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Dear Guests…

Welcome to the 14th International Educational Technology Conference; IETC-2014, Chicago- USA. "The International Educational Technology Conference (IETC)" is an international educational activity for academics, teachers and educators. IETC promotes development and dissemination of theoretical knowledge, conceptual research, and professional knowledge through conference activities, proceeding books, and the Turkish Online Journal of Educational Technology (TOJET). Its focus is on sharing, creating and disseminating knowledge among academicians, school administrators and teachers about the use of instructional technology for learning and teaching in educational field. This conference is now a well-known educational technology event worldwide and the number of paper submissions and attendees are increasing every year. This year, IETC-2014 is held in Chicago and will last three days. The first day is devoted to keynote presentations. We have many keynote speakers including Prof. Dr. Durmuş GUNAY and Prof. Dr. Buket AKKOYUNLU from Turkey, Prof. Dr. Saedah SIRAJ from Malaysia, Prof. Dr. Steve HARMON, Prof. Dr. J. Ana DONALDSON, Prof. Dr. J. Michael SPECTOR, Prof. Dr. Theresa J. FRANKLIN, Prof. Dr. Kay A. PERSICHITTE, Prof. Dr. Sharon SMALDINO from the USA. They will share their knowledge, research and experiences with us and talk about the recent developments in the field of educational technology. On the second and third days, conference participants from all over the world will present their academic works, research and classroom practices about educational technology.

I hope that we will meet again at the 15th International Educational Technology Conference - IETC-2015 which will be a combined academic event with IRSEM, International Research Symposium on E-Learning and New Media organized by AECT on May, 2015 in Istanbul, TURKEY.

Thank you for your participations and contributions for the success of this conference.

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Nature of Higher Education, and Recent Developments and Tendencies In Turkish Higher Education

Prof.Dr. Durmuş Günay

Councel of Higher Education - TURKEY



Technology and the Future of Learning

Prof. Dr. Steve Harmon

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Georgia State University - USA



Through the Kaleidoscope Perspectives on e-Learning

Prof. Dr. J. Ana Donaldson

AECT Former President - USA



Balancing Relatively Stable Educational Goals with Rapidly Changing Educational Technologies

Prof. Dr. J. Michael SPECTOR
University of North Texas, USA

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Information literate lives in the 21st Century: Information Literacy for the Net Generation

Prof. Dr. Buket AKKOYUNLU
Hacettepe University, Turkey



Embracing the Future: Empowering 21st Century Learners

Prof. Dr. Theresa J. Franklin
Ohio University, USA



Evaluation Innovation: Fuzzy Delphi in Evaluating Education Design

Prof. Dr. Saedah SIRAJ
University of Malaya, Malaysia



Breaking the Curse: Teaching As We Were Taught

Prof. Dr. Kay A. Persichitte
University of Wyoming
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Instructional Design in the 21st Century

Prof. Dr. Sharon Smaldino
Northern Illinois University

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A critical look at the digital technologies in architectural education: when, where, and how?

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Abstract

In the past decade, architectural education has seen an increasing amount of digital technologies being involved in the design studio curricula. Following the trends in the profession, these various technologies of computer aided drafting, enumerating, modeling, and analysis became not only key pedagogical nodes in the design studio, but also started to shape the overall curricular structure of architectural education as they also needed to be implemented as support courses in order to compensate the learning curves and the number of software available to architects. These digital technologies range from one end of simple drafting, conventional three dimensional modeling, and more sophisticated animation of buildings with a computer, to the other end of inventing new tectonic and spatial geometries using parametric computations. In this context, it will be unrealistic to argue against teaching and using digital technologies in architectural education. When one thinks how the profession has evolved in the past decade, it is necessary to embrace these tools in the architectural curriculum. However, a discussion that has not been clearly resolved is when, where, and how these digital tools are thought and used in the architectural education. My paper argues that the conventional tools of hand drawing, physical modeling, and hand making should be embraced in the foundational levels, and the digital tools should be introduced after developing a certain set of skills of one-to-one physical making where a sense of tectonic resolution, scale, and spatial experience is cultivated as a basis of architectural thinking with digital tools. In what follows, I will discuss this viewpoint through examples from architectural design studio education in the United States and in Turkey.

Keywords: architectural pedagogy; architectural design; digital architecture; CAD; CAM; computational design; architectural design studio; architectural drawing; architectural modeling; architectural thinking; architectural geometry

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1. Three schools, three practices

I will discuss the use of digital tools in the architectural education by focusing on three universities. Two of these universities are in the United States and one in Turkey and all three programs are accredited professional degree programs. I will first introduce the general structures of the schools, and discuss the approaches to the digital tools in the context of overall curriculum and design teaching attitudes. I believe a proper understanding of the general design pedagogies of the schools is an important part of when, where, and how the digital tools are implemented in the architectural education as a normative curricular question.

1.1. Background

School A is a 4+2 professional program in the United States. There are 8 undergraduate studios, 3 graduate studios, and a thesis semester. Digital tools start at the 3rd year of the undergraduate program, usually second term, and the rest of the program heavily uses digital technologies in the studios. Drawing and modeling programs are taught as a separate required one semester support course in the 2nd year, before the students start using these in the architectural design studios. However, the digital course uses projects from the 2nd year studios as base for its assignments.

School B is a 2 year professional graduate program in the United States, with also a 2 year core program that accepts students with other majors. There are 6 studios, and 2 semesters of thesis. Digital tools start in the 1st year of the graduate program, or the 3rd year of core program, usually the first term. So, there are only two design studios that use digital production and incorporation into thesis depends on the par-

ticular student. Digital tools are taught as elective courses, and there are no required courses. Depending on if and when the student chooses to take the digital elective, studio projects may be used as basis for the digital course assignments.

School C is a 4 year undergraduate program in Turkey. There is a masters program, however, due to professional licensing requirements in Turkey, the masters program does not count towards professional credit. There are total 8 studios that count towards professional credit. The digital tools are introduced in the 1st year and the rest of the program heavily relies on digital production and presentation in the studio. Drawing and modeling software are taught in required support courses in two semesters in the first year of the program along with the graphic component of the design studios.

2. Curricular structures and approaches to architectural design teaching

Despite the difference in number of design studios, School A and B follow similar approaches in design teaching. The first foundational studios emphasize hands-on making in different media, from hand drawings and sketching to physical models. Both schools structure these foundational studios around a concept of making that takes the product as a one-to-one scale made object rather than representing an architectural construct on the world in another scale. Therefore, the early studios aim at establishing a sense of tectonic making and seeing space in one-to-one crafted constructs even before they can be called architecture in the general sense of the term indicating habitable structures. Designing habitable structures, or the notion of building, is introduced gradually towards the second year and third year of education. The first year's assignments focus on ideas of space making and tectonic construction in volumetric and expanded conditions, introducing concepts of internal scale, joint resolutions, hierarchy, repetition, movement, and iterative relations between elements, materials, and spatial and tectonic moments, without making these part of a broader notion of building. Thus, a fundamental sense of spatio-temporal experience is cultivated through hands-on, one-to-one making, laying the ground for the basic strategies of controlling and managing the complexity of architectural space. The transition from these tectonic and spatial constructs to designing habitable structures and buildings takes place with the introduction of design problems that address questions of experience, movement, sight, light, and sense of enclosure relative to human scale in the form of fragments rather than full programmed buildings. The advantage of introducing architectural typologies and fragments as design questions is that the students transition from spatial and tectonic constructs to constructs that house human body much efficiently and steadily, being able to think about architectural experience with only focusing on certain aspects of it rather than tackling the problem in the complexity of a building. The result of these transitional assignments follow the complexity of the one-to-one constructs, carrying the knowledge of space and tectonics acquired, and thus a rich sense of architectural experience. In this way, the architectural typologies, or fragments, like door, window, stair, etc. become problems of boundary, threshold, movement, visibility, scales of enclosure, etc., parameters of spatio-temporal experience, rather than given known elements. Thus, along with a highly developed sense of space, tectonics, and experience, architectural design and making becomes a process of inquiry into the domain of lived human experience.

School C introduces a notion of basic design in the first semester, gradually going towards habitable space and even to the questions of interventions and context immediately in the second semester. This basic design approach follows the Bauhaus pedagogy of making things as discussions on basics of geometry in two and gradually three dimensional systemic constructs. Even if this basic design approach sounds similar to what Schools A and B introduce in the foundational studios, the main difference is the basic design approach takes the systems as ends in themselves and does not address the questions of space and tectonics as rigorously as the foundational design approach. (Please see Angelil 2003 and Franzen 1999 for further discussion of systemic versus spatial and tectonic making.) Typically the basic design starts with two dimensional graphic exercises that concern pattern relations, rhythm, hierarchy, in an elemental system. Then these get extruded in relief studies, gradually unfolding into three dimensional constructs. Similar to foundational design approach, the products at this level are one-to-one makings without a scale relative to human body or habitation. However, the questions that these systemic constructs focus are the elemental relations that iterate onto each other, thus the systemic resolution takes the priority as an end in itself rather than giving way to discussions of spatiality as a key concern. While a systemic construct can be deemed successful in terms numerical proportion and rhythm relations between its elements, it may

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not necessarily result in a successful spatial system if the elemental relations are controlled by iterative steps or numerical hierarchy rather than the space formulated and constructed as a relation between these systemic elements. These more pattern oriented two and three dimensional studies unfold into a larger scale site comprehension study with a system of interventions on a usually chosen real site. While there is a strong connection between pattern studies and large scale site operations, because the complexity of initial pattern studies fall short of addressing phenomenal experience in terms of tectonic and spatial resolution, the lessons of the pattern studies do not carry into the architectural scale required by the site assignments. Similarly, the basic design skills acquired in the first semester, gradually fall back into a more conventional architectural making as the program advances in the later years. Typically, the second year immediately starts to address questions of buildings and sites in small scale, and then the later years increase the level of complexity of building programs and scales of site operations.

3. Digital tools in the curricula

Schools A and B start to use digital tools in the studio only after establishing a very strong background of hand making in drawing and physical models, and only when the program starts to address buildings in the complex sense of a given architectural program on a given site. Because the students already cultivated the skills of thinking and making space with a strong sense of tectonic resolution, the digital tools can be utilized in their full potential from establishing difficult geometries to representing speculations of architectural experience in two and three dimensional digital constructs. The two schools differ in that School A teaches digital tools as a required support course in the second year of the 4+2 curriculum and School B only teaches in elective courses. While the digital course in School A uses the second year design studio projects as assignments, it is not before the third year the digital tools are used in the architectural design studio as part of the process and presentation of an architectural problem. School B requires digital tools in the third year of the Core program, or the first year of the Graduate program. In terms of production efficiency and the strength and variety of process and presentational techniques, the level of digital incorporation in the studio does not differ recognizably between the two schools. This shows that teaching digital tools as a required support course vs. electives, or even workshops, does not make a difference in the overall success of integration of digital tools in the design studio. Students learn the tools when they need them in the studio more efficiently than as a separate course. Because the assignments in the separate support courses tend to focus on the basics of drawing or modeling with software, these tools do not find their full potential before the students use them as tools of thinking and presentation for complex design problems they encounter in the architectural design studio. While the learning curves for each software vary, and there are a number of different software to learn, they usually share a basic common ground in vector and surface based operations, and each software start to show its strengths and weaknesses when applied on real time design problems. Thus, each student, regardless of what they can do with digital tools before they start to use them in the architectural design studio, starts to develop her/his own set of digital tools and techniques through working with them on particular design problems, and refine their skills through various process and presentational challenges they face in the design studio. Even if some students do not have much knowledge of digital tools, in a few weeks they start to use the tools without the learning curve becoming a hindrance for the design process. Also, when they learn the tools while applying them in the studio, the knowledge becomes much more permanent. This is indeed not very different from a professional office environment, where particular software are learned on the job through particular applications.

School C starts to use digital tools in the very first year while also teaching the basic software at the same time as a separate support class. The software production becomes part of the design process and presentation very early on. While most of the students show a recognizable skill set in using the particular software they are taught, because the production in the studio favors digital over manual making, this skill set remains limited to particular problems and software. When digital production takes over early on in the studio, the spatial and tectonic knowledge that comes from hands-on making does not find its full potential in the studio. Because the digital tools immediately come with the filter of a screen or print out, thus delayed results, there are certain shortcomings in the comprehension of the notion of internal and relative scale which then result in a lack of tectonic resolution and spatial refinement. This is not exclusively the problem of introducing the digital tools early on, but it is a result of not cultivating enough the

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manual tools of thinking and making space. There is an immediate feedback in manual labor which controls the perception of the maker, and results in the development of an internalized sense of spatio-temporal experience. Through the filter of digital tools, this development becomes hindered. Because a distinct knowledge of space making is not developed outside the digital realm, the students also become heavily dependent upon certain software and their limitations. Likewise. because they do not have the broader conception of space making and its possibilities, they stick to what they know they can do through particular digital tools. This also limits the free flow between different digital tools, and more importantly between digital and manual tools, that is very prominent in the student work of Schools A and B. This free and transparent flow between digital and manual media is a much emphasized point in the discussions of design process and the use of manual versus digital tools. (Please see Pressman 2012, 101-103 and Yee 2013, 91-100 for further discussion on manual and digital tools integration in the design process.) Accordingly, the design process, which becomes a domain of inquiry in the Schools A and B, is reduced to more conventional ways of thinking about design problems and architecture. Thus, while an intention for architectural experimentation and exploration into the domain of human experience is visible in the work of the former schools, the work in School C tends to fall short of addressing more contemporary questions of space making as architectural research.

4. Discussion

For the past decade or two, architectural profession has seen an increasing amount of incorporation of digital tools in the thinking and making of space. New formal and structural geometries enabled by computational techniques become more and more prevalent. Also, the design and construction work flow become much transparent and smoother with the advent of integrated software environments. Within this context, these digital tools started to emerge in the architectural education as key components of general curricula and design teaching in particular. While it is inevitable that these digital tools are used more and more in the design studios, when, where, and how these tools are implemented in the curricular structure make a recognizable difference in not only whether the full potentials of these tools are utilized or not, but also in the way the future architects cultivate the necessary complex set of skills to deal with architectural challenges in today's and tomorrow's world. While the process and production in the profession moves toward digital environments -think for a moment that even the physical models are now mostly produced with CAM techniques- these tools still require an internalized knowledge of seeing, thinking, and making space which cannot be cultivated through digital environment alone. Thus the manual production, hands-on making of one-to-one drawings and models still form the core of architectural thinking, and must be kept as part of the foundational curriculum in the architectural education. It is only through a strong background of spatio-temporal experience and tectonic construction that these tools can find their full potentials as tools for thinking rather than just tools of limited making of preordained geometries. Hands-on making sets and calibrates an immediacy that digital tools cannot and cultivates a sense for space, scale, and possibilities of phenomenal experience that digital tools can express in their use but cannot cultivate in their applications. Architectural students who use digital tools in later years of architectural programs after being given a strong manual foundation can more efficiently move between manual and digital tools and between different digital tools, thus have advantage over students who are exposed to digital tools early in the architectural program as they have a more refined and broader set of tools to deal with the complexities of architectural challenges. With this understanding of tools and the variety available to them, they also have a better sense of architectural design process that establishes a domain of inquiry and formulation for various architectural problems beyond the determination of tools at hand which may even involve invention of hybrid tools between manual and digital or between various digital tools.

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A proposed conceptual framework in measuring social interaction and knowledge construction level in asynchronous forum among university students

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Abstract

This paper presents a conceptual framework of a study that aims to measure students' social interaction and knowledge construction in an asynchronous online forum. In order to acquire meaningful learning through online forum, the proposed framework is grounded on three theories, namely social constructivism, theory of online learning and connectivism theory. In addition, a combination of multi analysis techniques in analyzing the forum messages was proposed, which include content analysis, cluster analysis and social network analysis. This study intends to elucidate the proposed conceptual framework with particular emphasis on the advantages of applying each method of analysis.

Keywords: Asynchronous Forum; Content Analysis; Cluster Analysis; Social Network Analysis; Social Constructivism, Theory of Online Learning; Connectivism Theory

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1. Introduction

One of the most widely used asynchronous communication tools in online courses is discussion forums. Discussion forum can improve students' understanding (Balaji & Chakrabarti, 2010) and also increase students' grades (Khoshneshin, 2011). Even so, past studies showed the students' interaction level is still low, and forum is still not popular (Wise, Speer, Marbouti & Hsiao, 2012). To create quality interactive discussion, the students should read the existing messages in the forum before posting their messages (Wise, et al., 2012a). However, they are lack of knowledge to apply the proper procedures for sending messages in the forum. For instance, most students focused on selected forums only (Peters & Hewitt, 2010), resulting a deviation from the topic being discussed (Hou, Chang, Sung, 2007). There are also students who just read the messages and do not take part in the forum. In addition, a high level involvement by the instructor may reduce the students' interaction level as they feel less confident in stating their ideas (An, Shin, & Lim, 2009). Based on the existing literature, the authors aimed to develop a conceptual framework that highlights these problems as well as to propose ways to improve the students' interaction level and knowledge construction in online discussion forum.

2. Analysis

A combination of different methods of analysis is valuable as each analysis could provide different information on the subjects. Moreover, each approach has its own limitations which can be compensated for by using an alternative method in order to collect comprehensive findings. Therefore, this paper attempts to explore the advantages of combining three types of analysis in asynchronous forum.

2.1. Content analysis

Content analysis is an effective technique for researchers to get a better understanding of the cognitive processes and the quality of online learning (Gunawardena, Lowe & Anderson, 1997). Although there are many models of content analysis, but this study recommends the use of Interaction Analysis Model (IAM) by Gunawardena, et al., (1997). As this study is focusing on the participants' knowledge construction in an online forum, the IAM model is favorable to be used in collaborative and constructivist learning environment. According to Gunawardena, et al., (1997), the knowledge construction process involves several phases starting from a lower level to higher level comprises of (a) sharing/comparing information (phase 1), (b) exploration of dissonance (phase 2), (c) knowledge co-construction (phase 3), (d) testing/modification of co-construction (phase 4), and (e) agreement/application (phase 5). The IAM was developed to measure the quality rather than the quantity of interaction to determine students' involvement to change the understanding of the individual or to generate new knowledge (Gunawardena, et al., 1997).

2.2. Cluster analysis (listening behavior)

Listening behavior consists of when and how students interact in discussion forum (Wise, et al., 2012). Expressing opinions or contribution in online discussions is conceptualized as speaking while listening consists of reading the opinions and ideas from peers (Wise, Speer, Marbouti & Hsiao, 2011). Students' action or task with existing post in the online discussion is considered as their engagement in the forums. Listening behavior patterns can be classified according to six domains, namely, temporality, breadth, depth, speaking, reflection and final grade with 13 variables (Wise, 2012). This study employs Wise's taxonomy involving four specific domains (temporality, breadth, depth, and speaking) and ten variables. Reflection domain is excluded in this study due to the limitation of the system used, while the final grade was also excluded due to the confidentiality of the students' grades.

Temporality domain involves four variables: average length of session, percentage of sessions with posting actions, average number of sessions per discussion and average number of reads before contributing a post. The breadth domain involves two variables: percentage of posts viewed at least ones and average number of views per discussion. The depth domain consists of one variable, i.e., the average length of time reading a post. Lastly, speaking domain involves three variables: the average number of posts contributed per discussion, average number of words per post and average length of time creating a post served. Cluster analysis was applied to determine the patterns of online listening behavior for every student according to their level of interaction in asynchronous discussion forums. The outcome of this analysis will suggest clusters with several patterns of listening behaviors among the participants in the online forum.

2.3. Social network analysis

According to Vercellone-Smith, Jablokow and Friedel (2012), Social Network Analysis (SNA) is a tool that can be used to assess the overall pattern of social interaction and information exchange that takes place in the overall discussion forum. Besides that, it could identify at-risk students in the class (MacFadyen & Dawson, 2010), and provide a visual representation of students' learning task (Dawson, Bakharia, Heathcote, 2010). Social network analysis can provide visual information such as strong or weak ties in the network. This will provide us with the information about potential high achievers or low-performing students in the class. An early identification of these students will allow the instructor to further encourage or to find a solution to help these students.

Betweenness centrality, closeness centrality, degree centrality and density are the variables used in SNA to analyze the social level of interaction among students in the online forum (Vercellone-Smith, et al., 2012). In SNA, the participants are 'nodes' and the connections (links) among the nodes pictured with arrowed lines. SNA can identify the participants in the network and the role played by them with regard to the degree centrality, closeness centrality, and betweenness centrality. These measurements provide the individuals' behavior information in the network, for instance; (a) a measure of distance from other participants (closeness centrality), (b) have more direct contact with other participants (degree centrality), or (c) found in a rewarding position, between other participants (betweenness centrality) (Hanneman, 2001). To gain this information, a software known as SNAPP developed by Dawson, et al., (2010), can be utilized.

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In this paper, SNA will be used to analyze students' engagement and social level of interaction in asynchronous discussion forums by categorizing them accordingly as active or passive participants. A participant is considered active if the participation rate is in the third quartile (upper quartile) and he/she is considered passive if the participation level is in the first quartile (lower quartile) (Lipponen et al., 2001). Consistently, students' participation level is considered high when their involvement for each activity (responses/post) are located at the third quartile and is considered low if located on the first quartile. A student is considered as a bridging participant if his/her value of betweenness centrality is located in the upper quartile of the group. Participants also considered the leader of information if the in-degree value is at the third quartile in the group. A student is identified as at-risk participant when the in-degree or out-degree value is located at lower quartile in the forum. Participants also identified as isolated participants if they have zero in-degree value.

- Degree Centrality
  Degree Centrality is used to evaluate network connectivity. This information can be found by measuring in-degree and out-degree - the number of a student's connection (links) with the other participants. In-degree centrality means the relation of a participant when received messages from others. Out-degree centrality means a participant sent messages to others. A participant is identified as more active in spreading information, opinion, comment or discussion if the value of out-degree centrality is high. In other words, it means the particular participant is influential in the network and popular. A leader of information is often associated with the high centrality (Brass, 1992), while the isolated participants are the those who may not have contact with peers (McDonald, Stuckey, Noakes & Nyrop, 2005).
- Closeness Centrality
  The closeness centrality is the individual's close position with others in the network. Nodes with high closeness centrality are participants closely with the others in the network. They can access all other nodes in the network easily. Students with high closeness values interact with others faster and often effective in transferring information. They also no longer rely on others to reach all participants in the network. Conversely, when a student has a low closeness value, but with the high central, he/she can receive the information flow in the network quickly. The speed of information spread in the network depends on the link in the path traveled. These students gain more contacts easily, easy to interact with others and more prone to influence to perform a task.
- Betweenness Centrality
  Betweenness refers to the extent a node lies between other nodes in a network. Participant with high betweenness value is called bridging participant or mediator. These participants can control the flow of information between students. A node with a high betweenness value regarded as a leader by other participants in the network (Mullen & Salas, 1991) as they help to coordinate the tasks and information flow in the network. If a network has an average high betweenness value, this shows there are mediators of information exist in the network.
- Eigenvector Centrality
  Eigenvector is to measure participants communication with active or passive participants in the group. If the eigenvector centrality is located on the third quartile in the group, it indicates that the participant tends to interact with active members. Conversely, if the eigenvector centrality is in the first quartile, it show that the participant tends to interact with students who are not active.
- Density
  Density is used to show student involvement in the network as a whole. As the density value of a network is 100%, this shows all students communicate with one another. Conversely, if the density is 0, meaning the network does not have any communication or contact among participants. In this study, participants are considered to interact at a high level or connected to each other if they have a high density of more than 75%.
- Direction of Interaction
  Direction of interaction indicates to whom a participant's response to in a discussion forum. It is shown by the arrows in a network diagram. There are two types of interaction direction: unidirectional and reciprocal interaction.

3. Theories

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The next section will discuss the three theories (social constructivism, theory of online learning and connectivism theory) that form the base of this study's framework.

3.1. Social constructivism

Social Constructivism provides solid theoretical foundation in providing guidelines for contrive discussion to enhance learning. Social interaction among participants in the learning context is seen as the primary source of cognitive and social development. This theory provides a deeper understanding on how a student acquires knowledge by interacting with a knowledgeable someone actively. Vygotsky (1978) introduced the concept of Zone of Proximal Development (ZPD), which means the distance between the actual development and the level of potential development that can be achieved through adult guidance or in collaboration with a peer who is more knowledgeable. This ZPD can be achieved by using scaffolding in the form of encouragement, guidance or reminders to help and motivate students to complete a given task. Involvement and interaction of students in group discussions provide them with the opportunity to make generalizations and transfer their knowledge, to synthesize the ideas of others and build an understanding to facilitate learning. This theory also emphasizes the importance of feedback in order to help individuals construct their knowledge. Based on the social constructivism learning theory, this study proposes using asynchronous discussion forums with collaborative learning method to analyze students' knowledge construction level.

- Collaborative
  Collaborative refers to students who work in small groups to do activities that are shared with the same goal. According to Vygotsky (1978), individuals learn more effectively by using a collaborative learning method. Students build collaborative knowledge through an interactive process involving sharing, consultation and modification of information (Gunawardena, et al., 1997). Through feedback, interaction and scaffolding, students will be able to build new knowledge. In this study, students are expected to actively construct meaning based on their existing knowledge and experience due to interactions in the online forum. From the perspective of social constuctivist, learning is a social activity that involves the construction of shared knowledge.

- Theory of online learning
  Theory of online learning refers to the preparation of learning in an online environment where interaction is the basic element of this theory. This theory was proposed by Terry Anderson (2004), who emphasizes that an effective learning environment should involve interaction between three macro components, namely students, instructors and content. This interaction will develop individual learning experiences on a deep level of new knowledge construction (Anderson, 2004). As such, Anderson (2003) argues that a deep and meaningful interactions will occur as long as one of the three forms of interaction (students to instructors, student to student or student to the content) exists at a high level. This study focuses on dialogue and discussion in an asynchronous discussion conducted in a hybrid learning environment. Similarly, six types of interactions, recommended by Anderson and Garrison (1998) can be simply applied in an asynchronous discussion forum environment. Multilateral interaction directly affects the meaningful learning occur through a collaborative approach in exchanging knowledge. The three most interactions in asynchronous discussion forum inclusive of; (a) student-instructor (involve dialogue and feedback), (b) student-student (involve the exchange of ideas, information and dialogue among peers, using collaborative approach) and (c) students-content (i.e., learning contents, course materials). Essentially, in online environment, all interactions, including interaction with content, peers and instructors occur through the interface (in this case: the computer). In summary, this online learning theory emphasizes on an interactive learning in order to achieve meaningful learning using a collaborative approach. Asynchronous discussion forums can provide opportunities for students to interact with contents (simulation of cognitive), instructors (support and enhance learning) and student to student (social interaction) in achieving learning outcomes.

3.2. Connectivism theory

Connectivism theory means network-based learning. George Siemens is the founder of the Connectivism theory and introduced it as a learning theory for the digital age (Siemens, 2004). Based on this theory, the learning process involves cognitive and affective domains. Connectivism emphasizes two important skills in the learning process is the ability to find the latest information and filter the information. Along this line, sharing knowledge is a vital component of this theory. It is important for the

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node to identify the resources that are reliable, and distinguish important information to create critical thinking. At the same time, the accuracy and validity of the information may also change. This theory allows students to gain experience of active learning by finding, presenting, analyzing, evaluating and making sense of relevant knowledge and geared towards meaningful learning. Students play an important role in determining the content of learning, communication and participation. The ability of students to see the relationship between a particular field, idea and concept is the basic skills (Siemens, 2008). The activity in forum allows students to share their knowledge in the process of finding and acquiring new information that can be trusted as well as determine the links that allow them to gain experience of active learning. Overall, connectivism allows students and teachers to access the latest information as well as to provide meaningful learning opportunities.

4. Conceptual framework

Conceptual Framework (Figure 1) is grounded on social constructivist learning theory. Two additional theories supporting this study are theory of online learning and Connectivism. In order for meaningful discussion to occur, an interactive interaction should take place in a constructivist learning environment. In addition, based on social constructivist learning theory, asynchronous discussion forum using collaborative approach is proposed in this study. This forum is conducted using an online learning facility in hybrid mode and supported by the theory of online learning. Theory of online learning emphasizes interaction and the computer interface acts as mediator for communication to occur between peers, instructor and content. Principles of connectivism are applied by the students in order to produce meaningful learning. To collect a comprehensive data on students' engagement and also on knowledge construction, three methods of analysis are proposed in this study: (i) content analysis, (ii) listening behavior (categorization of students according to their level of interaction) and (iii) social network analysis (SNA). This study also attempts to examine the correlation between the level of knowledge construction and social network, for instance between centrality and the knowledge level. Consistently, Gunawardena et al., (1997) claimed that high level of interaction will produce a high level of knowledge construction as well.



5. Contribution to knowledge

This framework has also made some contributions to the knowledge about online discussion forums.

- The main contribution of this study, is perhaps the multiple analyses in order to obtain comprehensive and extended information on students' engagement and knowledge construction. This study has proposed three methods of analysis on the forum content, namely, content analysis, cluster analysis and social network analysis. It is hoped that this suggestion will contribute to the online discussion literature.
- Cluster analysis on the patterns of listening behavior proposed by Wise (2012) is not widely used. Thus, the authors suggest this analysis to be used in evaluating the students' interaction level. This method can assist the instructor in identifying the types/clusters of students in order to facilitate teaching and learning using online discussion (especially to increase their levels of interaction and knowledge construction).
- Next, the combination of three theories (social constructivism, theory of online learning, Connectivism theory) that formed the theoretical proposal will contribute to the online discussion literature.
- Thus, this study provides a conceptual framework for further studies, especially for future research in online learning environment.

6. Conclusion

Realizing the importance of social interaction in producing higher knowledge construction, enhancement on students' achievement and producing critical thinkers, this study attempts to innovate a conceptual framework. The results of this study are expected to increase knowledge construction and interaction levels using a collaborative approach. Therefore, learning can be most effective when appropriate methods are applied to achieve its goal. This conceptual framework may aid and contribute as an alternative approach to instructors in monitoring the students' engagement and social interaction level. The proposed conceptual framework may benefit higher institutions.

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A replication study on the multi-dimensionality of online social presence

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Abstract

The purpose of the present study is to conduct an external replication into the multi-dimensionality of social presence as measured by the Computer-Mediated Communication Questionnaire (Tu, 2005). Online social presence is one of the more important constructs for determining the level of interaction and effectiveness of learning in an online environment. This study is unique as it provides the opportunity to replicate previous research on the dimensionality of the instrument and offers insight as to the nature of social presence among students enrolled in higher education postgraduate online courses.

Keywords: replication analysis, social presence, online learning

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1. Introduction

To frame good pedagogical practices for online learning, Garrison, Anderson, and Archer (2000) developed the community of inquiry model recognizing the transactional relationship between instructors and learners through the interaction of cognitive presence (of the learner), teaching presence (i.e. the structure and process), and social presence (i.e. affective interpersonal communication). According to Garrison et al. (2000), these elements, which define the community of inquiry model, are fundamental to a successful higher education learning experience. A key component in the model is the concept of social presence that refers to the affective domain as it relates to interpersonal communications. If social presence is absent, learner frustration develops because of the poor quality of interpersonal interactions (Rifkind, 1992). Conversely, a high degree of social presence in online learning is viewed as synonymous with an interactive environment (Lobry de Bruyn, 2004; McIssac & Gunawardena, 1996).

In assessing social presence within a text-based, asynchronous environment, three categories of communicative responses have been identified (Rourke**,** Anderson**,** Garrison**,** & Archer, 2001): affective indicators (i.e., values, beliefs, feelings, and emotions); cohesive indicators (i.e. group presence and commitment); and interactive indicators (i.e., attending in a socially meaningful way). Although Rourke et al. (2001) recognize that the coding and analyzing of CMC text-based transcripts using the aforementioned indicators provides a measure of the density of social presence, they also contend future exploratory studies including factor analysis would aid in further defining the construct.

The construct of social presence is the critical affective ingredient for online learning. Although earlier research on social presence has found it to be related to learner satisfaction (Gunawardena & Zittle, 1997) others such as Wise, Chang, Duffy and del Valle (2004) argue that it is more of a correlational than causal variable. Nevertheless, several researchers have demonstrated that social presence is one of the more important constructs to determine the level of interaction and effectiveness of learning in an online environment (Garrison et al., 2000; Gunawardena & Zittle, 1997; McIssac & Gunawardena, 1996; Lobry de Bruyn, 2004; Richardson & Swan, 2003; Rourke et al., 2001; Tu & McIssac, 2002). For example, Kim, Kwon, and Cho (2011) found that students who valued media integration, quality instruction and interactivity had increased social presence perception and heightened learning satisfaction While So and Brush (2008) demonstrated that in a distance learning environment, student perception and overall satisfaction of collaborative learning is associated with social presence (So, 2008).

Part of the difficulty in aggregating findings is the varying way that researchers have measured and reported social presence. For example, earlier efforts were found lacking because they were created for the face-to-face environment and then adapted to online learning without proper validation procedures. Recently, Sung and Mayer (2012) found a five-factor solution for the Online Social Presence Questionnaire that included social respect, social sharing, open mind, social identity, and intimacy. However, according to Sung and Mayer (2012) a limitation of their study is that it focused only on university students in Korea and consequently future research needs to examine if similar findings would be replicated in samples with different ages, genders, grades, intellectual levels, and cultural backgrounds.

Another instrument that has been developed to measure the construct, social presence, in a computer-mediated communication (CMC) environment is the Computer Mediated Communication Questionnaire (CMCQ; Tu 2005). The exploratory factor analysis of the CMCQ resulted in a four factor multi-dimensional model of online social presence (Tu & Yen, 2006). With the increased frequency of research reports using the CMCQ (Mykota & Duncan, 2007; So, 2008; So &, Brush, 2008; Stein & Wanstreet; 2003; Tu & McIssac; 2002; Tu & Yen, 2007) the need to explore the multidimensional characteristics of the instrument with different samples in varying contexts (i.e. replication analysis) is warranted so as to advance understanding of the construct's operationalization and interpretation.

Problematic to replication analysis are the lack of standardized metrics available to make informed comparisons of exploratory factor analysis (EFA) procedures conducted with separate data sets. Good EFA studies detail what might be expected for replication results. This can include the number of factors present, whether the factors are correlated or not, the factor loadings for the communalities that comprise the factor and the names of the factors as informed by substantive interpretation which includes the theoretical underpinnings for the factors identified (Osborne & Fitzpatrick, 2012). With the lack of standardized metrics, a similar procedure is advocated for EFA replication purposes whereby items are examined to see if they load to the same factors and if the individual item factor loadings are equivalent (Osborne & Fitzpatrick, 2012).

2. Purpose

With procedures for analysis having been reported in the literature and a basis for the interpretation of EFA replication data established it was decided to undertake a replication analysis. The main objective of the study then is to conduct an external replication (i.e. an independent external sample) of the CMCQ (Tu, 2005) using the same EFA procedures as previously reported by Tu and Yen (2006). By doing so a better understanding of the instrument's (CMCQ; Tu, 2005) generalizability will occur while adding to the extant research on the measurement of the construct social presence in an online learning environment.

3. Method

The participant sample is derived from students enrolled in the postgraduate special education program offered at the University of Saskatchewan. The postgraduate program is comprised of 9 courses that are delivered over two years. Using convenience sampling, 275 students (90% response rate) enrolled in the postgraduate program participated in the study. Participants in the study voluntarily completed the computer-mediated communication questionnaire (CMCQ; Tu, 2005). The sentence stems on the CMCQ were used to identify social presence in a text-based system with the CMC tools (email, discussion, and chat) The respondent was asked to complete each of the instrument's 24 items on the basis of a five-point Likert scale converted to a numerical weighting ranging in options from 0 (uncertain); 1 (strongly disagree); 2 (disagree); 3 (agree); and 4 (strongly agree). The frequency counts for the demographic variables age, sex, and numbers of online classes taken are reported in Table 1.

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Table 1. Frequency Demographics, N=275

	Frequency	Percent
Sex		
Male	20	8.3
Female	254	91.7
Age		
18-25	39	14.1
26-33	95	34.3
34-41	84	30.3
42 or older	59	21.3
Number of Online Courses		
1 course	113	40.8
2-3 courses	78	28.2
4 or more courses	86	31.0

To determine the adequacy of the sample for factorial analysis the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (i.e. KMO) and Bartlett's Test of Sphericity were calculated. The replication analysis of the CMCQ's multidimensionality also included a reliability analysis of the instrument's items. A visual inspection of the corrected item total correlations for the CMCQ was conducted with items below .10 deemed as outlier test items with a Cronbach alpha reliability coefficient value equal to or above .70 considered to reflect a high internal consistency. Following the procedures previously reported by Tu and Yen (2006) a principal components analysis with varimax orthogonal rotation was conducted on those items deemed to reflect high internal consistency. Subsequent to the orthogonal rotation a principal axis factor analysis using a promax oblique rotation was undertaken. In determining what factors were to be retained a two-line scree test of those the factors with eigen values >1 was applied. The methods described for the exploratory factor analysis replicates the methods of the initial validation study conducted (Tu & Yen, 2006). By following the same procedure undertaken by Tu and Yen (2006) a comparative analysis of whether the same factor structure with equivalent factor loadings and item communalities of the CMCQ can occur. The methods outlined are consistent with procedural aspects of replication analysis as reported by Osborne and Fitzpatrick (2012). As an external replication of the previously reported EFA undertaken (Tu & Yen, 2006) the present study adds value as it aids in determining the degree to which the CMCQ factor structure generalizes to a new data set and if there are any items considered challenging or problematic.

4. Results

A reliability analysis for the instrument (i.e. 24 items) was conducted with two items deemed as outliers and removed (i.e. items 4 & 19), see Table 2. The 22 remaining items reflected relatively high internal consistency with a Cronbach alpha reliability coefficient calculated at .732. In determining the appropriateness of conducting a factor analysis the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity were calculated (Tabachnick & Fidell, 2007). For the data the KMO statistic is between .7 and .8 (i.e. .734) which is deemed as being good, this indicates the sample should be adequate for the conducting of a factor analysis (Hutcheson & Sofroniou, 1999). Bartlett's Test of Sphericity tests the null hypothesis that the correlation matrix is an identity matrix, which implies the variables are uncorrelated. In this case, Bartlett's Test of Sphericity was significant (χ^2 (754) = 231 p < .05) which leads to the

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rejection of the null hypothesis and to the conclusion that there are correlations in the data set and that the data is appropriate for the conducting of a factor analysis.

Table 2. Item-Total Statistics

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
q1	46.6606	87.463	.345	.719
q2	46.8358	89.588	.201	.728
q3	47.3321	86.977	.279	.723
q5	47.2226	87.221	.233	.727
q6	47.9343	86.897	.266	.724
q7	46.9088	88.464	.254	.724
q8	46.7482	89.237	.251	.725
q9	47.4197	85.285	.318	.719
q10	47.2080	85.374	.401	.714
q11	47.2810	82.086	.466	.706
q12	47.0620	85.912	.356	.717
q13	47.2847	88.842	.226	.726
q14	47.5328	85.700	.288	.722
q15	46.9197	85.788	.357	.717
q16	47.5328	88.067	.252	.725
q17	47.3905	87.748	.295	.722
q18	47.8978	88.671	.176	.731
q20	47.7263	85.328	.333	.718
q21	46.8686	89.052	.267	.724
q22	46.3102	91.021	.172	.729
q23	46.8029	85.023	.389	.714
q24	48.0073	88.601	.145	.736

Like the initial EFA validation study conducted by Tu and Yen (2006), a principal components analysis with varimax orthogonal rotation was used to explore the underlying factor structure. Using the Kaiser criterion the first stage of the analysis identified seven components with eigen values greater than 1. In total these components accounted for 51.4% of the variance in the test items. The five factor pattern that best met the criteria of simple structure (Thurstone, 1947) and was clearly interpretable, and in this instance replicable as reported in the previous EFA (Tu & Yen, 2006), was retained. In the rotated component matrix the five components were well defined by 3-4 test items that had high loadings (≥.320) on only one component with those items that did not have a high loading on any one component or loaded across components excluded, see Table 3.

In the previous EFA with the CMCQ (Tu & Yen, 2006) a promax oblique rotation was also conducted because aspects of the multidimensional construct social presence as measured by the CMCQ were correlated. For the second phase of the EFA replication analysis, a similar procedure was adopted to determine the degree of correlation between the factors. In the principal axis factoring analysis using a promax oblique rotation, seven factors with eigen values greater than 1 were extracted accounting for 51.4% of the variance. A process similar to that used for the identification of a simple structure that is clearly inter-

pretable and replicable resulted in a five-component solution being retained. In the original EFA conducted by Tu and Yen (2006) the structure matrix was used for interpreting the oblique rotation. The structure matrix is a simple correlation of the variables with the factors. Following the procedures conducted in the original EFA, items with correlations ≥.320 for a factor and not correlated with another factor were retained see Table 4.

Table 3. Principal Component Analysis Rotated Component Matrix

	Component				
Item	1	2	3	4	5
q7	.745			-.121	
q10	.654		.215		
q1	.559			.157	.101
q15	.539	-.144		.276	.160
q18		.770	-.106		.128
q14		.648	.211		.116
q24		.606		-.106	
q9	.293	.470	.131	.333	-.144
q3			.655		
q11	.266	.143	.636	.138	
q12	.236		.492		.381
q8	.152	.124	.489		
q16	.161	-.157		.754	
q20			.176	.609	.150
q6		.129		513	
q22	.				.811
q23	.205	.253	.167		.636
q13			.189		.598
q2	.344		-.264		.229
q17	.134	.145	.217	.240	-.171
q5		.110		.207	
q21	.158			.247	.214

Table 4. Principal Axis Factor Analysis Structure Matrix

	Factor				
Item	1	2	3	4	5
q7	.698		.244	.109	.177
q1	.474		.322	.279	.235

q15	.412		.278	.270	.222
q18		.684			.194
q14	.119	.551	.311	.113	.236
q24		.396			
q11	.342	.167	.600	.217	.260
q3	.185		.464	.179	.150
q12	.297		.382	.157	.358
q17	.210	.139	.343	.288	
q8	.225	.147	.327	.164	.113
q21	.262	.131	.309	.268	.238
q10	.155		.292	.206	
q16	.216		.196	.624	.138
q20	.139	.116	.286	.453	.171
q6		.140	.287	.355	
q23	.375	.325	.390	.224	.658
q22		.121		.101	.571
q13	.502		.286	.230	.334
q9	.219	.349	.161	.252	
q5			.174	.202	
q2	.204		.138	.141	.135

Following the EFA procedures conducted by Tu and Yen (2006), both the item and factor loadings for the principal components analysis with varimax orthogonal rotation and the structure matrix for the principal axis factoring analysis using a promax oblique rotation were reported. In keeping with EFA replication practices (Osborne & Fitzpatrick, 2012) the factor structure and squared difference for item loadings on the factors for the orthogonal rotation and oblique rotation used in the original (Tu & Yen, 2006) and replication studies were compared. The factor structure and item loadings for the principal components analysis with varimax rotation are reported with the squared difference for item loadings determined, see Table 5. A similar procedure was used for the oblique rotation and is presented in Table 6.

Table 5. Principal Component Matrixes for CMCQ Factor Replication

	External Sample Factor Loadings					CMCQ Factor Loadings				
Item	F1	F2	F3	F4	F5	F1	F2	F3	F4	Squared Difference
q1	.559					.644				.007
q2										
q3			.655			.703				.002
q4								.516		
q5										
q6				.513						
q7	.745									
q8			.489				.369			.014

q9		.470								
q10	.654								.727	.005
q11			.636							
q12			.492							
q13					.598		.699			.010
q14		.648								
q15	.539									
q16				.754		.697				.003
q17										
q18		.770						.322		.201
q19										
q20				.609		.757				.022
q21										
q22					.811				.687	.015
q23					.636		.706			.005
q24		.606						.699		.009

Table 6. Principal Axis Factor Structure Matrixes for CMCQ Factor Replication

	External Sample Factor Loadings					CMCQ Factor Loadings				
Item	F1	F2	F3	F4	F5	F1	F2	F3	F4	Squared Difference
q1	.611					.523				.007
q2										
q3			.464			.604				.020
q4							.343			
q5										
q6				.355						
q7	.698									
q8			.327					.338		.000
q9										
q10									.612	
q11			.600							
q12			.382							
q13					.334			.616		.080
q14		.551								
q15	.412									
q16				.624		.740				.013
q17			.343							
q18		.684					.554			.017
q19										
q20				.453		.818				.133

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q21					
q22		.571		.621	.003
q23		.658	.546		.013
q24	.396		.392		.000

In the replication analysis the five factor solution was comprised of the Social Form of Communication, Privacy, Intimacy, Social Context, and Interactivity factors, see Table 7. The Social Form of Communication factor was realted to how CMC is viewed as a pleasant, social form of communication. The Privacy factor was related to the confidentiality of the CMC medium. The Intimacy factor describes the degree to which students express their personal stories and feelings. The Social Context factor realted to the ability of CMC to build trusting, caring, social relationships. Finally, the Interactivity factor related to one's CMC skill set and communication style.

Table 7. External Replication: Factors, Items, and Item Stems

Factor	Item	Item Stem
Social form of Communication	7	CMC is a pleasant means of communicating with others
	1	CMC are social forms of communication
	15	CMC allows realtionships to be based upon sharing and exchanging information
Privavcy	18	It is unlikely that someone might obtain personal information about you in CMC
	14	CMC is technically reliable (e.g. free from reliability errors).
	24	It is unlikely that someone might redirect your messages.
Intimacy	11	The language used to express oneself in CMC is meaningful
	3	CMC messages convey feeling and emotion
	12	The language used to express oneself in CMC is easily understood.
	17	The aggressive over-participation of others in CMC may cause to participate less.
Social Context	16	CMC allows me to build more caring and social relationships.
	20	CMC permits the building of trust relationships
	6	CMC is a sensitive means of communicating with others.
Interactivity	22	My keyboarding skills allow me to be comfortable participating in CMC.
	23	I am comfortable with the communication styles employed by CMC users.
	13	I am comfortable participating, even if not familiar with the topics.

5. Discussion

The external replication failed the most basic tenant of internal consistency reliability analysis with the determination of outlier test items (i.e. items 4 & 19). Nevertheless the reaming 22 items did meet the

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threshold for retention with the Cronbach alpha reliability coefficient deemed as moderately good and the sample determined to be appropriate for factor analysis.

In assessing the congruence of the factor matrixes presented it is clear that the communalities and item loadings for the factors do not meet structural equivalence in the strictest sense. Although the factor structure and pattern for item loadings across factors differs from the original EFA validation study conducted by Tu and Yen (2006) there are some similarities that are worthy noting. As such, there is some evidence that the Privacy, Social Context and Interactivity factors and item loadings have moderate item equivalency.

In both studies the Privacy factor was the second factor retained in the factor matrix. In the original EFA oblique rotation it accounted for 7.241 percent of the variance (Tu, 2005). In the replication analysis the amount of variance accounted for was slightly higher at 8.106 percent. Items 24 and 18 in both studies loaded above the .320 correlation with the squared difference for the item loadings being low. The Social Context factor (i.e. factor 1), in the original EFA, accounted for the most variance at 24.042 percent (Tu, 2005) whereas in the replication analysis the amount of variance explained was 5.625 percent. For comparative purposes in the original EFA items 1, 3,16, and 20 had item loadings that warranted retention. In the replication analysis the item loadings were mixed with 16 and 20 loading on the Social Context factor (i.e. factor 4), item 1 loading on the Social Communication factor (i.e. 1) and item 3 loading on the Intimacy factor (i.e. 3). In all instances the squared differences for the four items is low, however, only items 16 and 20 loaded on a single factor. The last remaining factor that exhibited moderate equivalency was the Interactivity factor. In the original EFA the Interactivity factor (i.e. factor 3) accounted for 6.839 percent of the variance (Tu, 2005) whereas in the replication analysis it accounted for 5.469 percent of the variance (i.e. factor 5). For comparative purposes two out of the three items from the original EFA loaded in the replication analysis. In this respect, items 13 and 23 had low squared differences whereas item 8 which loaded on the Interactivity factor in the original EFA validation did not in the replication analysis and instead had a relatively low item loading on Factor 3.

Further similarities between the original and replication EFA studies can be found among those items that did have component loadings above the absolute value. (i.e. .320). In this instance items 2, 5, 19 and 21 did not load on any communality in either study. Based then on the results of the replication analysis there is some evidence of moderate to low equivalency with the original EFA, however it would be erroneous to assume the strong structural equivalence exists. As to why this might have occurred it is important to understand that an EFA external replication analysis is specific to the context and sample from which the study originated. In the present replication analysis, limitations exist in the sample as it was drawn from those individuals who had little or no previous experience with online learning.

As well, the sample is from a different cultural context. In this respect, cultural mindset and native language communication patterns have been shown to shape computer mediated communication patterns (Yildiz, 2009). The degree of media integration in online learning has also been found to be a significant predictor of social presence (Kim, Kwon & Cho, 2011) and could be another possible explanation as to potential differences within the online programs from which the sample was drawn. Although the sample for the replication analysis is not heterogeneous in gender composition, research on the construct social presence has found that gender differences do not exist (Kim, Kwon & Cho, 2011; Tu, Yen & Blocher, 2011).

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6. Conclusion

In the external replication analysis convenience sampling was used, however, this is viewed as a limitation as it affects the generalizaibilty of the results. Future research should continue external replication of social presence instrumentation in varying contexts and with more systematic sampling procedures. As well, refinement of the item pool and item construction of the CMCQ might alleviate some of the issues surrounding structural equivalence and the generalization of findings.

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A school with iPad

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Abstract

The learning of science has always been a major obstacle for our Italian students. The cause is probably not to be found in the complexity of the content, but rather in the particular in which way learners are usually initiated in these subjects. The purpose of this study is to focus our attention on the possible positive effects that digital teaching aids can have on learning-related scientific disciplines. In fact, it is thought that the new digital tools can be a bridge between students' prerequisites and the teacher's, and ensure the achievement of objectives that do not concern only the content, but above all the means of achieving path to achieve them. In particular, we discuss an experience conducted at the Professional Institute "L. Scarambone "Lecce (in the South of Italy). With this brief research we will evaluate the effects on the development of the skills of logical and scientific tools online that foster the development of scientific content better than traditional teaching with the paper book.

Keywords: education; technology

1. Introduction

Italian students have always difficulties in scientific learning. The causes, of course, are many: the complexity of the issues, but also the unique approach by which the learners are usually introduced to these subjects. So far the only and almost exclusive tool for knowledge has always been the textbook, which has long been under surveillance on suspicion of its prevailing dogmatism and of its unecessary methods for the construction of scientific knowledge. Today, in contrast to the past, we have in addition to the traditional textbook, another resource, the digital one, on whose validity the debate is still very open. To my knowledge we have in fact, at present, no quantitative data on the possible positive effects of the use of computer tools used in the writing processes. But we could do some reflection and think about alternative teaching strategies, also pursuant to Article 11 of Law no. 221/2012 (and recently specified by Ministerial Decree of 27 September 2013 n. 781), which provides "per le nuove adozioni, a decorrere dalle scelte effettuate nell'anno scolastico 2013-2014, a valere per l'anno scolastico 2014-2015, libri di testo in una nuova versione digitale o mista (costituita da un testo in formato cartaceo e da contenuti digitali integrativi, oppure da una combinazione di contenuti digitali e digitali integrativi)" [for new adoptions, on the basis of the choices made during the school year 2013-2014, applicable to school year 2014-2015, textbooks in a new digital version or a mixture (consisting of a text in printed format and digital content supplements, or a combination of digital content and supplementary digital]. If the student was dropped in an immersive environment, i.e. in a class that makes use of digital technologies that stimulate multimodal perception, then he or she would actually acquire not only the best knowledge of scientific content - for which we have already done some research that has produced positive findings - but also best quality in written text. For this purpose, we present a small experiment carried out in Lecce - my own town in Italy, - offering results which, although still to be verified, given the paucity of available data, may reveal important clues about the different impact of the two strategies on the language skills acquired, which suggest an area for comparison studies and an opening towards the use of new technologies in teaching.

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2. The school

The "Luigi Scarambone" Vocational School in Lecce is a higher secondary education (average age 15-18). The school has about thousand students, mainly from disadvantaged backgrounds with a low level of aducational achievement. Some attend day and others evening courses. Precisely because of the lack of trust and willingness to study which is seen only as an obligation to be fulfilled, and not as an opportunity for personal growthand social redemption, in the school in question there is also a high level of non attendance, equal to 21.24% and of failure to gain any qualifications, 12.46%.

2.1. The i.School Project

Dario Cillo, the school principal, has a difficult environment to manage, as he said during the XVIIII GISCEL Conference (Group Intervention Study in the field of Education and Linguistics) "si è dato come *mission* quella di valorizzare la didattica laboratoriale come strumento prioritario per l'acquisizione di conoscenze e competenze. Il *learning by doing*, come avveniva nella bottega artigiana, è divenuto, anche nel quadro di discipline non propriamente laboratoriali, e grazie alla didattica digitale, la metodologia di base per l'Insegnamento/apprendimento, favorendo - attraverso la manualità, la manipolazione, l'uso multimediale dei sensi - il dialogo costante del "fare" con il "sapere"". [He said that his mission is to enhance teaching methodology, as a means for the acquisition of knowledge and skills. The *Learning by doing* method, as it happens in the artisan shop, has become, even in the context of disciplines which are not properly practical, and thanks to digital learning, the basic methodology for teaching / learning, encouraging - through the textbook: through handling - the multimedial use of the senses - the ongoing dialogue of "doing" with "knowledge".] (Cillo, Miglietta *in press*). The "L. Scarambone School was one of the first schools in Italy, from 2009, to adopt Classroom 2.0 (14 are planned by the end of 2014), and to experiment the use of tablets and wireless networks in education." (Cillo, Miglietta *in press*). The school, thus conceived, immerses each student in a motivating enviroment and equipped with various formats of computer: from desktop to tablet. While the textbooks are supported by self-produced digital texts, learning objects, specific apps, as well as handouts and books produced by the teachers and collected in a specific Learning Object Repository. As stated by principal Cillo "Sulla scia delle esperienze del *Future Classroom Lab* di *European Schoolnet* e del modello *TEAL (Technology-Enabled Active Learning)* proposto dal *MIT*, nonché dei primi esperimenti italiani di Aule 3.0, abbiamo realizzato la nostra Aula 3.1, riscoprendo ruolo e funzione del laboratorio come micro-rappresentazione di spazi aperti, mobili e componibili per la didattica digitale" [In the wake of the experiences of the Future Classroom Lab of European Schoolnet and the model TEAL (Technology-Enabled Active Learning) proposed by MIT, and the first experiments of Italian Classroom 3.0, we made our Classroom 3.1, rediscovering the role and function of the laboratory as a micro-representation of open spaces, with modular furniture for digital learning.

3. The experiment

In the experiment carried out in Scarambone Vocational School we took in consideration two 2nd grade classes. They were dealing with a unit of the science curriculum, related to the cardio-circulatory system: in one class, which we will call "class A", this was dealt with only the aid of the traditional textbook; in the other, "class B", however, the same topic was illustrated using the 3D *Heart Decide,* an iPad app. After a series of lectures given, by the same teacher for the same number of hours, each student in classes A and B was asked to produce an expository text about the cardio–vascular apparatus. Through comparative analysis of the texts produced in the two classes we were able to detect similarities and differences. For the study of the peculiarities of the projects we will focus mainly on the connectives, i.e. the yield of reformulations, oppositions, simplifications, conclusions, etc.. which are the focal points of a scientific text. We should stress, in fact, the difficulties that students encounter in the planning process of the text, due to the lack of competence in the introduction of new referents in the construction of logical relationships between concepts sometimes made by connections which are too far apart, or sometimes poorly reported or not reported at all.

Let us start with traits that best characterize the texts produced by the two classes under study. As already remarked by Steve Higgins in his *Does ICT Improve Learning and teaching in schools?* in a systematic survey conducted by Goldberg, Russell and Cook (2003), students who use computers when

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learning to write, are not only more motivated, but produce longer and better quality texts than those written by hand. And this is precisely what determines the gap between the texts of Classe A and B. The texts of the former were shorter - no more than half a page - not very precise and less detailed than those produced by class B, which were even two pages long and stringent and detailed in the description not only of the operation of blood circulation, but also of the organs involved in it. The texts of the class subjected to the bookish style, showed a lack of conceptual elaboration and contained empty phrases such as: "il cuore è uno degli organi più importanti" [The heart is one of the most important organs]; il cuore è formato da tessuto muscolare" [the heart is made up of muscular tissue]; " il cuore è un organo involontario; il cuore è un tessuto muscolare cardiaco striato"[the heart is an involuntary organ; the heart is a striated cardiac muscle tissue] that reproduce statements from the textbook. The texts of class B, however, were more original. Each started with different opening words, probably because they were the result of a personal re-elaboration of thought, freed from the written page.

- "La porta superiore del cuore si chiama atrio" ["The upper chamber of the heart is the atrium"]
- "Tutti noi per respirare abbiamo bisogno di ossigeno per respirare" ["To breathe we all need oxygen"]
- "I due vasi arrivano nella porta destra del cuore e la porta superiore detta atrio" ["The two vessels arrive in the heart's right chamber and the atrium's upper chamber"]

"L'ossigeno deve arrivare alle cellule per produrre energia (ATP) attraverso il sangue" ["Oxygen has to get to the cells to produce energy (ATP) [ATP: "Adenosine Triphosphate"] through the blood"]

In addition, in the texts of Class A, which made use only of the textbook, there were some gaps in the transition from small to large cardio-circulation: not always, in fact, thematic progression was respected. The hierarchy of topics was evaded and then logical consistency was also sacrificed. Instead, in the texts of class B, thematic progression was achieved in almost all cases and logical consistency respected. Another substantial difference is noted at the lexical level. In fact, while in Class A, vocabulary was limited and there was scarce use of adjectives, in the texts of Class B, as well as a general lexical richness, a vivid array adjectives was noted. For example, blood was characterized as ruby red, bright red, in Class B as opposed to dirty blood, oxygen-rich in Class A. Regarding the similarities, however, from the analysis of the texts available, it can be observed that the two classes presented, albeit at different levels, a deficit in the development, organization and grammaticalization of thought. Juxtapositions, fragmented syntax, a set of referents often embedded in a text that was not very consistent and orderly, are traits that are common to the designs of both classes. In particular, in those of Class A, syntax was extremely elementary and proceeded predominantly by juxtaposition, or by parataxis with only a few subordinate clauses. It follows that those who Prandi and De Santis (2011: 250) define as *referenti* [referents] and *processi* [processes], factors which require cohesive ties, were sometimes, if not often, rendered in a disjointed and disconnected textual structure. In Class B, despite the disjointed structure, one began, however, to glimpse a timid emergence of a more complex syntactic structure, characterized by final, causal and temporal relative clauses. In addition, there was a more frequent use of connectives that indeed have great importance in scientific texts, as they create unity and cohesion within the text and make explicit the logical-semantic relationships between parts of the text.

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4. Connectives

In all the texts analyzed we found:

a) explanatory conjunctions:

- "Il cuore è un muscolo costituito da un tessuto muscolare cardiaco involontario, ed è diviso in quattro cavità (parti) cioè: ventricolo destro, ventricolo sinistro, atrio destro e atrio sinistro" (classe A)[2] ["The heart is a muscle consists of an involuntary cardiac muscle tissue, and is divided into four chambers, that is: the right ventricle, the left ventricle, the right atrium and the left atrium"]

- "Il cuore è un muscolo volontario. È costituito da due ventricoli cioè destro e sinistro" (classe B) ["The heart is a voluntary muscle. It consists of two ventricles i. e. left and right "]

Notice how in the first fragment that cioè ["that is"] is redundant, since it precedes a colon that, at the textual level, performs the same function.

b) adverbs of time, usually the common, 'poi' ["then"], for sequences of events:

- "[..] e le vene riportano il sangue pieno di anidrite[3] (SIC!) carbonica e di sostanze di rifiuto al cuore che poi pompa il sangue verso i polmoni per farlo ricaricare di ossigeno." (classe A) ["…and veins carry the blood filled with carbon dioxide and waste products, back to the heart that then pumps it to the lungs to make it recharge with oxygen."]

- "La circolazione del sangue parte dal cuore che attraverso le arterie porta il sangue ricco di ossigeno e di sostanze nutritive alla cellula del nostro corpo e le vene riportano il sangue pieno di anidrite (SIC!) carbonica e di rifiuto al cuore che poi pompa il sangue verso i polmoni per farlo ricaricare di ossigeno" (classe A) ["The blood circulation starts from the heart that, through the arteries, carries oxygen-rich blood and nutrients to the cells of our body and the veins carry blood, filled with carbon dioxide, back to the heart that then pumps it to the lungs to make it recharge with oxygen"]

- "La piccola circolazione sono l'arteria polmonare portano il sangue contenente CO^2 e poi prende l'ossigeno e riportano il sangue con ossigeno al cuore attraverso le vene polmonari" (classe A) [The mall circulation is the pulmonary artery carrying blood containing CO^2 and then takes the oxygen and carries blood with oxygen back to the heart through the pulmonary veins"]

- "Il colore del sangue è rosso scuro e rosso vivo. Il sangue è rosso scuro quando è ricco di anidride carbonica che poi verrà ripulito nei polmoni e riportato al cuore attraverso le vene polmonari" (classe B) [The colour of the blood is dark red and bright red. The blood is dark red when it is rich in carbon dioxide which is then cleaned up in the lungs and carried back to the heart through the pulmonary veins"]

- "le vene entrano nel cuore e finiscono nell'atrio destro dove il sangue è pieno di ossigeno attraverso le vene arriva il sangue sporco lo portano nell'atrio destro dove poi viene pulito e poi lo portano nel corpo" (classe B) ["the veins go into the heart and end up in the right atrium where the blood is full of oxygen. The dirty blood comes through the veins. lt is carried to the right atrium where it is cleaned up and then carried back to the body"]

There were also some cases also 'dopo' ["after"] the conjunction that introduced an implicit temporal sentence:

- "Questo sangue "sporco" passa nel ventricolo destro e tramite l'arteria polmonare viene portato nei polmoni lasciando CO^2 e prendendo ossigeno, dopo essersi ripulito tramite la vena polmonare il sangue ritorna al cuore" (classe B) ["This "dirty" blood passes through the right ventricle and trough pulmonary artery is brought into the lungs, leaving CO^2 and taking oxygen. The blood, after being cleaned through the pulmonary vein, returns to the heart"]

[2] Some of these fragments are available also in Cillo, Miglietta, *in press*
[3] The yield of t d is due to interference of the phonetic dialects of Salento. The same phenomenon can also be observed in the next fragment.

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The only cases of progression of tenses are sometimes entrusted to the tenses, the future or the past participle:

- "nella piccola circolazione cioè al cuore ai polmoni viene trasportato sangue ricco di anidrite carbonica e verrà ripulito nei polmoni e riportato al cuore attraverso le vene polmonari" (classe B) ["In the small circulation that is the carbon dioxide -rich blood is transported from the heart to the lungs and it will be cleaned inside the lungs and carried back to the heart through the pulmonary veins"]

- "il sangue, ricco di ossigeno e nutrienti viene distribuito in tutto il corpo (periferia), partito dall'aorta passano arterie, arteriole e capillari arteriosi arriva nella cellula, arrivato nella cellula il sangue lascia l'ossigeno e nutrienti e prende CO_2 e sostanze di rifiuto" (classe A) ["the oxygen-rich blood is distributed throughout the body (periphery), coming from the aorta through arteries, arterioles and capillaries get into the cell. When the blood arrives into the cell, leaves the oxygen and nutrients and takes CO^2 and waste products"]

c) the adversative conjunction 'mentre'["while"] was very frequent in the texts of Class B, but occured only once in those of Class A:

- "l'arteria esce dal cuore mentre la vena entra" (classe B) ["the artery leaves the heart and enters into it"] (Class B)

- l'arco toracico si divide in due parti importanti: dal cuore all'addome viene chiamato arco toracico mentre dall'addome al bacino viene chiamato aorta addominale" (classe B) ["the chest arch is divided into two major branches: from the heart to the abdomen it is called chest arch while from the abdomen to the pelvis it is called the abdominal aorta "]

- [...] il sangue è ricco di ossigeno ed è di colore rosso vivo mentre nella piccola circolazione il sangue è ricco di anidride carbonica ed è di colore rosso scuro" (classe B) ["the blood is rich in oxygen and is bright red while in the small circulation blood is rich in carbon dioxide and is dark red in color"]

d) The conjunction 'inoltre' ["furthermore"], sometimes, rather than being an additive, serves to mark an orderly succession, serving as filler, a conversational signal:

- "La pressione arteriosa varia, il picco massimo si ha quando il cuore si contrae (pressione sistolica) mentre il minimo (pressione diastolica) si ha per le contrazioni quando il cuore si espande e si riempie di nuovo di sangue. Le arterie inoltre aiutano il cuore a pompare sangue. Fatta eccezione per le arterie polmonari, che portano il sangue ai polmoni per ossigenarlo. Inoltre, le arterie vanno rimpicciolendosi in condotti sempre più piccoli" (classe B) ["blood pressure varies, the maximum peak occurs when the heart contracts (systolic) and a minimum (diastolic) when the heart expands and refills with blood. The arteries also help the heart to pump blood. Except for the pulmonary arteries, that carry blood to the lungs to oxygenate it. Furthermore, the arteries tend to shrink into ever smaller ducts"]

e) The adversative conjuction, 'invece' ["whereas"] does not occur in the texts of Class A, but in the texts of Class B is less frequent than 'mentre' ["while"]:

- " Quando il cuore si contrae si chiama sistole whereas quando il cuore si rilassa chiama diastole" (classe B) ["When the heart contracts it is called systole, whereas, when the heart relaxes it is called diastole"]

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- "Il sangue delle vene è composto di anidride carbonica ed è più scuro, invece il sangue delle arterie è più chiaro perché è composta da ossigeno." (classe B) ["Veins blood is composed of carbon dioxide and is darker, whereas the arterial blood is lighter because it is made up of oxygen"]

- "Le arterie, invece, fanno in modo che avvenga la grande circolazione, cioè il sangue ricco di ossigeno, quindi di colore rosso vivo, vada dal cuore alla periferia (SIC!)" (classe B) [The arteries, whereas, are so that the large circulation takes place, i.e., the oxygen-rich, then bright red, blood go from the heart to the periphery"]

As can be seen, in the last fragment there are three cohesive conjuctions: adversative, explanatory and conclusive that, however, are not used proficiently: we are faced with a complicated sentence before presenting complex anomalies, probably due to a poor habit of stand-alone text planning.

f) the adverb'infine' ["finally"], indicating the final stage of a process, in this case blood circulation, occured only once in the texts produced by Class B:

- In questa maniera il sangue rilascia l'ossigeno alle cellule e prende l'anidride carbonica. I capillari si raccolgono infine nelle vene dove viene riportato il sangue al cuore" (classe B) ["In this way, the blood releases oxygen to the cells and takes up carbon dioxide. Finally the capillaries gather into veins where the blood is carrried back to the heart"]

g) the conjunction 'quindi' ["then"], with explanatory value, occurred only once in texts of Class B:

- "Le vene fanno in modo che avvenga la piccola circolazione, cioè i sangue ricco di CO^2 (anidride carbonica) quindi di colore rosso scuro, arrivi nell'atrio destro [….]" ["The veins allow the small circulation take place, i. e. allow the blood rich in CO^2 (carbon dioxide) and therefore of a dark red colour, to reach the right atrium"]

5. Conclusions

From this brief analysis we put forward conclusions on what might be the results if we adopt new technologies instead of the textbook, which, however, we do not believe should be discarded altogether, but rather kept as support.

As we have noted, the class that used the iPad achieved positive results, and performed better than the class that stuck to the traditional textbook. The texts they produced were longer, richer in scientific-technical terms and adjectives that best characterize body parts than the texts of the students who studied with the textbook alone. This constituted a substantial difference.

Furthermore, although there were no significant differences particularly with regard to the syntactic-textual structure of the texts produced by the two classes, the fact that there is a particular incidence of use of juxtapositions and coordinated sentences in Class A compared with a higher frequency of use of subordinated in the texts of Class B should not be underestimated. In addition, even connectives, which are almost non-existent in the texts produced by Class A, -only a few examples of 'poì', 'cioè'- are more numerous in texts produced by the class that used the iPad. Indeed, you can sometimes count as many as three in a single period, although at a syntactic level they are not always proficiently employed.

These results should, therefore, lead us to reflect upon the potential of new educational media, which stimulate cooperative learning, and put the student at the center of the learning process. The student thus becomes an active subject of his or her knowledge, who constructs ideas, reworks, plans his or her own content in texts that affirm his or her originality and his or her distance from a prepackaged knowledge, which is that offered by the traditional textbook. On this subject, Edgar Dale already expressed similar ideas almost seventy years ago. The American educator, in 1946, in his *Audio-visual methods in teaching* denounced the abstract verbiage of the textbook in favour of the introduction of audio-visual media in

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schools of all levels in order to promote a real learning as opposed to a 'bookish' one. Dale noted that the adio-visual media should not be used mechanically, but in an "operational sharing of ideas."

But to ensure that visual data form the basis for a good text it is necessary to achieve a methodology which integrates science and linguistics where these two must learn to work together, so that "doing" science with new technologies converge with "doing" language. As Cristina Lavinia (2004:93) noted, "dobbiamo superare la "scissione tra le due culture" , la cultura umanistica e quella scientifica, che spesso sembrano non comunicare tra loro; per cui, chi possiede l'una pensa di non poter capire l'altra e, in particolare, di non poter dir niente a proposito di contenuti sentiti come proprietà esclusiva di ciascuno" [we must overcome the "split between two cultures", the humanistic and scientific ones, which often do not seem to communicate with each other. In fact, he who comes from one of two backgrounds thinks he can not understand the other and, in particular, that he can not say anything about the contents which are reported upon as exclusive domain of the other].

As I noted at the eighteenth Giscel conference "one might think, for example, of using digital technology for the construction of the text, even during the science lesson: a lesson in two voices. On one hand the display of the small and large blood circulation, on the other the diagrammatic representation of a mirror, to be filled with the individual portions of text, that correspond to the individual paragraphs, and the branches connecting the logical connectives that join in succession, temporal and causal, blocks of text. Replacement exercises can then be designed to verify the changes of meaning or miscommunication when the wrong cohesive ties are created, or even the cohesive sense is omitted. One can show how a '"myocardial infarction of the text" can be produced when "cohesive movement" stops just like it happens in our body. In short, it would be desirable to reflect on language, grammar on the 'anatomy', to prove that the movement works if the grammar of the text works. We are only at the first steps. We must learn to walk together towards a new integrated scientific-humanistic digital teaching.

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A service learning student-community project

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Abstract

A collaborative project is described. In this project, students in a web design class were asked to contact local non-profit organizations and create websites (collections of web pages) to benefit these non-profits. Two phases of the project, planning and implementation, are described. The project, suitable for both online and face-to-face instruction, required that students keep a journal. The instructor did a follow-up investigation to assure that the websites that students created were indeed what the non-profit asked for.

Keywords: web; page; site; webpage; website; design; planning; implementation; online; face-to-face; student; business; community; collaboration; service; learning; project; journal; follow-up; feedback

1. Introduction

Many non-profit organizations lack the knowledge and resources to create a website that could effectively attract the public. Web developers can be found and can certainly help, but at a price.

In my introductory web page design class students learn early in the semester that the overall process of developing a website is more than creating the web pages. Before they are assigned the project, they have already been through about two thirds of the course and they have learned that a useful website is attainable only after the planning phase has successfully been completed. The planning phase consists of defining the website's purpose and its target audience.

The steps that a student had to go through to complete the project included: create a list of local non-profits to contact and ways to contact them; identify one local non-profit that is interested and willing to work with the student; collect all needed data (logos, images, etc.); sketch the navigation structure; determine the content and links for each page; sketch the page layout for each page; and finally create the website with its web pages. Besides these steps, each student had to keep a journal and after the website was created the instructor had to make sure that it was what the non-profit really wanted.

The importance of training our students properly in web design is of outmost importance. The overall process of developing a website is not just creating the web pages and linking them together. Good planning includes sketching the navigation structure of the website and determining the content and navigation of each web page. In addition, keeping a journal of meetings with the non-profit and interactions is equally important.

2. Steps in developing a website

In my Web Design class, I spend about three thirds of a semester covering the basics of Adobe Dreamweaver with a brief introduction to HTML. A major topic during the first two thirds of the semester is website development with the emphasis being on defining the purpose and target audience. This is the

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first step in the planning of a website. If one does not know why this website is needed or what the intent (purpose) for the website is then the website will not be successful to accomplish anything of value. Just as important, if no thought is put into who will look at the website (audience), it will not be of interest to the ones who need the information. A simple example is that if one is to create a website to attract potential customers for a restaurant, the website creator needs to pay attention that the website should be designed as a tool whereby people learn about the restaurant and what makes it to be a good restaurant. An attractive menu advertising specials of the day with clear and attractive pictures of the dishes is essential in this case. If the restaurant caters to adults as well as to children, then the designer should take this into consideration when designing the website. At the end, the planning phase should include a navigation structure (fig. 1) that, in the case of a restaurant, might look something like this (Marrelli, 2009):

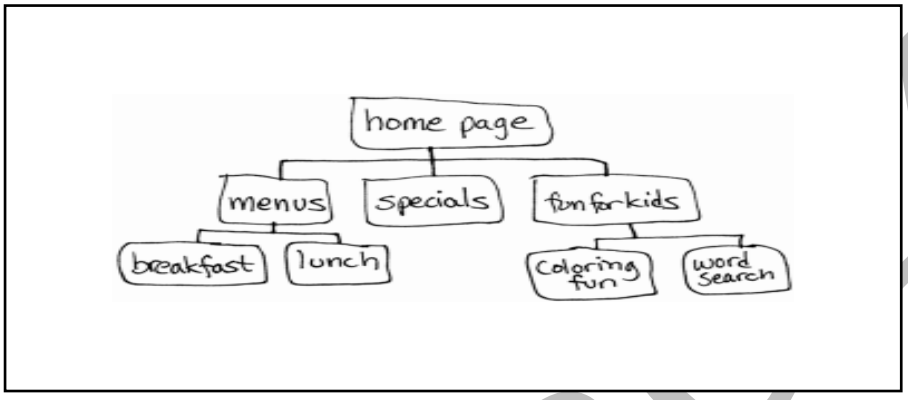


Fig. 1. Navigation Structure for the Restaurant website

Note that at this stage, the navigation structure could only be a sketch drawn by hand, although the designer could use simple and readily available software such as Microsoft Word or Microsoft PowerPoint to create it. This sketch, as it's evident in the example, should show the arrangement of the pages from general to specific.

The next phase is the implementation phase where the designer needs to use the software of choice (in my class, Dreamweaver) and create the website. In our restaurant example, this should include the needed navigation bars and the content for each page such as the one in this example that shows only one of the web pages, the Lunch Menu page (fig. 2) (Marrelli, 2009).

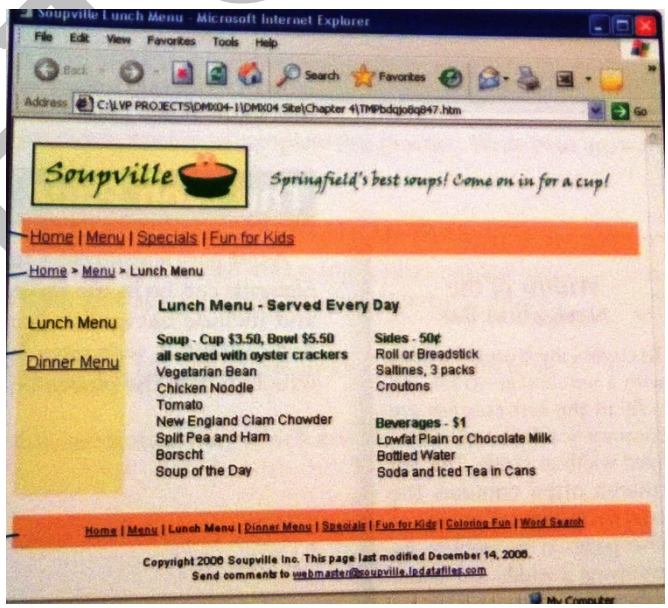


Fig. 2. Lunch Menu web page of the Restaurant website

While creating the website, the designer should carefully follow four basic design concepts. The first design concept is that an effective website should be appropriate for the intended audience by matching purpose and target audience. The second is that there should be a meaningful arrangement of the web pages that follows principles based on user expectations. The third is that the website should be consistent by using consistent cues. Finally, the fourth design concept is that it should make it easy on the user to traverse through it. These four design concepts might seem obvious but it is easy to overlook them. Once the students are introduced to these basics of website design, and after they have already created at least two websites with a few web pages each, then they are ready to work on the project.

3. Service learning

The following paragraphs briefly explain service learning (Western Kentucky University Service-Learning Faculty Handbook, 2014).

Service-learning can be described as "learning by doing while helping others." It is considered a form of experiential learning in which students participate in an organized activity that meets learning objectives and identified community needs at the same time. Course content improves the quality of student service projects. The service experience enhances student learning.

The three integral components of service learning are: meaningful service, applied learning, and reflection. Meaningful service means that faculty and students work together with the community to identify a project. Applied learning means that the project is related to the course and helps students practice what they have learned in the course. Reflection is when students can use the project for meaningful learning.

The types of service learning include Problem-solving or community-based research projects, placements at community organizations, faculty-led programs (assignments or options, student-led programs, direct-service projects, indirect-service projects, and interdisciplinary and international service-learning projects).

4. The project

The steps that a student had to go through to complete the project included:

- Research local non-profits
- Make a list of local non-profits
- Choose an interested non-profit
- Meet non-profit representatives to discuss
- Plan the web site
- Implement the plan
- Revise as needed
- Complete project to the non-profit's satisfaction

In the process, students would need to collect all needed data (logos, images, etc.); sketch the navigation structure; determine the content and links for each page; sketch the page layout for each page; and finally create the website with its web pages. Besides these steps, each student had to keep a journal and after the web site was created the instructor had to make sure that it was what the non-profit really wanted. To enhance the project's effectiveness, assessment should be conducted on any level and not just the end-product itself (the website); students should journal throughout the course of the project and document what they have learned going through the entire process. Directions for preparing the journal should include questions that the students must answer such as: How did you search for non-profits that might

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be interested in you developing a web page for them? Did you use the phone book or did you get your contacts by using the phone, email, or the Internet? What is the name and other contact info of the one non-profit that you actually selected? What is the date that you made the initial contact with this non-profit?

In addition, in the journal, students should write a brief summary of what was discussed at each of the meetings that they had with this non-profit, including date for each meeting and whether the meetings were conducted by phone, email, etc. Other info such as what they learned while working with this non-profit in general and describe the non-profits' needs for having the website that the student created for them. Finally, students should comment on what experience they might have gained while working on the project.

After the project was completed, there was feedback that the instructor requested from the non-profit. Here are some examples of such feedback:

Feedback #1:

Everything went wonderfully well in working with Jessica. She made and kept appointments and was prompt in replying to my e-mail and phone messages. She was always business-like and pleasant to work with. Jessica worked with your outline and that helped us both to be very clear and specific about what needed to be on the website. She made good suggestions and took direction very well and was a pleasure to work with.

Feedback #2:

Melna was very easy to work with and created a great site for our office. We have needed a useful and user-friendly website for quite some time so I am very pleased that she created this for us.

Feedback #3:

It has been a pleasure working with Annette on this project. I appreciate having had the opportunity for this website to have been part of the learning process in one of your classes. We worked on an ongoing basis to come up with what the website would look like. I then gave her additional ideas to help with development. She seems to have a very creative mind when developing the website and an understanding of what the end user would want to see. We formally met 6 to 8 times to formally review and work on the project. I am very happy with the work she has done. It looks great and will be a very useful website.

5. Benefits

Some of the benefits for students include that students make new contacts with potential future employers, they apply class knowledge to real life, and they boost their resumes. Benefits for the non-profits include that they get help to complete unfinished projects and/or create the website that they could never have created without help. Non-profits needs this help because they may lack the knowledge to create an effective website, they may lack the resources needed to create it. They may also lack the funds to finance creating the website or they may lack the time to devote in its design and implementation.

6. Problems and replications of the study

One of the problems in implementing the project was that I did not make it an absolute requirement in this class that students find a non-profit and not just a local business. As a result, some of my students selected a local business rather than a non-profit to complete their project. This did not diminish the use-

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fulness of the project as some local businesses received a lot of needed help from my students and at the same time my students learned from working on their projects. In future implementations I can request that only non-profits are to be used by all students. However, this may prove to be too restrictive for some students who have to complete a major project in a limited amount of time, especially if the class is large and is taught in a rather small community.

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A study of EFL college students' acceptance of mobile learning

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Abstract

Mobile devices with Internet applications have dramatically increased the convenience of accessing information for EFL college students in language learning. This study used Technology Acceptance Model as a theoretical framework to examine the factors related to Taiwanese EFL college students' behavioral intention to use mobile English vocabulary learning resources. Data collected from the questionnaires of eighty four EFL tertiary level college students were analyzed by using correlation analyses and regression. Results showed that the participants' behavioral intentions had high positive correlations with mobile devices' compatibility, self-efficacy, perceived ease of use respectively. It had a moderate positive relationship with usefulness. Regression analyses showed that perceived usefulness, perceived ease of use, self-efficacy, and compatibility account for 71% of the variance explained in behavioral intentions to use mobile English vocabulary learning resources. Compatibility is the best predictor of users' behavioral intention of use.

Key words: behavioral intention, perceived usefulness, perceived ease of use

1. Introduction

With the advance of modern technology, the society has been transformed to 'mobile society'. Mobile learning technologies have influenced many aspects of education, and provide new method for instructors to deliver knowledge and motivate students to engage in various learning activities (Derting & Cox, 2008;Mitra, 2007; Siozos et al., 2009).Through mobile learning, people can download different English learning apps to their smartphones,and other mobile devices via Apple App Store,Google Play,Windows Phone Store, and BlackBerry App World. Also, because of the rapid development of mobile technology in higher education, students using mobile devices with Internet accesses have expanded communication methods, opportunities for collaboration, access to traditional learning and information resources (Donaldson, 2010).Thus, mobile learning will become the milestone of the technology education.

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2. The research models

The research direction of recent studies have focused on implementation of mobile learning in developed countries (James, 2008), environment settings for mobile learning (Brown, & Parsons, 2006; Chao & Chen, 2009; Liu& Jin, 2008; Virvou & Alepis, 2005), and users' acceptance in mobile learning (Liu & Li, 2009; Phuangthong & Malisawan, 2005).Many theories have been proposed to account for the user's acceptance of technology. One of the most widely used models to explain a potential user's behavioral intentions of using a technological innovation is Technology Acceptance Model (TAM) proposed by Davis (1989).

This model, with high reliability and validity as reported in Adams (1992), included the constructs of perceived ease of use, perceived usefulness, and attitudes towards using and behavioral intention of use (1989). Based on the theory, users' perceived ease of use influenced the intention of users thereby affecting perceived usefulness (Davis, 1989).TAM has been applied in a wide variety of contexts and many technology acceptance studies identified the factors influencing the users' behavioral intentions of use and the actual use of mobile learning technology devices. These studies also showed the weight of these factors may differ as a function of different user types and e-learning technology types. For example, Ronnie, Christopher and Eugenia (2011) adopting the Technology Acceptance Model (TAM) examined students' behavioral intention to use an electronic portfolio system. The result showed that perceived ease of use (PEOU) had a significant influence on learners 'attitudes towards usage.

Seliaman and Turki (2012), based on Acceptance Model (TAM), explored Saudi university students' use of mobile devices and smart phones for accessing their course materials, searching for information related to their disciplines, sharing knowledge, conducting assignments. The results showed that students' perceived usefulness of mobile learning was closely related to the factors including their course materials accessing, searching for information related to their disciplines, sharing knowledge, finishing their homework.

Also, many researchers investigated students' attitudes and perceptions toward a new technology such as mobile learning, podcasting, and other technology-based applications (Al-Fahad, 2009; Alghazo, 2006; Andone et al., 2007; Boon et al., 2007; Croop, 2008; Fozdar & Kumar, 2007; Stockwell, 2008; Yousuf, 2007).For instance, Ahmad and Steve(2013**)** investigated the acceptance rate of university students' intention to adopt mobile learning. The result showed that 55% of the students accepted mobile learning in a higher education. The applicability of the TAM has been well supported by a considerable body of previous research across a wide range of educational settings (Pituch & Lee, 2006).

Venkatesh and Davis (1996) revised the TAM model with the inclusion of additional external variables, which influenced a person's acceptance of information systems. One of the important external variable in the TAM research included users' computer self-efficacy. It is found that individuals with high efficacy expectations were more likely to succeed in a given task. High self-efficacy individuals usually work harder and longer than low self-efficacy individuals (Wood & Bandura, 1989).

In addition to self efficacy as one of the external factors, the other factor (i.e. compatibility) was included in this study. Compatibility is related to the reasons why someone adopted new innovations. One of the most popular models is Rogers' Diffusion of Innovations (Sherry & Gibson, 2002). Rogers (2003) identified five constructs in his Diffusion of Innovations model, and it shaped the rate and likelihood of adoption (1995). . This model included the constructs of relative advantage, compatibility, complexity, trialability and observability. In this study, the researcher only chose compatibility as the other external variable because the compatibility of the innovation is closed related to the user's life and practices.

Base on the previous study, Technology Acceptance Model (Davis, 1989) was employed by many different researchers in different study fields. Importantly, studies on the TAM have incorporated domain-specific external variables into the standard model, providing an elaboration of its theoretical structure. Also, some studies also pointed out that the weight of these factors may differ as a function of different user types and e-learning technology types. The present study extended the TAM by including two additional constructs, Self-Efficacy and Compatibility, to provide further insight into the user acceptance in a specific learning context. Therefore, the researches aimed to investigate tertiary level EFL college students' Acceptance toward Mobile vocabulary learning app. The research questions were as follows:

1. What are the relationships among the constructs of the model?

2. Which factor can best predict users' behavioral intention of using mobile vocabulary learning resources?

3. Methodology

3.1 Participants and instruments

The participants were 84 tertiary level EFL college students including 68 male and 16 female Engineering students. They were asked to fill in a 20-item questionnaire, adopted from Davis' Technology acceptance model (1989) and Roger's Innovation Diffusion Theory (1995).The instrument consists of five constructs including perceived ease of use (4 items), perceived usefulness (4 items), self-efficacy (4 items), compatibility (4 items) and using intention (4 items). Using a 5-point Likert scale ranging from 1= strongly disagree to 5= strongly agree, each respondent was asked to indicate the extent to which she/he agreed or disagreed with the given statement. In terms of the reliability for each construct, Cronbach's α value for perceived usefulness was .87; perceived ease of use .86;self efficacy, 0.802; compatibility .901; intention to use .82. The definition of each construct, and the items included in each construct were illustrated below.

3.2 Data analysis

The statistical software SPSS 17 was used to calculate these collected data. For the research questions, descriptive statistics, correlation analyses and multiple regressions were used to answer the research questions.

4. Results

4.1 Descriptive statistics of the constructs

Descriptive statistics showed that among the five constructs, ease of use had the highest rating (mean=16.04), followed by self -efficacy (mean=15.95), behavioral intention (mean=15.18) while compatibility (mean=15.02) had the lowest rating.

In terms of each item in the construct of usefulness , referring to the fact that learners believed that mobile vocabulary learning app can promote their efficiency in learning vocabulary, item 5 had the highest rating whereas item 6 had the lowest one(see Table 1).

Table 1. Items in the Construct of Usefulness

Item		*M*	*SD*
5	Using learning vocabulary through mobile phones is not restricted by time and place	4.17	.691
6	Using learning vocabulary through mobile phones can help me access the information I needed.	3.76	.887
7	Using learning vocabulary through mobile phones enhance my effectiveness on my learning.	4.10	.830
8	Learning vocabulary through mobile phones provides helpful guidance in performing tasks.	3.93	.929

In terms of learners' performance in the construct of perceived ease of use, they believed learning vocabulary through mobile phones can save time (see item 2) while "learning vocabulary through mobile phones is convenient" had the lowest rating in the construct (see Table 2).

Table 2. Items in the Construct of Ease of use

Item		*M*	*SD*
1	Learning vocabulary through mobile phones is easy for me.	4.11	.822
2	Learning vocabulary through mobile phones saves time.	4.12	.827
3	Learning vocabulary through mobile phones is convenient.	3.88	.884
4	Learning vocabulary through mobile phones is easy to use.	3.93	.875

According to Innovation Diffusion Model theory, the definition of Self-Efficacy was defined as users' ability of using mobile application through mobile interface. Item 9 had the highest rating while item 12 had the lowest one (see Table 3).

Table 3. Items in the Construct of Self-Efficacy

Item		*M*	*SD*
9	I could complete learning vocabulary tasks through mobile phones if there is no one around to tell me what to do	4.15	.814
10	I could complete learning vocabulary tasks through mobile phones if someone had helped me get started	3.86	.880
11	I could overcome the difficulties encountered when I used mobile phones to learn vocabulary.	3.62	.943
12	I could complete learning vocabulary tasks through mobile phones whatever mobile phones how difficult is.	3.39	1.042

According to Innovation Diffusion Model theory, compatibility refers to the fact that users believed that learning vocabulary through mobile phones was related users' life experiences. Item 16 had the highest rating while item 15 had the lowest one (see Table 4).

Table 4. Items in the Construct of Compatibility

Item		*M*	*SD*
13	To use learning vocabulary through mobile phones, I don't have to change anything I currently do.	3.79	.958
14	Using learning vocabulary through mobile phones does not require significant changes in my existing work routine.	3.80	.861

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15	Using learning vocabulary through mobile phones is same as using other software I have used in the past.	3.75	.930
16	Using learning vocabulary through mobile phones can reinforce from computer.	3.85	.898

In terms of Using Intention, it refers to the intention of individuals of using mobile in the future (Taylor & Todd, 1995). Thus, the researcher defined it as a person's intention of using mobile phones in learning vocabulary. As shown in Table 5, item 17 had the highest rating while item 20 had the lowest one.

Table 5. Items in the Construct of Using Intention

Item		*M*	*SD*
17	I am willing to use mobile phones to learn vocabulary	3.99	.843
18	I will continue using mobile phones to learn vocabulary in the future.	3.76	.939
19	Overall, I will learn vocabulary through mobile phones.	3.71	1.001
20	I will recommend others learning vocabulary through mobile phones	3.58	.947

4.2Results of research question 1

Correlation analyses showed that perceived ease of use and perceived usefulness, self-efficacy, compatibility and using intention had high correlation among one another (p<.01). As shown in Table 6, the participants' behavioral intentions had high positive correlations with mobile devices' compatibility (r=.829, p<.001), self-efficacy (r=.762, p<.001), perceived ease of use (r= .709, p<.001) respectively. It had a moderate positive relationship with usefulness (r=.679, p<.001).

Table 6. The Inter- correlation among the constructs

Variables	Ease of use	Usefulness	Efficacy	Compatibility	Intention
Ease of use	-				
Usefulness	.770**	-			
Efficacy	.692**	.67**	-		
Compatibility	.76**	.77**	.80**	-	
Intention	.70**	.67**	.76**	.82**	-

** p<0.01

4.3 Results of research question 2

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In order to clarify the relative contribution of these variables, the researchers conducted linear regression analyses. Results showed that perceived usefulness, perceived ease of use, self-efficacy, and compatibility account for 71% ($R^2=0.719$) of the variance explained in behavioral intentions to use mobile English vocabulary learning resources (see Figure 1).

Perceived ease of use and Perceived usefulness explain 54% of the variance in behavioral intention of use ($R^2=546$).Self-efficacy, perceived ease of use and compatibility combined to explain67% ($R^2=679$) of the variance in perceived usefulness while self-efficacy and compatibility explain 60% ($R^2=604$) of the variance in perceived ease of use.

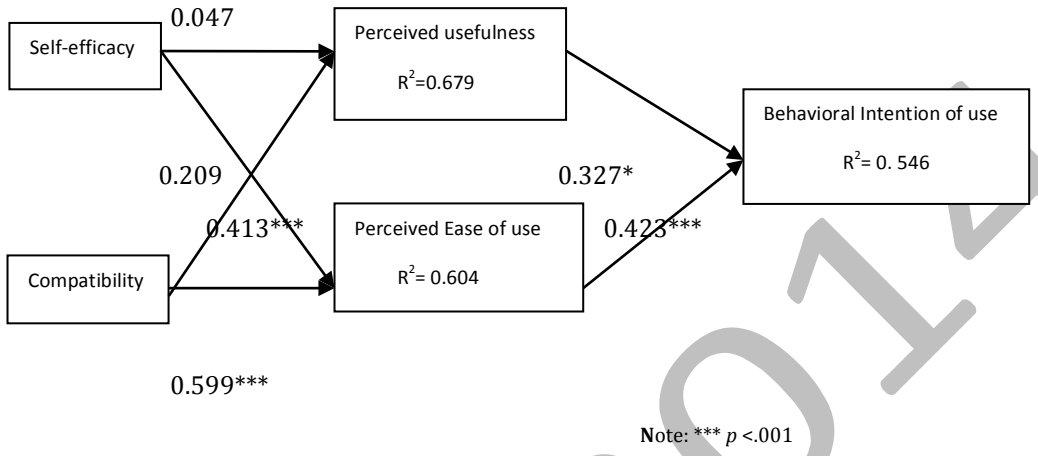


Figure 1. Results of Multivariate Regression Analyses

One indicator of the predictive power of path models is to examine the explained variance or R2 values. R2 values are interpreted in the same manner as those obtained from multiple regression analysis. They indicate the amount of variance in the construct that is explained by the path model (Barclay et al., 1995).The path coefficients and explained variances for the proposed model in this study were shown in Figure 1 and Figure 2.According to Figure2, Compatibility can best predict users' behavioral intention of use (p<.001).

Based on the findings in the study, we also found compatibility had significant effects on perceived ease of use and the behavioral intention, which were in agreement with previous studies (Chang & Tung, 2008; Chau & Hu, 2001; Hardgrave et al., 2003; Wu &Wang, 2005).

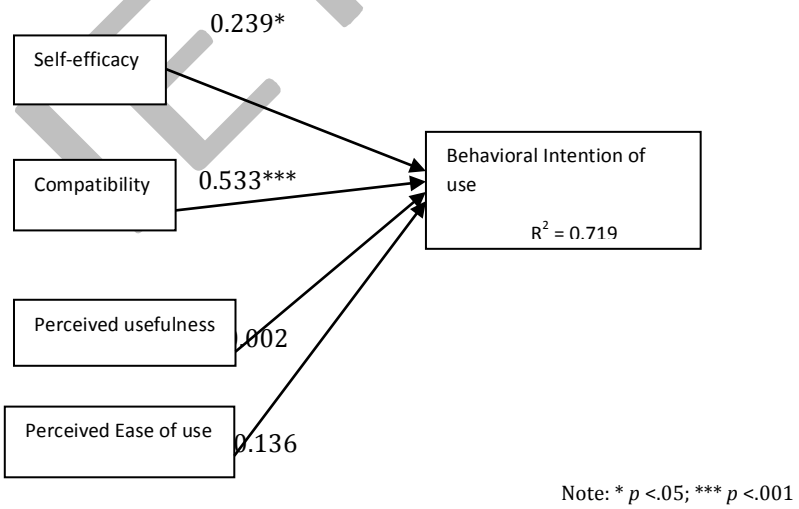


Figure 2 Results of Regression Analysis

5. Conclusion

This study used Technology Acceptance Model as a theoretical framework to examine the factors related to Taiwanese EFL college students' behavioral intention to use mobile English vocabulary learning resources. According to the results, college students' behavioral intentions had high positive correlations with mobile devices.

Regression analyses also showed that Perceived usefulness, perceived ease of use, self-efficacy, and compatibility account for 71% ($R^2=0.719$) of the variance explained in behavioral intentions to use mobile English vocabulary learning resources(see Figure 1).Learners' behavioral intention to use mobile English vocabulary learning resources was significantly determined by Compatibility.

As previous studies demonstrated, we found that the TAM appeared to provide researchers a theoretically sound model used to predict the users' behavioral intention to use the mobile learning systems. According to TAM, perceived usefulness and perceived ease of use had a significant positive effect on learners' behavioral intention to use the m-learning systems. Such was the case in this study; the m-learning systems users thought that the higher perceived usefulness resulted in a higher behavioral intention to use the m-learning systems. Furthermore, these findings supported existing research that both usefulness and ease of use were believed to be important factors in determining the acceptance of m-learning systems, as proposed by Davis et al. (1989). Finally, this study also indicated that perceived ease of use had a positive direct effect on perceived usefulness. The results were in agreement with what Venkatesh and Davis (2000) found in their study.

Based on findings, some suggestions for future studies were proposed. Firstly, researchers may include actual use behaviors or other external variables in their future studies that might influence students' behavioral intentions on mobile learning. Secondly, the study investigated tertiary level EFL university students from one university. It was suggested that inclusion of more university students or other mobile devices, systems were strongly suggested for future research. Thirdly, the impact of culture on mobile learning acceptance could be studied in experimental settings. Furthermore, many researchers explored students' behavioral intentions toward mobile learning, but few investigated teachers' behavioral intention on mobile learning. It might be interesting to compare teachers' and students' behavioral intention on mobile learning and teaching. Finally, it can include actual use behaviors or other external variables that affect the acceptance of mobile learning, in order to predict and explain users' acceptance of mobile learning in future studies.

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A Study of Psychological Variables and Scholastic Achievement of Distance Learners with Disabilities in Nigeria

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Abstract

Education of students with disabilities has received constant attention in the recent times. Disabilities are of different types; physical, hearing impairment, visual impairment, mental retardation and others. The educational needs of the disabled students are a bit different from the ones for mature and reforming non-traditional learners. Hughes (Octernaud 1990). The concern for the scholastic achievement of non-able distance learners is therefore the concern of researchers in the field of distance education. The scholastic achievements of distant learners with disabilities can be predicted by several variables. This study determined the extent to which the selected factors when taken together would predict the scholastic achievement of distance learners with disabilities scholastic achievement of the National Open University of Nigeria. Participants in this study were distance learners with disabilities selected from all the six-geopolitical zones of The National Open University of Nigeria. The instruments employed included (SATDLQ) Students Attitude Towards Distance Learning Questionnaire, (DLSES) Distance Learners Self Efficacy scales of 70 items among others. Data elicited were analyzed though multiple repressions Analysis (Backward or Stepwise elimination procedure). This study also provides some recommendations for improvement of scholastic achievement of distance learners with disabilities in National Open University of Nigeria. Participating academic/tutorial facilitators were also suggested to encourage the formation of tutorial study groups that will encompass students of different ages for sharing of ideas and knowledge.

Key words: Noun; Scholastic Achievement; Multiple Correlation; Distance Learning; s; Disabilities.

1. Introduction

There has been a growing interest in the education of students with disabilities in the recent times. This is contingent on the fact that students with disabilities constitute a distinct population with educational needs that are different from mature and returning non-traditional learners Hughes (Octernaud, 1990). Concerns are equally being expressed as regards the scholastic achievement of these categories of students. Pamela (2006) noted that the scholastic achievement of non-abled distance learners has been a source of concern to researchers in the field of distance education. Moisey (2004) also observed that students with disabilities took courses at higher rate than their non-disabled counterparts and reported that these students with disabilities experienced somewhat less success in these courses. Moreover, completion and performance rates ranged from 40% for students with psychological disabilities to more than 65% for students with sensory disabilities. In view of this, Oladejo (2010) opined that there is little doubt that distance education can enhance access to students with disabilities and that disability specific support services can enhance success. The researchers also observe that it appears that the scholastic achievement of distance learners with disabilities has not received much attention in Nigeria.

The scholastic achievement of distance learners with disabilities can be predicted by several variables. Studies have linked scholastic achievement of distance learners with disabilities to psychological variables (Oladejo, 2010). Generally, psychological variables are important in distance learning system because for the performing students, researchers agree on the necessity of being psychologically stable (Sewart, Keegan & Holmberg, 1983; Murphy, 1989; Suciat, 1990; Chan, Yum, Fan, Jegede & Taplin, 1999; Ojokheta, 2000; & Ergul, 2004). Some of the psychological variables identified by scholars as motivating

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distance learners include self-efficacy beliefs, locus of control, self esteem, goal achievement (Pintrich & De Groot, 1990; Abdul-Raham, 1994; Pajares & Miller, 1994; Sheets, 1995; Lim, 2000), goal satisfaction, self-worth, self-acceptance, study habits (Sweet, 1986; Strein, 1995), self-concept, self-regulation skills (Bandura & Martinez-Pons, 1990; Pajares & Kranzer, 1995; Lim, 2001; Wang & Newlin, 2002).

In the area of disability studies among distance learners, Ommerborn, (1998, 2001) has made an extensive review of studies worldwide. The review suggests the need for improving the disabled-specific support services and its access to needy students. According to Horn and Berktold (1999), based on longitudinal data for 1989-90 enrolled students in post-secondary education, majority of students with disability are males and older compared to their counterparts without disabilities. Further, nearly half of those with disabilities left the College without completing their studies as against one-third of students without disabilities.

Distance education provides distinct advantages for many students with disabilities by offering access to postsecondary educational opportunities that may not be present at more conventional universities. For example, Paist (1995) notes that flexibility in the location, scheduling, and delivery of distance education programs can provide disabled students with what may be their first real access to higher education. Similarly, Ommerborn (1998) in an extensive review of distance education programmes worldwide for students with disabilities notes similar findings, emphasizing that in addition to improving access, it is equally important to ensure that students with disabilities receive the support they require to ensure success in their studies.

However, for the purpose of this study, the researchers investigated self-efficacy, self-regulation, study habits, self-concept, goal achievement, locus of control, stress and attitudes towards distance learning as psychological predictors of scholastic achievement of distance learners with disabilities at the National Open University of Nigeria.

1.1 Statement of the problem

All over the world, academic performance appears to be one of the major criteria for judging educational standard and quality. Thus, the scholastic achievement of distance learners with various forms of disabilities has also been a source of concern to researchers in the field of distance education. This study will therefore, provide a causal explanation of scholastic achievement of distance learners with disabilities. It will build and test a nine-variable model that will consist of some psychological variables namely self-efficacy, self-regulation, study habits, self-concept, goal achievement, locus of control, stress, attitudes towards distance learning and scholastic achievement at the National Open University of Nigeria.

1.2 Objectives of the study

In line with the title of this work, the broad objective of the research was to carry out a causal model of some psychological variables and scholastic achievement of distance learners with disabilities at the National Open University of Nigeria. Specifically, the objectives of the study among other things were to:

1. determine the extent to which the selected factors, when taken together, would predict the scholastic achievement of distance learners with disabilities at the National Open University of Nigeria.

2. find out the relative contributions of each of the factors to the prediction of the scholastic achievement of distance learners with disabilities at the National Open University of Nigeria.

3. determine if there was any significant gender difference in distance learners with disabilities' scholastic achievement at the National Open University of Nigeria.

4. investigate if there was any significant difference between employed and unemployed distance learners with disabilities' scholastic achievement at the National Open University of Nigeria.

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5. find out if there was any significant difference between married and single distance learners with disabilities' scholastic achievement at the National Open University of Nigeria.

This study was carried out on some psychological variables and scholastic achievement of distance learners with disabilities. Thus, the study covered the only distance learning-dedicated University in Nigeria, the National Open University of Nigeria (NOUN). Participants in this study were distance learners with disabilities to be selected from all the six geo-political zones of the National Open University of Nigeria. The selected factors included in the study as predicting the scholastic achievement of distance learners with disabilities are psychological variables namely self-efficacy, self-regulation, study habits, self-concept, goal achievement, locus of control, stress, attitudes towards distance learning. To this end, all the six geo- political zones of the country will be covered.

2. Literature review

This section brought to the fore, a detailed theoretical and empirical review of some existing literature that are relevant to the present study. The review of related literature is carried out under the following sub-headings.In the area of disability studies among distance learners, Ommerborn, (1998, 2001) has made an extensive review of studies worldwide. The review suggests the need for improving the disabled-specific support services and its access to needy students. According to Horn and Berktold (1999), based on longitudinal data for 1989-90 enrolled students in postsecondary education, a majority of students with disability are males and older by as compared to their counterparts. Further, nearly one-half of those with disabilities left the college without completing their studies as against one-third of students without disabilities. Moisey (2004) analyzed the characteristics, enrolment and completion rates of undergraduate students with disability at Athabasca University. The study found out that most of the disabled students have received one or more types of assistance and support for their studies and that it has improved their course completion rate.

Burgstahler (2001) has suggested Universal Instructional Design to enhance access to and success of disabled students in both distance and on-campus setting. Fichten, Asuncion, Barile and Lamb (2003) studied the disability services provided in Canadian higher education institutions, both on-campus and distance education setting. They raised serious concern over the need for improving disability-specific access and support services in distance education institutions. Kim-Rupnow, Dowrick and Burke (2001) have emphasized the need for outcome based research to understand the access and effectiveness of disability-specific support for students with disability in distance education. A summary of the experiences of western countries in providing access to post-secondary/higher education for students with disabilities in conventional and ODL mode has brought the following important points:

- In recent years, across the world, there is an increase in the enrolment of students with disabilities in higher education.
- disability-specific support services received little attention in distance education system as compared to on-campus education
- Lack of information on admissions and disability-specific services for disabled students in distance education limits the understanding of their problem
- Available research studies in the field show that only fewer than half of the enrolled students with disabilities receive support for their higher education
- Application of adaptive technology to assist learning of disabled has shown positive results in reaching out the disabled and it had improved their success rate.

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♦ Students with disabilities are facilitated through various forms of e-learning that had increased their access and success in learning.

Psychological variables, also known as motivational characteristics, are very important in the literature of distance learning. Equating psychological variables as motivational is better understood in the definition of motivation by Mitchell (1982:81) that "Motivation represents those psychological processes that cause arousal, direction, and persistence of voluntary actions that are goal directed". Steers and Porter (1987, pp. 5-6) believed that "When we discuss motivation, we are primarily concerned with (1) what energizes human behaviour; (2) what directs or channels such behaviour; and (3) how this behaviour is maintained or sustained." Understanding what motivates distance learners has therefore, been a topic of much research over the past quarter of a century (Mitchell, 1982). This is because for the performing students, researchers agree on the necessity of being psychologically stable (Sewart, Keegan & Holmberg, 1983).

Motivation therefore, is an interactive construct representing the direction a person is going, the emotional energy and affective experience supporting or inhibiting movement in that direction, and the expectancies that a person has about reaching their destination or achieving their goals. MST does not prefer or rank any one of the three components, it views all three components as functioning in an interdependent triumvirate process. If any one of the components is absent in a particular episode, then the subject will not be motivated to initiate activity even though the other two components are firmly in place (Ford, 1992).

There has been a great deal of disagreement among researchers about the nature of motivation and the operation of motivational processes. However, most professionals agree that the presence of motivation was inferred from the behavioral indicators, choice of tasks, effort, persistence, and achievement. Although the index *choice of task* may sound appealing, it is usually not a useful index in the academic setting as students typically have few choices in that environment. In the academic setting, students who are motivated to learn usually expend *effort*, the second index, to succeed. Students that are motivated to learn usually expend greater mental effort during instruction, organizing, and rehearsing information, monitoring level of understanding, and relating new material to prior knowledge (Pinrich & De Groot, 1990). Some researchers, like Albert Bandura, Paul Pintrich, and Dale Schunk, have all assessed students' mental effort and found a relationship to self-efficacy. Self-efficacy, on the other hand, correlated positively with effort and achievement (Schunk, 1983).

Educational problems go beyond declining performance scores; most schools today face a crisis in student motivation (Meece, 1993). Student motivation is therefore, critical for learning, and several researchers have found a positive and robust correlation between motivation and academic performance (Urugoghi & Walberg 1979; Vellerand & Serecal, 1993). The concept of motivation is one of the most important psychological variables of learning in any educational environment (Maehr, 1984). Questions of why students engage, pursue, and accomplish certain goals or tasks, or why they avoid others, have been the subjects of scholarly inquiry since the writings of Socrates, Plato, and Aristotle.

Motivation, especially within the distance education context, provides the fuel for student engagement. This is because, without motivation, students will neither think about nor organize their knowledge due to the separation of students and the instructor by time and place. There are many constructs of motivation that have emerged from different theoretical approaches during the last quarter of the twentieth century. Social-cognitive learning theory defines motivation in terms of the students':

1. (a) self-efficacy beliefs about their abilities to engage, persist, and accomplish specific tasks (Bandura, 1986; Stipek, 1988);
2. (b) goal-setting activities (Dweck & Leggett, 1988); and
3. (c) learning strategies and cognitive and meta-cognitive processes (Pajares & Kranzler, 1995; Schunk, 1995).

Since the beginning of the twentieth century, the concept of motivation has been studied according to a variety of perspectives (Overton, 1984; Weiner, 1992). In the last thirty years, many models,

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approaches and theories have inspired researchers studying motivation and education. According to Pintrich & Schunk (1996), many are the results of modern conceptions of human beings and of the way in which they learn.

Motivation as earlier asserted by Bandura (1991), is multi-dimensional. It measures impulsive and deliberate action; it is concerned with the internal and external factors; and also observes causes for behaviour (Halawah, 2006). It can therefore, be defined as a general tendency to interact with and to express influence over environment. Student's motivation for learning is generally regarded as one of the critical determinants, if not the most important determinant of the success and quality of learning outcome (Mitchell, 1992).

From available research on motivation and academic performance, it is quite evident that motivational constructs do in fact, impact the academic performance of students. There are studies documenting the correlation of the Scholastic Aptitude Test, American College Testing (Ward, 1993), Mathematics (Carpenter, 1993; Ward, 1993; Gist, 1996), High School Grade Point Average (Price & Kim, 1976; Carpenter, 1993) and College Entrance Examination (Price & Kim, 1976) scores and the performance of College students. Also well documented are studies in the areas of arts and sciences, psychology, philosophy, and natural sciences.

Many psychological variables predict college GPA, that is, academic performance, and retention. Brooks and DuBois (1995) found that emotional variables exerted a strong influence on how well students adjusted to their first year of college, which is a strong predictor of academic success (Heyningen, 1997). It has further been reported that the possession of high self-confidence (Boyer & Sedlacek, 1988; Foster, 1998), self-control (Wolfe & Johnson, 1995), and having an achievement-oriented personality (Foster, 1998) are associated with a higher academic performance. In addition, students who are adaptive perfectionists tend to adjust better to college and as a result, have higher rates of retention and performance (Rice & Mirzadeh, 2000). It has been suggested that personality variables may be useful predictors of future college performance and attrition (Cross, Harper, Osher & Kneidinger, 2000).

Furthermore, Gottfried (1990) found positive correlations between psychological variables and performance. Specifically, she reported that young students with higher academic intrinsic motivation had significantly higher performance. She also found that early intrinsic motivation correlates with later motivation and performance, and that later motivation is predictable from early performance. It was also reported that perceived academic competence was positively related to intrinsic motivation.

In addition, Halawah (2006) in his study on the effect of motivation, family environment and student characteristics on academic performance, established a positive correlation (r= 0.7) between performance and motivation. It therefore, appears that students who feel competent and self-determined in the school context develop an autonomous academic motivation which in turn, had a positive impact on school performance (Fortier, Vallerand & Guay, 1995).

However, some studies have reported little or no significant relationship between psychological variables and scholastic achievement. A study conducted by Niebuhr (1995) examined relationships between seven psychological variables and students' academic performance specifically, focused on individual motivation and its effects on academic performance. Findings show that student motivation had no significant effect on the relationship with academic performance. Another earlier study of Boggiano, Main & Katz (1991) regarding differences on gender in motivation found that females were significantly more extrinsic than males, thus, female students' performance is less associated with their interests than male students' academic performance (Shiefele, Krapp & Winteler, 1992). Also, Stipek & Ryan (1997) reported that few studies that have examined motivation in young children established that it is a weak predictor of academic performance.

The present study examined such motivational characteristics, that is, psychological variables as self-efficacy beliefs for distance education, self-regulation skills, study habits and self-concept with respect to academic performance of distance learners in Nigerian Universities.

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- Regulation: Distance Learners' Self Regulation Skills Scale (DLSRSS) with 15 items that reported Cronbach alpha reliability coefficient of 0.68.
- Distance Learners' Study Habits Inventory (DLSHI) comprises has 20 items and has Cronbach alpha reliability coefficient of 0.76.
- Self-Concept: Distance Learners' Self Concept Scale (DLSCS) with Cronbach alpha reliability coefficient of 0.76. It has 15 items.
- Stress: Hopkin's Symptom Checklist consisting of 30 items. It is a four point rating scale. The Cronbach alpha reliability coefficient of this scale was 0.74.
- Self-Esteem: The modified version of Basavanna's Self-esteem Scale consisting of 28 items was used for studying self-esteem. The original true-false type of response pattern was changed to a three point rating scale, on which a high score indicated low self-esteem. It had a reliability coefficient of 0.96.
- Locus of Control: The Rotter Internal-External Control Scale that consists of 23 items and has Cronbach alpha reliability coefficient of 0.72.
- Goal Achievement: Goal Achievement Rating Scale of 20 items with Cronbach alpha reliability coefficient of 0.65.

The researchers also used a self-designed distance learners' bio-data master sheet (DLBMS) to collect students' results from various study centers.

3. Findings

Findings from the present study revealed that the eight psychological factors, namely self-efficacy, self-regulation skills, study habits, self-concept, students' attitude, locus of control, goal achievement, stress when taken together, accounted for 2% of the variance in students' academic performance. This shows the importance of the selected explanatory variables to the criterion variable. This is consistent with some earlier related studies which established significant relationships between some students' psychological characteristics and academic performance in distance learning programmes. For instance, the present study is in agreement to some earlier studies such as those of Woodley and Parlett, (1983), Powell et al., (1990), Abdul-Rahman (1994), Parker (1994), and Sheets (1995) that reported positive correlation between students' socio-psychological variables and academic performance. Findings from this study however, contradicted the works of Boggiano, Main & Katz (1991), Niebuhr (1995) and Stipek and Ryan (1997) as these studies showed that student motivation had no significant effect on academic performance and that few studies which have examined motivation in young children established that it is a weak predictor of academic performance.

The reason behind this finding might not be unconnected with the fact that students, who feel competent, self-efficacious and self-determined in the school context, develop an autonomous academic motivation which in turn, had a positive impact on school performance. Furthermore, some factors made significant contributions. Those factors that made significant contributions are self-concept ($r=.026$; $p<.05$), students' attitudes ($r=.035$; $p<.05$), stress ($r=.033$; $p<.05$), study habits ($r=.023$; $p<.05$) and self-efficacy ($r=.002$; $p<.05$) respectively. This is not surprising because distance learning places more responsibilities on the shoulder of the students than the institutions. Ergul (2004) argued that for distance learners to be able to achieve, they need to control their learning, be more efficacious, develop good study habits and also regulate themselves. This finding therefore confirmed the results of the earlier studies such as Pintrich and De Groot (1990) and Zimmerman and Martinez-Pons (1990) who reported significant and positive correlation between self-efficacy and academic performance.

Also, this study reported significant difference in the scholastic achievement of distance learners with disabilities based on marital status as revealed from hypothesis 3. It therefore contradicts studies conducted by Chacon-Dugue (1985), Wang and Newlin (2002) and Ergul (2004) established insignificant correlation between marital status of distance learners and their academic performance. This is however, in line with those of Woodley and Parllet (1993) and Powell et al. (1990) that found a significant relationship between marital status and academic performance of distance learners. The rationale behind this finding might not be unconnected with the fact that single distance learners with disabilities are likely to

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be less occupied with home demands than the married ones who have children and spouses to take care of.

4. Conclusion

All the eight students' psychological characteristics (self-efficacy, self-regulation, study habits, self-concept, goal achievement, locus of control, stress, attitudes towards distance learning,) contributed differentially to the scholastic achievement of distance learners with disabilities at National Open University of Nigeria. Some recommendations are hereby made towards the improvement of the scholastic achievement of distance learners with disabilities at NOUN. These recommendations are based on the summary of findings and conclusion reached thereafter. The recommendations are stated below:

* Students should pay serious attention to all the selected factors, most importantly those that have significant contributions on their scholastic achievement.
* Participating academics/tutorial facilitators in the programmes should always encourage the formation of tutorial study groups that will encompass students of different ages for the sharing of ideas and knowledge. In addition, academics should always display positive attitudes to the students so that they too can have positive attitudinal dispositions towards the programme.
* Guidance Counselors, Study Centre Managers and other Administrative Staff should always focus on the development of positive image of students in the learning activities.
* Institution's Administrators should always organize regular seminars and workshops for students through which information on the influence of the selected factors on their scholastic achievement would be disseminated to them.
* Distance learning Institutions should provide adequate special students' support services and facilities in order to develop in the students, positive attitudinal dispositions towards distance education in general and their courses of study in particular. Specifically, adequate provision should be made for special learning need students, who may be disadvantaged in the inclusive education system. Furthermore, distance education institutions need to devise a mechanism of keeping distance learners highly motivated until the completion of their programmes. Essentially therefore, keeping on the institutional agenda, the learning needs of the students and addressing them appropriately is hereby suggested.

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A technological approach to creating and maintaining media-specific educational materials for multiple teaching contexts

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Abstract

Depending on the teaching context different types of educational materials are used. To best support the various forms of communication, the educational content should be provided in a suitable media form. For example: visual PowerPoint slides for face-to-face teaching; detailed lecture notes for follow up at home and self-study online content for e-learning. Each media type has particular characteristics, which lead to a range of individual ways of creating content using media-specific authoring tools. The effort required to offer concurrent educational materials for different teaching contexts increases with every additional medium. The author has to create and maintain every single document, although there is an overlap in content and structure between all the materials.
This paper discusses the requirements for authoring and maintaining those documents and how they are received and analyzes the lack of current authoring technology. Based on this pre-study, a technological approach is demonstrated, which combines media-specific formats and authoring tools with a connected single-source content system.

Keywords: Media Specific Writing; Multiple Teaching Contexts; Authoring Technology

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1. Introduction

In history, the most common form of education was the traditional lecture at medieval universities. Commonly, an instructor would read from a hand written source to the audience. Due to the lack of expensive hand written books, the only way to receive the content was by listening to the readings and explanations while taking note (Schwinges 1999). Since this time, the teaching process has evolved rapidly. To this day, a number of different ways to access educational sources exist. Teaching and learning take place in a lot of different forms and situations. For the best outcome and learning success, it is important that every teaching context is supported by the best fitting learning strategies and educational materials. Every teaching context is specified by some individual characteristics, and teachers have to care about these to be able to create and provide the best possible education environment. Nowadays there is hardly a teaching situation imaginable where only a single communication channel is used like the oral speech of the lecturer. To take into account of other receiving ways, new teaching forms and communication channels are used to deliver the learning content to the audience. Nearly all kinds of teaching environments use additional educational materials to support or replace the teacher in the learning process. If you look at today's students daily learning routine, it can be seen that the learning "environment is filled with visual, electronic and digital texts, those texts that are referred to as 'multimodal'" (Walsh M. 2006). It's for that reason that more and more modern educational documents in different media forms are produced with the help of computer technology.

1.1. Planning and creation of educational materials

When an author wants to provide adequate education materials for a teaching context, one has to pass a complex creation process. Kerres (1999) suggested an approach based on multiple steps. In the first step, an author has to determine the topic, identify the target audience, and set adequate learning objectives. Based on this screening, the appropriate contents are chosen to fulfill these objectives. In the next

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step, the decision has to be made in which didactic manner the author wants to guide through these contents. The selected contents get organized into a learning path which defines in what order these contents get presented to the audience. The result of this phase is a structured topic which contains all contents in a learning friendly order. Not until then is it time to think about the educational materials which should be used to deliver these contents. The author has to decide which media form can support the chosen teaching context in the best way possible. On the base of this media selection and the elaborated contents in form of the structured topic, the author can start to create the actual education materials. Kerres (1999) refers to the fact that the didactical preparation of a learning topic should be detached from the media-specific depiction of the associated contents. This creation process ensures that an author can concentrate completely on the line of argumentation, without thinking how it is visualized on the educational materials. Several authors have stressed the importance that the content development should be done independent from the material production. Using the example of presentation slides, Tufte (2003) states that the borders of the medium restrict the writer in his possibilities to express the content. Keller (2003) takes this idea little further: "But PowerPoint has a dark side. It squeezes ideas into a preconceived format, organizing and condensing not only your material but - inevitably, it seems - your way of thinking about and looking at that material." This basic idea can be applied for all other media forms too, because every medium has some particular limits for the expression of content.

1.2. Providing educational materials for multiple teaching contexts

It gets even more difficult when an author wants to provide a course with its elaborated contents in some additional concurrent teaching contexts. Walsh, M. (2009) analyzed several studies, where multiple educational materials were used in some multimodal learning environments. She came to the conclusion that learners can profit by the mixture of different media forms. It is certainly possible to use only one single document for all teaching situations. However, the desired learning success can then fail because the learners cannot follow the content of the course in an appropriate manner. In a previous publication, Walsh, M. (2006) states that various factors have influence on the interaction between the reader and the material. Beside some other factors, she points to the "the immediate situation in which the text is being read at any particular moment." (Walsh, M. 2006) Because of the uniqueness, every teaching situation uses some specific forms of education materials. For example: visual PowerPoint slides for face-to-face teaching, detailed lecture notes for following up at home, and self-study online content for e-learning. Not all educational material suits to every teaching context. This has the effect that several unique documents are required to support each teaching context adequately. The author has to create and maintain every single document, although there is an overlap in content and structure between all the materials. The problem is, these materials differ in style and extent. This paper describes the impact of media-specific styles of educational materials, and discusses the requirements for authoring and maintaining those documents. After analyzing the lack of current authoring technology, a new approach is demonstrated on how authors can create and maintain those educational materials more efficiently.

2. Media style characteristics

The style of educational materials differs in context of the perceptive situation. An author has to care about the following style characteristics of media forms to be able to create materials which fit the target teaching environment.

2.1. Access type

How do participants get access to the materials? In general, this can be divided in two ways: private and public. Students have private access to material when they get their own copy of a document and can use it on their own. The other way is by public access, when only the instructor has a single example of the material. The most important difference is that the instructor has complete control over the use of the document. For example, this can be seen on a PowerPoint presentation. The audience gets public access when the instructor presents the slides with a projector. The instructor controls the presentation time and duration of each slide. It's not possible for a student to go back or stay any longer at a specific slide in the material.

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2.2. Materialization

There is the distinction if the materials are delivered in a digital or analogue way. Digital documents require an electronic device to use them, while a usual sheet of paper can be used without any technologic prerequisites.

2.3. Semiotic style

There are different semiotic systems (text, image, video, audio etc.) which are used in media types in a variety of ways. Depending on the teaching context, all of these semiotic systems have different advantages and disadvantages. This means that some semiotic systems are more adequate for some media forms than others. Images, for instance, can be perceived and conceived in a fast and intuitive way while texts can describe details more precisely. The author does not only have to choose from different semiotic systems. There are also a variety of possibilities to depict the identical message with divergent use of signs and symbols from the same system. For example, some media types prefer text as short bullet items (like presentation slides), while others use well written full sentences.

2.4. Degree of specificity

Content can be expressed in different degrees of specificity. Depending on the teaching context, authors have different preferences in which level of detail they want to present on the topic. For example, when presentation slides are used to visualize the oral speech of a lecturer, the content on the slides is usually compressed to some short abstract phrases while extensive lecture notes can contain explanations in a more detailed fashion.

2.5. Content fragmentation

Every media form has a specific way to group and order the depiction of the content on the low level of the document structure. On the one hand, there are some media types which don't need much effort to achieve this media-specific fragmentation layout. For example, fluent continuous text produced with a word processor gets fragmented into several sheets of paper automatically by the software. On the other hand, there are media types with a more strict fragmentation layout like PowerPoint slides. The author has to care about the content fragmentation and spread the whole topic into several uniform slide fragments.

2.6. Expression variety

To depict a message, it is not always possible to use the same expression in all types of media forms. Every media type supports a set of structural elements to express messages and organize the content. The quantity and behavior of these elements are not the same for all types of documents. For example, it is impossible to use a video or audio clip on a simple sheet of paper.

3. Authoring technology

After exploring some important style characteristics of media types, it is apparent that several independent educational materials are required to support multiple concurrent teaching contexts adequately. This section will provide an overview about current authoring technology approaches which can be used to create those educational materials. It is necessary to distinguish between two basic strategies: firstly, creating individual separated files by using media-specific editors, and secondly, generating materials from single-source contents automatically.

3.1. Media specific authoring tools

The most common way to create educational materials is certainly the usage of some media-specific editors. There is a wide range of authoring software solutions which are designed to create and edit only one particular media type. For instance, there are the well-known software packages like Microsoft Office, Apple iWork as well as some open source alternatives such as Apache OpenOffice. All of these packages

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contain editors which support some specific media forms like presentation slides (e.g. Microsoft PowerPoint) or continuous text documents (e.g. Microsoft Word). Using these tools lends a big advantage to the creation process. Usually these editors are able to take care of all media specific characteristics of the particular target media. For instance, almost all word processors offer an empty sheet of paper after starting a new document. From the beginning, it is clear which media type is the most desirable. Additionally, an editor like this mostly offers designing tools which are specialized to create content for the current media form. Endowed with a media-specific editor, it is easy to produce educational materials which fulfill the most common design requirements.

Returning to the fundamental issue of multiple concurrent teaching contexts, it has to be clarified how such tools support the creation and maintaining of different education materials. Depending on the target media types of the educational materials, a number of media specific authoring tools are deployed simultaneously. Usually an author has to create an independent document file for each teaching context to take into account all relevant media characteristics. Therefore the number of files increase with every new teaching situation. For example, when an author offers presentation slides, lecture notes, and e-learning resources for the same learning content, there are already three separate files and three different authoring tools involved. The most significant down side is that the files are not connected to each other, hence the only way to share redundant content between the files is to use the well-known copy and paste function (Rockley et al. 2012 p.50). This leads to problems when parts of the content or structure are to be changed. This can happen, for instance, when an old course may be updated and reused in a new semester. New content should be added, and existing content should be moved to another position or deleted. The author has to apply all changes to every independent file redundantly and manually.

3.2. Single source publishing

Figure 1 shows the basic components of a traditional single source workflow. The main idea of this approach is that there is only one single source storage which contains the whole content base, without any layout or formatting information. Furthermore, various transformation rules exist which direct how this single source content gets transformed into some media-specific output materials. (Stigler 2003 p.203)

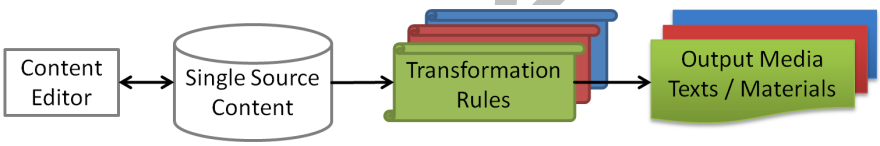


Figure 1 traditional single source publishing workflow

The single source publishing approach was developed originally for technical documentations in the early 1990s. The goal was to reuse existing content for different document versions to support various communication channels (Rockley et al. 2012 p.50). Because of similar requirements, authors of more recent studies have proposed that this authoring technology can also be used to produce educational materials (Walsh, L. 2007 p.914, Closs 2011 p 26).

Mackenzie (2011 p.92) states, that this "method particularly suits projects where the content of the different versions overlaps significantly and the information is likely to be revised or updated frequently". This way has a huge advantage over the first approach which was dealing with several separate files. With a single source strategy, it is possible to make content modifications (like inserting, moving, or deleting) at a central point. "A document is updated one time and then 'transformed' rapidly and dynamically into multiple formats as needed" (Sapienza 2002, p. 157).

When publishing from single source content, it does not mean that all output materials are using the exact same content and structure with only another media style. A fundamental idea is that the whole learning subject is split into smaller content fragments (individual texts, pictures, videos etc.) and stored at a central point. From this basic set of information, pieces of content for the output material can be chosen arbitrarily. Rockley et al. (2012 p.51) explains this development as follows: "At the beginning, single sourcing meant identical content and multiple channels, but as authors became concerned about the effectiveness of identical content used in multiple channels, they moved to customized content. This type of content is customized to meet the needs of the customer, the type of content to be developed, and the

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channel. Content is deliberately built for customized output from the single source to meet specific audience needs or output requirements."

Despite all the advantages, there are also downsides of this approach. In Figure 1, it is visible that the single source content gets created and changed by a generic editor. Like any other authoring software, this editor supports a limited set of expressions to depict the content. The consequence is that the output materials can only contain content expressions which are supported by the editor. For instance, when the editor is not able to handle video material, it is impossible to get a movie clip into the output material. Another problem becomes visible by looking closer at the transformation rules and the automatic output creation process. The problem is, an author can influence the appearance of output material only in an indirect way. The author has to revise the transformation rules for the target media type to change the output appearance. These rules contain strict instructions for a computer on how to transform the single source content into a media-specific file. On the one hand, this works fine for media-types with strictly defined layouts, like fluent continuous texts with predefined style templates. On the other hand, there are media types which allow a bit more creative designing, like free positioning and orientation of pictures and texts in presentation slides. For example, Pötzsch (2007, p.95) was able to show that a lot of PowerPoint users create free designed text-image-collages without use of the default layouts. For a computer algorithm, it is impossible to do something like this on the base of a transformation rule. Finally, it can be summarized that on the one side, the single source publishing approach is able to manage overlapping content at a central point, but on the other side, it can be seen that this technology is unable to take care of all media specific characteristics of the output materials.

4. The best of both worlds

Based on these previous findings, a technological approach is demonstrated which combines both authoring strategies into a single approach. The objective is to get the best of both worlds: using media specific editors with some kind of single source content management. Figure 2 demonstrates this functionality.

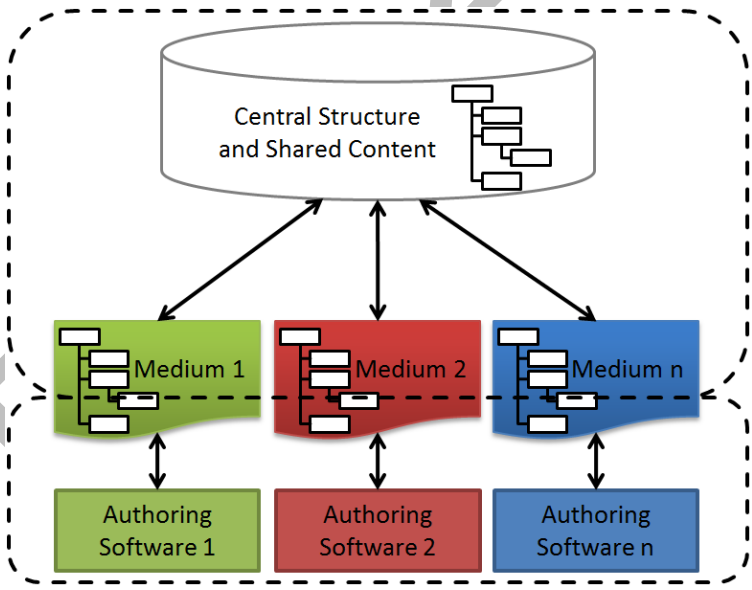


Figure 2 media-specific files connected with a single source base

The base for this approach is the idea that the characteristics of materials and their media types can be divided into two groups: shared characteristics which are the same for all concurrent materials, and media-specific characteristics which are unique for every single material. The concurrent educational materials were created on the base of a planned and structured course topic, therefore they share the same structure and content. In contrast, the depiction of the content, layout, and formatting are media-specific characteristics.

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To confer about the shared media characteristics, each concurrent material is connected to the same external single source base. This central data store contains all information which is shared between the concurrent materials such as the overall structure and redundant content. As all materials are connected to the central data store, it is possible to apply changes to all other connected materials. For instance, when an author deletes some content in a material, this content change gets committed to the single source base. From here, this change gets applied to all other connected materials.

Furthermore, all these materials are saved in traditional media-specific file types. Therefore these files can be edited with usual authoring tools. This means the author can use all options which are offered by the media-specific authoring software to create materials in an optimal way. Since the material files are connected to the central data store, all the concurrent materials belong to the same structure; a set of ordered and encapsulated structure items. Nevertheless, it is the task of the specific media file to depict the content of these structure items. There are 3 ways to handle a structure item in a specific medium:

- Each connected material can use particular expressions to explain the same content. So it's possible that the same message is depicted in one media file with text, and in another media file with a picture.
- It's possible to use shared content which is synchronized between all connected materials by the central data store. This means when an author changes a shared content text in one material, these changes get committed to the single source base and thereby are applied to all other connected materials.
- Apart from the ability to use shared content or media specific alternatives, it is also possible to leave out structure items. It's not required that every structure element from the single source base must be present in every material. It therefore means that each connected material has only a subset of the central super structure.

The connection between the single source base and the material files can be realized with software plugins inside the media specific authoring tools. These plugins have to synchronize the shared structure and content with the single source base.

5. Conclusion

The findings of the study show that in current teaching environments, it is not easy to provide the best suiting educational materials, particularly when similar content should be taught in multiple teaching contexts. The currently available authoring approaches have great difficulties in various areas. Some strategies are not able to create all media types in adequate ways, while others are not able to manage the overlapping learning content in an effective manner.

For all the media specific characteristics of the educational materials, this study suggests a new authoring approach that combines media-specific formats and authoring tools with a connected single-source content system.

At the moment, two Microsoft Office plugins are being developed to connect the content between Word and PowerPoint files as a first implementation of this concept.

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Activating devices and their use in e-Learning – focussed on handicapped students

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Abstract

The article deals with the questions related to the activation of students using the electronic technologies for their studying emphasizing the handicapped students. It focuses on the problem of the transformation of the passive students into "the immediate participants in studying" in context of obstacles placed in front of those students which, due to their handicap, are limited in the process of studying.

The article states e.g. that the activation plays an important role in the effectiveness of the studying and it is desirable to look at it bipolar. It means that the reflection has to be found during the instruction as well as during studying - on the side of a pupil as well as on the teacher's side. Thanks to inclusive trends that manifest themselves in education in Europe, it is possible to meet the handicapped students in common education more often and therefore it is desirable to pay attention to this issue.

Keywords: e-learning, activation of a student, handicap.

1. Activating devices and their use in e-Learning

Education is connected to the humanity from the whole beginning, it goes through the continuous development and it goes under the gradual innovative processes as well. E-Learning became a phenomenon in the middle of the 20th and 21st century and it includes a number of sub-elements that are in many cases connected in the coherent system that enables individual´s effective development not only intellectually. This development should be done through active studying when the student is developing intensive study activity that is ideally motivated by his own interest and that is conducted without distinct pressure and the aid of other person. However, the activity should be specifically aimed, led, controlled and evaluated. It is needed to create a proper situation using the activating devices for the students' active studying.

The modern educational technologies are able to ensure the abovementioned facts. From the technological point of view, we can speak about the extensive systems meant for the studies of fully distance character that use the sophisticated devices to provide cooperative studying. On the other hand, it can be meant only as a support of the full-time studying conducted in the traditional conception.

If the e-Learning should be a full alternative or a component of the traditional education, then it has to be based on the deep and complex pedagogical analysis of the educational process and its elements, processes and links.

The modern educational technologies provide a number of opportunities for conducting a more effective studying only in case of the *effective activation of students*[6]which is valid to the "face-to-face" instruction as well as to the distance instruction that has a lot of specifics. Due to them, every person can become a student in case of the distance education, healthy or with a handicap, but he/she has to be able to study individually and to have his/her own responsibilities for the educational procedure and an aim

* In this chapter the term "*student"* is used; however, in the given context it can be changed to different terms such as "pupil", "educant", "the educated one", "the studying individual", etc.

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that he/she wants to reach. This is conclusively related to the desirable application of the equal opportunities in the educational fields.

T. Svatoš (Svatoš, 2009) states that the new educational technologies represent a progress in the development of the didactical devices that support the educational purposes. Their common signs are:

- Integrality (link of the partial devices to the "higher" unit),
- Multimediality (presentation based on different information from one source),
- Interactivity (the user is actively taking part in the process of instruction – studying),
- The increased importance between so-called hardware and software,
- The independence of the educational roles (greater independence especially for the "educated one")
- Opening of the relatively new forms of education (distance education, e-learning, blended-learning, individualized instruction) that are based on the management of the individual´s studying activity which supports his/her self-education.

E-Learning is closely related to the use of the informative and communicative technologies in the fields of education. In accordance to the general perception it is understood as a kind of studying during where the gaining and using of knowledge is distributed and simplified by electronic devices (Průcha, Walterová, Mareš, 2009). Due to high educational potential became the e-Learning a perspective emerging area of the pedagogical theory and practice which is continuously, systematically and intensively being dealt with on the national and international level – those authors should be mentioned: S. B. Eom and J. B. Arbaugh (Eom, Arbaugh, 2011), R. C. Clark and R. E. Mayer (Clark, Mayer, 2011), Y. J. Joo, K. Y. Lim and E. K. Kim (Joo, Lim, Kim, 2011), A. Mauthe and P. Thomas (Mauthe, Thomas, 2004), J. Anderson and R. McCormick (Anderson, McCormick, 2005), S. Bennett, K. Maton and L. Kervin (Bennett, Maton, Kervin, 2008), S. Kluge and L. Riley (Kluge, Riley, 2008), R. Möhlenbrock (Möhlenbrock, 1982), M. F. Paulsen, (Paulsen, 2003), D. S. Smith and J. B. Caruso (Smith, Caruso, 2010), D. Tapscott, (Tapscott, 1998), A. Bates and G. Poole (Bates, Poole, 2003), R. Ramanau, A. Hosein and Ch. Jones (Ramanau, Hosein, Jones, 2010).

The possibilities of the students' (i.e. studying individuals') activation are different and it is not possible to think only about the study supports that are already holding concrete educational content. The means of the students' activation vary, e.g. the communication between the teacher and the student, the educational activities and environment etc. The primary aim of the activation process is the transformation of the passive students into the "the immediate participants in studying" (Kotrba, Lacina, 2007), however, the activation process is linked to the tutor as well. The activity of the students is understood as an increased and intensive activity which is based either on the inner slope, spontaneous interests, emotional motives and vital needs, or on the conscious effort (Maňák, 1998). It can manifest itself in many ways, e.g. as an exploring activity, physical activity, technical activity, artistic activity, sport activity, etc., and it is clear that not all of them are related to the e-Learning, or more precisely - it cannot be induced like that. The activation methods are defined as procedures that lead the instruction in such a way that the educational aims are gained mainly on the basis of the own study work of the students and the focus is emphasized on the thinking and problem solving (Maňák, Švec, 2003).

In terms of the educational process and aim achieving is substantial the inner activity because it is developed from one´s personal devices, from students' interests, from their attitudes and conviction. This activity can be in some cases hard to initiate and to direct the required way; that is why the teacher[7] has a wide field of possibilities when it comes to the external activation. Attention has to be paid to the apparent, pretended and formal activity which is educationally useless.

In relation to e-Learning there appears to exist passivity of the students which is the opposite of the activity. This state is not desirable and it has to be eliminated and this can be done with help of the educational e-Learning technology that can be considered as one of the assumptions of the successful students' activation.

2. Possibilities of students' activation in the e-Learning

[7] The term "teacher" will be used, however, in a given context can it be changed into similar terms such as "pedagogue", "tutor", "author of the study support", "educationalist", "mentor", "the teaching one", etc.

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The substantial task of the teacher and the didactic devices is to activate the student properly, because if attention of the students is not paid, the mastering process cannot be done effectively. Motivation is also very closely related to that. All the processes of cognition, either perception or thinking, are aimed to an object. The basic sign of the attention is therefore the focus on the object (thing) which can be materialistic or psychical (the content of our mind) and concentration on it (Linhart, 1987). Feelings, perceptions, memory, thinking, images, these are all psychical processes that have their own specific content. Attention does not have this specific content; however, it manifests itself in cognition and thinking, memory and other cognition processes (Pardelt, Boroš, 1979). If the attention incorporates itself into the cognition process, it means that the human not only hears but also listens, listens to something and hearkens; not only sees, but also watches, has his eyes on something, observes; and his cognition turns into *active* treatment with the perceived material and into its obtaining for a specific aim (Rubinštejn, 1964). Those all are essential moments to which should be proper attention paid and they are important for realization of the successful process of the studying – the e-Learning.

If we now focus the problematic of attention in terms of e-Learning, it can be concluded that in the fields of psychology it is desirable to use the sophisticated learning systems with a number of tools. Why does the study via e-Learning with use of multimedia elements catch attention of the students? We should focus on the education as a whole. Its use is an opposite to the verbal style of teaching but it cannot be denied that any content of education can be taught without multimedia's effect on it, e.g. only in verbal way. It is known from the fields of psychology that any contrast between the stimuli catches attention. We should keep in our minds that educational process with use of multimedia offers to the students an alternative, something new – the activities of the active character. Those are activities very substantial for the students' development and not only a simple perception of the verbal interpretation of the teacher. In this considered case is the attention from the side of the students paid inadvertently, unintentionally and is paid because of the catchiness of the object and is conditioned by immediate interest. This moment has for the education a significant importance because of the reason that it is undisputed that intentional attention is developed from subconscious attention.

Subconscious attention is not clearly passive but includes also the activity of the subject. It is unconditionally necessary that the students' attention is paid to the teacher and that the teacher can establish the e-Learning process on subconscious attention conditioned by an immediate interest. The use of multimedia's effect in terms of subconscious attention is only one of the possibilities; however, it is not the significant one. It is desirable though to support the development of the intentional attention of the students with use of different didactic devices as well.

Motivation is closely related to the activation process and it is a direct result of the cognitive and affectively social factors. M. Badinská (Badinská, 2007) argues that by using the informative technologies is the educational process becoming motivating and dynamical.

3. Limits and possibilities of activation of the handicapped students during the e-Learning

It is currently possible to observe a trend of the increasing integration and the inclusive efforts and pursuits in order to integrate the handicapped students into the common educational institutions. However, it causes a number of special needs for creation of the materialistic didactic devices that are going to be adapted to the concrete needs and possibilities of the handicapped students.

e-Learning can to the handicapped students mean a pro but an obstacle as well. It depends on a number of circumstances, but mainly on the type and the range of a handicap. Moreover, it has to be considered that every teaching object has its typical specialties and orderliness and therefore it needs own appropriate methods and organisation forms (Ludíková, 1989). e-Learning enables, due to its flexibility, the realization of education which is adapted to the people with special educational needs, mainly to the people with physical and cognitive handicap, in the specially modified environment which enables alternative ways of communication (e.g. purely audio or purely visual communication in the sign language, etc.).

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J. Glozar and col. (Glozar a kol., 2007) state that the principles guarantying to the handicapped people the highest possible accessibility to the e-Learning course already in its creation are mostly identical to the needs that can be stated generally:

- exact and clear structure of the course that corresponds to the clearly formulated educational aim,
- clear and correct literary language whose complexity corresponds to the educational aim (but is not more complex than needed),
- correct technical treatment, i.e. in accordance to the applicable standards for the source code.

According to S. Nečas (Nečas, 2008) the visual function causes from the psychological point of view a number of difficulties:

- visual acuity – corresponds to the visual exactness, differentiation of the distance and proximity, a human being has to use compensational aid; otherwise he/she is unable to move safely,
- ability to adequately visually perceive under different lighting conditions,
- the field of vision sets the range of the ability to perceive visually. Degenerative retinal disease is very typical. In order to see, a human have to look on things by sideways look and has difficulties to orientate himself/herself in the environment,
- colour vision – disorder of the colour vision is often indicated among visually handicapped people, limitations for a practical life are not significant.

The hearing has the compensative function among the *visually handicapped students*; therefore it has to be considered when using e-Learning. While creating the e-Learning materials for the visually handicapped or blind students, the following specifics have to be kept in mind (Pavlíček, 2012):

- a visually impaired does not work with PC intuitively but analytically (he/she has to learn some concrete ways and solutions and that makes it a significant difference between the working of a visual impaired user and a user who has no visual impairment),
- a visually impaired user has to work with an operational system and some of the applications set up specially in order to make them accessible,
- a visually impaired user uses PC and all the programmes mainly by a keyboard with help of the keyboard commands (shortcuts),
- a visually impaired user gains information linearly – he misses the context of the displayed information,
- a "screen reader" opens up to the visually impaired user only information in text form (therefore he/she is not able to work with pictures, graphs, etc. – it is needed to use so-called tactile graphics here),
- a purblind user sees in one time only a (small) part of the screen during the use of the software magnifying glass, he/she misses the context of the showed information,
- some of the purblind users need a different set up of the screen scheme than the standard adjustment (e.g. "High contrast of black")

Loss of hearing does not have to be a problem in e-Learning, however, if deafness is congenital then there appear problems during understanding of the terms and the electronic study supports have to be adjusted to those. The possible auditory stimuli, that could under the other circumstances be used, are replaced by visual ones but those sometimes do not show a whole picture of the reality.

In case of the *physically handicapped* students there are mostly no difficulties with the perception of e-Learning because mostly those handicapped students are paraplegics and quadriplegics with significant handicap of the lower limbs. e-Learning courses are in those cases a significant contribution to overcome the obstacles and they open up education with minimal the need of physical movement in the terrain. However, handicap of the upper limbs (tremor, damage of the fingers' fine motor skills) or their complete dysfunction can dramatically modify the ability of use of the computer technologies. Those cases have to be usually treated by supportive hardware devices (a special mouse, a special keyboard, writing with the help of compensatory attachments, writing with the help of eyes, etc.). Relatively low frequency and typological differences of those cases make it impossible to formulate the general principles of availability – it has to be achieved individually (Glozar a kol., 2007).

Even the *mentally challenged* students can successfully educate themselves with the use of e-Learning, however, it depends on the level of their mental challenge. There are developed and successfully used special computer programmes that contribute to the development of the educated individual's character effectively.

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Mental challenge is defined as a serious handicap of the mentality development from the prenatal, perinatal or early postnatal aetiology and they lead to the significant limitation in the adaptive functioning of the handicapped child or adult in his social environment (Říčan, Krejčířová, 1997).

The main signs of the *mental retardation* are (Nečas, 2008):

- a low level of the mentality that manifest itself mainly by insufficient development of thinking, limited ability to learn and therefore a difficult adaptation to the common life conditions,
- the handicap is congenital (except for the dementia),
- the handicap is permanent even though it is possible for a slight improvement depending on the aetiology and action, i.e. educational and therapeutic influences.

As K. Zatloukal and M. Ulrich (Zatloukal, Ulrich, 2008) state, the e-Learning materials can help in educational process to the students with a mental challenge. They have a number of specific problems given by their dysfunction or dysfunctions. It is hard to integrate them with the others and therefore the specific and different attitude is needed. If the education there is led by appropriate means with appropriate educational materials, it is possible to achieve very positive results.

The **concluding information** about stylizing the content itself in the electronic document in order to make it available also to the students with handicap, and, they can easily move and orientate; states M.Kudláčková (Kudláčková, 2012):

- text – different sizes and shapes of the fonts can be used for the differently sighted persons. It is appropriate to have a possibility to increase the font size or to decrease it in accordance to the needs of the individual. The lowest font size of 12 – 14 is recommended. The contrast between the text and the background should be as big as possible. Information in form of an image should be commented (described). Used font should not be too narrow but too wide neither;
- structure – the author should use a variety of styles of the headings which helps to create the automatic contents. For the students with handicap is it much easier, due to those headings, to orientate within the text. Those styles of headings should be used logically (e.g. heading 1 – used for the name of the main chapter). The text should be divided into paragraphs and well structured;
- images – all images should have a brief comment. Graphs, schemes, maps, etc., have to have a word equivalent (or an audio equivalent) so that it is clear what information wants the author to be shared;
- hyperlink – most of the time is pasted with the help of *ctrl-c* and *ctrl-v* which is very simple; however, this kind of hyperlink does not have to make sense to the people with handicap (hyperlink is actually processed by a subtraction software in form of letter by letter and the original sense of the sentences can get lost in there). Therefore it is useful to describe the hyperlinks as well;
- colour – if the author uses colourful combinations in order to highlight the text, he should make it with help of the most possible contrast (light tones on dark tones and vice versa);
- multimedia – if the author wants to use an audio or video object, he/she should mention this within the text and he/she should briefly describe what is its content and if it is important for the understanding of the content. If the video contains an essential communication then it has to be described in more detail, the transcription should be made or audio recordings should be delivered. If the video contains subtitles, they have to be transformed separately (outside the main text);
- formats – they are a specific types of documents that are being used commonly by the authors in their e-Learning courses. They can deliver information in whole in a certain format, e.g. MS Word, MS Excel, MS PowerPoint, PDF format, web format, etc. According to EBU, the best choices in transforming information to the students with handicap are the online formats. MS Office formats are relatively well available, however, also here can occur several problems (mainly in structuring of the text);
- scientific symbols – to make the mathematical and scientific symbols available is a complex thing to do because some of the students with handicap prefer to read mathematics in the Braille alphabet, some of them need a bigger font (sometimes even with a specific highlight), some of them cooperate with a voice output (combination of speeches). Authors use often images in their graphical representation of the mathematical notation (either on websites or in other formats such as Word, Excel) and those have to be commented as well.

The virtual worlds can be effectively used as specific educational platforms for the handicapped students. Their value in this context is appreciated by K. Olševičová and K. Mls (Olševičová, Mls, 2010) who state that the virtual worlds can be used as specific educational platforms, e.g. there was created and successfully tested a virtual environment in Germany where the handicapped students were training the

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life situations and tasks (Groenewegen, Heinz, Fröhlich, Huckauf, 2008). The importance of the multiusers virtual environment is appreciated as well by H. Marešová (Marešová, 2012) who states that their use took a new dimension of the experiencing education into the process of education.

The webcasting systems came currently to the fore in accordance to education of the handicapped students. L. Herout (Herout, 2010) remarks that the biggest potential can be seen mainly when the individuals with special needs in the education, such as students with learning disorder, handicapped students or on the other side very talented students who need individual resolution in order to achieve the defined educational aims, are tried to integrate within the common collectives.

4. Conclusion

No e-Learning education can be performed effectively if it is not projected in a high quality before so that the students become active. This condition applies even more when speaking about the handicapped students.

Activation of the students can be performed with help of different means and devices, i.e. here can be mentioned the use of stimulation, models, electronic conferences, appropriate design of the user's environment and the didactic games. But the most important are the problem learning and education. A human remembers longer and better things that he/she explored by his own active and heuristic activity; this states also J. Linhart (1982, p133). It is not enough to explain only the matter, some of the parts have to be processed into the problems that should be solved by the students individually. The study materials should lead students to their individual thinking and inferring.

Already in the phase of the preparation of the e-Learning courses should be the specifics of the handicapped students considered because the modification can be later very problematic. Attention should be paid not only to the technological side but also to the personal one, i.e. the mentors and tutors should take part in the special preparation focussed on the acquiring of the competences that are necessary for the effective e-Learning education of the handicapped students.

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ADULT LEARNERS' PERCEPTIONS OF DESIGNED HYPERMEDIA IN A BLENDED LEARNING COURSE AT A PUBLIC UNIVERSITY IN MALAYSIA

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Abstract

With the advent of the computer and the Internet, many higher institutions in Malaysia have begun to integrate conventional teaching with these two technologies. This approach in learning which is also called 'blended learning' offers significant benefits, namely time and location shifting. However, the principles applied to activities designed as a blended course must be taken into consideration–especially when the students are off campus adult learners with minimal opportunity to attend conventional tutorials. A study was conducted to look into this issue by seeking feedback from adult learners regarding blended learning within an academic reading course at a Malaysian public university, National University of Malaysia (UKM). The study was aimed at finding ways to improve the course offered to off campus students who were scattered throughout the country. The method of inquiry of this study is qualitative in nature and which utilizes observation, Think-aloud Protocol and semi-structured interviews as the research instruments. The subjects of this study were selected off campus students who were attached to various hospitals. The focus of this paper is to discuss the students' feedback pertaining to the designed hypermedia and comprehension questions. This paper also explains some pedagogic implications. The implications drawn is of great value to the students; teachers as the facilitators; teachers as the course designers and the administrators in improving blended learning course offered to UKM off campus students.

Keywords: hypermedia; adult learners; blended course; off campus students

INTRODUCTION

Since the 1950's Computer Assisted Language Learning (Beatty, 2003) or CALL has been used as resource for language learning. Throughout the early years of CALL, students had to move to a computer lab or computer terminal for instruction, but CALL has progressed tremendously since then. Currently, with the advent of computer technology and the changes in government policy, English language lessons such as reading can now be conducted in virtual classrooms utilizing the computers and the Internet. Reading, as a skill, is an important component of language teaching and learning (Wallace, 2010). It is argued that when there is little reading especially in formal education, there would be little language learning taking place (Nuttall, 2005; Wallace, 2010). For that reason, many language programs incorporate reading lessons. In a conventional reading course, students obtain their input through lectures and tutorials in lecture halls and classrooms. If the students face any difficulties in their reading, they can always seek assistance from their respective teachers or their fellow classmates. With CALL, the traditional ways of learning has evolved to include the use of new technologies to enhance the teaching and learning, as well as the development of reading skills among learners. From 2008 to 2010 distance learners in the Allied Sciences Faculty at the National University of Malaysia (UKM) took English for Life Sciences which was a preparatory reading course to equip the students with relevant reading strategies for use in their coursework. The main objective is that by the end of the course, the students would be able to apply the appropriate reading strategies that can facilitate their reading of academic reading materials especially on Life Sciences. The course designers who were also the researchers, however, were aware that they should not be blinded with all the positive aspects of CALL as highlighted by various studies. Findings of studies suggested that students, particularly adult learners, faced many difficulties in comprehending hypermedia docu-

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ments. Thus, the researchers felt that it was crucial to embark on a study to investigate the issue on local ground. The main objective of this study was to investigate the distance learners' perception of the reading materials in the course which is in the form of hypermedia documents. The major question for this study was: what are the learners' perceptions of the designed hypermedia? It is hoped that the findings of the study could guide and facilitate the course designers in designing better hypermedia documents especially for the teaching of English for Specific Purposes reading course.

LITERATURE REVIEW

INTEGRATING ICT IN ENGLISH FOR SPECIFIC PURPOSES COURSES IN A MALAYSIAN SETTING

Technology in a language course is used to tailor to the needs of specific groups of users. Some educators (Ramesh & Sanjaya, 2007; Wallace, 2010) categorize the purposes for reading into several categories, namely survival, educational, environmental, informational, occupational, recreational and ritualistic. In general, higher institutions in Malaysia try to equip their students for using English for environmental, occupational and informational purposes (Halimah, 1998). The educators also try to create contexts so that the students could fully function in these three main areas. To date, higher institutions in Malaysia normally offer one or all three types of English courses: English for Proficiency, English for Specific Purposes or English for the Workplace to equip the students for the abovementioned purposes (Radha, 2007). It is argued that local tertiary students encounter problems when reading academic texts (Radha, 2007). This problem is a serious problem in the Malaysian context because most of the references at the tertiary level are written in English. Furthermore, with the advent of the Internet, many students at the tertiary level read from websites to equip themselves with relevant knowledge in completing their assignments and preparing for tests and examinations.

In Malaysia, the use of virtual classrooms in the teaching of English is quite new. Most virtual classrooms offered at higher institutions use the hybrid approach since most Malaysian educators as well as the students are still in the transition between traditional and e-learning mode (Rozhan & Helen, 2004). According to Keerti (2009), a hybrid program is a program which combines a myriad of methods namely face-to-face classroom (physical delivery), online programs and self-paced learning. Thus, the users, namely both the educators and the students, need to adapt to the new technology to gain the benefits that technology offers. As Dail (2004: 24) wrote in her doctoral thesis, "as the computer technology evolves to meet the demands of society, society must continue to adapt to changes in the technology". Further to this, teaching and learning styles have been altered due to the widespread use of the Internet and the World Wide Web (WWW) (Grabe & Stoller 2002; Wallace, 2010). The teaching and learning in higher institutions in Malaysia is also very much affected by these developments, in addition to the government policy to promote lifelong education. Online learning through the utilization of the Internet is seen as the right move toward fulfilling both the needs of new media as language learning resource, and addressing lifelong education as envisaged by the government. However, in the Malaysian setting, online learning is closely associated with, or rather restricted to, distance learning whereby students take a particular course off campus, therefore, may not be at the same place to learn the subject, and the learning takes place via online (Norlida, 2006).

The English for Life Sciences course focused in the study employed blended learning approach but utilized the use of virtual classrooms for its reading component. Blended learning, as mentioned previously, is a combined instructional method, namely face-to-face instruction with computer-mediated instruction. It has been argued that one of the benefits of blended learning is an increased access to knowledge (Lee & Chung Hyun, 2013). The course designers were interested to see how far the use of online materials (heretofore known as hypermedia documents) that they designed or adopted were an efficient and a good way to help students develop their reading skills, according to the perceptions of the students. According to Beatty (2003), hypermedia refers to hypertexts but the links are not just from text to text but they also involve links to various media such as sound, images, animation and/or video. By conducting research on the users' perceptions of the use of hypermedia, necessary improvements could be made to the designed hypermedia in order to tailor to the needs of many parties in their own institution namely the teachers, distance learners and the administrators.

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ADULT LEARNERS AND READING

This study involved adult learners as research participants, thus, it is essential to describe the characteristics of adult learners since they have different characteristics in comparison to young learners. The participants in this study could be categorized as adult learners as they fulfill the definitions given by many scholars. Knowles and Holton (1998) defined adult learners as people who have arrived at self-concept. That is, they are able to be responsible and take charge of their own life particularly learning. They would tend to grow resentment to others who impose their wills on them. They prefer to be involved in the decision making process which involve their well-being. Carnine et al. (1997) emphasized that adult learners are capable of appraising, managing and regulating their own reading performance).Other scholars including Miller and Stine Morrow (1998) added that adults are able to conceptualize the content of what they have read. They could relate their prior knowledge to bring meaning and later to develop better understanding of the reading materials.
All the adult learners in the course offered at UKM possessed a Diploma in related fields of Life Sciences. Therefore, as far as reading is concerned, they could relate their academic knowledge and working experience toward enhancing their reading comprehension. Apparently, adults are capable of becoming self-directed learners as they possess the characteristics mentioned earlier and additionally, due to their greater sense of responsibility, are able to manage their time wisely in comparison to youths (Timarong et al., 2000).

Due to the above characteristics of adult learners, the course designers designed the course (English for Life Sciences) materials, activities and evaluations accordingly. This course which adopted a hybrid approach allowed the adult learners, as students of the course, to have more freedom in 'managing, regulating and appraising their own reading and performance' **(**Carnine et al. (1997), as mentioned earlier on in this article. They were given ample time to navigate their own reading, and to complete their assignments. However, the adult learners were still provided with sufficient support with regard to resources, templates, guides and samples. The class instructor also served as a facilitator to guide them in reading the hypermedia documents, and in answering the reading comprehension questions. The class instructor also modeled the usage of hypermedia reading strategies (Corbel, 2004). They could also discuss with their classmates via online forum to complement each other's understanding of the reading materials and to provide social support. Social support is pivotal to create a sense of belonging among distance learners (Pica et al., 1989). The assistance of their peers through collaborative learning could help the students' maintain their motivation, attain/acquire new skills and reading strategies, check their understanding and share new ideas (Murphy & Gazi, 2003).

In many cases, adults relative to children can resist new reading strategies as they are already comfortable with their own reading strategies (Laird, 1985). Nevertheless, in the current scenario, adult learners do not have much choice but to adjust themselves to a new curriculum (Knowles & Holton, 1998). It is further explained that new information can also be perceived as a tool that leads to changes which some adults resist. In this instance, the process of unlearning the already existing reading strategies is a need even though the process is difficult. This process can also be lengthy because they need to learn new hypermedia reading strategies and unlearn the existing reading strategies at the same time. This could be problematic for some adult learners.

Another researcher, Tseng (2008) conducted an interesting research on learners' difficulties in reading websites. His participants were asked to do reading comprehension exercises on the Internet. His interviews show that readers faced some difficulties including eyestrain, the tendency to skip lines and getting lost on the computer screens. They also had difficulties in taking notes as well as in overcoming old reading habits, and had the tendency to get distracted by reading irrelevant websites. Based on his findings, he proposed some pedagogical suggestions accordingly. His suggestions included the need for the teacher to be cautiously selective in choosing educational websites for their students, and the need to train the students on how to adjust the computer screens and web pages on their own. His study also revealed that teachers should also teach their students how to read texts on the web.

It is safe to conclude that adult learners' ability to comprehend the hypermedia documents is heavily dependent on how they are capable of relating the information of the hypermedia documents to their existing knowledge and their capability of adapting themselves to the accompanying assignments given to them (Carrel,l 1987; Yahya, 2008). Their inability to do so will lead them to feel unmotivated and inhibited to read (Laird, 1985). Hence, they need to be given appropriate scaffolding instructions and assistance to

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ascertain their success in learning particularly in a course which integrates a lot of reading activities using hypermedia documents.

THEORETICAL BACKGROUND

COGNITIVE THEORIES

Cognitivism is a study of what happens in the brain or the study of mental processes namely sensation, perception, attention, encoding and memory which behaviorists do not examine in their theories (Jordan et al., 2008). Cognitivists believe that human learn in linear form (Jordan et al., 2008), involving mental processes such as mental planning, goal-setting and organizational strategies. In this regard, the use of meaningful feedback is important in order to facilitate and support crucial mental connections that aid comprehension (of certain subject materials). Learners' data processing mechanism identifies a particular (language) learning opportunity, processes and retrieves the information for the purpose of gaining understanding of the information, makes the necessary connections for creating new knowledge and assimilating new information. Cognitivists believe that if educators are able to understand how the learning process (such as organizing and processing of information) takes place, they are able to design learning activities to optimize learning.

Cognitive theories are also relevant to adult learners. Adult learners also learn in linear form. Humans go through a few stages when they develop their intellectual capacity but it does not stop when the learners reach a certain age (Rogers, 2002) or a certain stage (Lantolf & Thorne, 2006). Rogers (2002) states that a person is more intelligent at the age of 50 than 30 as his intelligence is more developed at this point of time. He adds that in order for a person to learn, he must first need to understand. With reference to hypermedia documents, a question worth asking is how these kinds of documents present difficulties for adult learners? Rogers (2002) and Lantolf and Thorne (2006) suggest that learning materials in the form of hypermedia documents necessitates the application of certain guiding principles. One is that hypermedia documents should be divided into meaningful units and then mastered. The hypermedia documents should then be developed from simple to complex. Moreover, there is a need for hypermedia documents for adult learners to include practice of intellectual exercises. It is because at this age they prefer activities which challenge their intellectual capabilities. One of the activities that promote higher degree of comprehension is exploration. Unlike in traditional reading lessons where the answers or responses are delayed, prompt answers should accompany the multimedia exercises so as to enable the readers to evaluate their abilities quickly. After assessing their reading comprehension level, they would then adjust their hypermedia reading strategies to improve their reading comprehension.

The design of the reading component comprising hypermedia documents in the course offered to the Life Sciences students at UKM was based on the suggestions given by Rogers (2002) and Lantolf & Thorne (2006). Nevertheless, it is not possible for the course designers to speculate on the perceived usefulness of the documents, or the reasons behind any difficulties encountered in using the hypermedia documents among the relevant students. In this respect, although the principles behind its design were adhered to during the design stage, it was felt necessary to conduct a study that seek the adult learners' perceptions of the designed hypermedia in order to shed light on the issue that may arise in the use of the documents among adult learners. It is hoped that this study could provide some insights for the course designers to improve upon the designed hypermedia and ultimately enhance the students' reading comprehension of English for Life Sciences materials.

RESEARCH METHODOLOGY

The research design employed by the researcher in this study is a case study in order to conduct an intensive study of a specific group of people. Merriam (2009) defines a case study as a study which is aimed at gaining a comprehensive understanding of a situation and it is a process rather than the outcome or product of the phenomena. Under the umbrella of a case study, this study is known as an intrinsic case study which intends to catch the complexity of a single case. Thus, the findings could not be used to generalize to

the general population (Stake, 1995). The findings could only be applicable to a group of people which possesses the same characteristics or traits (Miles & Huberman, 1994). This complies with the objective of the researchers whereby there was no intention to study this specific case to understand other cases.

Trochim (2006) and Merriam (2009) proposed that in a case study, a combination of research instruments should be used to corroborate the data evidence or to serve the purpose of triangulation. By adopting a few research tools, the findings of each research tool will at the end be able to cross-illuminate each other (Perakyla, 2000). The research tools employed in this study were observations, semi-structured interviews, and Think Aloud Protocol (TAP). If there are any discrepancies among these sources of data, the researcher asked the participant/s further questions in the following meeting so as to resolve the discrepancies. The researcher has taken some necessary measures to ascertain the validity and reliability of this study. The measures include expert validation of questions for the semi-structured interview questions, member checks/participant validation and audit trail. These measures are proposed by Uma Sekaran (2004:3) in that, "… the reliability measures indicate the extent to which it is without bias and hence ensures consistent measurement across time and across the various items in the instrument". The measures utilized are also recommended by Creswell (2003), in particular the need for researchers to be honest since the researcher is the main instrument. Yin (2009) notes that in a case study, all measures must be applied throughout the conduct of the case study.

In order to observe qualitative research etiquettes, the data was arranged according to the participants' pseudonyms. The participants were assured that their real names would not be revealed so as to not to breach their privacy (Angrosino, 2000). In addition, the researcher also sought consent from the participants. Only participants who volunteered were accepted as the participants of the study. The researcher made prior appointment according to the participants' convenience. The interview responses were transcribed verbatim.

DATA COLLECTION TOOLS

In order to obtain the answers to the research question posed in the study, observation, TAP and semi-structured interviews were utilized. The participants were observed individually for five times. The researcher went to the participants' workplace or homes in order to observe them reading the prescribed hypermedia documents. Each observation lasted between 60 to 80 minutes. While reading, the participants also employed Think Aloud Protocol to express their perceptions of the hypermedia documents uploaded earlier onto the UKM website. The TAP was then followed by semi-structured interviews which lasted about 30 minutes each participant.

PARTICIPANTS & SETTING

First year students registered in the Allied Sciences Faculty were required to enroll in an English course namely English for Life Sciences. The course focuses primarily on reading life sciences hypermedia documents from diverse sources namely books, journal, newspapers, websites and magazines. These hypermedia documents were adapted and uploaded as the prescribed reading for this course.

The designed hypermedia documents were used by the distance learners; all of whom were adult learners with at least a few years working experience in health related organizations. At the time of the study, the learners were attached to hospitals, municipal councils and universities. Their ages ranged between 30 and 45 years old. The students had limited face-to-face meetings with their facilitators and fellow classmates, that is, they only saw one another during the initial two weeks. For the remaining twelve weeks of the semester, the students studied at home or workplace. They became 'self-directed learners' until Week 15 when they gathered at UKM to sit for the final exams. There were eight participants in this study.

FINDINGS AND DISCUSSION

In general, when the participants were asked about the contents of the hypermedia documents prepared

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by the course designers, the interview responses were varied. First, most of the participants viewed that the number of reading articles was sufficient. Second, two of the research participants regarded the contents as being good, relevant and beneficial for their studies and work. The participants INTAM and INTFA (pseudonyms) stated that: "*Some of the contents are good. I could obtain a lot of knowledge from the reading materials" and "I believe the hypermedia help me since they are related to medical science. They are also relevant because they discuss updated issues and general knowledge*". As adult learners, it is very essential for the learning materials to be relevant and directly applicable to their working environment (Akyel & Ercetin, 2007). Adult learners do not learn for the sake of learning but to perform a task, to solve a problem or to lead a more satisfying life (Laird, 1985).

The above participants also mentioned that the teacher should select credible websites as they had found a few inaccurate statements in the hypermedia documents. The participants in the study were adult learners who possessed a Diploma in health sciences and had a few years of working experience. There is, therefore, a good likelihood that they could identify credible sources and those which were not credible such as texts from the Wikipedia, newspaper articles and blogs whose writers are people who may or may not come from a medical background. It is also possible that the respondents were able to identify inaccurate information which appeared in some of the hypertexts using previous schemata.

With reference to contents, in contrary to INTAM and INTFA, many of the other participants commented that the contents of the hypermedia documents were uninteresting which caused them to read only 40% to 60% of the uploaded hypermedia documents on the UKM website. When probed further, the participants cited reasons such as the presence of a large number of unfamiliar words especially jargons and terminologies ("*some of the words are too high level for me as I regard my English as at moderate level. When the contents contain many unfamiliar words, I would feel bored).* However, for INTAM, the hypermedia documents were not difficult. This difference in opinion could be due to a few reasons. One is that INTAM was used to reading journal articles in the Life Science discipline, as expressed in the following statement: *"I'm used to reading journals so I don't have much problem thus far".* It could be said that participants would find the contents to be difficult unless they had experience reading journal articles written in the life sciences. Another reason for the difficulty can be said to be language related. Evidence of this comes from some participants' suggestion concerning the use of glossary to accompany the hypermedia documents. The participants expressed preference for a bi-lingual glossary, such as English and Bahasa Melayu to aid understanding. This evidence is taken from INTSA, "*I prefer to get the translation from English to Malay. Straightforward*".

In addition, the glossary should be in the form of hyperlink ("*I could easily use the hyperlinks to the glossary. It enables me to make quick reference on the words that I'm not familiar with*"). The glossary should consist of important words in the hypermedia documents. Acknowledging that there are terms in Malay that do not have one-to-one relationship with the terms in English, one participant suggested in the interview that the English teachers should work collaboratively with content lecturers to produce a glossary of terms. However, it is difficult to ascertain if this is a language problem or issues pertaining to accuracy of information since the participant was able to identify two wrong translations ("*There are translated words which are inaccurate like 'chronic' and 'acute'. I suggest that the English instructors seek assistance from the content lecturers to ascertain the accuracy of the translation*"). Related to the accuracy problem could be the credibility of the online sources as reading for adult learners who are professionals in their own field.

Moreover, individuals' attitude also affected their interest in reading as admitted by INTRA and INTLI, "*OK, by nature I feel lazy to read or refer to reading materials" and "It is because by nature I don't enjoy reading. I prefer the hypermedia but reading takes a long time".*

> From the observations and participants' TAP, it is found that visual design and effect played a role in the participants (losing) interest in reading. The participants tend to skip the hypermedia documents which were regarded as being 'too long', and perhaps too taxing to read as the result of the size of the words being '*too small'* and the gaps between the lines as being 'narrow'. When enquired further, the participants stated that, "*Sometimes, the website contents make me confuse lah. Some of the reasons are the arrangement is too compact, the words are too small, or the paragraphs are too long. I would prefer if the contents are in point forms and they are put into simple sentences".* It was also reported by the participants that when the hypermedia documents were too long, the size of the words too small and there existed narrow gap between the lines, the participants would experience eye and mental fatigue easily. INTLI stated, "*I could not concentrate for a long period of time"*. Another participant, INTNI,

gave similar view, "*As I mentioned earlier, my retention power is limited I could only read one or two paragraphs then I quit reading".* When they experienced eye and mental fatigue, they tend to skip lines and got lost on the computer screen.

When discussing these 'on the screen' reading difficulties, all the participants admitted facing the same problem. The findings of this study are almost similar with Tseng's (2008) study. When reading printed texts, readers tend to move their eyes from left to right, in a straight line. However, when reading a hypermedia document, readers read information in scattered bits and pieces and not as a textual whole. Their eyes move in circular motion (Nelson, 1992). These difficulties progress with age. These participants, being adults, were used to reading printed materials during their schooling years unlike younger learners who are very exposed to the Internet at an early age, and therefore are very well accustomed to the digital print. Design issues come into play at this point. Rightly so, hypermedia documents are designed as they are because they are meant to be interactive and allow for links to other sources, as most other texts online. This particular issue calls for design considerations, on the part of website designers or those more specialized in IT, but as language teachers and designers of digital language learning materials, there is a need to be aware of potential challenges associated with physically reading hypermedia documents among adult learners. On that note it may be possible to engage in prior training for both teachers and learners in terms of dealing with new media and how that might conflict with using traditional texts. It is worth noting at this point that sufficient user training or preparation has been found to be very important toward ensuring success for an e-learning endeavor (Sami & Mohd Mudasir, 2013).

In addition to the situations surrounding most of the participants, one other issue is degree of familiarity. It was reported by the participants concerned that their working environment did not require them to access and use hypermedia documents. It took them a longer time to adapt to the 'new reading environment'. It could be possible that some degree of motivation was lost in the process because of the challenges associated with adapting themselves to the new environment (Laird, 1985). The participants' actual reading environment, as it was encountered at work, appears to be in contrast to the reading they were expected to do in the course. In this instance, there was a need for the participants to learn new reading strategies involving hypermedia documents.

With respect to retention power, Tseng (2008) stated that the retention power of adults is also lower than children's resulting in faster eye and mental fatigue). In many cases, adults relative to children resist new reading strategies as they are already comfortable with their own reading strategies (Laird, 1985). Nevertheless, in the current scenario, adult learners do not have many options but to adjust their reading strategies. It is important that the course designers make necessary improvements to the designed hypermedia documents to facilitate reading.

Some other issues require consideration as well. 'Dullness' of the contents of the hypermedia documents were mentioned, and this was attributed to the 'size of the words'; or font size; ("*The size of the words is too small therefore, it is less attractive*") and the lengthiness of the paragraphs, including aspect of color. ("*Limited colors on the pages*"). Three of the participants stated the font size should be 16. Being adult learners, they tend to shoulder multiple responsibilities (family, work and study), so it is possible that lengthy articles were viewed as 'cumbersome' because they faced the problem of time constraints. The participants further commented that when the selected article was too long, the participants lost interest in reading even at first glance ("*I quit reading immediately when I see the article is too long*"). Continuous forty-five minutes of reading was reported by the participants to be physically demanding as it put a strain on the eye, subsequently causing them to lose concentration. Added on to these challenges were issues such as not owning a laptop, not having Internet connection and having short retention power ("*At times we do not have sufficient time, do not have a laptop and others to access the website*").

The textual organization of hypermedia documents was also commented on. It seems that the participants preferred hypermedia documents with subheadings; citing constant disturbances from family members at home and work demands. In that respect, it could be said that they needed a text which was easier for them visually. According to the participants, the subheadings should be of different colors to enable them to distinguish between subheadings and paragraphs. This can be illustrated by a statement obtained from interview responses given by INTAM and INTLI,

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"***The texts should be designed i**n such a way that could ease our reading like putting in the subheadings and mark them in different color*"

And courses in UKM have started to integrate IT and use its potential for academic or professional purposes". Currently, very few teachers in UKM are tech savvy in the area of learning management systems (LMS). They need to be more computer savvy before they could train the students. They need to be exposed to a different set of language pedagogy for hybrid teaching and to be trained on how to exploit the potential of course management systems before designing a course. She also wrote that the facilitators and course designers need to be trained on course management systems, ethics and conventions that govern the use of online information before designing the course. "The trainings must be conducted continuously, as attitude change would not occur overnight (Norizan 2003, p. 205)". The teachers who often are also the course designers must be knowledgeable and efficient to manage and deliver suitable course materials. Without sufficient knowledge and support, both parties, the teachers and the students, could easily become technophobic and frustrated as designing and using hypermedia documents, for instance, is a complicated and demanding task (Moras, 2001; Dudeney & Hockly, 2007).

CONCLUSION

It is only through research that the details of the needs can be revealed. It is hoped that the findings of this study which are derived from the students' responses are able to provide some guidance especially for the course designers and also the teachers. These findings could facilitate the course designers to improve the designed hypermedia documents especially for use in English for Specific Purposes course, such as the one offered for Life Sciences students in the study. It is also hoped that efforts would be focused on developing more online materials to fulfill the needs of Malaysian distance learners. It is because with respect to language skills in the Malaysian scenario, the students considered reading as the most important skill (Radha, 2007).

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An application for fundamental computer programming learning

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Abstract

Applied computer laboratory lessons could be unproductive because of many students in there. Correcting students' mistakes one by one is wasting lesson time. Especially for beginners, most of these mistakes caused by complex integrated development environments. In this study, we develop a client server application for computer laboratories. Developed application is able to compile programming language source code remotely. Thus, students don't need to make something out of the writing source code. Furthermore, instructors don't need to install compiler to the each computer in laboratory. For start lesson, it is enough that server has just been configured.

Keywords: computer programming education, computer laboratory, client server application

1. Introduction

Computers are used almost in all business areas. Therefore, it is inevitable that computer courses become parts of the school curriculum (Mayer, 2013). These courses are at the level of the computer operator for social classes while the technical classes need to be more specific and detailed. Most of these courses are consist of computer programming courses. Computer programming is a difficult and challenging subject area which places a heavy cognitive load on students (Mow, 2008).

It is obvious that programming courses done in the computer laboratory. Conventional way of teaching computer programming is installing compiler and integrated development environment (IDE) to all students' computers. While this is not a problem here for engineering students, but there are some difficulties for vocational school students because of they don't have any enough background knowledge about computer programming (Ismail, Ngah, & Umar, 2010).

One of the challenges faced by students is complexity of IDE. Spending time for configuring IDE for every new project and correcting issues caused by project creation mistakes in the limited time of lesson is wastes lesson time. By the number of computers in the lab this problem being more complicated.

In this study, we predict that an application for providing very simple interface for single file source code writing and simply compiling and running may help to students to concentrate writing code rather than configuring IDE. Therefore we developed an application using laboratory network infrastructure to achieve this goal. This application was designed for client / server structure. This design is consistent with laboratory network infrastructure. Teacher's computer implies the server while students' ones are clients. Client side of developed application does not need any installation; it is simply executable file like notepad application coming with Windows™ operating system. Server side of this application needs that preferred compiler tool path has been configured. Once server application is configured, it is ready to compiling. A typical laboratory network infrastructure is shown as Figure 3.

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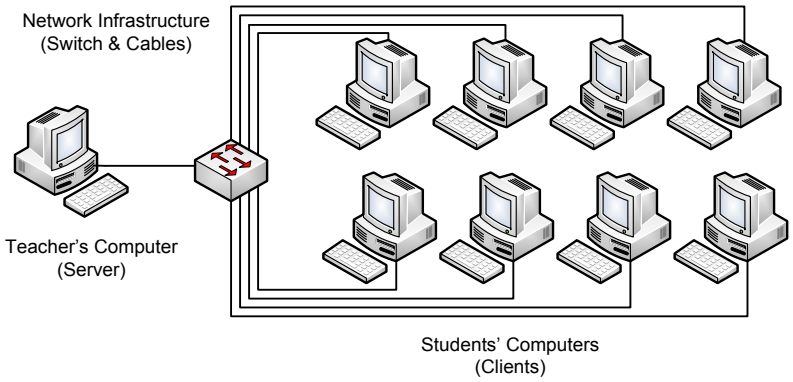


Figure 3 A Typical computer laboratory network infrastructure

2. Available programming environments

There are many programming languages available today. Many popular programming languages like C++, C#, Java, web scripting languages like PHP have same syntax notation with C for fundamental statements. Also almost all embedded chip manufacturers have C compilers for embedded development. Arduino is most popular example for this (Arduino, 2014). So we prefer C language for teaching to students. Therefore students can easily migrate own knowledge to many sections in programming like step up to advanced programming languages or drill down to embedded programming.

Every programming language needs a suitable compiler. Compiler translates the source code to the executable binary code for specific platform or processor. Compilers are an executable command line tool that takes source codes as input files and generates output files.

Source codes are simply text files. Writing source code does not need any specific tools. Basically a text file editor is enough for writing it. But many projects consist of multiple source codes that cause complicated compile sequence. For helping programmers to writing source code there are many advanced editors have been developed called as IDEs.

IDEs are designed for programmers and/or engineers that profession is computer programming. These IDEs contains advanced editor, compilers, tools and helpers. Table 1 shows available IDEs that suitable for using for education in laboratories.

IDEs showed in Table 1 are selected with these criteria: a) Designed for Windows platform. b) Supporting at least C / C++ language c) Having at least C / C++ compiler internally or externally. d) Usable for free without any license issue. These IDEs are tested on a single core CPU, 512MB RAM computer with Windows XP SP3 clean installation. This computer had a 16 Mbps internet connection. Previously installed components have been uninstalled and temporary folders and registry have been cleaned before installation of every individual IDEs. Every installation wizard has been completed by its default options. Some setups contain its pre-requirement components for install these automatically while required. Some installations download its updated components from Internet while installing. After installation of every IDEs, a simple "Hello World" program has been compiled and ran for testing.

Table 1 Available integrated development environments that suitable for using in education

IDE Name and Version	Pre-Requirements	Compiler	Setup Size	Installed Size	Setup Duration
Microsoft Visual C++ 2010 Express	-	Microsoft C++	175 MB	385 MB	16 min 30 sec
NetBeans 8.0 CPP IDE	JDK, MinGW	MinGW	62 MB	217 MB	6 min 30 sec
Eclipse Luna IDE	JRE, MinGW	MinGW	165 MB	223 MB	25 sec
Bloodshed Dev C++ 4.9.9.2	-	MinGW	9 MB	60.7 MB	1 min 50 sec

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Orwell Dev C++ 5.7.1	-	MinGW	45 MB	341 MB	1 min 55 sec
CodeLite 6.1.1	-	MinGW	45 MB	328 MB	40 sec
C Free 5.0	-	MinGW	14 MB	89.1 MB	15 sec
CodeBlocks 13.12	-	MinGW	101 MB	259 MB	50 sec

Bloodshed Dev C++ has small setup size and simple interface. Unfortunately Dev C++ development has been stopped in 2005 and does not support anymore. This IDE is still working on many systems but having some issues with newer operating systems (Bloodshed, 2014).

Orwell Dev C++ is based on Bloodshed Dev C++ and updated releases are available on its web site. Orwell Dev C++ has similar interface with Bloodshed Dev C++ (Orwell, 2014).

C Free is another small sized and simple interfaced IDE and does not need any pre-requirements (Arts, 2014).

NetBeans and Eclipse are based on Java and haven't got build in compiler. Java Runtime Environment (JRE) or Java Development Kit (JDK) must be installed before installation of these IDEs. Preferred compiler should install separately and these IDEs needs to have been configured before compiling (Eclipse, 2014; Netbeans, 2014).

CodeBlocks has similar interface to NetBeans and Eclipse. But setup file includes its pre-requirements and compiler (Codeblocks, 2014).

Microsoft Visual C++ 2010 Express is a part of Microsoft Visual Studio IDE. Supporting wide range of tools causes huge setup media and seriously long setup time (Microsoft, 2014).

CodeLite IDE was installed successfully but had crashed without any message. We could not able to run this IDE for presented test system (Codelite, 2014).

3. Application for teaching and learning fundamental programming

The common difficulty of these IDEs is installing, configuring and maintaining on many computers. Inspecting students' source code and correcting mistakes is another difficulty in laboratory. Finally, collecting students' work files is another problem in many times. Our developed application is designed to bring solutions to these problems. There are some studies that aim to similar purposes (Karkalas & Gutierrez-Santos, 2014; Rodrigues, Marques, & Martins, 2014).

Many computer laboratories have a local network that computers are able to communicate with others and able to connect to the Internet. There are many computer classroom management applications have been developed by thanks to network infrastructure. Developed application in this study is using network infrastructure in computer lab.

Application is designed in two separate modules called as client and server. Server module is running on teacher's computer. Client modules are running on students' computers. The preferred compiler should have been installed on teacher's computer. Client modules do not need any installation or configuration. Client module consists of one simple executable file. Once server module has ran, it broadcasts its own IP address to the all clients. Client modules captures these IP address and ask student to enter name for connect. Once after connecting to the server, it is ready to compile and run. Server module lists connected clients by names and IP addresses. Teacher is able to see and any student's source code and console out by clicking on it.

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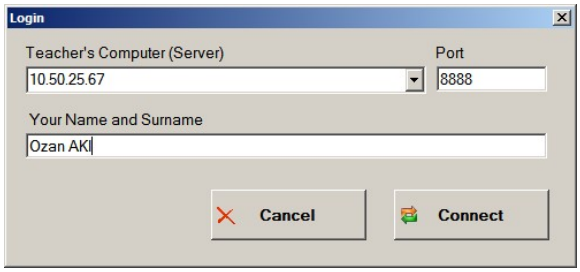


Figure 4 Client module's login screen

Client module interface is very simple like a notepad. There is a file menu that consists of file operations like new, open, save, close a file. Another menu has only one choice that named Compile & Run. When student click on compile and run menu, source code is sending to the server module for compiling. If code has any syntax error and compiling has failed, compiling results send back to the client module. These error and warning messages viewed on console window at the client application. Students can correct the code and try again until the compiling is successful.

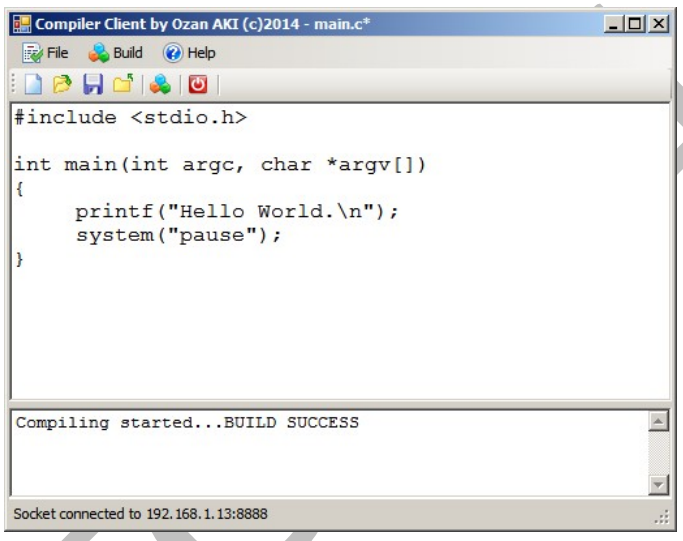


Figure 5 Client module's main screen

When any client code compiling is successful, compiled and linked executable file is send back to the client and automatically run that students can interact and view results. After the lesson or unit, teacher can collect all compiled source codes with students' names by one clicking into the any folder.

This application was developed by Microsoft Visual Studio C# Language with Dot Net Framework 4.5 for Windows platforms. Socket programming and threading techniques are used (Schildt, 2011). Transmission Control Protocol (TCP) is used for transmit source code and executable file. User Datagram Protocol (UDP) is used for dispatch server IP address. Every compiling process started as new thread for avoid blocks other compiling requests. Returned executable file is running as local console application in client computer. Students can fully interact with their built application.

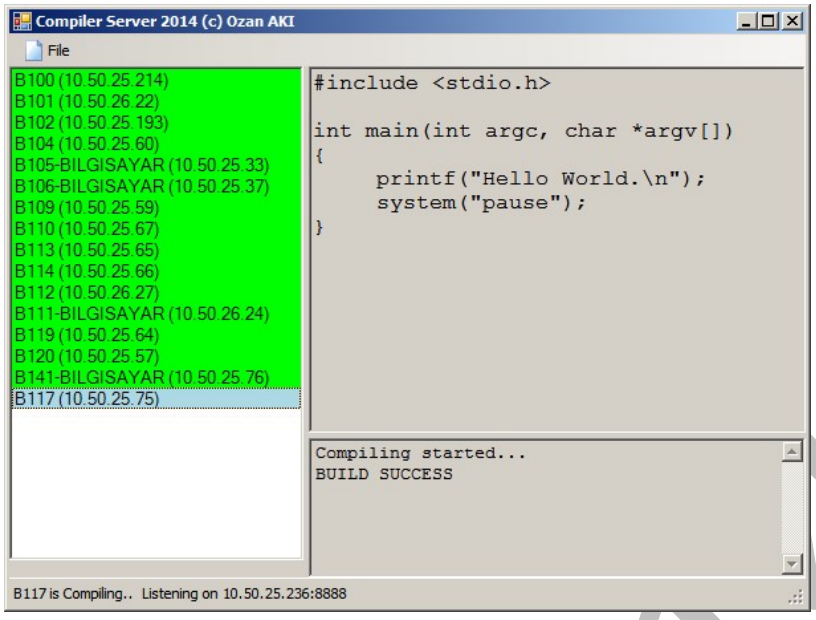


Figure 6 Server module's main screen

Advantages of this application can be listed as below;

- Does not need to install compiler to the all computers
- Teacher can see any students' source code and console results on their screen
- Teacher can collect all source codes by students' name by one click
- Students don't need to do any configuration. Students can just writing code and simply compile and run it.
- Client computers do not need to be a high-end hardware.

Probability disadvantages of this application are listed below;

- Clint module have not an advanced editor that helps and suggests while writing code
- Client module have not coloring source code key words
- Client module does not indicate an error by coloring line.

4. Discussion and results

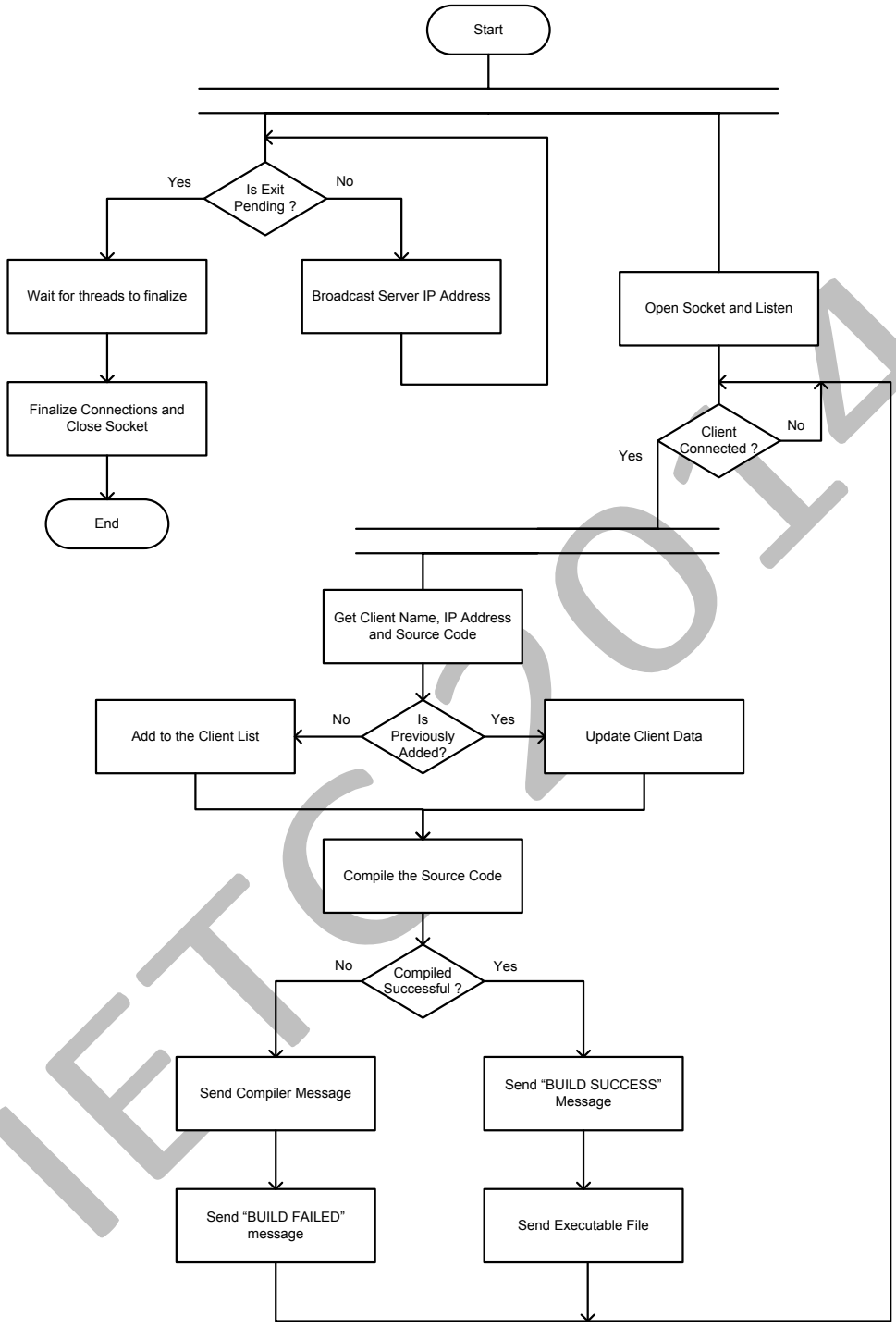
Developed application is an initial attempt to realize the idea. Application is tested in computer laboratory with 16 clients. Minimalist GNU for Windows (MinGW) is used for compiler tool chain on server. All clients had compiled remotely its source code successfully. After all compiling processes, all students' source codes were collected easily by one click. Test results shows that this application could help teaching of computer programming but not tested on real lesson conditions yet.

On the other hand, IDEs should not be considered to be disregarded by this application. This application is designed for beginner students in computer programming. After meeting students to the programming, of course students should learn using of least one IDE for programming.

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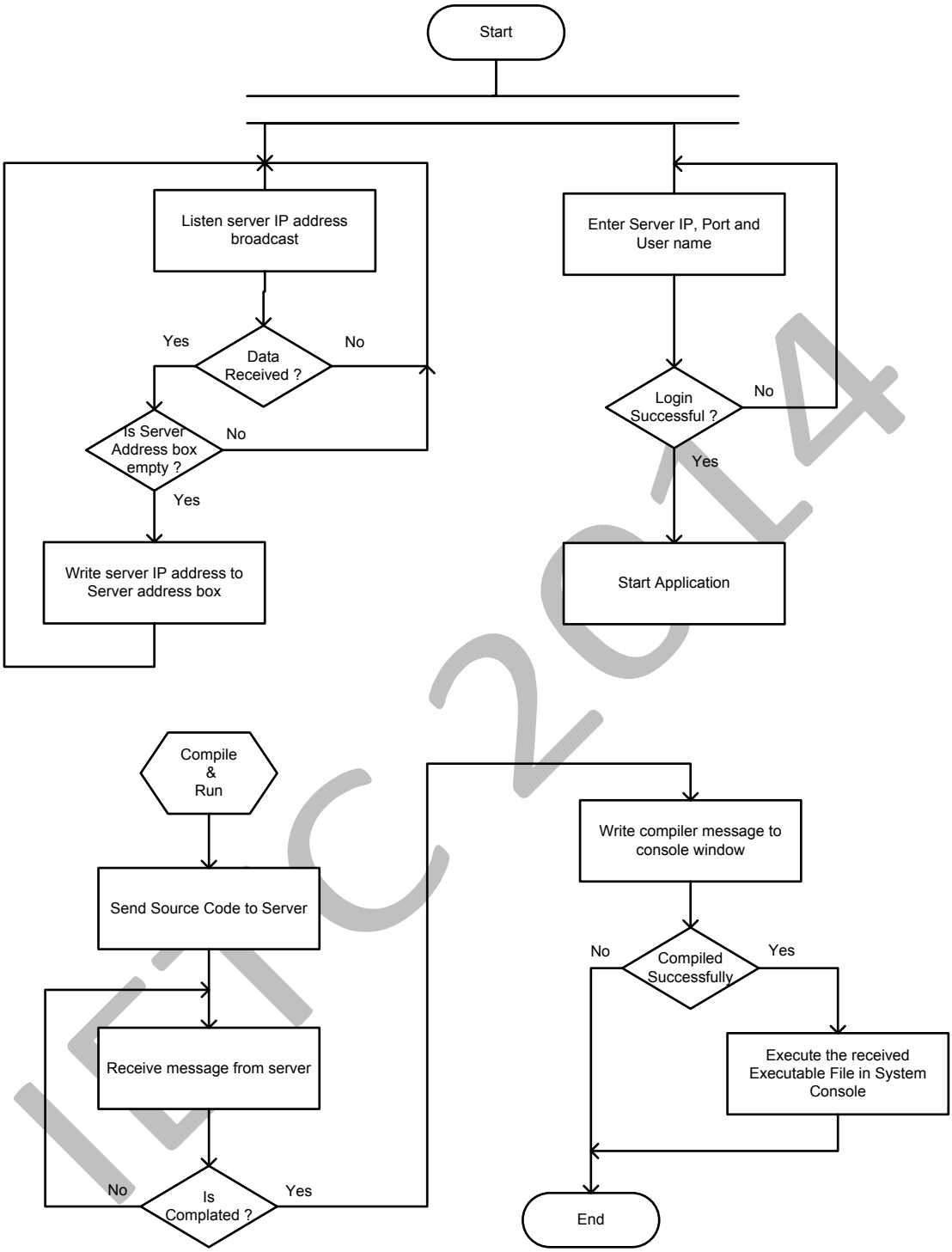
Appendix A. Flowcharts

A.1. Server Module Flowchart



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A.2. Client Module Flowchart



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An empirical study of critical success factors of mobile learning platform from the perspective of instructors

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Abstract

Mobile learning is newest learning platform and based on the rapid rate of proliferation of mobile technology throughout the world is expected to grow at a rapid rate. However, the adoption of m-Learning is proceeding at a cautious rate. This mismatch in the rate of growth of the technology itself and the use of the technology in learning is a subject of extensive interest to researchers. However, research in the area has been mostly focused on understanding the success factors of the platform from learners' perspective. In this research, we have conducted an extensive analysis of the extent to which various factors are considered to impact the success of mobile learning from the perspective of instructors. This is because instructors not only are one of the core users of the platform they also hold a great deal of influence in promoting the platform usage among learners. The results of the research were not found to be statistically significant showing that greater population size is required to assess various hypotheses.

Keywords: m-Learning, mobile learning, higher education, critical success factors, empirical studies.

1. Introduction

Mobile phone is easily the most profligate technology the world has ever seen, in terms growth, reach and technical advancements. While its prominence can be traced to the 1980s, in less than three decades the mobile technology has revolutionized the way people communicate and access information (Alrasheedi & Capretz, 2013a). This has result in rapid spread of mobile phones among the global population. For instance, while the reach of mobile phone was limited to about one-third of global population in 2004 (Paul & Seth, 2012), according to the recent estimates by World Bank, over 90% of the world population live within the range of a cell phone tower in 2010. This means that the number of people using mobile phones increased from less than 700 million in early 2000s to over 5 billion or 70% of the world population in 2010 (The World Bank Institute, 2012). Mobile phone technology has also grown leaps and bounds in terms of its versatility, which almost continual addition and extension of features and capabilities. This has made them devices of choice by an increasing number of people us to stay in touch with the rest of the world. Even though, educational systems have been shaped by the emerging technologies practices (Capuruço and Capretz 2009).

With this background, one would expect that the concept of mobile learning would be adopted at a similar rate, especially in higher-learning institutions in the technical sector where both learners and educators are more tech savvy. While much of the research suggests that the interest in exploring mobile learning has remained high (Rockley & Cooper, 2012) the adoption in the educational sector has been slow (Peters, 2009). This is especially true for higher educational sector, where the adoption of mobile learning has been especially slow. Interestingly students in higher education are receptive towards the idea of usage of mobile learning as they are comfortable with the technology. However, researchers speculate the issue lies with instructors many of whom do not understand how to use these devices in learning, while others are uncomfortable with the technology. The lack of an adoption framework combined with rapidly changing technology and concerns about security and privacy have only slowed down the actual adoption

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rate (Wilen-Daugenti, 2009). It can be seen that attitude of instructors is one of the major bottlenecks to the success of mobile learning. The detailed analysis of the opinions of instructors is the subject of the present study.

The structure of the paper is as follows. Section 2 presents the literature review where several relevant aspects related to mobile learning and perception have been discussed. Section 3 presents the research model and the hypotheses that would be tested. Section 4 presents the research methodology. Section 5 presents the analysis of data comprising of demographic analysis, correlation analysis and determination of regression equation. Section 6 presents a discussion of the results and the limitations of the present study. Section 7 presents the conclusion.

2. Literature review

Mobile learning offers users several unique features that were not possible in traditional learning platforms and even in e-learning to so extent. The first among these features is mobility that refers to the prospect of having flexibility in terms of time, place, pace and space that is not achievable when using non-mobile versions of devices (Andrews, et al., 2010). Another unique feature of mobile learning is collaborative learning. While collaboration is a part of education in traditional learning scenarios as well, the use of mobile devices means that learners can now interact with fellow students and educators from different locations even when they are not in a formal classroom. Mobility combined with collaborative learning makes the m-Learning platform different from any other existing learning platform, whether it is traditional face-to-face learning or other technology-based platforms like e-Learning (Kukulska-Hulme & Taxler, 2007).

Because of the ubuiquitousness of mobile technology, it difficult to escape the immense ramifications offered by the mobile learning platform. Ironically, every single feature that makes mobile learning possible has a downside to it, including the technology. First, the wireless communication technologies might offer anytime, anywhere learning possibilities, but the actual feasibility depends on the interest and diligence of learners (Kukulska-Hulme, Introduction, 2005). The education sector spends a lot to time and effort into making sure that students actually learn something and hence the focus on face-to-face interactions during learning and examination sessions. Wireless technology adds an additional burden because universities would be expected to impart successful degrees to the same caliber of students, if mobile learning is to be included as a mainstream education platform (Ally, 2009). Second, the security issues related to internet technologies are too pertinent to be ignored. This means that the university has to spend a significant amount to ensure that their systems are secure (Alrasheedi & Capretz, 2013b). This, in turn means, rising cost of education. As one of the objectives of distance education has always been reducing cost of learning, this aspect may nullify any cost savings. The hand-held device technology also acts as barrier in several ways. First the rapidly changing features, means that the development and modification of the learning platform has to keep up its pace with changes in technology. As new models of all brands of phones turn up every few months, this is not a very easy thing to do. Also unlike standard computers, the user interfaces of mobile devices are too varied and hence designing a common user interface itself is a challenge. Finally, as multiple technologies exist in terms of the types of handsets, the operating systems, and device capabilities, the implementation of mobile learning platform to make it user friendly is extremely difficult (Melhuish & Falloon, 2010).

As can be seen from above, there are several legitimate barriers to the adoption of mobile learning by users. From a developer's perspective solutions are a cross between the requirements and budget. The requirements are decided by the users. Hence, the exact requirements of a successful mobile learning platform can be best decided by the users themselves. Researchers have conducted several studies to assess the factors that learners consider important. But as discussed at the start, learners are already receptive to the idea of mobile learning. It is the instructors who are skeptical of the idea and are slow to adopt the principles of m-Learning. As the success of any educational paradigm is dependent on the interest of the educators, it is important to understand the factors that educators consider important while adopting m-Learning. Furthermore, it's vital for instructors to improve the teaching strategies (Seddigi, Capretz, & House, 2009).

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Ironically however, not many studies have been conducted in this regard. The few studies that have been conducted offer interesting background, though the studies are extremely limited in scope. MacCallum and Jeffrey (2009) conducted such a study in New Zealand on tertiary education. The researchers find that the educators have ambivalent feelings towards m-Learning in higher education sector. While all educators agree with the wide ranging benefits of the platform they are concerned about the integration of these technologies with the curriculum and the time taken for the implementation. While educators welcome low level integration of mobiles to support learning activities, the use of m-Learning as a separate platform is not one they are highly receptive to (MacCallum & Jeffrey, 2009). An extensive study conducted by Pollara (2011) in US found another reason why higher education faculty are not overtly receptive to the use of mobile technology in learning. The research found that faculty perceptions on the usefulness of mobile technology in education were affected because many believed that students used the devices actually for socializing purposes when they reported that they were doing study-related tasks. In their view, this affected the entire learning process by distracting students, to the extent that some instructors actively banned the use of mobile devices inside the classrooms. Interestingly students believed that they would perform better if the use of mobile phones were not restricted (Pollara, 2011). This background only serves to highlight how important is it to conduct a detailed study into understanding the perspective of instructors towards m-Learning in the higher education sector.

3. Research model & hypothesis

The purpose of the research is to present a research model for assessing how and to what extent different factors affect educators' perspectives on the use of m-Learning, in the higher education sector. Figure 1 below shows the research model diagram.

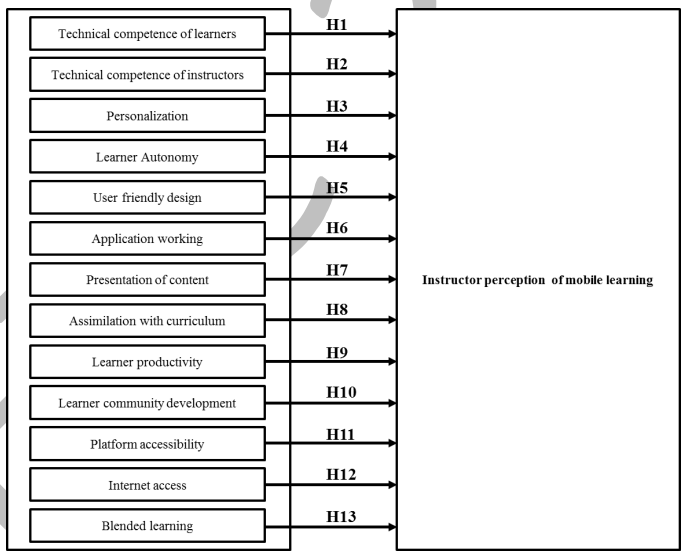


Fig. 1. Research model – critical success factors affecting the success of mobile learning from instructors' perspective

Educators are the backbone of learning and hence their attitude towards a new platform is extremely important to understand. Our previous research found 13 factors that affect the overall attitude towards the m-Learning platform (Alrasheedi & Capretz, 2013c). To determine the user satisfaction levels we have conducted a detailed survey targeting the educators using the m-Learning platform. (In this paper the words instructors and educators have been used interchangeably).

Overall the objective of the research is to determine the answer to the following question:

"To what extent do various critical success factors impact instructors' perception of a mobile learning platform?"

The multiple linear regression equation of the model is as follows:

Instructor perception = $c_0 + c_1f_1 + c_2f_2 + c_3f_3 + c_4f_4 + c_5f_5 + c_6f_6 + c_7f_7 + c_8f_8 + c_9f_9 + c_{10}f_{10} + c_{11}f_{11} + c_{12}f_{12} + c_{13}f_{13}$.

In the equation c_0, c_1, c_2, c_3, c_4, c_5, c_6, c_7, c_{08}, c_9, c_{10}, c_{11}, c_{12}, and c_{13} are coefficients and f_1, f_2, f_3, f_4, f_5, f_6, f_7, f_8, f_9, f_{10}, f_{11}, f_{12}, and f_{13} are the 13 independent variables. To empirically investigate the research question, the 13 hypothesis are derived as presented below:

hesis 1. Technical competence of students positively affect the overall instructor perception
)othesis 2. Technical competence of instructors (from their own perspective) will positively affect the overall instructor perception
hesis 3. Extent of personalization will positively affect the overall instructor perception
hesis 4. Extent of learner autonomy will positively affect the overall instructor perception
hesis 5. User friendly design of m-learning platform will positively affect the overall instructor perception
)othesis 6. Better application working (ease of platform usage) will positively affect the overall instructor perception
)othesis 7. Possibility of interesting ways of presenting the course matter will positively affect the overall instructor perception
)othesis 8. Assimilation with curriculum, from learners' perspective, will positively affect the overall instructor perception
hesis 9. Perception of increased learner productivity will positively affect the overall instructor perception
)othesis 10. Perception of increased opportunities for learner community development will positively affect the overall instructor perception
)othesis 11. Perception of improved platform accessibility will positively affect the overall instructor perception
hesis 12. Perception of improved internet access will positively affect the overall instructor perception
hesis 13. Blended learning possibility will positively affect the overall instructor perception

4. Research methodology

Instructors are not only one of the primary users of the mobile learning platform, they also act as mentors to the primary users – the learners. In addition, instructors are also responsible for course design and dissemination, which makes them the more important user in terms of the extent to which they use the m-Learning platform. The present study focuses on gathering the opinions of instructors and analyzing them in a systematic manner. To collect the data we gave the questionnaire to various undergraduate and post graduate instructors teaching different courses in five universities in Saudi Arabia. We assured the instructors that the survey was confidential: their identity would not be disclosed and their primary responses would be used for this study only. We received a total of 64 completed questionnaires.

4.1. Reliability and validity analysis of measuring instrument

The present survey of mobile learning comprised of a series of questions determining the attitude of educators towards m-Learning platform. Nine of these questions were straightforward involving single-item measurements. However, four of the questions involved multi-item rating scales: learner productivity, learner community development & platform access, which use four-item measurements; and internet access that uses three-item measurement. In addition, the overall learner perception is also measured using three-item measurement. In all these cases it is important to assess the reliability of the measurement scales. This is done to quantify the reproducibility of a measurement and is performed using an internal consistency analysis – calculating the Cronbach's alpha. The limits of the satisfactory levels for this reliability coefficient has been performed by various researches. Most of the studies cite the studies by van de Ven and Ferry, who consider that coefficient of 0.55 and higher is satisfactory (Van de Ven & Ferry,

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2008). Recent studies by researchers like Osterhof, however have increased this the minimum satisfactory level of the reliability coefficient to be somewhat higher at 0.6 (Osterhof, 2001). In our case, the reliability coefficient is all cases is >0.8, which means that the measuring instruments used are reliable. The Table 1 below shows the values of Cronbach's alpha and PCA eigen values for the factors discussed.

Table 2. Cronbach's alpha for multi-measuring rating scales.

Success Factors	Item Numbers	Cronbach's alpha	PCA eigen
Learner Productivity	(ix to xii)	0.9360	1.7159
Learner Community Development	(xiii to xvi)	0.8415	1.6147
Platform Accessibility	(xvii to xx)	0.9462	1.7019
Internet Access	(xxi to xxiii)	0.8078	1.6440

4.2. Data analysis procedure

The data analysis procedure for the present study comprises of three steps. The first step is to check if there is a parametric correlation test between the dependent and independent variables to check if any of the critical success factors or hypothesis could be rejected. The second step involves conducting a non-parametric test is conducted between the the dependent and independent variables in order to reduce the external validity threat (Raza, Capretz, & Ahmed, 2012). The third step is the actual regression analysis to determine the regression equation i.e. the value and sign of the coefficients for each of the variables.

5. Hypothesis tests and results

5.1. Demographic distribution of the population

This section discusses the distribution of the population based on demographics. As mentioned, the total population comprised of 64 teachers. Of this, 47 (~73.44%) were male and 17 (~26.56%) were female. Further, as mentioned earlier, the population comprised of tutors from different universities. The distribution was reasonably uniform. Only one of the instructors was under 25 years of age. A majority i.e. 36 or >50% of the instructors were between 36-55 years of age. The next largest age group was 26-35 years, which involved about 21 of the instructors. Only 6 instructors were over 55 years of age. An overwhelming majority of the instructors i.e. 61 out of 64 were employed full-time, the remaining were employed part-time. In terms of the teaching levels, 48 instructors or 75% of the population taught Undergraduate classes, while the remaining 16 instructors or 25% of the population taught post graduate classes.

One of the important aspects of demographic analysis was to understand the extent of mobile phone proliferation among this group of users. The survey results were extremely interesting in this regard. All the instructors owned mobile phones. Further an overwhelming majority i.e. 59 out of 64 instructors or 92.2% of the instructors owned a smart-phone or a PDA. Additionally, 55 instructors or 85.94% also owned a desktop PC, while a significant majority i.e. 62 instructors owed a laptop/tablet PC/mini notebook. All the instructors had internet installed on at least on of these devices, and a significant majority i.e. 59 instructors or 92.2% of the instructors had internet installed on their mobile phones. This data shows that the mobile phone and internet penetration was extremely high among instructors and they were both aware of and were active users of the mobile phone as well as internet technologies in tandem.

5.2. Hypothesis testing using parametric and non-parametric tests

Before conducting the actually regression analysis, additional tests were conducted on the hypothesis to see if any of these could be rejected thus simplifying the analysis. To test the hypotheses H1-H13, parametric and non-parametric statistics were used to examine the Pearson and Spearman correlation coeffi-

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cients between the individual independent variables i.e. the critical success factors and the instructor perception of the critical success factors.

Table 3. Hypothesis testing using parametric test.

Hypothesis	Critical Success Factor	Pearson Correlation Coefficient	Spearman Correlation Coefficient
H1	Technical competence of learners	0.476	0.433
H2	Technical competence of instructors	0.689	0.592
H3	Personalization	0.647	0.555
H4	Learner Autonomy	0.658	0.627
H5	User friendly design	0.610	0.582
H6	Application working	0.673	0.600
H7	Presentation of content	0.613	0.558
H8	Assimilation with curriculum	0.536	0.564
H9	Learner productivity	0.601	0.684
H10	Learner community development	0.716	0.552
H11	Platform accessibility	0.702	0.592
H12	Internet access	0.644	0.491
H13	Blended learning	0.701	0.650

The results of the statistical calculation for the Pearson correlation coefficient are shown in Table 2 below. It is commonly fact that the lower the p-value the better chance there is of rejecting the null hypothesis and hence the more significant is the result in terms of its statistical significance (Stigler, 2008). In the present case, all the p-values are 0.00. This means that the results are significant.

5.3. Testing of the Research Model

A multiple linear regression equation for our research model was presented earlier. Following is the linear regression equation:

$$\text{Instructor perception} = c_0 + c_1f_1 + c_2f_2 + c_3f_3 + c_4f_4 + c_5f_5 + c_6f_6 + c_7f_7 + c_8f_8 + c_9f_9 + c_{10}f_{10} + c_{11}f_{11} + c_{12}f_{12} + c_{13}f_{13.}$$

In order to determine the coefficients of the equation above we run a regression analysis. In addition to giving the model coefficient the regression also gives the direction of association. As can be seen from the model equation above, all the critical success factors are assumed to have positive association with the user perception. The regression analysis will inform whether this is true in all cases. Further, the analysis does not include any categorical predicators. The results are given in Table 3 below.

The result of the regression analysis offer interesting insights into the model. First, not all the coefficients are positive. This means that critical success factors – Technical Competence of Learners, User Friendly Design, Learner Community Development and Platform Accessibility – all have negative association with instructor perception. This deviates from the expected relationship.

The final regression equation is as follows:

$$\begin{aligned} &Instroctor\ perception \\ &= 0.830 - 0.072\ (Technical\ Competence\ of\ Learners) + 0.104\ (Technical\ Competence\ of\ Instructors) \\ &+ 0.014\ (Personalization) + 0.221\ (Learner\ Autonomy) - 0.020(User\ Friendly\ Design) + 0.036\ (Application\ Working) \\ &+ 0.036\ (Presentation) + 0.043\ (Assimilation\ with\ Curriculum) \\ &+ 0.258\ (Learner\ Productivity) - 0.250\ (Learner\ Community\ Development) - 0.019\ (Platform\ Accessibility) \\ &+ 0.249\ (Internet\ access) + 0.250\ (Blended\ learning) \end{aligned}$$

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From the regression analysis, it is seen that the model accounts for 53.76% variability in the dependent variable i.e. instructor perception. However, the p-values in all cases is more than 0.05, which means that none of the relationships is significant. This means that the relationship coefficients cannot really be said to show the actual relationships between the dependent and independent variables.

Table 4. Multiple regression analysis of the research model.

Critical Success Factor	Coefficient term	Coefficient value	t-value	p-value
Technical competence of learners	f_1	-0.072	-0.50	0.621
Technical competence of instructors	f_2	0.104	0.57	0.575
Personalization	f_3	0.014	0.08	0.937
Learner Autonomy	f_4	0.221	1.24	0.222
User friendly design	f_5	-0.020	-0.11	0.915
Application working	f_6	0.036	0.16	0.873
Presentation of content	f_7	0.036	0.23	0.818
Assimilation with curriculum	f_8	-0.043	0.25	0.801
Learner productivity	f_9	0.258	0.87	0.391
Learner community development	f_{10}	-0.250	-1.09	0.279
Platform accessibility	f_{11}	-0.019	-0.08	0.933
Internet access	f_{12}	0.249	1.49	0.144
Blended learning	f_{13}	0.250	1.64	0.108

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6. Discussion of the results

The results of data analysis presented in this paper is only a snapshot of the detailed analysis. Further exploration of several of the interrelationships can be conducted using the data. These have not been covered here because of the results of the regression analysis.

The demographic analysis of the results shows a highly skewed distribution towards the male population. However, the presence of female instructions was not insignificant either as they comprised of one-fourth of the entire population. As expected most of the instructors are between 26 and 55 years of age, with a few instructors over 55 age limits. Also, there is a minuscule representation of instructors less than the age of 25, as is expected in general from the faculty of tertiary technical institutions. Interestingly most of the instructor population was found to be technically savvy and very comfortable with owing and using advanced mobile phone devices. The use of internet was also universal and a majority of the population accessed internet from their mobile devices. The instructors were also found to be technically savvy an owned other devices likes desktop PC, laptops and tablet PCs. This clearly shows that lack of technical awareness is not an issue to the adoption of mobile learning platform within five Saudi Arabia universities.

The effect of four of the critical success factors - learner productivity, learner community development, platform accessibility, and internet access, as well as the dependent variable 'instructor perception' was

determined using responses from multiple-items in the survey. As such, it was important to first assess the reliability of the instrument. This was done by conducting an internal analysis, by conducting an internal analysis by determining the Cronbach's alpha for these multiple-items. It was found that the Cronbach's alpha in all the cases was >0.8. This is clearly much higher than even the recently determined higher threshold of 0.6. Hence, the averages of the response could be used for determining the individual variable coefficients in the research mode.

The next step involved determining whether there was a correlation between the different independent variables and the dependent variables. In the present study both parametric and non-parametric studies were carried out. This was to remove the threats to external validity. In all the cases, the Spearman's Rho was found to be somewhat lower than Pearson's coefficient though the correlations were always >0.4. More importantly, all the hypothesis were found to be statistically significant as the p-values in each cases for both parametric and non-parametric correlation analysis was found to be 0.00. This meant that in all cases there was a reasonable correlation between the various critical success factors and the instructor perception based on the current data.

Once, it was made sure that the critical success factors had statistically significant relationships with instructor perception, the next step was to determine the regression model. It is at this point that the present study reaches a hitch. First, in case of the variables the expected direction is negative - Technical Competence of Learners, User Friendly Design, Learner Community Development and Platform Accessibility. This means that in all these cases, the instructors believe that the critical success factor is inversely related to the success of mobile learning. Interestingly, all the four factors are related to learners. It is very easy to believe that instructors consider that these factors are not of much important when deciding the success of mobile learning. One of the research studies in the literature review section points towards the attitude that instructors believe that mobile phones are disruptive to m-Learning, which might explain this attitude. Another interesting aspect is that none of the coefficients are >0.3, which shows that instructors are divided into what they believe are the critical factors for the success of mobile learning. Among the factors, the most influence was attributed to Learner Autonomy, Learner Productivity and Internet Access.

Additionally, and more crucially, in none of the cases the p-value was <0.05. In fact, in all the cases, the p-value was higher than 0.1 and in some cases it was even greater than 0.9. This shows that based on the current data, none of the relationships was found to be statistically significant. This might be because the population size was small and comprised of only 64 instructors which was used to analyze 13 hypotheses. Another reason might be because most of the success factors were considered from the learner perspective.

6.1. Limitations of the study

As mentioned earlier, this research did not explore all the interrelationships between the demographic factors and the instructor perception. Some factors such as gender are believed to have an effect on the user perception on mobile phones. The regression equation included only continuous parametric data and so the demographic categorical variables were not considered. The idea was to first explore the relationships without assessing the internal factors responsible for the individual responses. As none of the relationships were found to be statistically significant, the internal analysis using demographic variables was not conducted. The analysis can be a part of future analysis, once more data is collected to see whether increasing the survey population. As all the critical success factors showed significant correlation with the dependent variable i.e. instructor perception, this is a reasonable assumption to make.

7. Conclusion

In this paper, we have presented the results of a detailed and systematic investigation into the critical success factors affecting user perception of m-Learning from the perspective of instructors. As instructors are one of the crucial user groups, it is important to understand the factors they consider crucial for the success of mobile learning. The results of our study showed that none of the factors analyzed were statis-

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tically significant. The reason for this can be attributed to the large number of hypothesis tested and the small size of population. Future studies would involve whittling down the number of hypotheses and increasing the size of population.

The study result also showed that according to instructors, the following factors – Technical Competence of Learners, User Friendly Design, Learner Community Development and Platform Accessibility – had negative association with the success of mobile learning. Again this result cannot be said to be conclusive because the results were statistically not significant. Finally, the research was limited because the impact of demographic factors on survey responses was not assessed. Future work would endeavor to sort all these aspect of the research.

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Analysis of students' listening behavior patterns in an asynchronous discussion forum

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Abstract

Of late, it is common to see the use of asynchronous forum in a hybrid learning environment. This study employs Wise, et al.,'s (2012) patterns of listening behaviour to explore the students' interaction level in an online forum platform. Listening behaviour refers to tasks such as when and how students interact in discussion forums. A total of 23 postgraduate students from a public higher educational institution in Malaysia involved in this study. Using a cluster analysis method, the results indicated four types of listening behaviours. Based on these analyses, some strengths and potential weaknesses in the discussion forum were identified.

Keywords: Asynchronous Discussion Forum; Cluster Analysis; Listening Behavior; Interaction.

1. Introduction

Online forum can be used to complement learning and teaching, particularly in blended or hybrid learning courses. According to Balaji and Chakrabarti (2010), asynchronous discussion forum can increase students' understanding and give them the opportunity to share information, perspectives and experiences. Besides, it leaves an impact on achievements (Cheng, Paré, Collimore, & Joordens, 2011). Thus, it is important to know the level of interaction or students' engagement in an online discussion forum. Students' engagement level can be analyzed using social network analysis and cluster analysis. In this study, cluster analysis is carried out to classify the students' level of interaction and participation in an online forum.

2. Listening behaviors

In this study, expressing opinions or contribution in online discussions is conceptualized as speaking while listening consists of reading the opinions, contributions or post of peers (Wise, Speer, Marbouti & Hsiao, 2011). Listening behavior consists of when and how students interact in discussion forums (Wise, Speer, Marbouti & Hsiao, 2012). According to Wise, et al., the actions or tasks of students with existing posts in the online discussion are considered as their engagement in the forum. An example of the listening behavior action is opening or reading and replying the posts sent by other participants. Listening behavior patterns are classified according to several domains such as temporality, breadth, depth, speaking, reflection and the final grade (Wise, et al., 2012). This study only employs four specific domains consist of 10 variables, involving temporality, breadth, depth and speaking. The final grade is also excluded due to the confidentiality of the students' examination results. Reflection is excluded in this study due to the limitation of the learning management system being used.

Temporality includes four variables include average length of session, percent of sessions with posting actions, average number of sessions per discussion and average number of reads before contributing a post. The depth consists of one variable, namely the average length of time reading a post. For the breath domain, it comprises of two variables, namely percentage of posts viewed at least once and average num-

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ber of views per discussion. Speaking involves three variables, namely the average number of posts contributed per discussion, average number of words per post and average length of time creating a post.

The study analyzes the patterns of online listening behavior for every student participant according to his or her level of interaction in the discussion forum. The level of students' interaction is important in learning because (i) the interaction affects the quality of learning (Trentin, 2000), (ii) interaction is a significant cause for making teaching and learning (Vygotsky, 1978) and (iii) it will affect the learning process as well (Garrison & Anderson, 2003). The quality of the interaction determines the success of online learning and teaching. Instruction becomes more effective when it occurs in a dialogue form where students can interact with their peers or instructors who guide their learning. However, online discussion forums found to have many constraints in achieving the learning objectives.

3. Asynchronous discussion forum

The asynchronous discussion forum may contribute to understanding the learning content, knowledge construction and student achievement. However, it is still less popular among students (Wise, et al., 2012). In asynchronous discussion forums, students are less involved or not willing to ask their peers (Anuratha Kanniah & Pramela Krish, 2010). Although students' participation is needed, they rarely post messages in online discussions (Cheung & Hew, 2006).

To create a quality interactive discussion, it is advisable to read existing messages before posting one's own messages (Wise, et al., 2012). However, students do not follow the procedures to be involved in the discussion. This resulted in: (i) no sequence in delivering forum (Herring, 1999), (ii) discussions that deviate from the topic of learning (Hou, Chang, Sung, 2007), (iii) no link to the original forum and thus forum becomes an independent statement (Khine, Yeap, & Lok, 2003), (iv) the discussion becomes disjointed and inconsistent (Zhu, 2006) and, (vi) forum would be meaningless (Thomas, 2002). According to Peters and Hewitt (2010), students also focus on the selected forum only. These issues will affect the quality of discussion and the learning process. Consequently, the students' level of thinking, as well as their knowledge construction will be affected. Therefore, there is a need to analyze the students' listening behavior patterns in terms of reading and responding to their peers' messages. These listening behavior patterns will be measured and analyzed based on the posts they sent in the online forum.

4. Objectives

Based on the problem statement, the objectives of this study are;

- To analyze the listening behavior patterns (levels of reading and responding peers' message) according to their level of interaction in the forum.
- To group the students into clusters according to their level of listening and responding to their peers' messages in the discussion forum.

5. Methodology

The study was conducted at a public university in Malaysia involving an asynchronous discussion forum as part of a coursework requirement. A course at postgraduate level (master by coursework) was chosen for this study. This course is offered in a hybrid mode whereby weekly face-to-face class sessions as well as online learning session using a learning management system (LMS) are applied. The discussion forum is part of the LMS activities carried out for the online learning session. A total of 23 postgraduate

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students enrolling in the course involved as the participants in this study. The instructor provides a topic of discussion and the students are required to respond to the assigned topic. The log files extracted from the online forum activities are used for data processing. These include the information such as the number of students' view, read and reply messages or post messages and the time in each of the tasks in the forum. Based on these data extracted from the log files, cluster analysis will be used to analyze the students' listening behavior patterns as proposed by Wise, et al., (2012).

6. Findings

The sample consists of 23 participants involved in asynchronous discussion forums. The agglomeration schedule, icicle, and deudogram vertical graph are used to identify the number of clusters present in the discussion forum.

Table 1: Agglomeration Schedule (four clusters).

Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	22	23	4.502	0	0	20
2	2	8	17.863	0	0	11
3	9	19	35.588	0	0	9
4	11	15	55.899	0	0	12
5	13	14	79.019	0	0	11
6	5	12	102.196	0	0	14
7	3	4	130.543	0	0	13
8	7	10	176.469	0	0	12
9	9	16	232.698	3	0	13
10	17	21	307.471	0	0	16
11	2	13	402.628	2	5	15
12	7	11	521.173	8	4	15
13	3	9	668.614	7	9	19
14	1	5	853.757	0	6	19
15	2	7	1194.828	11	12	18
16	17	20	1559.322	10	0	17
17	6	17	2106.500	0	16	20
18	2	18	2857.638	15	0	21
19	**1**	**3**	**3811.788**	**14**	**13**	**21**
20	**6**	**22**	**5690.428**	**17**	**1**	**22**
21	**1**	**2**	**16246.048**	**19**	**18**	**22**
22	**1**	**6**	**54751.076**	**21**	**20**	**0**

Based on the Agglomeration Schedule (Table 1), there are four clusters in the classification of listening behavior patterns here. The differences are so significant for the last four sets of data. In specific, the differences are significant between 19 and 20 (3811.788-5690.428), between 20 and 21 (5690.428-

16246.048), between 21 and 22 (16246.048-54751.076). This is reinforced by Figure 1.0 (Vertical Icicle graph) indicating four clusters. Next, deudogram (Figure 2.0) also suggests four clusters, namely cluster 1 (students 22 and 23), cluster 2 (students 17, 21, 20 and 6), cluster 3 (students 2, 8, 13, 14, 11, 15, 7, 10 and 18) and cluster 4 (students 3, 4, 9, 19, 16, 5, 12 and 1).

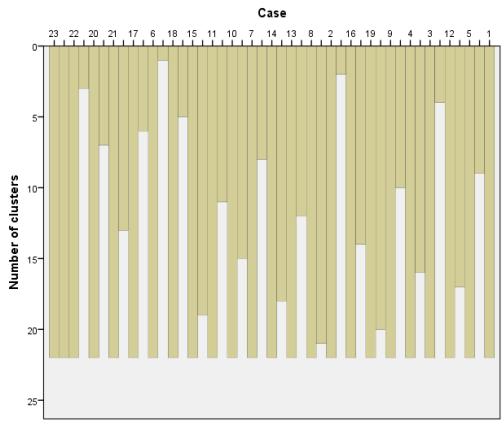


Fig. 1. Graph vertical icicle for cluster analysis of asynchronous discussion forums

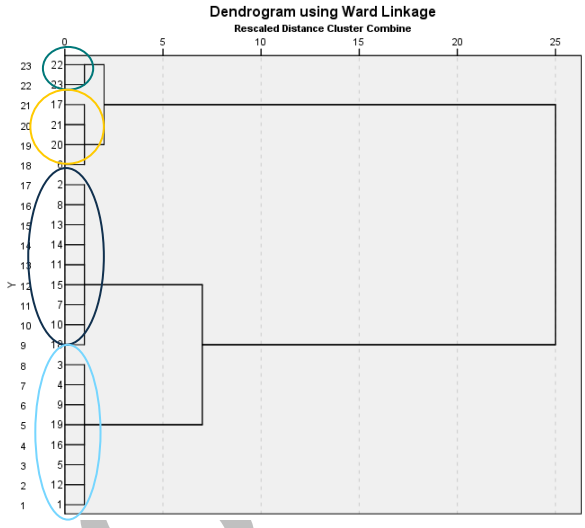


Fig. 2. Deudogram for cluster analysis of asynchronous discussion forums

6.1. Characteristic of each cluster listening behaviors patterns

One-way ANOVA was further used to identify the characteristics of each cluster. Table 2.0 indicates the findings for all ten variables for the four clusters identified earlier.

Table 2: ANOVA results to test the differences in terms of the 10 variables between the four clusters

Domain	Variable	Cluster	N	Mean	Standard Deviation	F	p
Temporality	Average length of session	1	8	.12	.20	.880	.469
		2	9	.08	.07		
		3	4	.21	.26		
		4	2	.00	.00		
		Total	23	.11	.17		
Temporality	Percent of Sessions with posting actions	1	8	.21	.09	3.336	.046
		2	9	.14	.07		
		3	4	.20	.15		
		4	2	.00	.00		
		Total	23	.16	.11		

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Breadth	Percent of posts viewed at least once	1	8	.26	.10	1.678	.205
		2	9	.25	.11		
		3	4	.27	.15		
		4	2	.07	.04		
		Total	23	.24	.19		
Breadth	Average number of views per discussion	1	8	12.60	5.28	.469	.708
		2	9	12.29	5.09		
		3	4	13.00	7.12		
		4	2	3.50	2.12		
		Total	23	11.79	5.70		
Depth	Average length of time reading a post	1	8	.92	1.71	.421	.740
		2	9	.51	.63		
		3	4	.54	.32		
		4	2	.01	.01		
		Total	23	.61	1.08		
Speaking	Average number of posts contributed per discussion	1	8	2.88	1.73	3.271	.044
		2	9	2.33	.87		
		3	4	1.50	1.00		
		4	2	.00	.00		
		Total	23	2.17	1.44		
Temporality	Average number of sessions per discussion	1	8	14.38	5.71	2.214	.120
		2	9	16.00	6.63		
		3	4	14.50	7.19		
		4	2	3.50	2.12		
		Total	23	14.09	6.74		
Temporality	Average number of existing reading post before contribute a post	1	8	1.25	1.35	1.721	.197
		2	9	.85	.74		
		3	4	5.00	8.04		
		4	2	.00	.00		
		Total	23	1.64	3.49		
Speaking	Average number of words per post	1	8	90.29	12.71	114.24	.000
		2	9	140.18	11.42		
		3	4	35.50	14.53		
		4	2	.00	.00		

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		Total	23	92.43	49.27		
Speaking	Average length of time creating a post	1	8	.06	.04	.844	.487
		2	9	.11	.19		
		3	4	.27	.52		
		4	2	.00	.00		
		Total	23	.11	.24		

The classification of listening behavior patterns were also supported by the ANOVA findings (Table 2.0). The significant differences between the four clusters exist in three variables only, namely (i) the percentage of sessions with posting actions, (ii) average number of posts contributed each discussion and (iii) average number of words in one post. The insignificant differences between the four clusters are in terms of: (1) the average length of session, (2) percent of posts viewed at least once, (3) average number of views each discussion, (4) average time reading a post, (5) average number of sessions per discussion, (6) average number of reads before contributing a post, and (7) average length of time creating a post.

Next, for each variable, the clusters are ranked accordingly. Thus, for each variable, the highest ranking cluster is categorized as 'Highest', the second highest ranking is categorized as 'High'. The third highest ranking is categorized as 'Low', while the lowest ranking is categorized as 'Lowest'.

- Cluster 1: Based on Table 2, the variables are placed in four different categories. Cluster 1 recorded the highest ranking in three variables: (1) the percentage of sessions with posting actions, (2) average time reading a post and (3) average number of posts contributed each discussion. In addition, this cluster is ranked as 'High' in five other variables: (i) average length of session, (ii) percentage of posts viewed at least once, (iii) average number of views each discussion, (iv) average number of reads before contributing a post, and (v) average number of words per post. This cluster was ranked as 'Low' for two other variables, namely, average number of sessions for each discussion and average length of time creating a post. No variable ranked as lowest.

- Cluster 2: This cluster is ranked as 'Highest' in two variables: (a) average number of sessions for each discussion and (b) average number of words per post. In addition, it was categorized as 'High' for two other variables: the average number of posts contributed each discussion and average length of time creating a post. Cluster 2 is categorized as 'Low' in six other variables: average length of session, percent of sessions with posting actions, percent of posts viewed at least once, average number of views each discussion, average time reading a post and average number of reads before contributing a post. No variable was identified in the 'Lowest' category.

- Cluster 3: This cluster was ranked as 'Highest' in five variables: the average length of session, percent of posts viewed at least once, average number of views each discussion, average number of reads before contributing a post, and average length of time creating a post. It was ranked 'High' for three other variables: the percentage of sessions with posting actions, average time reading a post and average number of sessions for each discussion. Moreover, two variables were ranked as low category, namely, average number of posts contributed each discussion and average number of words per post. No variable is ranked as the lowest.

- Cluster 4: This cluster was ranked as the 'Lowest' in all ten variables: the average length of session, percentage of sessions with posting actions, percentage of posts viewed at least once, average number of views each discussion, average time reading a post, average number of posts contributed each discussion,

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average number of sessions each discussion, average number of reads before contributing a post, average number of words per post and average length of time creating a post. No variable was ranked either in the highest, high or low category.

6.2. Discussion of listening behavior patterns

The listening behavior patterns were analyzed based on four domains, namely, temporality, breadth, depth and speaking. The temporality domain was classified as coherent, incoherent or moderate. The breadth domain was categorized as comprehensive, limited or moderate. Depth domain was identified as extended, limited or moderate. The fourth domain – the speaking domain – is classified as the most frequent, moderate or infrequent.

Table 3 shows the summary of the characteristics of students based on their listening behavior patterns or levels of reading and responding peers' message. Since there are four clusters being identified, the position (ranking) of each cluster for each variable in the study also identified. The finding of this categorization is shown in Table 3.

Table 13. Listening Behavior patterns on each cluster based on four domains.

	Temporality	Breadth	Depth	Speaking
Cluster 1	Moderate	Moderate	Extended	Moderate
Cluster 2	Moderate	Moderate	Moderate	Frequent
Cluster 3	Coherent	Comprehensive	Moderate	Moderate
Cluster 4	Incoherent	Limited	Limited	Infrequent

- Cluster 1 (C1): Focused Listeners, Moderate Speakers, Moderate in Temporality (8 students)
  Compared with other cluster, C1 strength lies in the depth domain that is to read and understand peers' post in extended level. But these students are moderate in accessing or choosing certain posts to read (breadth). Similar to C2, C1 students spend time (temporality) moderately in online forum. They only contribute or respond (speaking) moderately in the forum. Furthermore, their ability to provide feedback or overall response is moderately good. In the study by Wise, et al., (2012), this cluster is closely associated with concentrated listeners and integrated talkers cluster. For the speaking domain, this study shows C1 members as moderate speakers.

- Cluster 2 (C2): Moderate Listeners, Active Speakers, Moderate in Temporality (9 students)
  The strength of C2 is in the speaking domain. C2 students contribute the most frequent posts or responses. They moderately access (breadth) and read the posts of peers (depth). They spend time (temporality) moderately to post in the forum. They did not view or read all the posts, instead, they choose to read a particular post and then provide or contribute actively. C2 students spend time (temporality) that is similar to the first cluster. For this cluster 2, although they indicated similar result by Wise et al (2012) in terms of moderate temporality and breadth (Wise et al., 2012 called it as concentrated listeners) but they are not in the extended depth. Also, although C2 members scored frequent in speaking domain, it could not be related to reflective talkers as proposed by Wise et al., because it does not have reflectivity variable in this study.

- Cluster 3 (C3): Extended Listeners, Moderate speakers, Coherent in Temporality (4 students)
  The strength of C3 involves two domains - temporality and breadth. C3 students spend maximum time in asynchronous forums compared with the students in the other clusters. Similarly, their ability to provide feedback or overall response (breadth) is at highest level compared with other clusters. However, they only contribute post or respond (speaking) moderately in the forum. Despite their breadth of scope is comprehensive, the reading in understanding (depth) their peers' post is at the moderate level. This cluster is similar to broad listener and reflective talkers of Wise et al.,'s (2012) cluster due to the similarities in three domains as often extended temporality, comprehensive breadth and moderate in depth. However, both studies contradict each other in the speaking domain as this study involves moderate whereas Wise et al.,'s finding indicates frequent speaking.

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- Cluster 4 (C4): Silent Listeners, Incoherent Temporality (2 students)
  C4 students' participation in online forum is at the minimum level (temporality). They just view (breadth) and read (depth) some peers post without any contribution (speaking). As for the research by Wise, et al., (2012), it can be closely connected to the superficial listener but not intermittent talker as no contribution was made by the students.

7. Recommendations

Listening behavior analysis can provide detail information about the students' tasks or activities, in which the students can be clustered based on their interaction level. This information can help instructor to identify those with do not participate in order to increase their level of interaction as well as to help them constructing their knowledge. Analysis of clusters allows the instructor to focus on the strengths and weaknesses in the discussion forum as an initial step to diagnose the students. This approach allows the instructor to diversify the scope and topic of discussion. In addition, cluster analysis can provide data on the number of members in the clusters. This allows the instructor to focus in detail by meeting the student personally or focus on target groups by uploading material with content suitable for the students in the online forum.

For example, Cluster 1 involved eight students identified as Focused Listeners and Moderate Speakers. The task could be addressed in a wider scope of discussion as their weakness lies in the breadth and contribution. Next, for Cluster 2 (Moderate Listeners, Active Speaker, 9 students), the focus should be on the breadth and depth of each topic discussed. Also, students can be exposed to apply their knowledge in different situations with the setting for an example. This can produce a broader topic of discussion as well as in-depth discussion on the topics. For cluster 1 and cluster 2, when the weaknesses are corrected, this will indirectly improve the time (temporality) spent in the discussion. While for Cluster 3 (Extended Listeners, Moderate speakers, 4 students), the strengths of the students of this cluster are in the domains of temporality and breadth. Then the focus should be on the depth of the topics discussed. Followed by the last cluster (Silent Listener, 2 students), these students need personal approach and opportunity given by the instructor to enable them to engage in the discussion.

This study will contribute to the understanding of the importance of the cluster analysis approach in asynchronous discussion forums. However, it is suggested that an interview session to be carried out to extend the findings further by investigating students from each cluster to obtain further insight into their engagement in online discussion forums. This will assist in providing further information to understand which particular aspect that requires improvement. Thus, a mixed methodology is recommended as this approach allows for the collection of data from multiple sources for deeper understanding of the investigation.

In order to increase social interaction, a collaborative approach is suggested. For example, the findings from the study of Fariza Mohd Nor, Afendi Hamat and Mohamed Amin Embi (2012) showed that collaborative approach can provide a positive impact on online learning. Along this line, future research should examine the effectiveness of collaborative approach by evaluating the quality or knowledge construction among the participants. This can be achieved by applying the content analysis method, for instance, using the Interaction Analysis Model by Gunawardena, et al., (1997). This method can also examine the effectiveness of social interaction in an online discussion. Content analysis and social network analysis method in asynchronous forum can provide even inclusive results on interaction level of the students. Combining content analysis methods and social network can provide information covering both the cognitive and social aspects occur an online environment.

8. Conclusion

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The effectiveness of asynchronous discussion forum in assisting the instruction and learning depends on the tasks or activities conducted. For example, the success of asynchronous discussion forums depending on the students' interaction, participation and the quality and the extent of scholarly discussions taking place. The analysis of these online forum activities - listening behaviors - will reflect the types of participants. Based on this analysis, further suggestions can be made to improve their learning.

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Architectural education, project design course and education process using examples

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Abstract

Architecture is a discipline which creates healthy, livable and aesthetic spaces for the users using the opportunities of the natural environment to satisfy the needs and desires of the users within specific criterion. As it is the case in other design based disciplines, importance of theoretical and applied studio courses which bring the student design capability and creativity in architectural education is so remarkable. The most important facts that prepare the student for the profession and design process are the basic studio courses which basic design and space concepts are given.
This study examines the working methods of students on a project design course and education process using examples.

Keywords: Architectural Education, Design Studios, Space.

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1. Architecture as a concept

One of the various definitions of architecture is "the art and activity of building, designing and organizing space and its surrounds, where functions and festivities connected with human life created as a community and individually are carried out."At the same time there are also emotional approaches to the definition of architecture. In this regard one finds "a synthesis attained within a communal process that succeeds in attaining the level of civilization, includes subjective and aesthetic values and is completed with the achievement of a product" (İzgi, pp. 35-41). Architecture is tied to many aspects as one understands from its definitions and has become the subject of different evaluations from the point of view of concept, scope, professional duty, responsibility and education. The unity and the interconnected relationship of these definitions are unavoidable. When compared with other artistic branches, it is an activity that involves different directions and relies on intellectuality as all artistic activities do. During the design and action process, architecture in the broadest sense creates a new, artificial atmosphere by limiting and dividing the piece chosen from nature.

2. Architectural education

Those who resort to the accumulation of experiment register advances and, turning that accumulation into knowledge makes the worker a master (İzgi, p. 75). From the beginning of building construction until the present, master-apprentice created the educational model. This method that relies on application produced an education system in which the architect through experimentation possessed all the knowledge required of the profession. We see past examples of this in the archival records. In Ottoman history the

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"Imperial Architects' Society" was an organization that included classifying masters and journeyman architects under the management of the chief architect. This organization that handled work for government and military purposes continued with architectural education. In Europe organizing that began in the Renaissance continued with the Fine Arts Academy that Vasari established in Florence and the Fine Arts Academy in Paris in the seventeenth century. The powerful developments in the West led to the creation of their like with the establishment of the Sanayi-i Nefise-i Mektebi Ali (High School of Fine Arts) under the leadership of Osman Hamdi Bey in the nineteenth century. This approach at the same time stressed the unity of the architect-art person. It can be explained as follows: The purpose of the type of creativity was organized so that architectural education was included under the roof of the fine arts. The Ecole des Beaux-Arts continued its tradition for many years[11] and experienced changes to its identity, status and program among educational organizations through the Industrial Revolution. (İzgi, pp. 75-79). The Bauhaus that followed the Ecole des Beaux-Arts was a school that relied on an educational foundation that included all the fields of architectural creativity with the idea of the basic unity in architectural education and began from zero under the supervision of a master. The foundation of the educational studios within the architectural discipline was laid with the educational program, the goal of which was to unite them. The aforementioned educational programs were applied in architectural education and included experimental studies to acquaint students with the basic principles of creative movements that lay at the foundation of the visual arts (Dikmen, p. 1511). One sees that the teaching method gained importance through the Bauhaus student-teacher (master-apprentice) interaction. An educational method was used that recognized the possibility of the student being active and developing freely and the possibility of learning while doing, discovering the fundamental characteristics of the means being used and free of moulds. In the Bauhaus curriculum that developed with the theory of Gestalt[12] perception, the student proceeds through the apprentice, journeyman and master levels during the educational process that includes all the necessary applications for the level of creative work and the scientific fields. The innovation that the Bauhaus principles brought to its form of architectural education in counter-distinction to that of the Ecole des Beaux-Arts was of the students being free and active instead of being classically prepared and accepting of passive and guided instruction (Dikmen, p. 1512). In Turkey architectural education was organized under the Council of Higher Education (YÖK). The university in the institutional and theoretical sense has to be an effective, obligated, complete and free organization in the fields of education, research, criticism and educating faculty.

3. Design

The meaning of the word design is as follow: it is a process that includes something being drawn and/or being built as a whole with its mass and its surroundings following criticism and documentation of the theoretical, functional, spatial, structural and actual characteristics of the whole building whose function has been altered in order to meet the requirements (Dikmen, p. 1514). In design's basic principle, it is important to walk around every part of the aforementioned virtual space, think about contextual approaches and, in short, experience it. The process is an artistic phase and within it there is choice, decision making and responsibility. At the same time the documenting of every detail and data is essential in order to achieve further perceptions of the building correctly. During the design development process which is two dimensional at the beginning it generally reaches a three dimensional virtual appearance. Transferring a three dimensional abstraction into two dimensions is achieved using technical drawing methods. The perspective sketches that are prepared by various methods during the design process, the colored or black / white lines, models, photographs of models, animations and thoughts are useful from the point of view of fixing and transfer.

[11] Assigning the same topic to all of those engaged in working for a diploma and setting up an award competition.

[12] The Gestalt Concept appears as a reaction to the "behaviorist concept" in which learning is only evaluated within the relationship of warning-reaction (W-R). Contrary to the behavior concept in which every W-R relationship is independently examined, it ensures that the intellect creates a tie between those warning.

3.1. Design studio

Design studios are places in which students obtain basic knowledge related to architecture. One of the difficulties experienced in this process is not having the infrastructure which would prepare those students among the ones who come knowing beforehand something about the profession of architecture. In other countries generally university preferences are clarified at the middle school level and educational opportunities provided that are directed at this. In Turkey the students are placed in departments related to the choice and placement tests after middle school. If the architectural students are placed in the aforementioned department that is outside their personal interests, they begin the process without any accumulation of professional knowledge.

One of the other problems met with during the period of architectural education is that the person comes to university education from different educational models. Among these one can find the teacher from the centrally molded education whom one doesn't need to cross examine. In architectural education the one who can relay what he is thinking and produce endless solutions is the aforementioned centrally educated student. These types of approaches that reveal suitable strength at the same time reduce the output expected of the education.

In architectural education the studios are the places in which architectural design education is experienced. They rely on the principle of developing skills and sharing ideas. In the design studios the basic problem for the educational element and the student is that there isn't a method that suits every student. The reason is that there are differences in individual creativity which is tied to the person's perception of design and which is individual. In this situation the approaches that reveal creativity must concentrate on the ways of elucidating the problem, being able to create different and unusual solutions to the problems, being able to dream and relate this and achieving the skill of original thinking. There is the need for criticism of the concept that one thinks up in various languages of the preliminary sketch, model, perspective, etc. in order to develop the design and turn it into a finished product. If the design were an abstract concept, the way to approach it would include the exact opposite.

The healthy progress of the process and adding the active-creator-researcher brings a healthy result. In this process the critiques on the table create a multi-lateral atmosphere of rethinking and production. In the master / apprentice relationship the goal is to develop the student's design skills while accepting criticism. At this point it is expected that the teacher has the personality to direct the student to think differently, research and be cross examined. It is expected of the student that he will introduce himself with his own words in his own way, debate and create his own individual design rather than a repetition of the master. Jury evaluations that are assembled in the sense that different teachers offer critiques and the participation of guest jurors provide for the creation of a synthesis of different points of view for the student. In this regard it mustn't be forgotten that the design studio is a continually interactive area.

3.2. The impossibility of design if it didn't exist – creativity

The concept of creativity is not to make something out of nothing but it must be evaluated as the vehicle and method used so something does exist (Dikmen, p. 1515). To approach the subject with different perceptions and points of view earns the individual the adjective of creative. In order for a different point of view to be achieved the student's motivation has to be affected. During the design stage the appearance of creativity is not from books or repeating what has been taught; it comes as criticism of what the student produces and the production of new knowledge. For this reason design studios have to be organized in a way that can bring to life an imitator and a developer of a way of seeing and thinking and a model for attaining knowledge. The skill of being able to teach only quality creativity requires increasing the intellectual accumulation on subjects of research and skill. That every student has a different development process and style of learning necessitates the use of more than one method at one time. For this reason design methods are experimental change that has to happen with traditional methods.

3.3. Operating in design studios

The purpose in design studios is to provide that the problem given to the student is one to be thought of during the studio process and in daily life outside the studio. In studio education the way to achieve a talent for criticism and understanding through the entirety of experimental and conceptual knowledge is

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through an argumentative atmosphere and counter criticism. The basic structuring of studio education can be identified as follows:

-Student centered education,

-The possibilities of multiple solutions for the problem, and

-Programs that can change in accord with studio dynamics.

Of the factors that affect the learning level of the students who enter the architecture department is that they don't have the same level of knowledge and concept. When this situation is observed, evaluating the dynamics which the differences have created well and providing support and motivation create an important process.

3.3.1. Problem identification

During the operational period of the design lesson the characteristics of the subject that will be done and detailed information should be given to the students verbally and in writing. Information such as the research, production of ideas, preliminary sketch work, pre-scale model and final scale model and due date should be announced to the students on a time line. In critiquing the problem, identification of the problem should be clarified for the student by observing whether what is wanted during the project's progress was understood or not. In situations where it seems necessary, the student's better perception of the product can be ensured by identifying the problem on examples of three-dimensional models. Because identifying the problem correctly means that the solution has been transferred to the design correctly. What is expected of the student is the production of an effective design that suits the target (creating the assemblage-conceptualizing-stain work) and projecting this in a correct fashion. (See Picture 1-5)

3.3.2. Research

After the project has been introduced the program, target group and the research on sample subjects are requested from the students. Here the goal is to ensure that the students have enough information about the subject and to increase the speed of their perception. If design is thought of as a process, it could be thought that every bit of information learned would provide positive additions to them during the design process. However, during the research process it mustn't be forgotten that internet and library searches aren't enough and examining extant examples along with them is an important point. One can say that design samples made up to the present that suit the design wanted in the project can be examined by the students and the design critiques will be useful for observing how change or development occurred. Sharing the research carried out by the students with other students and educators in the studio atmosphere provides a positive addition to the production of ideas during the progress of the project.

3.3.3. Producing ideas and sketch work

All the information which is acquired as the result of research carried out during the process of producing a solution to the project that has been taken up as the design problem should be transferred to the production of thoughts and ideas along with the effects of cultural life. This stage is one of education's most important pieces of the design's principal problems and the process of producing ideas. The development of ideas produced by means of sketches must always be a part of architectural education. In this regard the student must begin with the accumulation of all the field lessons to sketch the production of the creative idea which is wanted or can answer the need. At this stage the functional diagrams, the situational plan and the silhouette studies occupy an important place (See Pictures 5-14).

The affect of the sketches made with paper and pen which play an important role in the solution of the problem must be conveyed to the student. The technology developed in our day and advanced programming techniques provide great ease at the design stage. The students who want to use this situation are skipping the work on producing ideas and sketches which we can characterize as the most important stage of the design process and directly begin their designs on the computer. But sketches give the student very important clues about what the design that appears should resemble. That other components like typology, color, images, materials and the use of the structural system are drawn in sketches is useful for the students approaching the project with different points of view as well as developing the process of producing ideas.

In the situation in which the design begun in a virtual atmosphere continues, the student is restricted by the limits on the skills of the program used and without noticing it permits the design to go in the direc-

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tion of the program. In the situation in which several students work in this fashion perhaps producing designs that resemble one another could be discussed in terms of the program's characteristics. While computers and tablets get between brain and hand coordination in the computer situation, in sketch work both brain and hand coordination are used together. In this way the production of ideas can be done freely multiplying without any reduction. The students become accustomed to working with sketches and undoubtedly after graduation it will provide positive additions to them as designers.

3.3.4. Critiques, modeling

The critique brings together points of view about the student and teacher's design process in the architectural design studios. When a short break is taken in the work for the critique process, it creates an atmosphere for sharing ideas. Critiques don't have a single purpose or a clear format. They can be done in many various forms and the work process can expose very many different points of view.

Critiques have two important characteristics. The first is to put the entire attention on the student's work and the process. The second is that the student shares his work with the educator and other students. As a result there's an exchange of views that adds to the design process. At this stage the student would apply the corrections on the sketches in line with the design critiques made of the sketches. The critiques made ensure that the student is pointed in the right direction. Later on the student may apply the most suitable design solution to the drawing and bring the design to the final stage. After that the student prepares a three-dimensional preliminary scale model in the measurements wanted. The purpose in wanting the preliminary scale model is to ensure knowing how the two-dimensional design will be seen physically in three dimensions and being able to study it in relation to the environmental data. The presentation of the design applications done for the solution of the problem is very important for the student and the educator. A successful solution can turn an unsuccessful situation through the application of a carelessly made scale model. For this reason the student should take pains over making the scale model to prevent situations like these (See Pictures 15-24).

4. Evaluation – solution

The completion of architectural education is documented with a diploma, etc. The process which results in the acquisition of the title of architect is the beginning of a new educational period. Architectural education must rely on the goal of a broad education aimed at acquiring a cultural level related to architecture. As a special section within this concept, by being evaluated and achieving a common level, one can reach a successful result. The teacher's relaying information in architectural education that must rely on the free choice of the profession at the beginning and the method that relies on his logic in which correct mistakes are tied to formulas must always be questioned. Depending on the sources for the accumulation of information that the architectural candidate feels the need for through personal approach, observation and effort, his acquiring an accumulation of information must be supported and not remain within the boundaries of the organization. The sources that nourish this education, the students, teaching staff, professionals, bureaus and construction sites have to effectively contribute to the education, and the validity of the system of thought and development must be ensured at every level of the education.

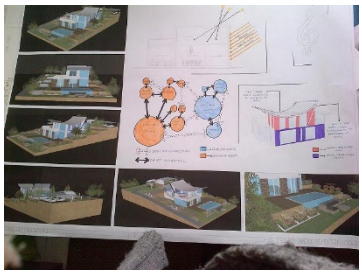
Architecture has shown a development directed for a long time at expertise in various fields like design, construction and management. In this regard the students who make up the foundation of the education are the candidates who will take on the duty of being faculty members later on. For those who join education and management, it is just as necessary and useful as for organizations and faculty. In this process the candidate must be supported in order to possess a preparatory accumulation while being independent of the subject that he has chosen. Because architectural design education has a multi-layer and experimental atmosphere, the continuity of the flow of information among the disciplines must be achieved according to the view of the architectural candidate. Gaining the atmosphere of the assembled studio function has to be conceived not as a product but as a process that is focused and has to be focused. Today the ability of drawing what they dream of will become the acquisition of the unity of the concepts of technology and art.

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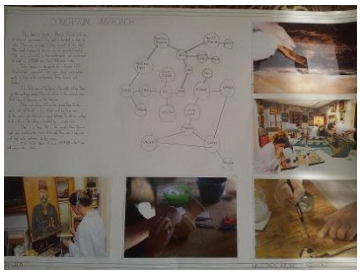
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Mustafa Kılınç
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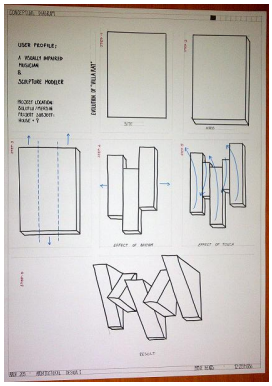
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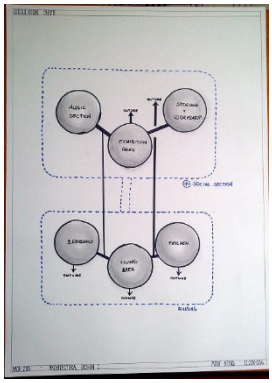
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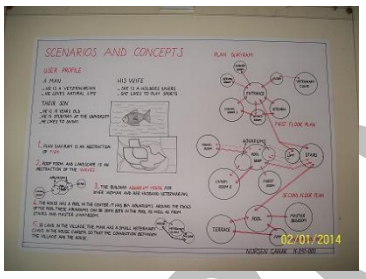
Pic. 2



Pic. 3



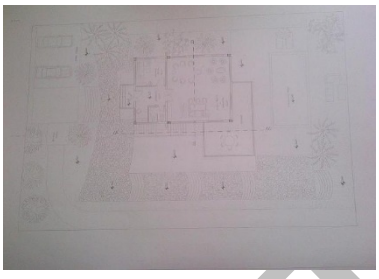
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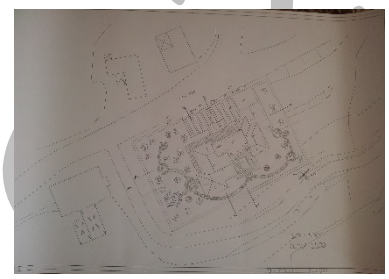
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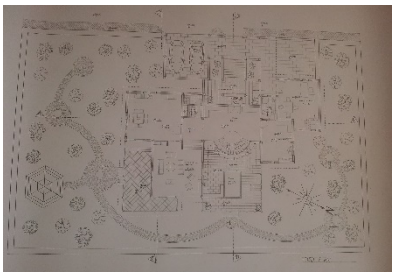
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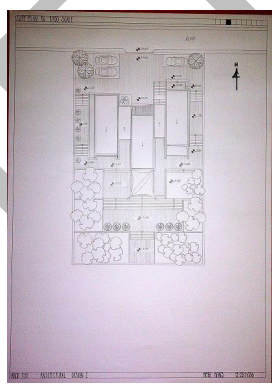
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Pic. 8



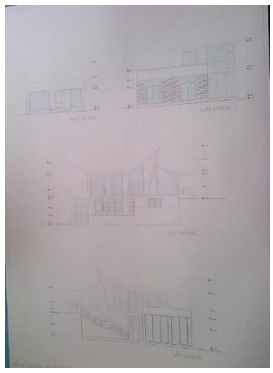
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Pic. 10



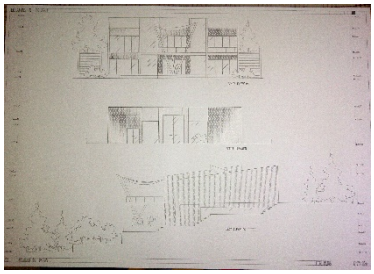
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Pic. 12



Pic. 13



Pic. 14



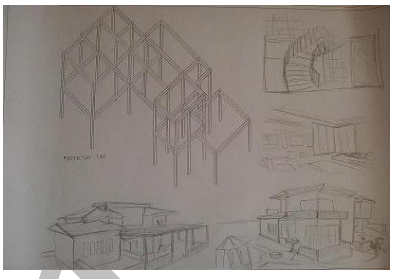
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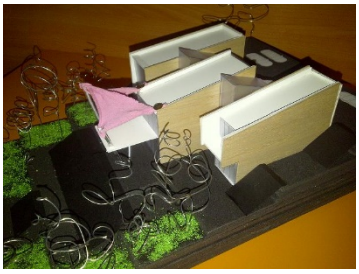
Pic. 16



Pic. 17



Pic.18



Pic. 19



Pic. 20



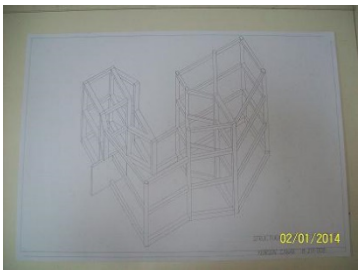
Pic. 21



Pic. 22



Pic. 23



Pic. 24

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Aspects of chemical technology teaching at university

Hanna Wilczura-Wachnik13, Bazyli Semeniuk, Andrzej Kaim, Adam Myslinski
Faculty of Chemistry, University of Warsaw, Pasteura 1, 02-093Warsaw, Poland

Abstract

International Educational Technology Conference has been founded in 2001. The first of "The International Educational Technology Symposium (IETS)" was held at Sakarya University in Turkey in 2001, and this year IETC 2014 will be organized in USA. As it is written in the official document IETC "is an international, non-profitable, educational technology activity with the mission of educational technology in education and its practical application." During 13-th conferences different aspects of education on different levels have been presented.

In this presentation I would like to discuss some aspects of Chemical Technology teaching at university. It is a very specific problem. Why? University is not a technical school, there are not given any engineering courses except chemical technology. Usually students at university have not well enough technical background. Faculty of Chemistry University of Warsaw is a large research and teaching centre with fully developed programmes in fields of chemistry. Among many courses given at our faculty Chemical Technology belongs to courses difficulties making students. Chemical Technology Division experiences will be presented in context of the course contents, student teacher communication, types of supporting materials for lecture and laboratory. There will be presented examples of experiments manuals, schemes of installations for periodic and continuous chemical processes, unit operations and unit processes simulations using CHEMCAD™ version 6 program.

*Keywords:*chemical technology; lecture; students experiments

1. Introduction

Chemical technology teaching at university it is a very specific problem. Why? University is not a technical school. There are not given any engineering courses except chemical technology. Usually students at university have not well enough technical background. Faculty of Chemistry University of Warsaw is a large research and teaching centre with fully developed programmes in fields of chemistry. Among many courses given at our faculty Chemical Technology belongs to courses difficulties making students. Keeping it in mind teachers prepare a many supporting materials for both lecture and student laboratory.

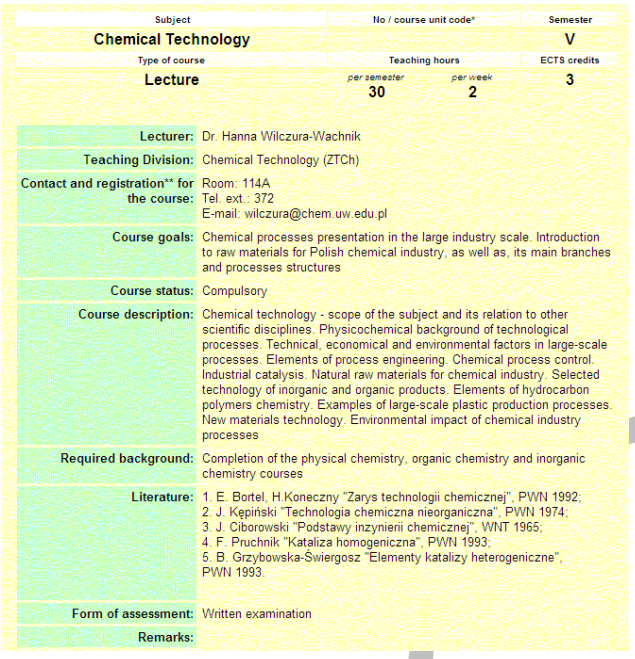
Presently, computers involve on easy communication between student and teacher. Now, students are able to find on faculty web-pages all information they need about studies program, courses contents etc. Moreover, suitable computer programs and networks give a chance on visualization, prediction and graphical presentation studied processes, in chemical technology research area.

Chemistry belongs to experimental sciences. Theoretical background is very important but experiments involve to verify it in practice. On chemical technology courses (specially on laboratory) students have a very good occasion to combine and use in practice previously acquired knowledge during curses of physical chemistry, analytical chemistry, organic chemistry etc.. Chemical technology lecture at Faculty of Chemistry University of Warsaw gives students the basic knowledge of the chemical processes in the large industrial scale, introduces to raw materials for chemical industry, as well as, presences main branches and processes structures. Required background for students who attend this course is completion of the physical chemistry, organic chemistry and inorganic chemistry courses.

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*E-mail address:*wilczura@chem.uw.edu.pl

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Chemical technology laboratory is conceived as a complement to the lecture and giving a chance to contact to chemical technology processes in practice in a small scale. In the frame of this course students attend to experiments, classes and computer experiments. During this course students learn for example how in chemical technological process (continuous or periodic) detergent, soda, PAV are produced. On the base of own experimental data student prepare a material balance. Next using CHEMCAD™ program student simulates such process (keeping the same parameters and conditions) and compare to obtained experimental results. Due to lack of rudiments of chemical engineering in the university curriculum, simple demonstrative examples for the basic course should be selected from the simulator program with a great care. Application of simulator program to specialization courses was more effective comparing to bachelor level students (Semeniuk 1998).



Subject	No / course unit code*		Semester
Chemical Technology			**V**
Type of course	**Teaching hours**		**ECTS credits**
Lecture	*per semester* **30**	*per week* **2**	**3**

Lecturer:	Dr. Hanna Wilczura-Wachnik
Teaching Division:	Chemical Technology (ZTCh)
Contact and registration for the course:**	Room: 114A Tel. ext.: 372 E-mail: wilczura@chem.uw.edu.pl
Course goals:	Chemical processes presentation in the large industry scale. Introduction to raw materials for Polish chemical industry, as well as, its main branches and processes structures
Course status:	Compulsory
Course description:	Chemical technology - scope of the subject and its relation to other scientific disciplines. Physicochemical background of technological processes. Technical, economical and environmental factors in large-scale processes. Elements of process engineering. Chemical process control. Industrial catalysis. Natural raw materials for chemical industry. Selected technology of inorganic and organic products. Elements of hydrocarbon polymers chemistry. Examples of large-scale plastic production processes. New materials technology. Environmental impact of chemical industry processes
Required background:	Completion of the physical chemistry, organic chemistry and inorganic chemistry courses
Literature:	1. E. Bortel, H.Koneczny "Zarys technologii chemicznej", PWN 1992; 2. J. Kępiński "Technologia chemiczna nieorganiczna", PWN 1974; 3. J. Ciborowski "Podstawy inzynierii chemicznej", WNT 1965; 4. F. Pruchnik "Kataliza homogeniczna", PWN 1993; 5. B. Grzybowska-Świergosz "Elementy katalizy heterogeniczne", PWN 1993.
Form of assessment:	Written examination
Remarks:	

Figure 1. Chemical technology lecture page on faculty web-page.

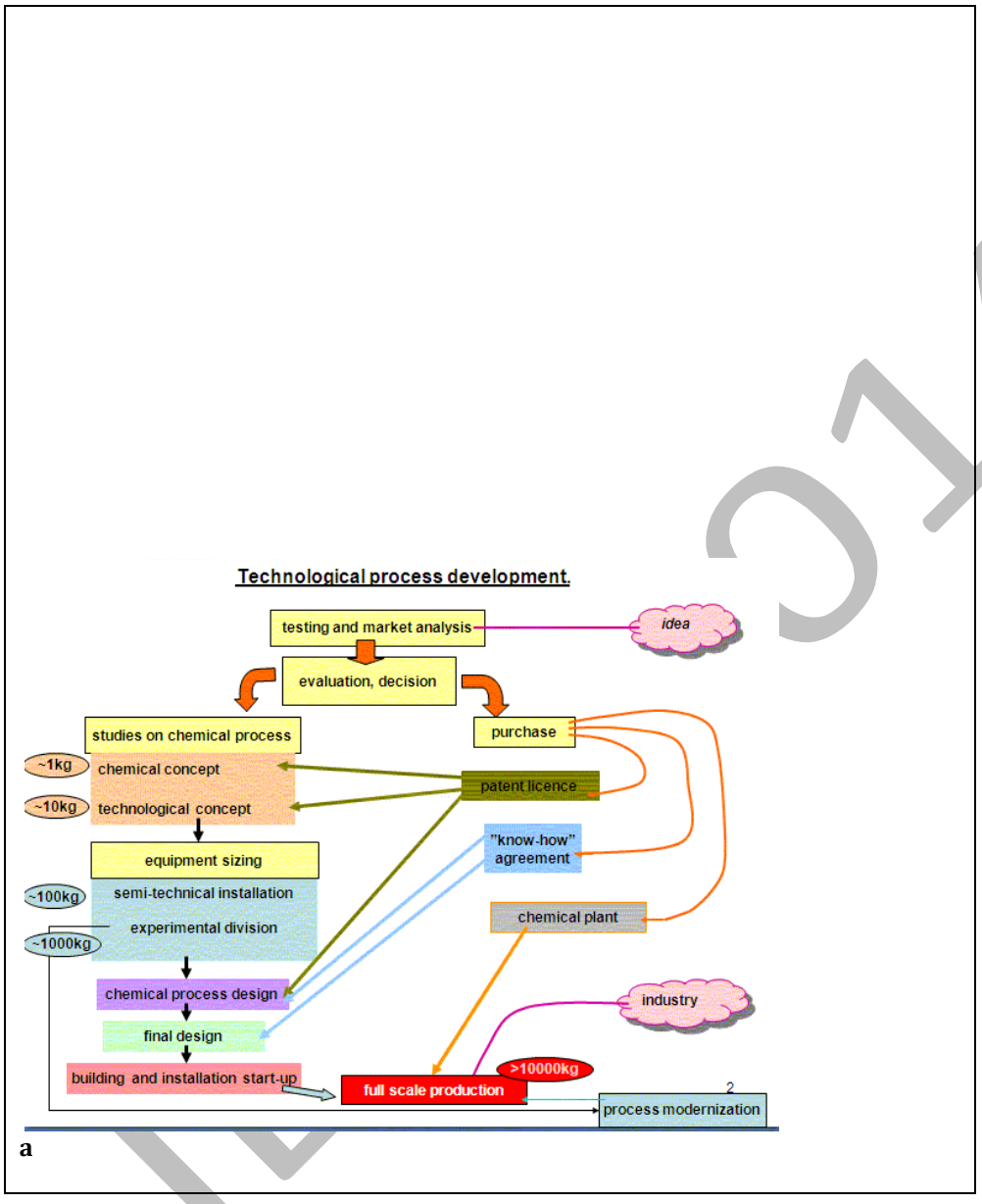
2. Chemical technology – lecture

The lecture content is the following: scope of the subject and its relation to other scientific disciplines, physicochemical background of technological processes, technical, economical and environmental factors in large-scale processes, elements of process engineering, chemical process control, industrial catalysis, natural raw materials for chemical industry, selected technology of inorganic and organic products, elements of hydrocarbon polymers chemistry, examples of large-scale plastic production processes, new materials technology, environmental impact of chemical industry processes. Detailed information's about contents of each lecture students can find on lecture web-page (Wilczura-Wachnik 2013). The picture of such page is shown in Figure 1. Supporting materials for lecture students can find on course web-page (Wilczura-Wachnik 2013).

As it was mentioned earlier, students at university have no technical background. Because of that teacher has to find the certain way to explain technological problems using simple graphs, diagrams schemes etc.

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Examples of lecture slides are presented on Figures 2aand b. It is obvious that is impossible to explain engineering problems without technical symbols. This part of chemical technology lecture is the most difficult for university students. Teaching staff at Chemical Technology Division noticed the significance of laboratory experiment combining to computer simulation in teaching process.



a

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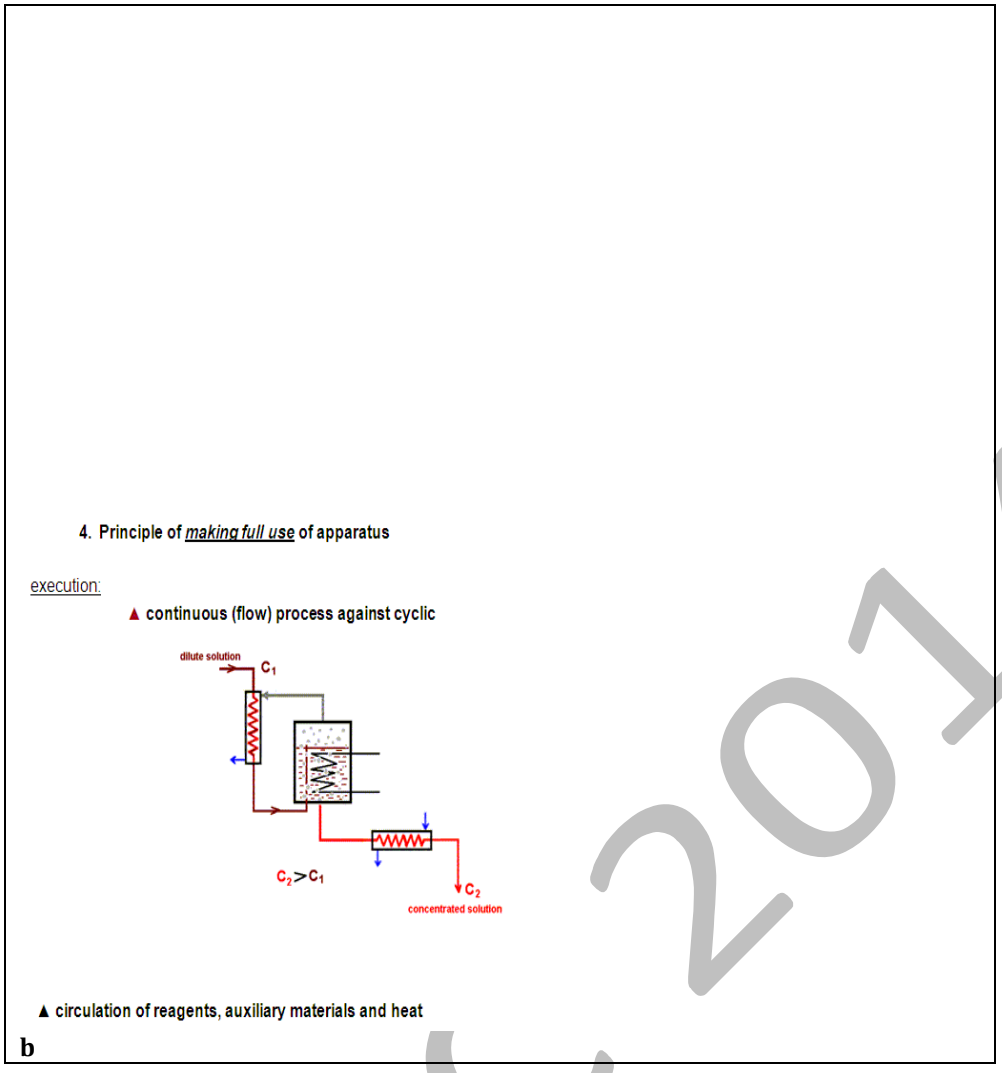


Figure 2. Examples of chemical technology lecture slides. (a) Technological process development , (b) scheme of operation unit (Wilczura-Wachnik, 2013).

Using slide (b) shown on Figure 2 teacher is able to explain 4-th technological principle of making-full use of apparatus as well as example of unit operation .

The balance sheets represent a separate package in the teaching of chemical technology both within the framework of the lecture and laboratory. On Figure 3 is shown an example of Sankey diagram.

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Sankey diagram

Theoretical material balance of NH_4HCO_3 in reaction: $H_2O + NH_3 + CO_2 \rightarrow NH_4HCO_3$							
Raw materials (compounds)				products			
	compound	kg	%		compound	kg	%
1	H_2O	227,9	22,79	1	NH_4HCO_3	1000,0	100,00
2	NH_3	215,2	21,52	2	-	-	-
3	CO_2	556,9	55,69	3	-	-	-
	Total amount	1000,0	100,00		Total amount	1000,0	100,00

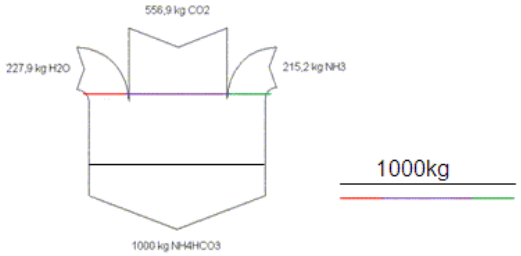


Figure 3. Example of material balance.

3. Chemical technology – laboratory

Chemical technology laboratory is organized in such a way that each teacher takes care on six students. These students are divided in two three person groups. Each group works on one installation. Our experience shows that this is the optimal number of student groups. Students cooperate during experiments; learn to organize work in group. Usually, spontaneously appears emerging leader, who directs the work of the entire group.

Chemical technology laboratory is organized in the following way: test or quiz from theoretical background connecting to experiment, next students have a time (around 10 minutes) to recognize elements of installation (they can use manuals). Next is a time to talk to teacher and explain how the experiment will be realized. Finally students begin experiment and until the end of laboratory they take care about installation. Before leaving laboratory is obligatory for student's present results sheet, clean installation and make order on place they work.

Students have free access to all supporting materials (manuals, theoretical introduction, and literature) to each exercise on laboratory web-page . On Figures 4a and b are presented schemes of installation

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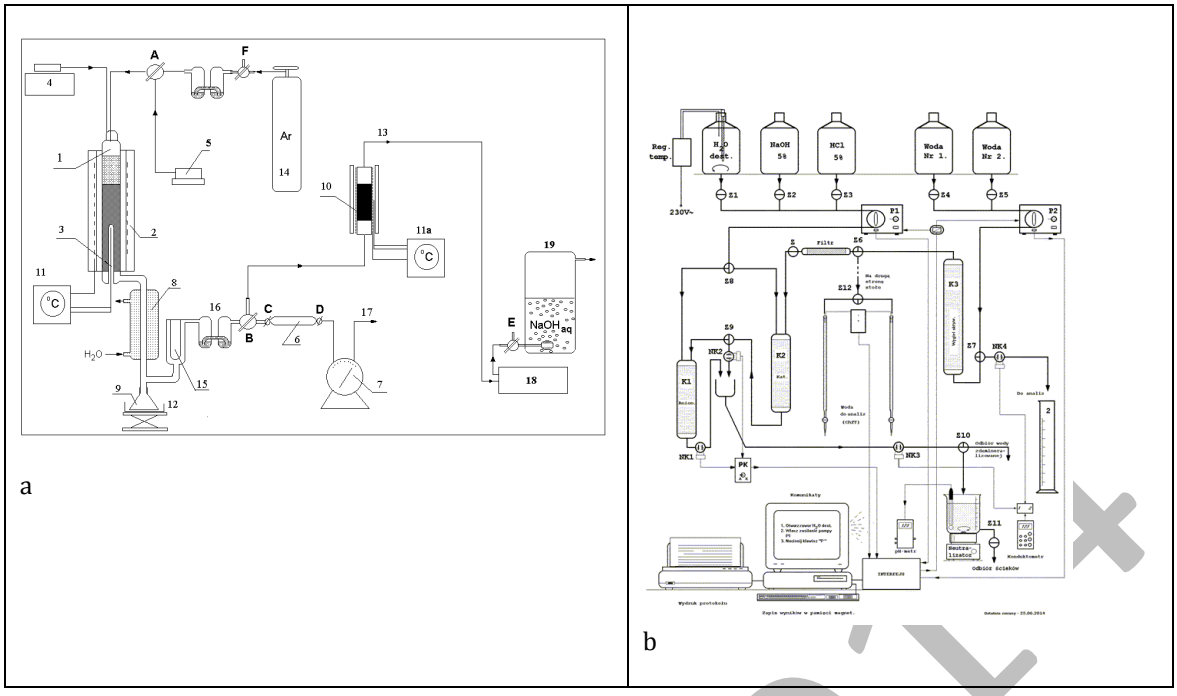


Figure 4. (a) Catalytic cracking installation (Wilczura-Wachnik, 2013) , (b) Water treatment installation (Myslinski 2013).

As it was mentioned earlier for some technological processes is possible to make its computer simulation using CHEMCAD program. In chemical technology teaching it is a very important educational helper. For students are offered computer simulations of unit operations and processes as testing of rectification column, suspension polymerization of styrene and others. First page of instruction to CHEMCAD for suspension polymerization of styrene (Kaim, 2012) is shown on Figure 5. Each instruction for computer experiment contains theoretical introduction to problem undergoing simulation. The second part of such manual is instruction to CHEMCAD procedure. Except the aim of the simulation there are given detailed information about each computer window as well as possible action. Examples of such windows are presented on Figures 5-10.

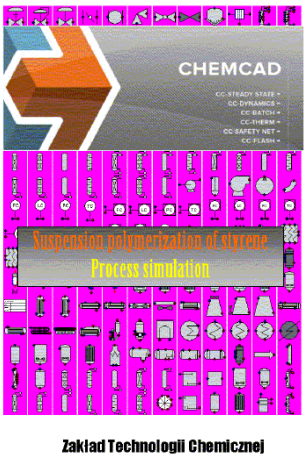


Figure 5. First page of instruction - simulation unit process (Kaim, 2012).

Below on Figures 10 – 14 are presented examples of CHEMCAD version 6 windows.

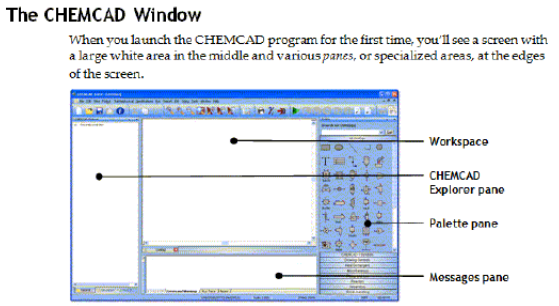


Figure 6. Structure of the CHEMCAD version 6 window.

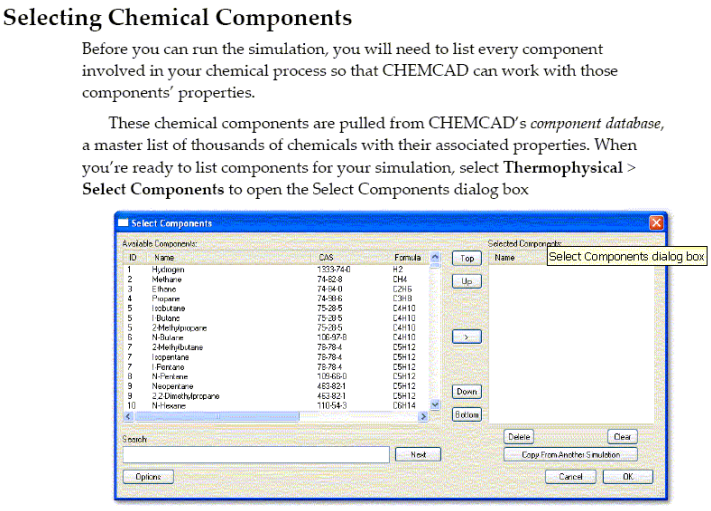
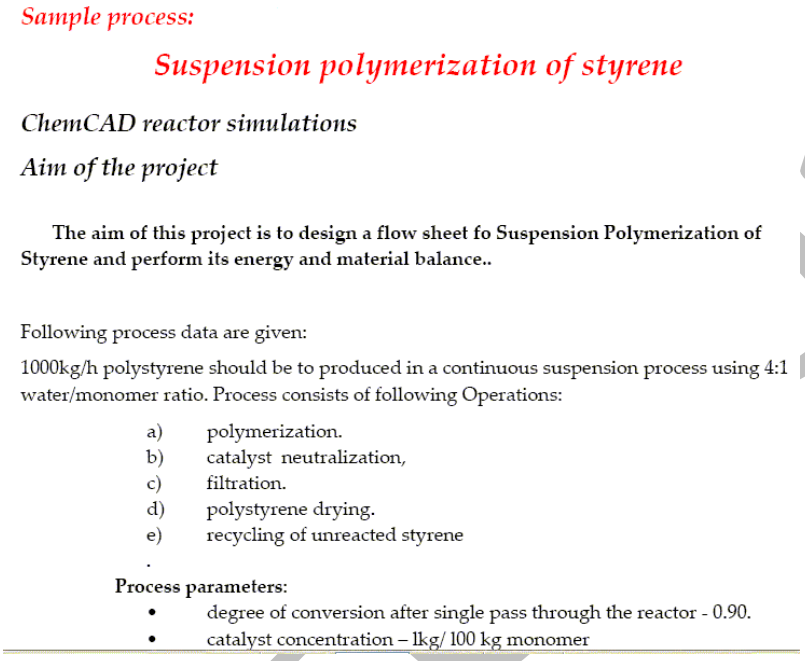


Figure 7. Example of CHEMCAD window.



Sample process:

Suspension polymerization of styrene

ChemCAD reactor simulations

Aim of the project

The aim of this project is to design a flow sheet fo Suspension Polymerization of Styrene and perform its energy and material balance..

Following process data are given:

1000kg/h polystyrene should be to produced in a continuous suspension process using 4:1 water/monomer ratio. Process consists of following Operations:

a) polymerization.
b) catalyst neutralization,
c) filtration.
d) polystyrene drying.
e) recycling of unreacted styrene

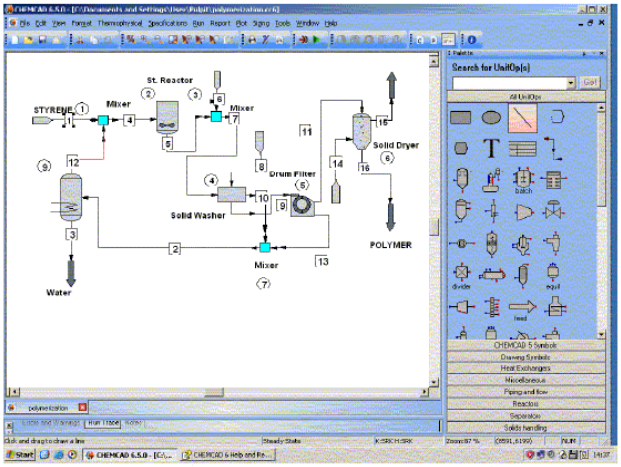
.

Process parameters:

- degree of conversion after single pass through the reactor - 0.90.
- catalyst concentration – lkg/ 100 kg monomer

Figure 8. CHEMCAD window – beginning of project entitled "Suspension polymerization of styrene".

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6. Go to Format => Engineering Units. Choose the engineering units you want. You can at any time go back and change these engineering units.

Figure 9. Six CHEMCAD window in project "suspension polymerization of styrene.

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10. Now you are ready to try to have ChemCAD converge the mass and energy balances. Go to Run => Run All to run the simulation. If you do that and you get the message "Recycle calculation has converged" you probably succeded. You should only check if the desired products (concentrations) have been obtained. If you get an error box, that means it didn't converge. You have to correct can now look at the results.

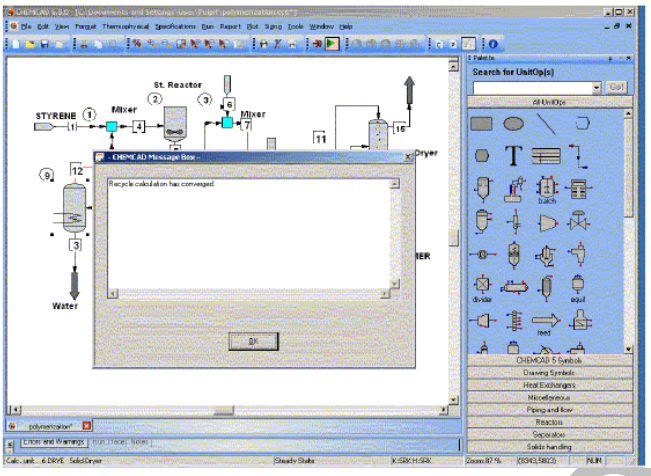


Figure 10. Ten CHEMCAD window in project "suspension polymerization of styrene

4. Conclusions

In conclusion, a significant progress in educational technology which has been observed on the end of previous centaury made a chance to organize the educational process in a unique way. Presently chemical technology course at university appear for students more interesting comparing to the past. Computers and suitable program simulations used during chemical technology courses involve students at university to get theoretical experience in engineering aspects of chemical technology.

Acknowledgements

The author would like to thank Colleagues from Chemical Technology Division at Faculty of Chemistry U.W. for sharing materials, also the EU POKL 04.01.01-00-100/10 for financing the participation in the Conference.

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Aspects of Students about Information Technology Courses in Social Science

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İstanbul University, Informatics Department, Beyazit, Istanbul, 34452, Turkey

Abstract

Information Technology (IT) is used in almost every area of higher education. However, it can be clearly seen that number of courses intended to teach the use of IT in social science is quite low in Turkey. There is a gap between generations who design curriculum and who take classes at universities. If we consider digital natives will attend universities soon, it is very important to redesign the curriculums including topics about IT. Besides the number of IT courses in science curriculum is more than the number of IT courses in social science curriculum.

In this study, authors aimed to determine the aspects of students about IT courses in social science. In this scope, a questionnaire is conducted to fourth grade students of Philosophy Department at Istanbul University who have taken Logic and Computer Practices II class. The questionnaire consists of 19 questions and it is conducted to 140 students.

According to study results, students expressed that IT courses are vital for their future professional life and workplace. They believe that it is necessary to add various IT courses such as office programs, information management, web design, database, and programming languages to curriculum in social science at higher education institutions.

Keywords: Higher education; IT courses; philosophy education; social science.

1. Introduction

Human needs sometimes can be considered as critical factors which acts in shaping the social processes. Today, information and technology become important almost in every field and also society is now referred to as information society. Information Technology (IT) which consists of integration of computer and communication technologies, and especially effects on developments in communication technogies infrastructure (Tahirov, 2009), has been one of the important and effective sub branches of today's world of technology. IT is defined as tools that helps to produce, collect, accumulate, process, retrieve, disseminate and protect information (Akkoyunlu, 1998).

Rapid developments in IT, has led to a shift and remodeling in social structure (Çalık and Sezgin, 2005). Furthermore, the existence of individuals who can use IT effectively will provide the ability of benefiting from this technologies at the highest level. However, goals toward becoming an information society, deficiencies and inadequacies related to user skills about usage of IT tools and digital literacy level of users cause ineffective usage of information and communication technologies (ICT) and hinders utilization of overall effect sufficiently (TBMM, 2012). Therefore, developed countries are intended to be literate, to access information, to gain and to develop their skills of using and assessing to information including all members of society untill reaching the 21st century which is the age of information and technology (Önal, 2010).

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Only in the last 10 years, changes and developments in the internet and mobile technologies affected business and services in various fields to perform their operations online. Furthermore, our daily and professional life is changed because of these changes in the requirements of contemporary society (Hamiti et al., 2014). Many tools that we use in our daily life is changed with technological development. We can give many examples of this change such as from the box office where we buy tickets to machines which we fill our cards, from queues at banks to internet and mobile banking, from phones which sent images as its biggest function to smartphones which give opportunity to almost every transaction.

Working life is not much different than daily life. Today, developments in IT, especially increment of internet infrastructure and usage network, significantly effect every sector; economic integration, which has occured with the disappearance of borders between countries, has changed quality and structure of provided services significantly with these developments (Özbilgin, 2003). In addition, advances in technology entails redefinion of professional requirements at the organizational level the workplace environment, health and safety at workplace reorganizing and restatement of business plans, job descriptions (Göktürk, 2007). Therefore, the new job descriptions which will be organized according to technological progress or new regulations in existing fields will create new jobs. However, at this point providing competitive edge will depend on effective use of IT tools.

Education is defined as the process of changing behavior of individuals in the desired way (Genç ve Eryaman, 2008). At the same time, considering the purpose of education which is educating individuals towards needs of the community, it is clear that education has quite important role in bringing up students for this IT era (Varol, 2002). High schools have an important role to provide IT education for students and to make them ready for global IT workforce (Csapo, 2002 in Randall and Zirkle, 2005). In schools large amounts of money is spent for computers/computer technologies but the more important issue is educational effectiveness of these technologies after integration to classrooms (Wilmore and Betz, 2000). The use of technology in education has increasingly gaining importance as technology education. In recent years, particularly the use of mobile technology in education is widespread. However, social sciences are considered to be less of studies in this field. Shih et al. (2010), specify that the use of mobile learning technologies for social sciences are reported less frequently than for the other sciences has technique-oriented content that develop the structural or systematic knowledge or skills of students.

According to these ideas, new education strategies and programs should be developed, IT should be used effectively as an education instrument (Gülseçen and Kubat, 2006), because, educational life without IT or IT tools is no longer possible for students and even for lecturers especially at higher education. Registration operations, searching book on a library, attending online courses and exams, communicating with the course lectrurer, etc. are some simple examples in terms of students. On the other hand, lecturers are trying to adapt IT for their courses and follow the developments for their students.

2. General Rationale and Hypothesis

Specifically universities, which are the most important institutions contribute a country's development and which provides the needed international qualified manpower by performing high levels of education and training activities at programs organized its internal structure training (Günay, 2004), is now trying to do own share in this new structure. In the process of restructuring, importance of acquiring the skills needed for higher education for individuals is increasing day by day (Saatçioğlu et. al., 2003) and IT usage is one of these skills.

These developments and new applications are quite proper, because one fact that we should take into account is nature of science that requires colloboration between researchers whether they are working at the same area or not. For example, a researcher who works at the business administration department, can need a software which helps to analyse data about customer behaviours and also the researcher need to know how to use this software. Another fact is sometimes students in higher education can be not curious enough to search about their studying area. In such cases only key is lecturers who can guide them

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to meet IT and IT tools. Moreover, it is important to decide which IT courses should be added to the curriculums.

At this point, when curriculum contents at universities in Turkey are examined, it is seen that fundamentals of IT courses are already existed. However, again we have to ask ourselves following questions: Are these courses enough for students?, Are students thinking that the IT courses that they have taken necessary for their business life?, How should IT education be according to students? and related to previous question what are student expectations from universities? Authors are inspired of these questions and the questions have become the start line.

In this study, it is accepted that IT education is disregarded at social science little more than science in Turkey. For this reason it is aimed to present aspects of social science students about IT courses at higher education in Turkey. Accordingly, a questionnaire is conducted to İstanbul University Faculty of Letters 4rd grade Philosopy Department students to find out their opinions about IT.

3. Method

Participants

The sample of the study consists of 140 forth grade students (102 female and 37 male at average age of 23) from the Department of Philosophy who had taken the course named "Logic and Computer Practices II".

Data Collection Tool

Questionnaire (see Appendix), which is prepared by authors, is used as data collection tool. The questionnaire is consisted of 19 questions. Two of them are demographic questions, 8 multiple choice questions are prepared to determine IT usage and IT education at universities and finally it has 9 open ended questions.

Data Analysis

Percentage and frequency tables are used to analyse data. Data analysis is performed with IBM SPSS Statistics 22.

Internal Validity of the Study

The questionnaire used as a data collection tool has been applied to students one to one. There has not been any redirection. There was not any question that has a clue about identity of the students. Age and gender were the only demographic questions of the questionnaire. Authors analyzed responses by themselves.

External Validity of the Study

Considering research group of the study, we can say that the results can be generalized limitedly. Generalizability of the results is possible with students who have the same education and features. A brief information about questionnaire is given to students before it is conducted.

4. Findings

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One hundred and forty students have responded the questionnaire, but participants have left blank some of the questions. 73% of them (102 students) is female and 27% of them (37 students) is male. Ages of students are between 21 and 42, the average is 23. 94% of students (131) has and only 6% of them (8) has not computer. Table 1 shows IT usage, general success rates and class assessments of students who participated this study.

Table.5. IT usage, general success rates and class assessments of the students

Questions	N	Minimum	Maximum	Mean	Std. Deviation
How many years have you been using computer?	138	1,0	24,0	9,678	3,7337
How many years have you been using internet?	136	1,0	18,0	8,426	3,3871
How many hours do you spend time on internet?	128	1,0	24,0	3,316	2,7125
What is your Weighted Grade Point Average (AGNO) at the end of the 7th term?	118	1,80	3,53	2,7208	,35644
Please evaluate your "Logic and Computer Practices II" course performance.	138	1,0	10,0	6,772	1,6535

Responses of "How do you describe yourself when it comes to technology?" question are given with frequency and percentage rates in Figure 1.

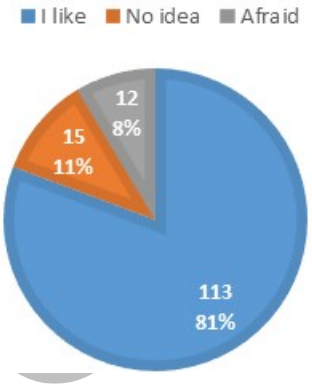


Figure 7. Attitude of the research group on technology.

Responses of "Do you think that IT courses which you have taken at university are sufficient?" and "Do you think that IT courses are necessary for your business life?" questions are given with frequency and percentage rates in Figure 2 – A and Figure 2 – B respectively.

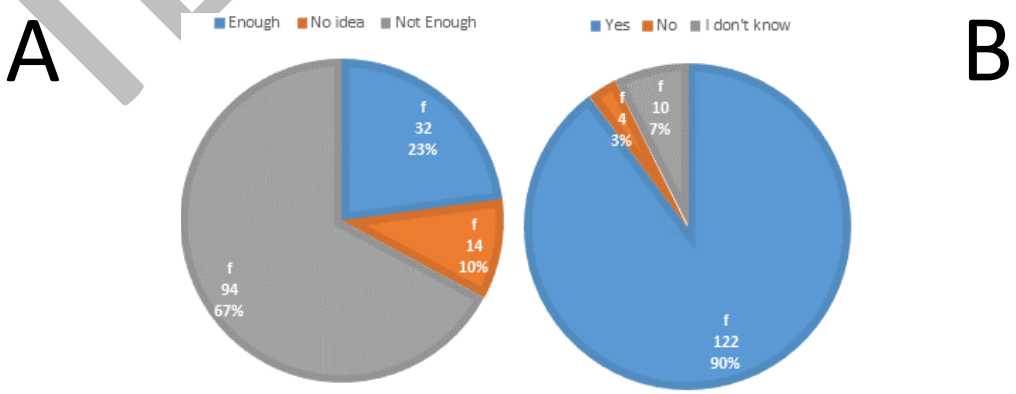


Figure 8 Aspects of students about IT education.

Responses of "What do you do on internet?" question is given with frequency and percentage rates in Table 2.

Table 2. Things that students can do on internet.

Option/Choice	*F*	*%*
Email	123	87,9
Forum	49	35,0
Group	80	57,1
Social Media	124	88,6
Search Engine	127	90,7
Blog	29	20,7
Learning Management System	20	14,3

As it is seen at Table 2, most of participants (90.7%) are using search engine, 87.9% of them are using email and 88.6% of them are using social media. Usage rates of blog (20.7%) and Learning Management System (14.3%) are lower.

Responses of "What do you prefer to be used in your educational life?" question are given with frequency and percentage rates in Table 3.

Table 3. Student expectations from internet during their educational lives.

Option/Choice	*F*	*%*
Email	111	79,3
Forum	42	30,0
Group	86	61,4
Social Media	99	70,7
Search Engine	82	58,6
Blog	30	21,4
Learning Management System	33	23,6

Responses of "Which course/courses do you prefer to take during your educational life at university?" question is given with frequency and percentage rates in Table 4.

Table 4. IT courses which students want to take at university.

Option/Choice	*F*	*%*
Office software (Word, Excel, PowerPoint etc.)	126	90,0
Hardware	52	37,1
Programming Language (C, PHP, Java, etc.)	39	27,9
Statistics Software	24	17,1
Information Management	38	27,1
Database	32	22,9
Web Programming	82	58,6
Other		

Responses of "Which of the following device/devices do you prefer to connect to internet?" question is given with frequency and percentage rates in Table 5.

Table 5. Device preferences of students to connect to internet.

Option/Choice	*F*	*%*
Desktop PC	44	31,4
Notebook	102	72,9
Tablet	42	30,0
Smart Phone	92	65,7

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It is obtained that when students are divided into groups according to their own description when it comes to technology, three groups have nearly the same average about evaluation their "Logic and Computer Practices II" course performance: I like technology (6.8), I have no idea (6.8), I am afraid of technology (6.7). Male and female students are both maximum 5 minute wait to open a web page. Average of the percentage of time that female students spend on the internet for research is 29% and average of the percentage of time that male students spend on the internet for research is 24%.

As Table 7 shows the results of the Independent-Samples T Test which compares computer ownership (Q9) and internet usage in years (Q13), there is obvious to see that in both Equal variances assumed and Equal variances not assumed cases the Sig. (2-tailed) < 0,05. Therefore, internet usage of students who have computers is different from students who do not have computers. In addition, if we look at Table 6, we can see that students who have computers have been using internet more than students who do not have computers.

Table 6. Group Statistics.

Q9. Computer ownership		N	Mean	Std. Deviation	Std. Error Mean
Q13. Internet usage (in years)	Yes, I have	129	8,636	3,3135	,2917
	No, I don't have	7	4,571	2,3705	,8959

Table 7. Independent Samples Test.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Q13. Internet usage (in years)	Equal variances assumed	,882	,349	3,196	134	,002	4,0642	1,2718	1,5488	6,5796
	Equal variances not assumed			4,313	7,336	,003	4,0642	,9422	1,8567	6,2718

5. Discussion and Conclusion

Considering demographic information of students, they have been using computer approximately for 10 years and internet for 8 years. They spend time on internet 3,3 hours per day. Students usually access internet via notebooks or smartphones (Table 5). Although average of AGNO is 2.7, their self-performance assessment of "Logic and Computer Practices II" course is 6.7 (1: The worst, 10: The best). Most students (81%) like technology (Table 1). For this reason, the sample group consists of students who mostly like technology, use computer and internet, can be classified as experienced and are above average in both general and course cases. Most of the students (67%) thinks that IT courses, which they have taken at university, are not sufficient. Furthermore, 90% of the students do not think that they will need this information for their business lives.

On one hand, most of the participants are using email, social media and search engines (Table 2). They also want to use these technologies during their educational life and their preference rate is higher when it comes to file sharing and communication with more than one person (Table 3). On the other hand, Table 3 shows that usage of blogs, Learning Management System and forums is lower. It is thought that the reason of this low rate has arisen because of their lack of information about related subjects (At Table 2, it can be easily seen that students are using them less than others).

Courses which students prefer to take during their educational life at university are respectively (from the most wanted): Office software (word, excel, powerpoint etc.), web programming, hardware, programming language (c, php, java, ..), information management, database, statistics software (for example SPSS, …) (Table 4). Many organizations are looking for office software usage skill today so it is normal to be at the top of the list for Office software. However, it is expected that information management and statistics software (for example SPSS, …) should be at the top of the list. This order is formed with lack of information about these terms more than requirement analysis.

If we consider students at universities are generation Y and generation Z is about to start university life, it is obvious to see that it is necessary to shape education contents according to IT needs in social science as well as other sciences urgently. This study can be extended to student who study at other departments in social science or to students who study at same department but from different national and international universities, so expectations of students can be determined clearer.

Acknowledgements

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Appendix.

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Questions of the questionnaire:

1. How do you describe yourself when it comes to technology?
- I like technology.
- I have no idea.
- I am afraid of technology.

2. What do you do on internet? (You can chose more than one).
- Email
- Forum
- Group (Purpose of file sharing, communication with more than one people etc.)
- Social Media (Facebook, Twitter etc.)
- Search Engine (Google, Yandex etc.)
- Blog
- Learning Management System (Moodle, Blackboard etc.)

3. What do you prefer to be used in your educational life? (You can chose more than one).
- Email
- Forum
- Group (Purpose of file sharing, communication with more than one people etc.)
- Social Media (Facebook, Twitter etc.)
- Search Engine (Google, Yandex etc.)
- Blog
- Learning Management System (Moodle, Blackboard etc.)

4. Do you think that IT courses which you have taken at university are sufficient?
- Enough.
- No idea.
- Not enough.

5. Which course/courses do you prefer to take during your educational life at university? (You can chose more than one).
- Office software (Word, Excel, PowerPoint etc.)
- Hardware
- Programming Language (C, PHP, Java, …)
- Statistics Software (SPSS, …)
- Knowledge Management
- Database
- Web Design
- Others (Please write your own choices) :

_____
_____

6. Do you think that IT courses are necessary for your business life?
- Yes.
- No.
- I don't know.

7. Gender:
- Female
- Male

8. Age: _____

9. Do you have computer?
- Yes, I have.
- No, I don't have.

10. Do you have internet access?

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- Yes, I have.
- No, I don't have.

11. Which of the following device/devices do you prefer to connect to internet? (You can chose more than one).
- Desktop PC
- Notebook
- Tablet
- Smart Phone

12. How many years have you been using computer?: _____

13. How many years have you been using internet?: _____

14. How many hours do you spend time on internet?: _____

15. What is the percentage of time that you spend on the internet for research?: _____

16. How many seconds do you maximum wait to open a web page? : _____

17. What is your Weighted Grade Point Average (AGNO) at the end of the 7th term?: _____

18. Please evaluate your "Logic and Computer Practices II" course performance (please chose a number between 1 and 10; 1: The worst, 10: The best) : _____

19. Please write down your opinions about the questionnaire.

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Attitude of Turkish EFL Learners towards e-Learning through Tam Model

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Abstract

The purpose of this study was to understand the attitude of Turkish EFL learners towards technology and to determine role of these factors in the academic achievement of the participants. Survey method was used to collect data about technology acceptance of the Turkish Foreign Language Learners. This research was conducted at a state-run university in 2012-2013 academic year and subjects were 231 male and 279 female e-language learners from the Vocational Higher School taking up English course through e-learning. According to the results of the research, some of the TAM factors have effects on the academic achievement of the e-learners. It is understood that while anxiety towards e-learning has a negative effect on academic achievement; perceived ease of use, attitude, satisfaction and self-efficacy have a positive effect on the academic achievement of e-learners. These findings indicate that Turkish EFL learners have a positive attitude towards technology and they are at the stage to make a decision to adopt or reject the technology.

Key Words: TAM, TAM in language teaching, language teaching and technology

1. Introduction

While Prensky (2001) names today's students as digital natives, Tapscott (1998) calls them net generation. Because they are born in a different world which is full of digital technology and this technology is an important part of their lives. Prensky (2001) states that the new generation is exposed to a huge amount of information since early childhood and therefore they think and process information much faster and are used to multi-tasking. However, they have little patience for long tasks and get bored easily. Therefore, it is vital for teachers to make a shift in methodology and learning content.

It has been proved that information and communication technologies encourage learners to make progress in their foreign language learning and motivate the learners in a positive and creative manner (Sanders & Morrison-Shetlar, 2001). Sankaran (2000) found that students who preferred courses supported with technology performed better than those who were presented in the lecture format.

However, Huang &Liaw (2005) state that, no matter how sophisticated and powerful the state of technology is, it is the user having a positive attitude towards it. Therefore, it is the purpose of this study to determine the attitude of Turkish EFL learners towards e-learning through Technology Acceptance Model (TAM) and propose some suggestions if there are any deficiencies.

2.Technology Acceptance Model (TAM)

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Technology Acceptance Model (TAM) (Davis, 1989) generated from the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) offers a theoretical basis for user acceptance and usage behavior of information technology. Figure 1 illustrates Technology Acceptance Model.

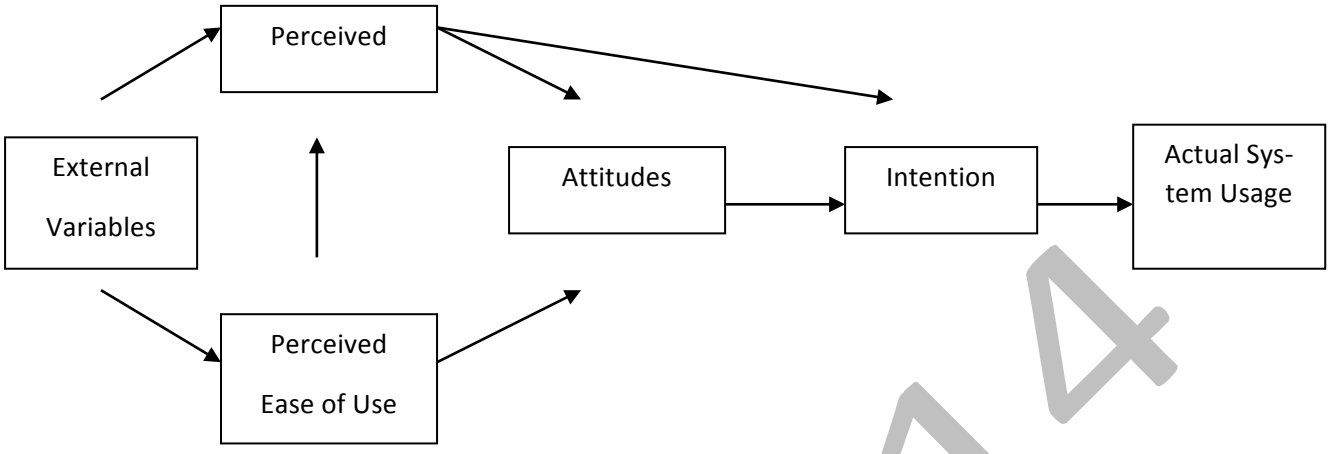


Figure 1: Technology Acceptance Model (Davis, 1989)

In TAM, there are two core beliefs as perceived usefulness and perceived ease of use which lead an individual's behavioral intention to adopt a system. Davis (1989) defines Perceived usefulness as "the degree to which an individual believes that using a particular system would enhance his or her productivity" while perceived ease of use is defined as " the degree an individual believes that using a particular system would be free of effort" (Davis, 1989). It can be stated that perceived ease of use has a direct effect on both perceived usefulness and technology usage (Adams et al., 1992; Davis, 1989). Davis (1989) cites that users' beliefs are directly related to a technology's usefulness, the attitude and the intention to use the technology. It is reported that perceived usefulness has stronger relationship with usage than other variables. Moreover, an individual adopts a technology if it is considered as convenient, useful and socially desirable even though it is not enjoyable to use the technology (Saga &Zmud, 1994).

TAM is a model widely used in the studies about the acceptance of technology. This model has been adopted and expanded in many studies in various types of technologies including e-mail, word processor, World Wide Web, enterprise resources planning (ERP) systems and proved high validity.

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3. Review of Literature

Rogers (1995) states in his Innovation Decision Process theory that an innovation's diffusion is a process that occurs over time through five stages: Knowledge, Persuasion, Decision, Implementation and Confirmation. Accordingly, ''the innovation-decision process is the process through which an individual passes (1) from first knowledge of an innovation, (2) to forming an attitude toward the innovation, (3) to a decision to adopt or reject, (4) to implementation of the new idea, and (5) to confirmation of this decision'' (Rogers, 1995). In cases where technology is very recently introduced into the educational system, studies have mainly focused on the first two stages, that is, on knowledge of an innovation and attitudes about it. (Akbulut, 2008)

The early studies on attitudes to computer technology generally revealed that existing culture, interaction with the tutors and dialogue were the predictors of success in distance learning. Moreover, these researches suggested that there was no significant difference in achievement levels between distant and traditional learners.

Thomas (1987) emphasizes the importance of the cultural/social norms of a country to the acceptance of technology. Thomas states, ''How acceptable a new technology will be in a society depends on how well the proposed innovation fits the existing culture'' (p.15). A user may resist a technological innovation because it may not fit within their micro- or macro-cultures. Thomas names his hypothesis as the cultural suitability factor.As Stone (1990) argues in his assessment of interactivity in distance learning, high quality learning can occur as long as students have interaction with tutors.

Johnstone (1991) stated that there was no significant difference in achievement levels between distant and traditional learners, but there is considerable variance in student attitudes and satisfaction levels (cited in Threlkeld&Brzoska, 1994, p. 49).

According to Kirkup and Jones (1996) the success of distance learning courses cannot be predicted. They (1996) summarize the most significant weaknesses of distance education as (a) its inability to offer dialogue in the way that conventional face-to-face education does; (b) the inflexibility of its content and study method; and (c) the isolation and individualization of the student.

Hilgenberg & Tolone (2000) believe that one of the most common problems of many distance learning courses is the limitation of dialogue between teachers and learners, and amongst learners themselves.

Khine (2001) corroborated with Yuen and Ma (2001) revealed that affective attitudes, general usefulness, behavioral control, and pedagogical use to be significant in determining the use of ICT. Kumar & Kumar (2003) reported that most teachers believe that the amount of computer experience has a positive effect on attitude towards computers.

Glancing at the recent literature on technology acceptance and e-learning, Lee et al (2009) investigated critical factors on e-learning adoption in South Korea and their study proposes a research model which consists of four independent variables as instructor characteristics, teaching materials, design of learning contents, and playfulness, two belief variables as perceived usefulness and perceived ease of use, and one dependent variable as intention to use e-learning.

In his study, Lee (2010) combines the expectation–confirmation model (ECM), the technology acceptance model (TAM) and the theory of planned behavior (TPB) to propose a theoretical model to predict the users' intentions to continue using e-learning. The results suggest that satisfaction has the most significant effect on users' continuance intention, followed by perceived usefulness, attitude, concentration and subjective norm.

Sang et al (2010) focused on the impact of Chinese student teachers' gender, constructivist teaching beliefs, teaching self-efficacy, computer self-efficacy, and computer attitudes on their prospective Internet and Computer Technology (ICT) use. Results indicate that prospective ICT integration significantly correlates with all teacher related variables, except for gender.

Tzeng (2011) investigated users' perceptions of the technology and the perceptions' association with attitude towards and intention of using the technology. The results prove that for prospective users, attitudes have the strongest significant effect on usage intentions.

Cheung and Vogel (2013) used the technology acceptance model to highlight the factors that influence the acceptance of Google Applications for collaborative learning. According to the research results, the subjective norm represented by peers is found to significantly moderate the relationship between attitude and intention toward the technology.

Melendez et al (2013) examined the perceived playfulness in the context of a blended learning setting with existing gender differences. The study suggests that there exist gender differences in the effect of playfulness in the student attitude toward a technology and the intention to use it.

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In this study, it is believed that TAM is the ideal model to figure out the attitude of Turkish EFL Learners towards e-learning because it is very comprehensive and as can be seen, valid results have been obtained from the studies.

4. Method of the study

In this research, survey method was used to collect data about technology acceptance of the Turkish Foreign Language Learners. There have been several studies focusing on TAM in various fields so far but little attention has been paid to understanding the perceptions of Turkish Foreign Language Learners through TAM in Turkish Vocational Higher education context. This study can be considered unique, because the effects of subfactors of TAM in academic achievement are also discussed. Therefore, the results and the implications of this study will highlight a different aspect of e-learning regarding a different population. It is hypothesized in this research that

4.1. Subjects

This research was conducted at a state-run university in 2012-2013 academic year and subjects were 231 male and 279 female e-language learners from the Vocational Higher School taking up English course through e-learning. The subjects were elected on voluntary basis and the total number was 510. The participants study English course 2 credits a week. E-learners benefit from videos, notes, files etc. prepared by language teachers in an e-learning context. Videos that are composed of 15-20 minute presentations, a discussion board which learners ask questions at any time and e-content which is supported by animations are the main characteristics of the present e-learning program. E-learning system is at students' disposal for 24 hours.

5. Findings

Table1. Demographic data of the participants

		F	%
Gender	Female	279	54,7
	Male	231	45,3
Facebook	Yes	468	91,8
	Nor	42	8,2
Personal Computer	Yes	391	76,7
	Nor	119	23,3
The skill of using technology	insufficent	0	0
	Not bad	129	25,3
	sufficient	251	49,2
	Very good	130	25,5
Daily internet usage	1-3 hours	168	32,9
	4-6 hours	239	46,9
	More than 6 hours	102	20,2
Documents	rarely	114	22,4
	sometimes	159	31,2

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	frequently	186	36,5
	very often	51	10,0
videos	rarely	113	22,3
	sometimes	194	38,3
	frequently	175	34,5
	very often	25	4,9
Exercises	rarely	87	17,3
	sometimes	255	50,7
	frequently	120	23,9
	very often	41	8,2

According to the demographic data collected, each participant (N= 468, 92%) almost has a facebook. Nearly 77% (N=391) of the subjects have personal computers. While 130 (%25,5) subjects' skill of using technology is very well, 251 of them have a sufficient skill of using technology. In addition, %20,2 (N=102) of the participants use internet more than 6 hours a day.

Analyzing the use of e-learning materials by language learners, course documents, videos, and exercises are the most frequently used ones. While 186 participants use course documents frequently, 174 use course videos at the same rate. Furthermore, 120 of the participants studied the exercises frequently. On the other hand, very few participants state that they take advantage of form pages. While 42 students use the form page for technical reasons frequently, 54 subjects use foreign language course form page at a high rate. Moreover, voice files and messages are used at a low rate.

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Career aspirations and background of students opting for fashion education courses in India

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Abstract

Fashion education is one of the fast growing and prosperous vocational education streams across the world. It has rapidly expanded during the last two decades; the courses offered in fashion education are predominantly related to Apparel, Home Furnishing, Accessory and Communication fields which are diffused into the domains of Design, Technology, and Management. The scope, prospects and employment opportunities are enormous as the fashion industry has spread across many other fields. The students undergoing interdisciplinary vocational programs in fashion and allied subjects are required to develop an open mindset and balanced personality for effective learning in order to face the challenges in the dynamic real life fashion environment. For the continuous and overall development of the student in education, his present status, domain acquaintance, perceptions and aspirations play important roles. This study has been mainly conducted to understand students in the perspective of these aspects. Primary data through a well-designed questionnaire had been collected from over 180 students of 2013-14 batch who have taken admission into various fashion related courses (under and post-graduation) at National Institute of Fashion Technology, Hyderabad Center, India. The collected data has been compiled, analyzed and presented through descriptive statistics. The current research involved the analysis of data pertaining to Fashion Design, Technology and Fashion Management students both at UG and PG courses respectively. The findings of the study are useful in understanding the back ground of the students, their awareness on fashion education, source of information, preferences of careers and life aspirations. The findings of this study can help in refining the curriculum and the overall fashion education process.

Keywords: Fashion Education; Student Aspirations; Student Perceptions; Fashion Design; Higher Education; Vocational Education

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1. Introduction

In any higher education process, for the continuous all-round development of student, the correct choice of course and effective learning during the program are very important and mainly depends on student's interest, domain acquaintance, perceptions and aspirations. Career choice has become a complex task with the advent of information technology, the emergence of post industrial revolution with different fields and variety of jobs. According to Kerka (2000) career choice is influenced by multiple factors including personality, interests, self-concept, cultural identity, globalization, socialization, role model, parental grooming, social support and

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available resources such as information and financial strengths. Once the students join the chosen course, the college is mainly responsible to understand the aforesaid factors and accommodate required learning for students to meet their aspirations. According to Salami (1999) many students made wrong choices in their career because of ignorance, inexperience, peer pressure, advice from friends, parents and teachers,

or tags attached with certain job types without adequate knowledge. As reported by Weber (2012), colleges across the U.S. are placing greater emphasis on job preparation and career development. According to (Yadav, 2014) now a days it is the children who decide about his/her career and the college in which he or she will pursue study, only small percentage of students are able to choose right career because they consult their parents, teachers and elder members of their family. Many researchers have studied in conventional higher education and found different parameters which influence career choice and curriculum deliverance and their influence however there were not many noteworthy studies found on fashion education and on how students recognize these courses from a career standpoint, what their backgrounds are, their intentions and aspirations. Therefore the present study has been undertaken and it is limited to students of Undergraduate Fashion Design (UGD); Fashion Design (FD), Textile Design (TD), Accessory Design (AD), Fashion Communication (FC), Knitwear Design (KD) and Undergraduate Fashion Technology (UGT) and Postgraduate Fashion Management(PGM) at National Institute of Fashion Technology (NIFT) Hyderabad, India.

2. Methodology

A questionnaire was developed with thirteen questions on demographic parameters of students and forty one questions pertaining to aspirations, perceptions, domain awareness and background status of students. Students responded to the questionnaire (hard copy) instantly during their admission reporting time. Out of about 210 students of newly enrolled, 186 students had responded; they are as follows: 139 Design (20 male and 119 female) under-graduates (FD, AD, TD, KD and FC), 26 technology (17 male and 9 female) under-graduates, and 21 (6 male and 15 female) management post-graduates.

The questionnaire comprised of closed ended questions with three different option types of yes or no, multiple choice or ten point scale. Wherever the students had marked more than one option on multiple choices equally divided weightage has been assigned to the all selected options and in final compilation the figures are rounded to nearest integer. The collected data was analyzed using descriptive statistics and compiled in tables or represented by graphs. Care was taken to ensure that wrongly answered questions were eliminated from the statistical analysis of that particular aspect of the study. The figures shown in the parenthesis of all tables are present value.

3. Demographic and course preference factors of students

The demographics of the sampled respondents was collected and presented here to elicit the information. The findings are; the mode (statistical) age of an under graduate student is 18 years and a post-graduate student is 22 years. Almost all students had their medium of instruction in school and college, as English with 86.74 percent of students from urban back ground. Table-1 furnishes the background of the students and table 2 shows gender ratio of students that are admitted. For about 86.6 percent of students these courses are of first priority of study and for the remaining 13.4 percent these are of second priority. Only one UG Design student out of total 186 students stated that she has considered this course as her last choice. 93.5 percent students stated that their parents have been highly interested in fashion studies and only remaining 6.5 percent students stated that their parents have low interest in these courses. From the sample collected it revealed that 25.4 percent of the students of Undergraduate Design program, 0.04 percent the students of Post Graduate Management and zero percent of the students of Undergraduate Technology program have taken special coaching for preparing for the national entrance examination and got admissions into fashion courses.

Table-1: Geographical background of the students absolute number and percentage in parenthesis

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Course	Urban	Rural
UG Design	115 (85.82)	19 (14.18)
UG Technology	22 (84.61)	4 (15.38)
PG Management	20 (95.24)	1 (4.76)
All Together	157(86.74)	24 (13.26)

Table-2: Gender ratios of students

Gender	UG Design	UG Technology	PG Management	All together
Male	20 (14.4)	17 (65.4)	6 (28.6)	44 (23.1)
Female	119 (85.6)	9 (34.6)	15 (71.4)	143 (76.9)

4. Fashion background of the students

4.1. Period in their lives at which the Students became aware of fashion courses

With the objective studying, at what points in the academic career the students came to know about these courses, data on three options were collected and the frequency of responses is shown in table-3.

Table 3: When did students come to know about fashion courses

Course	School days	Plus two & college days	Few days before applying
UG Design	99 (71.22)	40 (28.78)	0
UG Technology	16 (61.54)	9 (34.62)	1 (3.85)
PG Management	11 (52.38)	8 (38.10)	2 (9.52)
All together	126 (67.74)	57 (30.65)	3 (1.61)

The study found that most of the students knew about these courses during their school days (67.74 %). It clearly shows that the students identified their career choices and courses they would like to pursue well in their school days itself. The findings concurred with Shumba and Naong (2012), Watson et al. (2010), Barnett (2007), McMahon and Watson (2005), they found students are deciding their career choices long before they come to universities and the choice of subject they made whilst they were already in school. Very specifically, Alloway et al, (2004) identified that many students commenced their career planning during the junior grades in secondary school.

4.2. Information sources for students about fashion courses.

In order to determine from whom the students came to know about these courses; seven options were provided for their responses against each of design and technology undergraduate programs and one postgraduate program, as shown in Table-4.

Table-4: Source of first information about courses

Course	Parents	Relatives	Print Media	Friends	Teachers	Television	Internet
UG Design	28(20.29)	16 (11.59)	18 (13.04)	40 (28.98)	9 (6.52)	1 (0.72)	27 (19.57)
UG Technology	5 (19.23)	3(11.53)	1 (3.85)	12 (46.15)	1 (3.15)	0	4 (15.38)
PG Management	2 (9.52)	5(23.81)	4 (19.04)	5 (23.81)	2 (9.52)	0	3 (14.29)
All together	35 (18.82)	24(12.90)	23 (12.36)	57 (30.64)	12 (6.45)	1(0.53)	34(18.28)

Most of the students come to know about the courses from their friends (30.64%) and very few students come to know from television (0.53%). Similar trends have been seen in both the students enrolled for under-graduate and post-graduate. From the above it is clear that friends, parents and internet in that order are effective medium for providing knowledge on career options.

4.3. Motivation behind students to decide fashion career

In order to study, motivation behind students decision for fashion career five factors; self, parents, friends, relatives and teachers are considered for this study.

Table-5: Motivation for fashion courses

Course	Self	Parents	Friends	Relatives	Teacher
UG Design	72 (51.79)	43 (30.94)	11 (7.91)	6 (4.32)	7 (5.04)
PG Management	14 (66.67)	3 (14.29)	1 (4.76)	2 (9.52)	1 (4.76)
UG Tech	13 (50)	7 (26.92)	2 (7.69)	3 (11.54)	1 (3.85)
All together	99 (53.22)	53 (28.58)	14 (7.53)	11 (5.91)	9 (4.83)

Table-5 shows that self-motivation (53.22%) and motivation by parents (28.58%) are the two major factors which have influenced the students to join fashion courses. The same trend had been seen across all the courses. These results concur from those of Edwards and Quinter (2011) and Perrone, et al., (2001) who found that students own interests as well motivation from parents provide for their career choices. These results differed with Arudo (2008) who reported that the peer pressure also as a major factor that influenced career choice. Edwards and Quinter (2011) found in his studies that family members are more influential in student's career choices as compared to other persons. In a study Shumba and Naong (2012) have found that the family, ability of the student to identify preferred career choice and teachers are the three major factors influencing career choice of the learners. The above Table-5 clearly indicates that self-motivation and that of parent's contribute to career choices of the student and below Table-6 indicates that most of the students that prefer fashion programs had good acquaintance about the field.

Table-6: Fashion professional in family or acquaintances

Course	In family	Acquaintances

UG Design	18/137 (13.14)	53/136 (38.97)
UG Technology	6/26 (23.08)	10/23 (43.48)
PG Management	7/21 (33.33)	15/21 (71.43)
All together	31/184 (16.85)	78/180 (43.33)

4.4. No. of attempts made by the student to secure admission

The below table furnishes, the number of attempts the students make to get admission into fashion courses

Table-7: Number of attempts

Course	1st	2 nd	3rd	4 th
UG Design	116 (83.45)	19 (13.67)	0	4 (2.88)
UG Technology	19 (73.1)	7 (26.9)	0	0
PG Management	18 (85.71)	3 (14.29)	0	0
All together	153 (82.26)	29 (15.59)	0	4 (2.15)

From the above table it indicates that 82.26% of students have cleared the entrance exam in the first attempt and 15.59% of the students are in the second attempt. Surprisingly there were 2.15% of the students successful in the fourth attempt. It shows that the students prefer to pursue a fashion program from NIFT irrespective of their success in the first attempt. Similar trends were seen across the courses.

4.5. Parental educational qualification influence on child career decision

Parental educational attainment was positively related to academic involvement and is an important aspect that influences educational aspirations of children.

Table-8: Father's qualification

Course	PhD	PG	UG	HSC (10+2)	SSC (10th)	School drop-out
UG Design	6 (4.58)	36 (27.48)	68 (51.91)	11 (8.34)	5 (3.82)	5 (3.82)
UG Technology	0	7 (26.92)	14 (53.85)	5 (19.23)	0	0
PG Management	0	5 (23.81)	10 (47.62)	1 (4.67)	4 (19.05)	1 (4.67)
All together	6 (3.37)	48 (26.97)	92 (51.69)	17 (9.55)	9 (5.06)	6 (3.37)

Table-9: Mother's qualification

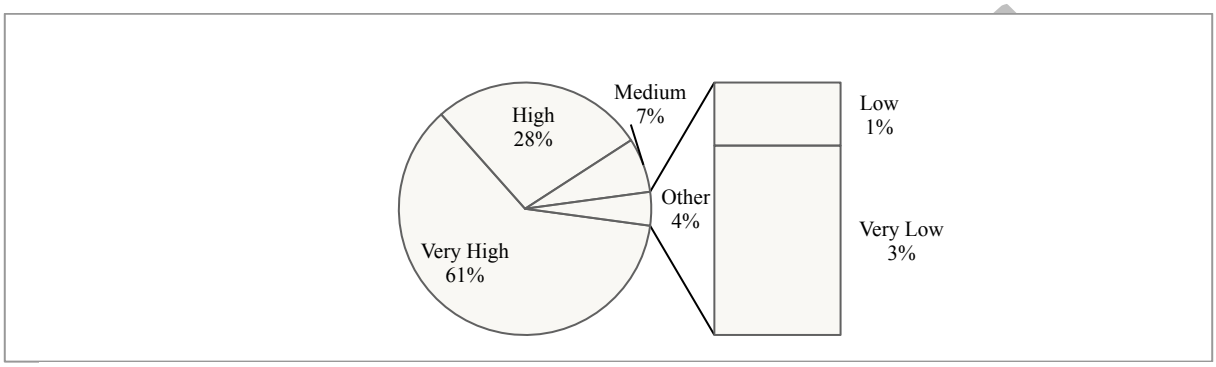
Course	PhD	PG	UG	HSC (10+2)	SSC (10th)	School dropout
UG Design	7 (5.04)	35 (25.18)	62 (44.60)	20 (14.39)	10 (7.19)	5 (3.60)
UG Technology	1 (3.70)	7 (25.93)	7 (25.93)	5 (18.52)	6 (27.00)	1 (3.70)

PG Management	1 (4.76)	2 (9.52)	10 (47.62)	4 (19.05)	4 (19.05)	0
All together	9 (4.81)	44 (23.53)	79 (42.25)	29 (15.51)	30 (16.04)	6 (3.21)

The above two tables viz; table-8 and table-9 show that about 70 percent of the student's parents are graduates or are better qualified (UG, PG or PhD). According to Mudhovozi and Chireshe (2012) parents' level of education have influenced career decisions among students.

4.6. Parent's inclination for fashion courses

The interest of parents on fashion course for their children has been collected on a 10 point scale.



Graph-1: Interest of parents on fashion courses as career option for their child

The scales are indicative of the interests as follows: Very high interest (10-9 scale points), High interest (8-7 scale points), Medium interest (6-5 scale points), Low interest (4-3 points) and Very low interest (2-1). The above percentage pie Graph-1 shows the compiled information.

5. Aspiration of the students

5.1. Occupational aspirations

In order to understand about the future career aspirations of the students and what they intend to do after graduation studies. The results obtained are given below.

Table-10: Future career occupation aspirations absolute number and percentage in parenthesis

Course	Own business	Job	Freelance	Teaching	Consultancy	Any other
UG Design	85 (61.15)	17 (12.23)	18 (12.95)	2 (1.44)	3 (2.16)	14(10.07)
UG Technology	13 (50.00)	9 (34.62)	3 (11.54)	0	0	1 (3.85)
PG Management	11 (52.38)	6 (28.57)	3 (14.29)	0	1 (4.76)	0
All Together	109 (58.60)	32 (17.20)	24 (12.90)	2 (1.08)	4 (2.15)	15 (8.06)

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After completion of the graduation program the students find many kinds of opportunities in their respective fields like: join a company as employee, start his own business, become an academician, work as a freelancer, work as consultant or as an expert advisor. The above table-10 indicates that most of the students who take up fashion courses are inclined towards starting their own business.

5.2. Extra-curricular interests of students

According to Martin (2013) greater participation in extra-curricular activities was used as a means to provide valuable career transition and to develop professional habits like life-long learning. The importance of extra circular activities was published by Stevenson (2011) who says majority of students irrespective of age believe that the inclusion of extra-curricular activities on application forms/CVs is more important than the actual degree they gain in order to secure employment.

Table-11: Interest in extracurricular activities

Course	Sports	Games	Environment	Culture	Literature	All activities
UG design	21 (15.11)	23 (16.55)	17 (12.23)	43 (30.94)	22 (15.83)	13 (9.35)
UG technology	9 (36.00)	6 (24.00)	1 (4.00)	5 (20.00)	0	4 (16.00)
PG management	7 (33.33)	3 (14.29)	3 (14.29)	6 (28.57)	1 (4.76)	1(4.76)
All together	47 (25.29)	32 (17.20)	21 (11.29)	54 (29.03)	23 (12.37)	18 (9.68)

The above table-11 indicates that the students exhibited interests in extracurricular like cultural activities, sports and games.

5.3. Aspiration for national and international relocation

The compiled findings of Table-12 are in order to study the aspirations of students in National and International relocation to pursue their career

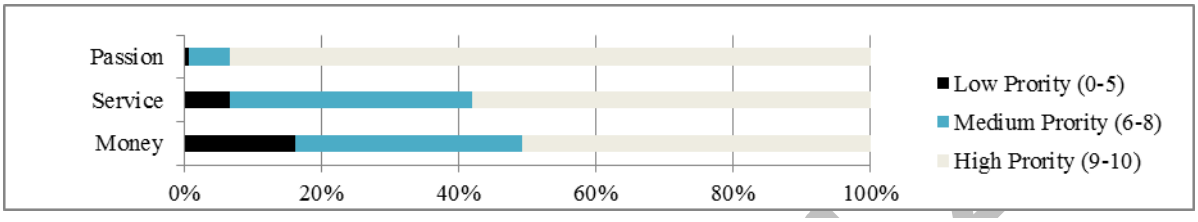
Table-12: Where students want to settle after completion of the course

Course	India	Overseas
UG Design	71 (51.08)	68 (48.92)
UG Technology	13 (50.00)	13 (50.00)
PG Management	14 (66.67)	7 (33.33)
All Together	98 (52.69)	88 (47.31)

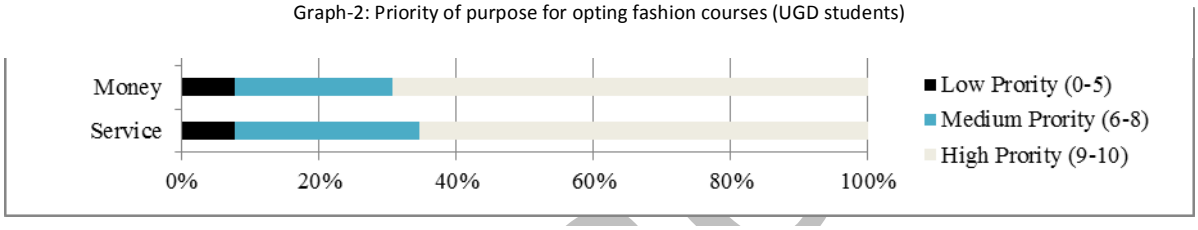
As far as the work location is concerned 53% of students would like to work in India while 47 % of them would like to work overseas after completion of their work. This is explicit from the table-12 given above.

5.4. Priority of purpose for choosing fashion courses

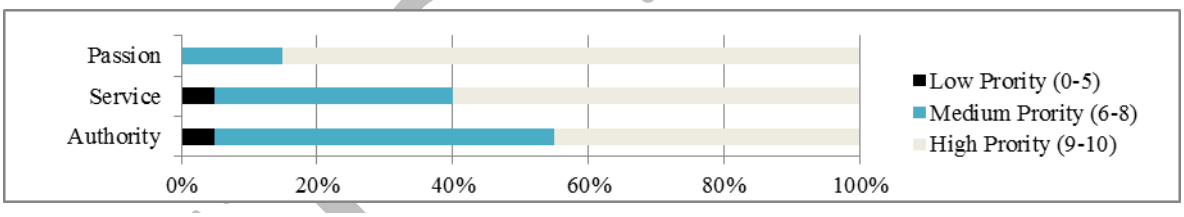
In a ten point scale option the data on the actual purpose for opting for the fashion course was gathered from the students. Five purposes were considered for the study; they are Fame, Money, Authority, Service and Passion. The priorities translated onto the ten point scale are as follows: low priority (0-5 points), medium priority (6-8 points) and high priority (9-10 points). The following graphs; graph-2 to graph-4 show the top three priority options of Design, Technology and Management students respectively in percentage.



Graph-2: Priority of purpose for opting fashion courses (UGD students)



Graph-3: Priority of purpose for opting fashion courses (UGT students)



Graph-4: Priority of purpose for opting fashion courses (PGM students)

It has become evident within the above analysis that students entering fashion education are generally motivated by a passion to learn about the subject and develop their creative abilities

6. Conclusions and discussion

The data pertaining to background, motivation and professional aspiration was collected to study the dominant factors. From the motivation stand point, the students own motivation was the main determinant, while on the parental back ground educated parents contributed to careers of their ward and most of the students were enabled by friends and electronic media (internet) for career choice. The design and management courses were preferred by female students, while the technology courses were sought after by male students. It is interesting to find that most of the students were keen in extra-curricular activities along with their interests in fashion courses. Most of the students have taken up fashion studies with the objective fulfilling their passions while many of them were keen on earnings but a few on glamour. The findings also revealed that the majority of the students demonstrated entrepreneurial interests and most of them had a background with English as the medium of instruction.

Students perceive and decide future career mostly during their higher secondary school days (i.e. VIII to X standard), not just at the entry in college education for their higher secondary education (12 year schooling). Therefore exposure to fashion awareness courses like seminars, counselling, art/creativity competitions to the students during the schooldays influence better and are more fitting. They can be organized by fashion colleges in coordination with schools. Awareness among the school students can be brought by publishing fashion education and career related articles in school magazines, conducting periodic open day sessions to school students where high school students can visit fashion colleges, and summer/ weekend/ holiday camps. It is effective to introduce fashion related subjects in the curriculum at the school level. It is to be propagated that fashion is not just restricted to apparel and ramp walks.

It is found that mostly urban students are pursuing these courses, as the main skills required to become successful in these career pursuits are creativity, sketching, presentation, spontaneity and good communication with prolonged working hours. Except for the communication skills the rural students possess the remaining skills to a large extent. Thus by encouraging and supporting rural students good fashion professionals can be evolved because of their innate skills which suit to fashion programs. Industrialization and post industrialization has made it possible for a common person to be richer as long as she or he has necessary skills and knowledge (Wattles, 2009).

After parents; teachers occupy the second position in terms of nurturing, grooming, guiding and encouraging students. This is due to the fact that they are very closely associated and know the abilities of the students in terms of knowledge, skills and attitude. However, it was found from the study that the teachers play a very minor role towards recognizing, motivating and suitably guiding the students for a fashion career. This may be because of ignorance of the teachers about fashion courses. This shows a need of fashion awareness courses for teachers, which may be planned during teacher the training programmes, like B.Ed. or M.Ed. Students should have wide range of career information related to Fashion and Design so that they can be able to explore before making their career choices at school level.

Most of the students aspire to start their own business as professional career after graduation. In any educational institution providing placements to passing out students is an important and critical but a challenging task. The demand or popularity of any course mainly depends on the placements historically. On the other hand some vocational courses including the ones in the fashion domain give an opportunity for graduates to start their own business with optimal resources and investment; it means rather looking for an employment opportunity these graduates can in turn offer employment to others. To successfully fulfil this social cause of the students required emphasis and orientation should be given towards entrepreneurship during the education process. Therefore the curriculum should include; improving managerial capabilities, soft skills, collaboration /networking with similar institutions. Internships in such areas with theoretical inputs and live projects opportunities are also important.

In vocational courses the context and deliverance of the curriculum is mainly dependent on the assignments and the back ground of the faculty delivering the subject. Therefore the institutions should orient and train the faculty keeping in view the student's aspirations and background and ensure curriculum deliverance in the appropriate context.

One key findings of the study is that more than 15 percent of the students get through the entrance in the second attempt preparing for one whole academic year. The reasons for this can be further explored and the required awareness & know-how for succeeding in the entrance examination in the first attempt can be determined and provided.

For the overall development of the student extra-curricular activities plays a very important role, as the students are interested in cultural, sports and games in that order. Hence emphasis should be given for these also along with the regular curriculum.

The study conducted based on the data collected clearly reveal that there are excellent prospects in fashion and design as career options. With the provision of awareness and revamping of the curriculum in the early stages of school education more number of students can be drawn into the careers in fashion. This also calls for refining the teaching methods and changing mind sets of parents, teachers and students about fashion education.

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Changes in ICT use by polish students from life sciences university

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Abstract

The paper assesses the changes in the use of the computers and internet, and specifically internet communication, by students of the Faculty of Production Engineering, University of Life Sciences in Lublin, Poland in academic years 2009/10 and 2013/14. The structured questionnaire was used as the tool for collecting data. The results indicate there was a dynamic raise of students with their own computers and with direct access to internet. There was a complete swap in the number of desktop units in comparison to laptops. Social media became the most popular application of internet. However, the students used also internet and computers for class preparation. The data collected indicated that the respondends used internet and its available services in every day life.

Keywords: information technologies, internet, higher education, students, internet communication

1. Introduction

Communication revolution is the term used to describe a rapid development of communication due to improvement of new information technics and technologies. Information and communication technologies (ICT) have become common in all aspects of life. That includes education although ICT impact has not been as massive as in other spheres of life. It is obvious that the improvement in information transfer technics determines interactions within communication community and intercultural communication (Bugajski, 2007).

Internet can be defined as a worldwide, dynamically changing system of computer networks. It offers a lot of services such as remote login, transfer of files, electronic mail, World Wide Web (WWW), discussion groups etc. Internet has gradually become dominating telecommunication method equal to telephones and television in terms of popularity and speed (Grzenia, 2008). Nowadays internet is common and omnipresent so current students think that it has been forever. Despite those believes the creation of internet was an accurately defined process, both in terms of time and location. Moreover, this process was precisely planned and also controlled and coordinated. In the last decade there has been a tremendous increase in the number of internet and ICT users. In Poland, in 2012 71% of the households had access to internet whereas 64% of population, in the age 16-74, used computers. However, the last number is still lower than the EU average which was 73%, while in the Scandinavian countries it was above 90% (Społeczeństwo informacyjne, 2012).

It appears that the media which not that long ago was mainly of interest to scientists has not become accessible to increasing number of users, with young people forming the frontrunners (Szczepanowska & Fiedler, 2010). Internet has become a new social space, which provides for most of people's needs, including higher education (Kirkup & Kirkwood, 2005; Kamal & Banu, 2010; Patel et al., 2011; Sysło, 2012). With the introduction of specialised learning software such as WebCT and Blackboard, Questionmark Perception, and I-Assess ICT has also started to change the way students learn (Akkoyunlu& Erkan, 2013;

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Uziak, 2009). Internauts, the users of internet, can satisfy their higher needs such as belonging or affiliation, respect and self-esteem by means of blogs or WWW. The provision can be extended to more hedonistic needs thanks to network games or the possibility of shopping via internet. The individuals in cyberspace can satisfy both individual and social needs.

Internet communication is based on the usage of a sign, an image or an icon, which replaces or limits the use of words. It also allows on the transfer of symbols, i.e. information, concepts, values, norms or statements (Juszczyk, 2011). Communication is a crucial process developing with human race since the dawn of time. However, the methods, opportunities and needs have been changing with time. Information, but also the speed of obtaining it as well as its transfer, is crucial in the current society. Indeed those features are fundamental reasons why internet is currently so important in the life of society; the additional features such as worldwide span, its multimedia aspect and interactivity are also significant. It is observed that the role of internet in the social communication, in its broad understanding, increases together with the extension of available services (Pawłowska-Mielech & Bocek, 2006).

There are three types of interpersonal communication within internet (Grzenia, 2008).

1. Conversation or chat, represented by all types of internet dialog.
2. Correspondence or mail, covering all types of communication based on electronic letter; that includes e-mail, groups, lists and discussion fora.
3. Hypertext, which represents texts available in WWW (also texts without hyperlinks) and not covered under the first and second type above.

However, the engagement of young people using internet is not always proper and may lead to many problems, including health issues. Although in comparison to other users university students excel in the level of computer knowledge and skills it does not stop that group from having serious issues with proper use of available technologies (Yau & Cheng, 2012; Lis, 2010). It is also not uncommon that their skills are shallow and use of internet is unsophisticated (Tutkun, 2011).

2. Objective, data and methodology

The objective of this study was to assess the changes in the use of the computers and internet, and specifically internet communication, by students. The study included bachelor's and master's degree students from the Faculty of Production Engineering of the University of Life Sciences in Lublin, Poland. The data collected covered years 2009-2014 (Lorencowicz & Kocira, 2012; Lorencowicz et al., 2013).

The method of a diagnostic survey was used in the collection of the data. The technique employed was survey and the questionnaire was used as the tool. Diagnostic survey is one of the most popular methods in social studies research. The method allows to collect information about functional and structural features and also the dynamics of social processes, opinions and views of a specific group of people. Surveys are almost always based on examining specifically selected sample of the general population. The aim of the study is a particular social phenomenon. The method of a diagnostic survey applies many techniques, including survey, interview or analysing the documents. The method implies and determines the selection of the appropriate research technique (Szczepanowska & Fiedler, 2010). As indicated before, the questionnaire was used in the current survey.

3. Results

The basis for the deductions in the current study was the empirical data collected through the questionnaires administered in the academic years 2009/10 and 2013/14. The study included a total of 325 (in year 2009/10) and 418 (in year 2013/14) students. Of the study group, the students from the rural areas constituted 61.85% in 2009/10 and 52.63% in 2013/14. In terms of the programme of study,

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the largest group represented Management and Production Engineering; 24.31% in 2009/10 and 70.57% in 2013/14. Agricultural and Forestry Engineering totalled 14.15% in 2009/10 and 6.94% in 2013/14, of all students participated in the survey. Programme in Transport was represented by 10.46% students in 2009/10 and 10.53% in 2013/14 (Fig. 1).

By analysing data from the survey it was concluded that there was a dynamic raise of students with access to internet, which reflected the general improvement in digitization and computerization in Poland. Among the study group the access to internet in 2009/10 had 86.77% and it increased over 12% to 99% in 2013/14. With the increment in the direct access to internet there was a decrease in the number of students accessing internet: using the university network by 3.45% (from 3.45% to 0.24%), hot-spots or internet cafés – 2.05% (2.39% to 0.34%) and via friends' access – 6.73% (7.15% to 0.42%).

Fig. 2 presents the distribution of surveyed students according to their level of study. It shows the increment in the number of students in the year 2 and 4 of the bachelor programme.

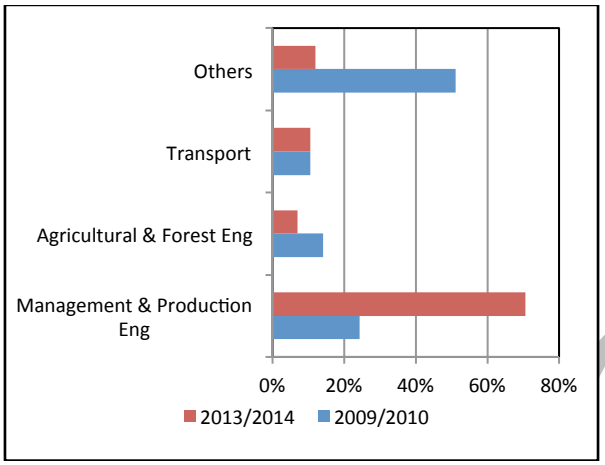


Fig. 1. Distribution of students according to the programme of study

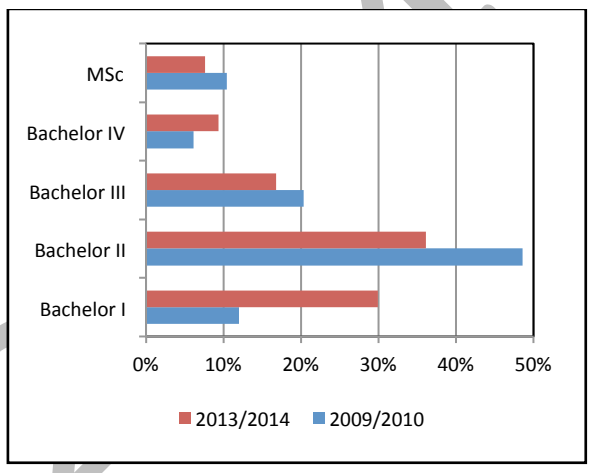


Fig. 2. Distribution of students according to the level of study

There was an increment of 18% in the number of students possessing their own computer; in 2009/10 more than three quarter of the students (78.15%) declared having their own computer whereas in 2013/14 almost all students had their own units (96.17%). At the same time the number of students not owning a computer dropped from 5.85% to 0.48%. There was also decline in the number of students sharing a computer with their siblings (from 14.15% to 3.35%). There was also a swap in number of laptops and desktops; the number of desktops dropped from 59.38% in 2009/10 to 19.38 in 2013/14 while the number of laptops increased spectacularly from 19.38% to 75.84%. The students affirmed owing also other computer hardware (Fig. 3).

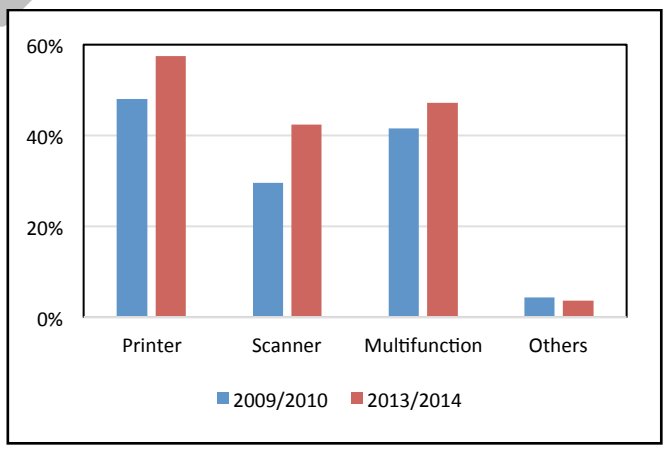


Fig. 3. Additional computer hardware

The results indicate that there was an increment in the additional computer equipment (Fig. 3). The increment was observed for all the equipment; printers, scanners and multifunction units. Reasonable and relatively low prices are obvious reasons for such a trend.

Fig. 4 shows the type of use of internet by the students. The graph indicates the general raise in the use of internet. The percentage increase of students using internet for seeking information was 15%. A similar trend (but the increase was only by 5%) can be observed in using internet in order to search for information related to students' programmes, courses and generally information related to their studies.

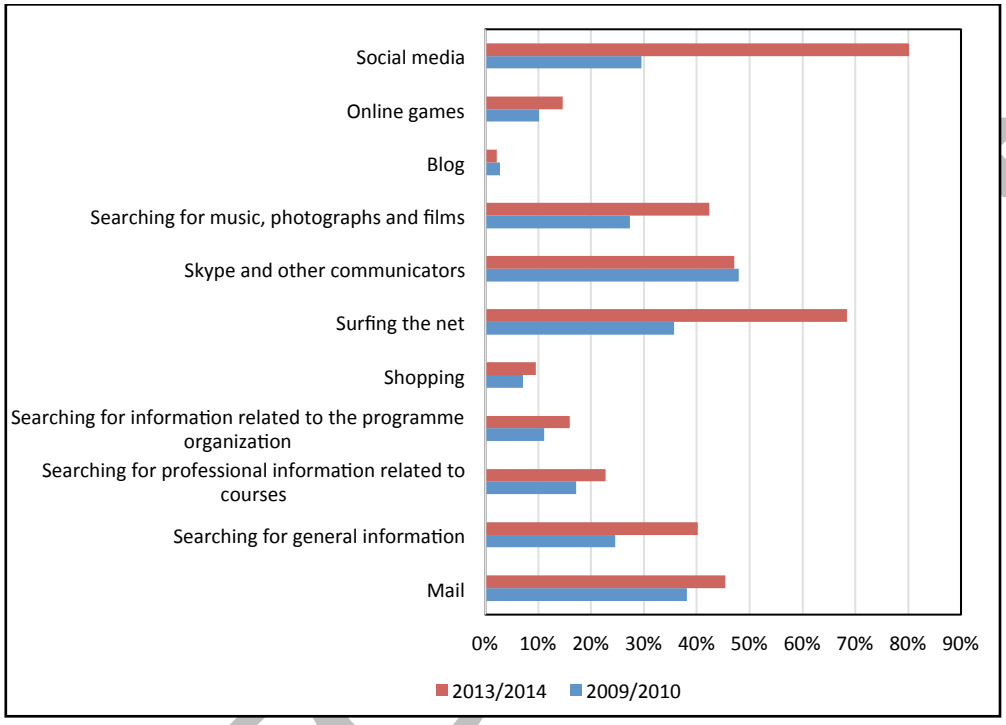


Fig. 4. Use of internet

More students use internet for shopping and for general internet surfing. Different types of internet communicators are also very popular among students. That includes Skype but also 'Gadu-Gadu', the most popular instant messaging system in Poland. Another important type of internet application was electronic mail, which allows for a quick and convenient method of communication. The use of blog is limited to only 2% of analysed population with most of the students not using it at all. It may be attributed to lack of time required to run a blog on every day basis.

The highest raise in application can be observed in social media. Within 4 years its popularity more than doubled, from merely 30% of students using it in 2009/10 to over 80% in 2013/14. Fig. 4 indicates that internet communication has become an important element in the life of students' population. It may indicate that the traditional form of communication, such as phone or old-style mail, will be gradually with time replaced by modern and swift communication forms. Collected data indicates that students consider internet to be very useful in their studies; 10% increment in the last 5 years. The above can be attributed not only to the general rise in the internet use but also with the number of learning, teaching and other information placed on different webpages. Additionally, internet provides for faster contact with friends, fellow students and acquaintances either through e-mail or social media. In the academic year 2013/14 there were no students who considered internet as redundant.

Fig. 5 shows the use of different software. It can be seen that there was an increment by 4% of users of Windows. The number of users of Ms Office, among the analysed population, increased by almost 7% and reached a value of above 90%. The use of other spreadsheets, text editors and graphics software each

dropped by 2%. The above proves an expansion and domination of Windows as an operating system and MS Office as a suite of desktop applications.

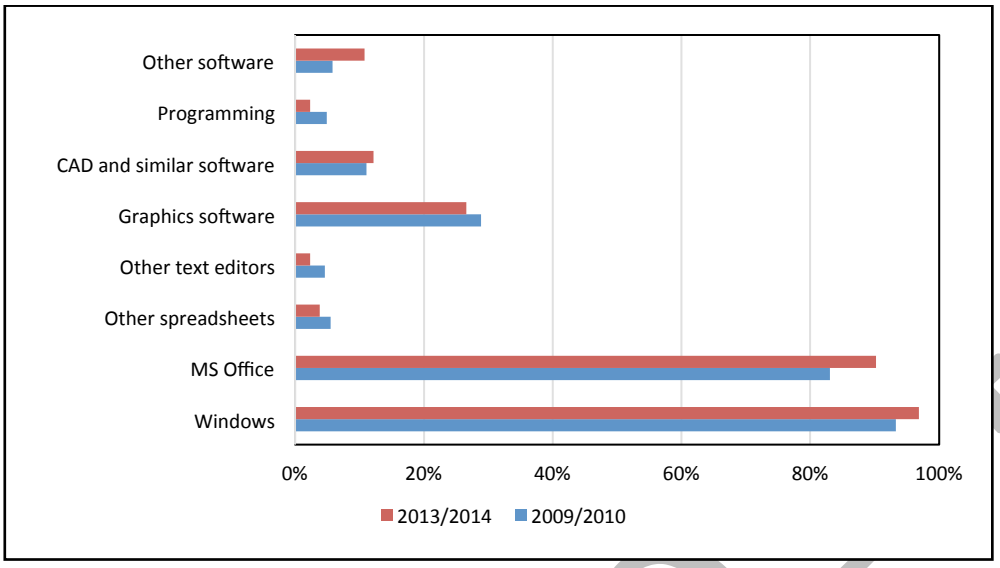


Fig. 5. Use of different software

Interestingly, less and less students write their own programs; programming dropped from very low 5% in 2009/10 to 2.5% in 2013/14. That is despite the fact that the analysed population consisted of students from engineering programmes.

The type of use of computers in everyday life is presented in Fig. 6. There was an overall rise in the use of a computer by students in all examined categories. The highest increase was in general net surfing; by 26%. A big group of students (over 50%) used a computer for listening to music and for watching movies.

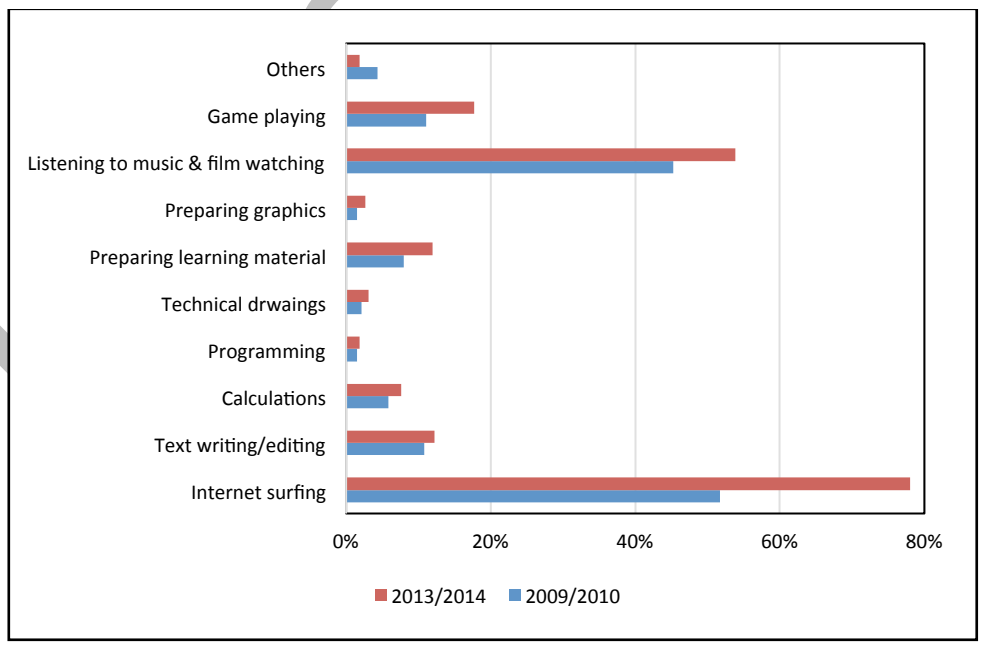


Fig. 6. Everday use of the computer

Although computer games were less popular nevertheless the percentage was still high at almost 18%. It is also important to observe that students were using computers for class preparations, text writing and editing and also for calculations. However, the level of computer use for calculations was relatively low for engineering students (less than 8%), the same applies to technical drawings (ca. 3%).

4. Summary and conclusion

The data collected indicated that the respondends used internet and its available services in every day life. Internet usage was for the students natural and something which would be difficult to live without. It was also established that it was relatively easy to get dependant on the net.

Internet is very popular and omnipresent and had big influence on students' life. Especially popular was internet communication, in the forms of mail and internet communicators, and also social media. In the period under review (between academic year 2009/10 and 2013/14) there was tremendous increase in the use of social media (more than 80%) whereas the usage of mail and internet communicators stabilized (both around 45%).

The actual reasons for the ever growing role of internet as the tool for social communication are its specific features, such as speed, growing access, scope and range of applications. It confirms the statement by Oliver (2002), made already in the beginning of the century, that the progress in information technology generates the necessity of new skills. The future development of new technologies depends on the progress of computer knowledge and skills of the society.

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Charisma building in the e-learning classroom: an exploratory study

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Abstract

Charismatic learning is the power to motivate the students, which is especially important in self-regulated learning. The results of the critical incident technique used in this study indicate that e-learning technologies do provide some good mechanisms to help instructors facilitate students' learning and make collaboration easier. Knowledge enhancement by self-regulation of learning is the preferred characteristic of charisma in the e learning classroom. Students mentioned some of the benefits such as the flexibility of the learning schedule, having access to on-line material for review outside of class, and having access to comprehensive supporting material for collaborative learning. Collaboration can happen in an on-line forum. Another characteristic of charismatic learning is the perception of trust in the instructor which is related to the availability and enthusiasm of instructors. The results suggest that in the e-learning classroom context the instructor should work more as facilitators than as the sole source of knowledge.

*Keywords:*Charismatic learning, e-learning, flow theory, critical incident technique;

1. Introduction

Why do we still need a new vision of learning charisma, in relation to the effectiveness of e-learning in higher education even though e-learning has been implemented for so many years? Because, although on the surface, new technology provides more resources, channels and opportunities for learning, in actuality, it is not easy to transplant the new digital learning environment into the traditional one and obtain positive synergy. The advantages of e-learning have been well discussed in the literature, for example, students who are shy about talking in public may feel better able to express their ideas in an e-learning environment (Francescato, Porcelli, Mebane, Cuddetta, Klobas, and Renzi, 2006). Students may also be attracted by the multi-media content of the digital classroom (Swan, 2004), and they may also have more opportunities to set their own learning strategies (Scriber and Encouraging, 2013). However, as there is weakness in all human interactions, not mean all students will gain benefits in e-learning classrooms.

Researchers have made efforts to "see" the effects of e-learning. Previous studies have tried to draw a picture of a classroom using the dramaturgy theory, with the teacher as the actor, the students as the audience, and the classroom as a theater (Halliday, Davis, Ward, and Lim, 2008). Halliday discussed the charisma of the teacher and role of the students in the creation of an attractive classroom environment. A charismatic teacher can inspire students to be willing to learn, and willing to cooperate with the teachers. Being able to evaluate and plot their learning experience is also very important.

Charm or charisma can also refer to the whole situation and not merely the leader. Based on ten years of teaching experience related to engagement in action and reflection upon andragogy theory, Raelin (2006) opposed the idea that successful learning is achievable only through reliance upon the charisma of the teacher. He argued that there has been too much focus placed on the teacher's charisma, their skills to excite the students to learn. He insisted that the greatest learning stimulant does not lie in how well prepared the lecturer is or how timely the feedback they give the student. Rather, it has to do with providing an effective-learning environment that encourages students to reflect, to construct, to take responsibility for and to accumulate their own learning. Raelin pointed out the importance of the idea of focusing on learning. The implication is that a teacher in the higher education system should be more a facilitator of

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knowledge in a community of inquiry. Teaching should thus be the orchestration of learning, rather than simple transmission of knowledge from the teacher to the student. A student should have more autonomy to learn how to learn and to choose the most appropriate path on his or her own. Also peers should help each other to integrate past knowledge, and to accumulate new knowledge.

Raelin's ideas remind us of what is at the center of learning. Students may be cognizant that a course providing self-regulated learning is much more attractive than one where the teacher is an excellent actor. Raelin's idea of putting the charisma back into learning is actually confirmed by flow theory (Killi, 2005). According to Killi, challenge is like blood pumped from the heart, bringing motivation for the learning process through cooperation with peers, reflection, searching for information, and so on. Learning charisma that comes from the challenge of learning itself may provide further stimulus to motivate and satisfy.

One problem with Raelin's paper was the lack of empirical investigation. The aim of this current study is to observe and measure learning charisma from the student's perspective in the e-learning classroom. Scenario-based data are considered suitable because learning performance is determined by the interaction of many factors, such as student background, teacher characteristics, characteristics of the learning content, pedagogical design, and the learning environment (Freitas and Olive, 2006).

Based on Raelin's (2006) and Halliday's (2006) research, the authors propose that learning charisma may be an effective vision to understanding the benefits of e-learning. The aim of the study is to classify student's satisfaction in the e-learning classroom and find the learning charisma. The study involves refining the elements of learning charisma using the critical incident technique. The purposes are: (1) to find the factors that enhance learning charisma; and (2) make propositions for the strategy of integrating e-learning into the traditional classroom.

2. Charisma and satisfactory factors in e-learning

Six important dimensions of the variables influencing students' satisfaction with e-learning are from previous studies and summarized in Table 1 (e.g., Sun et al., 2008; Fu, 2010; So and Brush, 2008). The first dimension is the learners' character, including students' self-efficacy and expectations. For example, the learner's anxiety about the use of computers has a negative impact on his/her satisfaction in e-learning. Student expectations of self-regulation to gain knowledge in e-learning lead to better performance but might not be related to satisfaction when compared to those who do not have expectations (Swan, 2004). The second dimension is the instructors' professionalism and attitude. The instructor's enthusiasm, professionalism, and expressive capability all impacted student satisfaction, but there might be a difference between the scenarios in e-learning and those in traditional classes (Sun et al., 2008; Fu, 2010). The third dimension is content design. Based on the technology acceptance model, content that is easy to use and useful is significantly related to students' satisfaction (Sun et al., 2008). Here the authors use "easy to learn" instead "easy to use" to refer to the learning situation. The technology dimension includes the benefits and problems associated with the e-learning platform, such as the flexibility of the learning schedule and strategy, accessibility and ease of use of the system, and so on (Scriber and Encouraging, 2013). The assessment dimension refers to the diversity and creativity of assessment, such as more personalized assessment (Sun et al., 2008). Last but not least is the very important dimension of students' satisfaction with e-learning is collaborative learning made possible by the available technology, such as online the chat room (So and Brush, 2008)

Table 1. Factors leading to satisfaction with e-learning from past studies

Dimension	Definition	Examples	Source
Learner	Learner's background and expectations of e-	1.Learner's self-regulation expectations	Paechteet al. (2010)

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	learning	2.Learner's self-efficacy	Ke and Kwak (2013) Kuo et al. (2014)
Instructor	Instructor's capability related to e-learning	Instructor's enthusiasm (e.g., response timelines) Instructor 's professionalism Instructor's communication skills	Fu (2010)
Content design	Content usefulness and ease of learning	E-learning course quality	Sun et al. (2008) Liaw and Huang (2013)
Technology	Benefits and problems with the platform	E-learning course provides flexibility Technology quality	Scriber and Encouraging (2013)
Assessment	Diversity in assessment	Assessment is creative	Sun et al. (2008)
Peer	Collaborative-learning	Collaborative-learning	So and Brush (2008)

However, ignoring the interactive effects and studying factors alone as has been done in previous studies does not reflect real scenarios. As noted by Swan (2004), the influential variables in learning are interactive, not independent. The authors suggest that the reason the interactions have been ignored in most previous studies is because they are so complicated, but overly simplifying satisfaction may cause the results to lose some validity. For example, satisfaction might come from the interactive benefit of learning strategies, schedules, assessment and collaborative-learning provided by using the e-learning technology (e.g., Fu, 2010; So and Brush, 2008; Liaw and Huang, 2013; Ke and Kwak, 2013; Kuo et al., 2014).

Charisma, as defined by the Oxford dictionary, is a kind of attraction which can inspire devotion in other people. Halliday, Davis, Ward, and Lim considered charisma in the classroom to be a deep ideological value shared between the leader and followers (Halliday, Davis, Ward, and Lim, 2008). Usually it is the teacher who plays the role of leader in the classroom. An instructor who can inspire students is considered a charismatic teacher. However, sometimes students can play the role of leader in commending, helping, or supervising the instructor's teaching. Charismatic leadership can also occur among students (friends) who interact frequently, who have similar values or perceptions as their leader (Pastor, Meindl and Mayo, 2002).

Understanding of how charisma is produced is usually context-based, analyzed based on the scene, the symbols, and the means of the interaction (such as speech, movement, and facial expression) between the leader and the follower. Halliday et al. described a classroom in higher education as being like a lecture theater, with many interactions happening between the instructor and the students, and between the students and their classmates. The task of a charismatic instructor is to provide sufficient challenge, inspiration, motivation, stimulation, confidence, and understanding to motivate students to learn. On the other hand, the willingness of students to cooperate with the teachers and the ability to evaluate and select their own learning strategy, are also very important.

Charisma in learning arises from a scenario of interactions between different factors and is not merely be limited to the leader, Simply preparing a good lecture or giving immediate feedback is not enough. Raelin argued that charismatic learning means that the instructor should provide an effective environment for students to accumulate knowledge. Based on this premise, the teacher is the facilitator to a community of inquiry, and that teaching is the orchestration of learning, not simply handing out knowledge as if feeding the students. It is better for students to be given more autonomy to learn how to learn, to choose the most appropriate way to learn. Peers are better off being able to help each other integrate past knowledge, to accumulate and form new knowledge. Charm in a classroom is not just the responsibility of the teacher, but goes back to the process of learning itself (Raelin, 2006).

Based on the above discussion of charisma in learning, charismatic learning is divided into three dimensions: trust, encouragement and knowledge enhancement.

The goal of this study is to discover what interactions between the elements of satisfaction will create a charismatic e-learning environment as shown in Fig 1. One scenario of satisfaction indicated the interaction of some satisfactory factors in e-learning: perceived importance of learning objectives (learner's expectations), usefulness of the content, good activity design and assessment, collaborative-learning, instructor as facilitator, and effectiveness of technology used. And the authors tried to discover one of charismatic learning: either trust, encouragement or knowledge enhancement from a scenario.

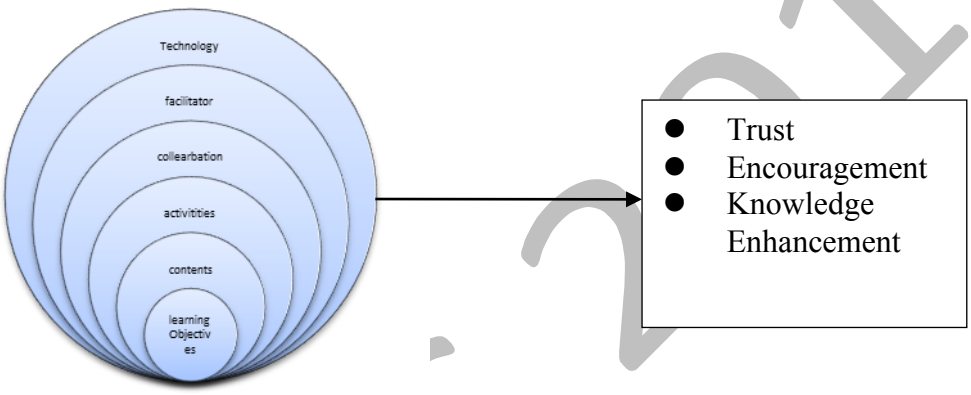


Fig. 1. Relationship between interactions of satisfaction factors and learning charisma

3. Research methodology for the critical incident technique (CIT)

This study utilizes a scenario-based analysis approach, the critical incident technique (CIT) to evaluate students' impressions. CIT was originally developed by Flanagan (1954) as a form of content analysis, but the set of procedures for gathering specific observations and important behavioural facts has grown in popularity with service-related research over the last three decades, in a large part due to its usefulness in solving practical problems and developing broad psychological principles regarding service encounters (Gremler, 2004).The study used the CIT to collect data for students' satisfaction with their learning experience in order to determine possible good interactions from different learning contexts.

3.1. Procedures of CIT

CIT is designed to make data collected in the field useful for answering research questions, while sacrificing the least amount of detail and depth possible (Bitner, Booms and Tetreault, 1990). CIT accomplishes this goal through a two stage process -- collection and classification. The first step, collection of behavioral observations, involves accumulation of self-reports from study participants. In the second stage, these collected events, phenomena or occurrences are classified so that the responses become useful for addressing practical problems (Flanagan, 1954). The four-stage CIT procedures used in the study can be

summarized as follows: 1) collect learning incident reports regarding satisfaction from students in the target classrooms; 2) categorize the incident reports into categories; 3) make name the categories; 4) examine the distribution of categorized reports to determine how important each category is.

Classified respondent data are referred to as "incidents." Incidents in the present study are comprised of interactions of learning factors as shown in Fig. 1: learning objectives, content, activities, facilitator, collaboration, and technology. This study probes for critical incidents by asking respondents to recollect especially satisfying e-learning experiences related to the target class they had participated in, including the time of the incident and what had happened, what the instructor had said or done, and what the outcome was. Most participants reported one incident per interview, but in some cases, two or three incidents were recalled, producing a total of 344 valid incidents from a sample of 320 students, surpassing the 433 incident average obtained in previous CIT studies (Gremler, 2004) and meeting the CIT analysis standard of 50 to 100 incidents for unambiguous activities (Flanagan, 1954).

3.2. Target courses

There were eight target courses. All were blended courses including e-learning classes and face-to-face classes. Four were basic science classes: Principles of Accounting, Research Methodology, Introduction to Computers, and Management Information Systems; three were more liberal classes: Information Technology and Literacy, Introduction to Software, and Objective-Oriented Programming Language. Some classes were perceived as more important and more difficult because they were required courses, such as Principles of Accounting, Objective-Oriented Programming Language, and Research Methodology. Students are generally willing to spend more time on required courses than elective courses.

4. Results and discussion

We found four major categories which seemed to satisfactorily describe the important characteristics of charismatic e-learning.

4.1. Knowledge enhancement by the facilitator using technology

The results indicated that knowledge enhancement was a critical type of charismatic learning in the e-learning environment. Student can control the learning process and strategy more in e learning environment. In face-to-face classrooms, instructors can more easily become the protagonist. Instead, in the e-learning environment, learning becomes the center of the learning activities and the instructor becomes the facilitator. For example, one incident described how well the instructor designed the discussion activities and provided sufficient material. Modern technology and multi-media material enhanced the level of interest and improved communication capability for e-learning. For example, through information shown in the forum frame, the instructor could know who and how many participants were in the forum and could give instant feedback to any specific student through the "VoIP" function. Students could browse the PPT materials using the Team Viewer e-learning software. All participants (instructor and students) could talk to each other using the "Talk" function.

Students usually had questions or encountered problems when they did homework or prepared for a quiz, not immediately after the lecture. Another example of an incident showed this to be the right time for the instructor to facilitate student's learning, not just by receiving his/her input, but also by enabling collaboration among the students. Many incidents in the different target courses described how the instructor designed good material for the students that allowed them to be prepared for the exams.

4.2. Knowledge enhancement through collaboration by using social media technology

Social media can provide a mechanism for initiating cooperation. In this category, the students were satisfied with the collaboration initiated with a team member, the convenience of the technology, and their grade. This category was also critical to team work assignments. Many students mentioned the usefulness of the Facebook community.

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4.3. Trust as facilitator in using e-learning technology

Two similar incidents serve as examples illustrating how trust was created in the e-learning classroom. In the first incident, the student perceived anxiety when the instructor announced the content of the exam, because they felt the challenge was too hard. However the student felt better after the instructor strove to remedy their anxiety as to whether they could complete all the assigned questions and how difficult the exam would be. And finally, the student obtained a satisfactory grade. The second incident illustrates how the teaching assistant effectively helped the student to complete their homework by using remote technology. All the incidents in this category indicated that trust in not just the facilitator but also in the e-learning technology provided extra opportunities for convenient communication between the student and the teacher.

Another example, this time for Principles of Accounting, normally a face-to-face class relates how the instructor also provided video tutorials to help students review. The student narrating the incident perceived the provision of online support materials such as video tutorials to be indicative of the enthusiasm of the facilitator. The student appreciated the support from the video.

4.4. Feel Encouragement (comfortable) due to the flexibility or availability of the technology

Unlike the encouragement received in a face-to-face classroom where most of the praise comes from the instructor, encouragement in the e-learning classroom comes from the usefulness of the technology. The technology provides more flexibility in terms of setting strategies and improving the efficiency of self-regulated learning, such as the selection of the learning schedules and processes to meet individual needs. It is also more convenient to transfer digital information or data than hardcopy information. One example incident ran as follows: “At nine o'clock, I get up in an empty dorm, eat breakfast and browse the materials on the e-learning platform. I felt the pleasure of learning”.

5. Conclusions

This study tries to determine what scenarios would allow the critical charismatic learning to be created in an e-learning environment. The scenario-based analysis approach (CIT) is used to classify students’ impressions of charismatic learning in incidents of satisfaction. The integrated effect was formed by the interaction of several factors: perceived importance of the learning objective, useful content, good activity design, collaborative learning, instructor as a facilitator, and effectiveness of technology used. Three kinds of learning charisma: trust, encouragement and knowledge enhancement were reviewed.

The results indicate that knowledge enhancement was the most critical type of charismatic learning in e-learning. In some difficult courses, such as Principles of Accounting or Objective-Oriented Programming Language, instructors provided on-line materials for students to review after class or they provided comprehensive supporting material for collaborative learning (discussion). To allow the learning content be the centre of learning, instructors combined efforts with e-learning technology to work as effective facilitators in the e-learning classroom. The findings verify that the charismatic learning proposed by Raelin (2006) .

A convenient communication platform helps collaborative learning and facilitates team work. Students seemed to prefer to use the social media they habitually used, such the Facebook, over chat rooms in the e-learning platform. The satisfactory incidents of collaboration also revealed that the students were satisfied with the final grade they got which they attributed to the facilitation of technology. Technology did act as an important facilitator of knowledge enhancement. Assessments such as homework or quiz were important to motivate students use facilitated materials in e-learning.

Trust usually came from the enthusiasm of the instructor who provided additional (unexpected) help. In situations such as when the students had problems doing homework or preparing for exams they appreciated the additional help received from the instructor or teaching assistant. Availability was increased by usage of e-learning technologies, such as email, chat rooms, or remote access technology. Instructors

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who provided online supporting material were considered to be more caring teachers, another type of trust by students.

Flexibility of the study schedule or strategy made students feel that the technology was good. For example, for an easy course, such as Information Literacy, students mentioned the flexibility of the class time (no need to get up early or being able to postpone study in the mid-term week) as being satisfactory. The incidents also combined with clear objectives were announced online to help students know how to set their own learning strategy.

The results described the roles of instructors, classmates or technology in the e-learning environment worked more as facilitators. Students perceived content or assessment as the centre of learning. We propose that to create a more charismatic learning environment, the pedagogical design of e-learning is better with a task with a clear objective, and integrated with useful content which has been decomposed and designed to be easily understandable. Multi-media content, selected to combine voice and figures with text, is better than text only. The students appreciated and considered the instructor to be enthusiastic if he/she prepared useful multi-media content. The role of instructor as facilitator is apparent. Collaboration can be either initiated by the instructor or by the students themselves. Activities more appropriate in the e-learning classroom are collaborative and self-regulated and finally the technology of e-learning does provide more opportunities for collaboration and communication among the instructor and students and among classmates as well as flexibility in setting individual strategies for learning.

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Chemistry laboratory applications supported with simulation

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Abstract

The aim of this research is to determine the effect of chemistry laboratory applications supported with simulations on the chemistry achievements, chemical laboratory anxiety and attitudes towards the use of technology of pre-service teachers. The sampling of the research consisted of 31 teacher candidates enrolled at Hacettepe University Faculty of Education. In the research, chemistry achievement test, chemistry laboratory anxiety scale and attitude scale regarding the use of technology in education were used as data collection tools. As a result of the research, it was found that the laboratory practices supported with simulations were more effective than the traditional verification laboratory approach in improving the pre-service teachers in chemistry achievement and attitudes towards education technology as well as decreasing the level of their anxieties about the chemistry laboratory.

Keywords: chemsitry laboratory, simualtions, pre-serivce teachers;

1. Introduction

As technology becomes more involved in our daily lives and more widespread, it is inevitable that education has become associated with technology. Individuals who are not good technology users are nearly impossible to adapt to their environment (Alkan, 1995). Quality of use of technology influences both the quality of life (Li and Perkins, 2007) and education (Ferdig, 2006). Although use of technology is not a solution that can overcome all problems related to education, today technology has become necessary for education environment (Kirschner and Selinger, 2003); because technology carries daily life into education environment, provides instruments for developing learning and gives more opportunity to teachers and students for feedback, thinking and correcting (Bransford, Brown and Cocking, 2000). As technology makes interaction between teacher, student, manager and family, it provides appropriate environment for teacher to develop as well (Çobanoğlu, 2010). Technology is constantly changing and developing. Lectures become more important and interesting thanks to modern technology.

Increasing amount of knowledge, enhancement of communication facilities, wide spreading of technology have changed the expectations from education. Educational institutions are expected to cultivate individuals, who can use technology effectively. The education system expects the same function from teachers. This expectation includes not only the teaching of how to use the technology but also integration of technology into teaching activities. More continuous, effective and productive learning can be ensured via using technology especially in the environments, in which scientific practices are carried out, especially laboratories. Laboratory application is an important factor that affects teacher training. The basic aim of laboratory is to observe and results performing practical trial of theories. Teacher candidates studying at Department of Secondary Science Education have to apply the experiments related to their field before they begin their profession and be informed of methods used in laboratories (MEB, 2005).

Chemistry laboratory applications are expected to have a structure directing to use information and think critically, to have technical equipment to develop cognitive process capability and hand skills. Therefore, the effects of use of technology in laboratory on pre-service teachers describing a new problem, explaining an observation and deciding on an issue should be researched; since teacher candidates do not always have the opportunity to learn, observe basic information and reach to a meaningful result with laboratory applications. Within this frame, experiments supported with simulations and laboratory applications are considered to complete these lacks using technology.

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The objective of this study is to determine the contributions of experimental simulations to wholesomely conduct of laboratory activities and ensuring appropriate learning in laboratories. By this way, it is aimed to increase the success of pre-service teachers in chemistry laboratories, decreasing the concerns regarding laboratories, and determining the benefits of the use of technology for educational purposes.

2. Method

In the study, the pre and posttest research design was used with control and treatment groups. Members of the control and treatment groups were determined according to unbiased sampling method. While the teaching of the treatment group was carried out within the chemistry laboratory supported with simulations, the teaching of the control group was carried out with the traditional verification laboratory approach.

2.1. Sampling

The sampling of the research consisted of 31 pre-service teachers enrolled at Hacettepe University, Faculty of Education. In the research, chemistry achievement test, chemistry laboratory anxiety scale and attitude scale regarding the use of technology in education were used as data collection tools.

2.2. Data collection tools

2.2.1. Chemistry achievement test: Performances of pre-service teachers were determined via the chemistry achievement test, which was developed by the researchers. The chemistry achievement test consisted of 15 multiple-choice questions regarding volumetric analysis. The validity and reliability studies of the chemistry achievement test were carried out with the participation of 231 pre-service teachers. The item analysis was carried out with ITEMAN Windows Version 3.50 statistics program. The average difficulty, average distinctiveness value and reliability coefficient of the chemistry achievement test were determined to be 0.49, 0.62 and 0.75 respectively.

2.2.2. Chemistry laboratory anxiety scale: The anxiety of teacher candidates towards chemistry laboratory were determined by the "Chemistry Laboratory Anxiety Scale" developed by Bowen (1999) and the Turkish adaptation studies made by Azizoğlu and Uzuntiryaki (2006). The anxiety scale consisted of 20 statements in a 5-point Likert Type. The scale had four sub dimensions. The Cronbach Alpha reliability coefficicent of the use of laboratory instruments and chemicals sub dimension was 0.88, work with other students sub dimension was 0.87, data collection sub dimension was 0.86 and using laboratory time sub dimension was 0.87.

2.2.3. Attitude scale regarding the use of technology in education: The attitudes of the pre-service teachers towards education technologies were determined by the "Attitude Scale Regarding the Use of Technology in Education" developed by Öztürk (2006). The attitude scale consisted of 39 statements in a 5-point Likert Type. The scale had three sub dimensions. These dimensions were reflection of technology use in education on teaching processes, self-improvement regarding the use of technology in education, classroom management and technology use in education. Cronbach Alpha reliability coefficient of the scale was 0.90.

2.3. Data analyses

In the research, preliminary test and final test points were examined for the data obtained from the treatment and control groups. During the analysis of the data obtained from the research, nonparametric tests were used since the number of participants was below the value recommended in the literature and normality assumption was not fulfilled (Green & Salkind, 2008). While examining the data obtained from the chemistry achievement test, chemistry laboratory anxiety scale and attitude scale regarding the use of technology in education, Mann-Whitney U-Test was used to find out potential differences between the treatment and control groups prior to the application. The difference between the pre and posttest scores after the traditional verification laboratory approach, which was supported with simulations, was examined with Wilcoxon signed-rank test.

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3. Results

The descriptive statistics regarding the pre and posttest averages of the scales applied within the scope of the chemistry laboratory research, which was supported with simulations, were summarized in Table 1.

Table 1. Descriptive statistics of Pre- and Posttest scores.

Scale	Group	Pretest			Postest	
		N	M	SD	M	SD
Chemistry achievement	Treatment	16	6.25	2.32	11.75	2.17
	Control	15	5.60	2.29	7.73	1.67
Chemistry laboratory anxiety	Treatment	16	2.27	0.52	1.89	0.53
	Control	15	2.36	0.59	2.24	0.45
Attitudes regarding the use of technology in education	Treatment	16	3.78	0.40	3.98	0.39
	Control	15	3.79	0.53	3.86	0.47

Findings regarding the chemistry achievement;

In the research, the averages of the pre-application chemistry achievement test for the pre-service teachers in control group to whom traditional verification laboratory approach was applied and the treatment group, who were educated with simulation-assisted teaching, were analysed with Mann Whitney U-Test. According to the result of the analysis, no significant difference was identified between the pretest average scores of the control and treatment groups in the chemistry achievement test ($U=102.500$; $p>0.05$). This result indicated that, prior to application there were no significant differences between the knowledge levels of the pre-service teachers in treatment and control groups about the given topic.

As a result of the traditional verification laboratory approach applications, which were supported with simulations, the difference between the pre and posttest scores of the pre-service teachers in terms of their chemistry achievements was examined with Wilcoxon signed-rank test. The obtained findings were summarized in Table 2.

Table 2. Wilcoxon signed-rank test results of chemistry achievement.

Chemistry achievement	N	M	SD	Z	p
Treatment group pretest	16	6.25	2.32	-3.333	.001
Treatment group posttest	16	11.75	2.17		
Control group pretest	15	5.60	2.29	-2.255	.024
Control group posttest	15	7.73	1.67		

When the Table was examined, it was seen that the chemistry achievements of the pre-service teachers in the control and treatment groups increased after the applications and this increase was statistically significant ($Z:-3.333$; -2.255; $p<0.05$). This result showed that the traditional verification laboratory approach, which was supported with simulations, was effective in increasing the chemistry achievement levels of the pre-service teachers.

The posttest averages of the pre-service teachers were analysed through the Mann Whitney U-test. According to the result of the analysis, there was no significant difference between the posttest scores of the pre-service teachers in the control and treatment group obtained from the chemistry achievement test ($U=19.000$; $p>0.05$). According to this result, the average of the posttest on chemistry achievement obtained by the traditional verification laboratory approach applications supported with simulations, which was applied to the pre-service teachers in the treatment group, was higher than the scores obtained by the traditional verification laboratory approach, and this created a significant statistical difference in favour of the treatment group.

Findings regarding the chemistry laboratory anxiety;

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In the research, no significant difference was identified between the pretest scores obtained by the pre-service teachers in the control and treatment groups for the chemistry laboratory anxiety (U=95.500; p>0.05).

The findings regarding the chemistry laboratory anxiety pre and posttest average scores of the pre-service teachers in the control and treatment groups were indicated in Table 3.

Table 3. Wilcoxon signed-rank test results of chemistry laboratory anxiety.

Chemistry laboratory anxiety	N	M	SD	Z	p
Treatment group pretest	16	2.27	0.52	-1.990	.047
Treatment group posttest	16	1.89	0.53		
Control group pretest	15	2.36	0.59	-1.083	.279
Control group posttest	15	2.24	0.45		

It was seen that the chemistry laboratory anxiety averages of the pre-service teachers in the control and treatment groups decreased after the application. A significant difference was identified between pre and posttest average scores obtained by the pre-service teachers in the treatment group from the chemistry laboratory anxiety test (Z:-1.990; p<0.05). It was determined that the observed increase in the scores of the control group was not statistically significant (Z:-1.083; p>0.05). This result indicated that the laboratory approach supported with simulations, which was applied to the treatment group, was effective in decreasing the chemistry laboratory anxiety levels of the pre-service teachers, while the traditional verification laboratory approach applied to the control group was not effective. There was no significant difference between the chemistry lab anxiety posttest averages of the pre-service teachers in the control and treatment groups (U=87.50; p>0.05).

The results of the analysis carried out for the comparison of the pre and posttest scores with respect to the sub dimensions of the chemistry laboratory anxiety of the treatment and control group after the application and posttest averages of the experiment-control group were summarized in Table 4.

Table 4. Wilcoxon signed-rank test and mann whitney u –test results of chemistry laboratory anxiety sub dimensions.

Chemistry laboratory anxiety	Gorup	Pretest		Posttest		Wilcoxon signed-rank test		Mann whitney u –test	
		M	SD	M	SD	Z	p	U	p
Use of laboratory instruments and chemicals	Treatment	2.07	0.77	1.85	0.63	-0.881	.378	212.500	.081
	Control	2.32	0.67	2.33	0.59	-0.085	.932		
Work with other students	Treatment	2.14	0.68	1.89	0.65	-1.476	.140	112.500	.764
	Control	2.20	0.54	2.00	0.63	-1.209	.227		
Data collection	Treatment	2.42	0.69	1.97	0.57	-1.892	.058	79.000	.102
	Control	2.37	0.75	2.30	0.42	-0.526	.599		
Using laboratory time	Treatment	2.47	0.75	1.85	0.52	-2.559	*.011*	69.500	*.040*
	Control	2.55	1.02	2.25	0.62	-1.206	.228		

According to the Table, the decrease observed in the sub dimensions of the chemistry laboratory anxiety scale with respect to the pre and posttest averages of the pre-service teachers in the control and treatment groups were quite outstanding. However, this decrease observed in the scores revealed a statistically significant difference in using laboratory time dimension. When the posttest averages were examined in order to explain the effects of the teaching methods applied to the control and treatment groups on

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the sub dimensions of the chemistry laboratory anxiety scale, a significant difference was detected between the control groups regarding the use of laboratory time.

Findings regarding the approach for education technologies;

Findings related to the attitudes of pre-service teachers in control and treatment groups towards education technologies were given in Table 5.

Table 5. Wilcoxon signed-rank test results of attitude regarding the use of technology in education.

Attitude regarding the use of technology in education	N	M	SD	Z	p
Treatment group pretest	16	3.78	0.40	-2.743	.006
Treatment group posttest	16	3.98	0.39		
Control group pretest	15	3.79	0.53	-1.024	.306
Control group posttest	15	3.86	0.47		

It was observed that the averages of the pre-service teachers in the control and treatment groups regarding education technologies increased after the application. A significant difference was identified between the average pre and posttest scores of the pre-service teachers in the treatment group regarding education technologies (Z:-2.743; $p<0.05$). It was determined that the observed increase in the attitude scores of the control group regarding education technologies was not statistically significant (Z:-1.024; $p>0.05$). This result indicated that the laboratory approach supported with simulations, which was applied to the treatment group, was significantly effective in improving attitudes of the pre-service teachers towards education technologies, while the traditional verification laboratory approach applied to the control group was not effective. There was no significant difference between the posttest average scores of the pre-service teachers in the treatment group and control group regarding education technologies (U=95.000; $p>0.05$).

The results of the analysis carried out for the comparison of the pre and posttest scores in the sub dimensions of attitudes towards education technologies obtained by the pre-service teachers in the control and treatment after the application and the posttest scores of the treatment and control groups were summarized in Table 6.

Table 6. Wilcoxon signed-rank test and mann whitney u –test results of attitude regarding the use of technology in education sub dimensions.

Attitude regarding the use of technology in education	Gorup	Pretest		Posttest		Wilcoxon signed-rank test		Mann whitney u – test	
		M	SD	M	SD	Z	p	U	p
Reflection of the using technology in education in the teaching process	Treatment	3.82	0.39	3.97	0.44	-1.565	.118	112.000	.750
	Control	3.79	0.47	3.89	0.44	-1.051	.293		
Self-improvement in the using technology in education	Treatment	3.69	0.52	4.00	0.50	-2.332	*.020*	96.500	.352
	Control	3.79	0.87	3.80	0.74	-0.377	.706		
The using technology in education and classroom management	Treatment	3.85	0.55	3.96	0.54	-0.959	.338	110.000	.692
	Control	3.80	0.63	3.89	0.78	-0.817	.414		

According to Table 6, the improvement in attitudes towards education technologies with respect to the sub dimensions observed in pre and posttest scores of the pre-service teachers in the control and treatment groups were quite outstanding. When the pre and posttest scores were examined, no statistically significant difference was found in the treatment group regarding self-improvement in using technology

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in education. However; there was a statistically significant difference in the treatment and control groups when the posttest scores were examined.

4. Conclusion and discussion

As a result of the research, it was found that the laboratory practices supported with simulations were more effective than the traditional verification laboratory approach in improving the pre-service teachers in chemistry achievement and attitudes towards education technology as well as decreasing the level of their anxieties about the chemistry laboratory.

Reaching a modern education level would only be possible through integrating the developments in information and communication technologies into education programs. Computer technology has enabled the graphical and symbolical creation of the information in the memory of individuals. Computer technology has made learning more meaningful and ensured recalling of the learnt knowledge through ensuring the correlation of graphics and symbols among themselves while creating knowledge. It is believed that due to these functions, technological applications enable the increase of success levels and improve the attitudes of pre-service teachers while decreasing the levels of their anxieties. The literature contains varied studies, which obtained findings that are supportive of the research result. (She and Fischer, 2003; Yenice, 2003; Arıkan, 2007; Çağlar, 2007; Hançer and Yalçın, 2007; Sambur and Can, 2007; Bayram, 2012; Bilen-Kaya, 2012;).

Educational technology increases the quality of the learning and teaching process and makes this process more productive and effective for both teachers and students (Uşun, 2000). It is important to present teaching materials according to the learning speed and capacity of each student (Demirel, 2004). The activities supported with technology provide learners with the opportunity to prepare for the activities in their own learning speed. Therefore, technology-assisted teaching may increase the exam scores of students, and affect the general satisfaction and confidence levels towards subjects positively (Day and Foley, 2006). The researchers observed that technology-assisted activities increased students' interest in courses, decreased the time to achieve the teaching objective, and made students more effective in class. It was also observed that the experimental practices on virtual platform helped students understand the points they should pay attention during the practices in laboratories (Kıyıcı and Yumuşak, 2005). The effectiveness of the laboratory approach supported with simulations could be predicted through its increasing effect in the quality of the learning-teaching process, making the process more productive and effective, creating an environment for teachers, where students could prepare and learn the chemical experiments in their own learning speeds.

Chemistry is one of the science subjects interested in abstract incidents. Therefore, visual representations are of great importance for the description of abstract incidents in learning and teaching chemistry (Crawford & Cullin, 2004). Kozma and Russell (1997) reported that chemistry, as a field of study, was based on representations or symbols due to its nature and therefore, symbols and other forms should be used in order to create a clear meaning. Some researchers have indicated that three-dimensional visual representations enabled the understanding of chemical structures and related features (Urhahne, Nick & Schanze, 2009). The contribution of using technology in chemistry classes to teaching is a proven fact in terms of enabling the conceptualization of abstract statements with the help of visualization (Waight, Liu, Gregorius, Smith & Park, 2014). The abstract information of the pre-service teachers regarding volumetric analysis became concrete presentations with the simulation visuals used in laboratory practices. These concrete presentations decreased the cognitive burdens of the pre-service teachers and they became more successful accordingly.

This research emphasizes that individual differences should be taken into account while education activities are carried out. The properties of technology-assisted chemistry laboratory practices such as facilitating understanding and remembering, providing reinforcement, making lessons interesting and enjoyable, improving experimental skills, enabling the identifying of the tools and chemical substances to be used during experiments, have also contributed to the research results. This study is of great importance for ensuring the pre-service teachers, who will be the teachers of the future, to keep up with the age, which is rapidly developing and changing, and to guide their students in becoming well-equipped indivi-

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duals. Therefore, it is very important to increase the number of studies in this field as well as contributing to the literature with new resources.

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Clinical application of humanoid robots in playing imitation games for autistic children in Iran

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Abstract

Autistic children are often impaired in initiating and responding to Joint Attention. In recent years, there has been an increase in the application of robots in diagnosis and treatment of autism. The purpose of the current research is primarily to originate the proper therapeutic scenarios and to implement two interactive humanoid robots as therapy assistants in autism treatment in Iran. In this paper, our focus is specifically on developing the necessary tools to improve joint attention and imitation in autistic children. To this end, the humanoid robots were programmed and teleoperated via Microsoft Kinect Sensor and Phantom Omni Haptic Robot to elicit reactions consisting of imitation of humans by the humanoid robots and vice versa. Our research target was to increase social interaction and involve autistic children in dyadic/triadic interactions.

Keywords: Human-Robot interaction (HRI), Autism Spectrum Disorders, Humanoid Robots, Joint Attention, Imitation

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1. Introduction

Statistics have shown an epidemic increase of Autistic Spectrum Disorders (ASD) worldwide since the 1960s, and this trend is also true for Iran**.** Autism is considered a brain development disorder which causes a lack of correct information processing, partial or complete impairment in language learning, impaired verbal and non-verbal communication, and problems in interpreting social situations (Edwards; 2011 and Scassellati; 2003). Autistic disorders are characterized by three major behavioral disorders: impaired interaction, impaired social communication, and impaired imagination and social creativity (Pouretemad; 2011).

There is no clear cut agreement on the prevalence of autism, and estimates vary from up to 100 out of a population of 10,000 (Pouretemad; 2011). The most recent statistics indicate that 1 out of every 88 children born in the United States is autistic (Scassellati; et-al, 2012). It is expected that more than 30,000 Iranians younger than 19 years old suffer from autism disorders. Autistic children share some common behavioral patterns which can generally be detected and modified. Individuals with autism often have some form of disorder in initiating and responding to joint attention (Pouretemad; 2011).

In recent years, robots have been increasingly used in education (Meghdari and Alemi; et-al, 2013) and autism diagnosis and treatment (Kozima; et-al, 2001 & 2007, Pioggia; et-al, 2007, Billard; 2003, Ferrari; 2009, Kim; et-al, 2012, Stanton, et-al, 2008). Research focusing on applying robots in autism treatment have pointed out that robots increase enthusiasm, focus, and attention; and cause novel social behaviors such as joint attention and automatic imitation. Research also indicates that autistic children work quite naturally with robotic technologies (Scassellati; 2003 and Diehl; et-al, 2012). When interacting with robots, people are mainly impressed by the robot's appearance (Scassellati; et-al, 2012). A variety of robots with different appearances and functions are currently being used around the world as therapy assistants in autism treatment; such as, Infanoid (Kozima; et-al, 2001), a robot the size of a human infant, is able to

move its hands and to open and close its mouth and fingers; Face (Pioggia; et-al, 2007) a very natural looking robot with silicon skin and high functions in showing facial expressions; Robota (Billard; 2003), a doll equipped with motors and sensors which is capable of moving its hands and feet and dancing; Muu (Kozima; et-al, 2007), a robot with one big eye and a cartoon-like appearance; Bandit (Ferrari; 2009), a humanoid upper body on a wheel base; Pleo (Kim; et-al, 2012), and Keepon (Stanton, et-al, 2008), animal-like robots, respectively, in the shape of a dinosaur and a bird, are some examples of the robots used in the research of autism treatment. The above mentioned robots are being used to elicit such behaviors as imitation, joint attention, and eye contact. The eminent feature of robots is their high level of repeatability and flexibility, as well as working without getting tired or making complaints. Since robots do not humiliate or belittle people, it is expected that autistic people face less anxiety in interacting with them and are more willing to participate in the learning exercises.

Our main objective is to explore clinical applications of two interactive humanoid robots as medical assistants (not a substitute for human therapists) in treating/educating children with autism in Iran (Meghdari, Alemi, Taheri; 2013). As a first step, this paper will focus on developing the necessary tools to improve two main social behaviours in children with autism namely as: imitation and joint attention. Preparing these robots to be used in eliciting their imitation of the patients and the patient's imitation of them, and designing proper therapeutic scenarios to improve autistic children's ability to initiate and respond to joint attention has been the purpose of this study. Our multi-disciplinary research team consists of robotics engineers, applied linguists, autism specialists, and psychologists.

2. Research methodology

The current study consists of the following two phases: the technical phase and the clinical intervention.

2.1 Technical phase

Initial step was to identify the necessary capabilities needed for a robot to be used for autistic therapy. According to the desired therapy scenarios, two humanoid robots called NAO and Alice manufactured by Aldebaran-Robotics and Robokind, respectively, are purchased. Each of these robots consists of specific features that will be used in the clinical stage. Additionally, the Alice Robot is capable of showing human facial expressions. The features of the two mentioned robots are as follows:

NAO-H21 Robot: This is a kid-sized humanoid robot with 57.3 cm in length, 4.5 kg in weight, with 21 degrees-of-freedom, equipped with 2 cameras, 2 microphones, 8 foot Force Sensitive Resistors sensors, one 2-axis gyrometer, one 3-axis accelerometer, capable of voice synthesis, different LEDs in eyes, body, and features a 500 MHz CPU. Beside the graphical user interface software, Choregraphe, it can be programmed using C++, Python, etc. To be used in an Iranian context, we have renamed it as "Nima" (see Fig.1).

Alice Robot: Alice, with the Iranian name "Mina", 69 cm high, weighting 5.7 kg, with 32 degrees of freedom (21 degrees of freedom in her body and feet, and 11 degrees of freedom in her face), equipped with two cameras placed in each of her eyes, temperature sensors, a 3-axis gyrometer, PIR, ground contact, and other sensors, and a 1 GHz CPU, is capable of showing different facial expressions such as joy, sorrow, anger, fear, and so on, thus being of great interest for children. This robot can be programmed in C++ and Java (see Fig.2). The robots' capabilities such as body movements, speech, and facial expressions will be used to design different therapeutic scenarios.

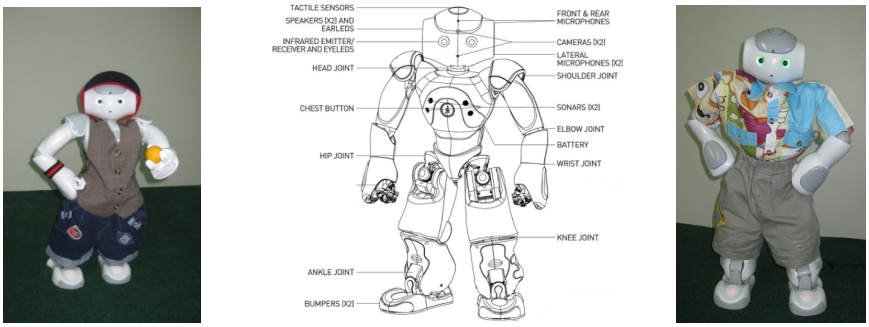


Fig. 1. A schematic overview of the NAO (*Nima*) Robot

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Fig. 2. The Alice (*Mina*) Robot

2.2 Clinical interventions

In the second phase of the study, the clinical interventions are being initiated with the autistic children at the "Center for Treatment of Autistic Disorders (CTAD)" in the presence of the robots and therapist. The treatment process for a group of 3-10 years old patients will continue at least for a period of 10 weeks. The approach is a single subject design and the interventions are currently underway. Robots are used in therapy sessions for:

- Quantitative and qualitative assessment of the amount of initiating and responding to joint attention by children with autism and if any improvement is shown.
- Improving social and imitation skills in autistic children.
- Creating a happy, interesting, and exciting teaching atmosphere for autistic children.
- Educating the therapists to be able to apply a robot in different stages of the treatment.

3. Therapeutic scenario design

In this section, the three main objectives of this paper will be discussed in the following subsections:

3.1 NAO real time imitation using microsoft kinect

Imitation of the autistic patients' behavior is an effective way of triggering their attention toward the therapist [3, 8]. Imitation and turn-taking games are considered as good therapy to improve social interactions, sense of self, creativity, and leadership in children and even adults with autism. Accordingly, we plan to achieve real time imitation of upper body movements by the NAO of humans. We have used Microsoft Kinect sensor which gives us the real time position (x, y, z) of the player's joints. Using forward and inverse kinematics, we are able to teleoperate NAO and obtain good real time imitation.

To this end, eight joints of NAO's upper body including Head-Yaw and Head-Pitch from the head, Shoulder-Pitch, Shoulder-Roll, and Elbow-Pitch of both hands are commanded in order to have admissible real time position tracking of the users' hands and head. The base frame, zero positions of the upper body joints of NAO, and the appropriate link frames are shown in Fig.3.

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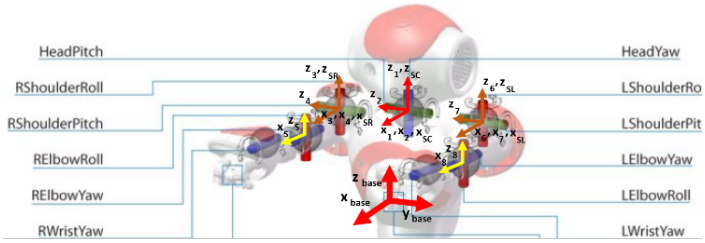


Fig. 3. NAO kinematic chains and upper body joints

For the homogenous transformation matrix ${}^{i-1}_{i}T$, the corresponding Denavit-Hartenberg (DH) parameters of NAO are given in Table 1.

Table 1. DH Parameters for Head, Right-Hand and Left-Hand of the NAO Robot

	α_{i-1}	a_{i-1}	θ_i	d_i
1	0	0	θ_1	0
2	$\pi/2$	0	$-\theta_2$	0
3	0	0	θ_3	0
4	$\pi/2$	0	$-\theta_4$	0
5	$-\pi/2$	$L_{RightArm}$	θ_5	0
6	0	0	θ_6	0
7	$\pi/2$	0	$-\theta_7$	0
8	$-\pi/2$	$L_{LeftArm}$	θ_8	0

We can combine DH transformation matrices of the corresponding joints to find the Head, Right Wrist, and Left Wrist positions of NAO:

$$ {}^{i-1}_{i}T = \begin{bmatrix} \cos\theta_i & -\sin\theta_i & 0 & a_{i-1} \\ \sin\theta_i.\cos\alpha_{i-1} & \cos\theta_i.\cos\alpha_{i-1} & -\sin\alpha_{i-1} & -\sin\alpha_{i-1}.d_i \\ \sin\theta_i.\sin\alpha_{i-1} & \cos\theta_i.\sin\alpha_{i-1} & \cos\alpha_{i-1} & \cos\alpha_{i-1}.d_i \\ 0 & 0 & 0 & 1 \end{bmatrix} \quad (1) $$

$$ {}^{ShoulderCenter}_{Head}T = {}^{SC}_{1}T.\,{}^{1}_{2}T \quad (2) $$

$$ {}^{ShoulderRight}_{ElbowRight}T = {}^{SR}_{3}T.\,{}^{3}_{4}T.\,{}^{4}_{5}T \quad (3) $$

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$$ {}^{ShoulderLeft}_{ElbowLeft}T = {}^{SL}_{6}T.\,{}^{6}_{7}T.\,{}^{7}_{8}T \quad (4) $$

$$ {}^{SR}_{WristRight}P = {}^{ShoulderRight}_{ElbowRight}T.[L_{RightForehead},0,0,1]^T \quad (5) $$

$$ {}^{SL}_{WristLeft}P = {}^{ShoulderLeft}_{ElbowLeft}T.[L_{LeftForehead},0,0,1]^T \quad (6) $$

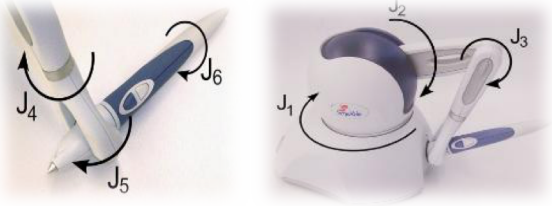
The inverse kinematics for the considered eight joints is presented in Table. 2. Now, the robots are capable of imitating the patients through the data retrieved by the Microsoft Kinect sensor. Kinect's data sampling rate is 32 frames per second. The (x,y,z) coordinates of 20 points of the user's body are accessible in each data sampling. The accuracy of the imitation process is elaborated in detail in the Results section.

Table 2. Inverse kinematics for the Head, Right Hand and Left Hand of the NAO Robot

HeadYaw: $\theta_1 = a\tan 2(H_SC_y, H_SC_x)$
HeadPitch: $\theta_2 = a\tan 2(\sqrt{H_SC_x{}^2 + H_SC_y{}^2}, H_SC_z)$
RSh_Pitch: $\theta_3 = -a\tan 2(E_SR_z, \sqrt{E_SR_x{}^2 + E_SR_y{}^2})$
RShoulderRoll: $\theta_4 = a\tan 2(E_SR_y, E_SR_x)$
RElbowPitch: $\theta_5 = \pi - a\cos(\frac{\vec{R}_{Arm}.\vec{R}_{Forehand}}{\lvert\vec{R}_{Arm}\rvert\,\lvert\vec{R}_{Forehand}\rvert})$
LSh_Pitch: $\theta_6 = -a\tan 2(E_SL_z, \sqrt{E_SL_x{}^2 + E_SL_y{}^2})$
LShoulderRoll: $\theta_7 = a\tan 2(E_SL_y, E_SL_x)$
LElbowPitch: $\theta_8 = a\cos(\frac{\vec{L}_{Arm}.\vec{L}_{Forehand}}{\lvert\vec{L}_{Arm}\rvert\,\lvert\vec{L}_{Forehand}\rvert}) - \pi$

3.2 Teleoperating NAO using haptic phantom-omni

Operating a humanoid robot is not an easy task for patients and therapists. Empowering autistic children to move the robot joints arbitrarily causes the children to show creative social behaviors. This may also help them get involved in triadic Child-Robot-Therapist and Child-Robot-Child interactions. To reach this goal, we have used a 6-DOFs haptic manipulator (see Fig. 4) manufactured by The Sensable Technologies PHANTOM, as an interface between users and our humanoid robots. The first three DOFs of this device are active while joints 4-6 are passive. The haptic device makes it possible for users to touch or manipulate virtual objects, and it can apply force feedback on the user's hand.



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Fig. 4. Haptic Phantom-Omni Robots and its 3 active and 3 passive DOFs

Autistic children or others can move the haptic device's pen in 3D space and use it as a remote controller to enjoy playing with the humanoid robot. The θ_1, θ_2, θ_3, and θ_5 values recorded by Phantom-Omni encoders are assigned to Head-Yaw, Head-Pitch, Right-Shoulder-Roll, and Right-Elbow-Pitch joints of NAO, respectively. Similar to the previous subsection, the data have been sent via wireless to NAO in order to have real time position tracking.

3.3 Teleoperating NAO using Haptic Phantom-Omni

Delayed development of joint attention, is one of the central disorders in individuals with autism. Utilizing humanoid robots is expected to improve low- and high-level joint attention behaviors such as eye contact, showing, pointing, and gaze shifting through different therapies. So far, programming of the robots to have behavioral-verbal interactions with the patients, as well as, their preparation to take part in different therapeutic situations has been completed. The robots have been programmed using the robots' speech, movement, and facial expressions capabilities, to implement a number of different therapeutic sessions to improve joint attention and imitation of autistic children. To exemplify, they are capable of waving, saying hello and goodbye, one-leg balance in order for the autistic children to imitate the action, pointing to different pictures and asking the autistic child to do the same, expressing happiness for a gift or to encourage the children, or sadness during clinical interventions. Moreover, they can provide verbal reinforcement based on the effectiveness of the responses given by the autistic child. They also teach different colors by changing the color of the LEDs in the robot's eyes and body while introducing the color, and playing music for children while dancing (see Fig. 5). Reinforcement and rewards (i.e. smile, hugs, etc.) are given for the performance of any of the joint attention skills. Having the robot and the therapist imitate the child while the child is involved in a game is considered an effective way to establish joint attention opportunities.

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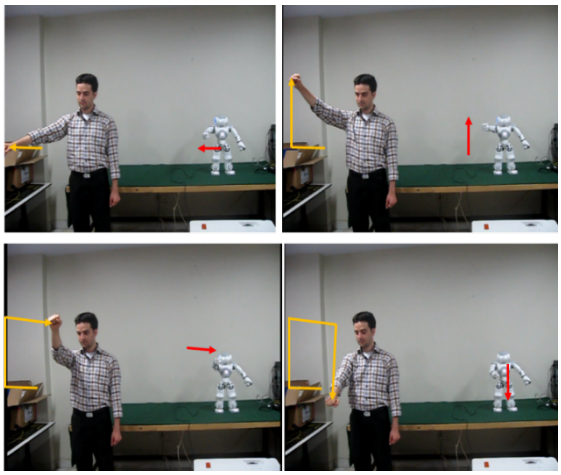


Fig. 6. Snapshots of drawing a square by the user

4. Results and Discussion

In this section, the experimental results of teleoperating NAO using Microsoft Kinect sensor is described. We have provided a C# code to save and process the joints' positions data gathered by Kinect. The goal is to have NAO imitate human upper body movements. Accordingly, the key points necessary for this purpose are Head, Center Shoulder, both Right and Left Shoulders, Elbows, and Wrists. Using inverse kinematics equations presented in Table. 2, the equivalent joint angles of NAO are calculated and sent wirelessly to the robot. Fortunately, the sampling rate of Kinect is adequate for good imitation. The lowest acceptable value for fraction of maximum speed of robot actuators is limited by imitation time delays. The upper limit is restricted by jerk increase in robot actions. It is experimentally found that these two requirements were met when this fraction was set to 0.8. Kinect data are noisy and the absolute position error of a fixed point may be more than 10 centimeters. Therefore, the data are filtered in order to smooth out short-term fluctuations through two methods: a) simple moving average of the previous 10 data, and b) 4^{th} order low-pass Butterworth filter with a cutoff frequency of 6 Hz.

As a case study, a person stood in 2 meters in front of the Kinect and moved his hands and head. The whole process took 113.4 seconds and included: movement of hands in arbitrary directions, elbows' flexion, drawing a circle and a square clockwise and counter-clockwise, and left/right and up/down head movements. In Figure 6, four snapshots of the process of drawing a square by the person are shown. Figure 7 depicts NAO's right wrist position in three situations unfiltered, applying moving average, and Butterworth filters to a person's right hand angle signals in a y-z plane. Figure 8 shows the right hand's angles versus time during the process of drawing a square. This part starts from t=31.3 (s) and lasts to t=35.1 (s). Figures 6-8 shows that NAO is able to imitate the person very well. The imitation accuracy is satisfactory for the clinical intervention sessions and therapeutic design. Although, usage of moving average or Butterworth filters decreases the imitation accuracy and slightly increase its time delay, filtering the angles' data makes the robot's movements much smoother and more reliable; and the robot's joints and body experience lower accelerations and jerks. The robot's imitation delay time is less than 0.4 sec. in the unfiltered and filtered angles' data. Figures 9-11 show the circle drawing movement's snapshots and right wrist position graphs.

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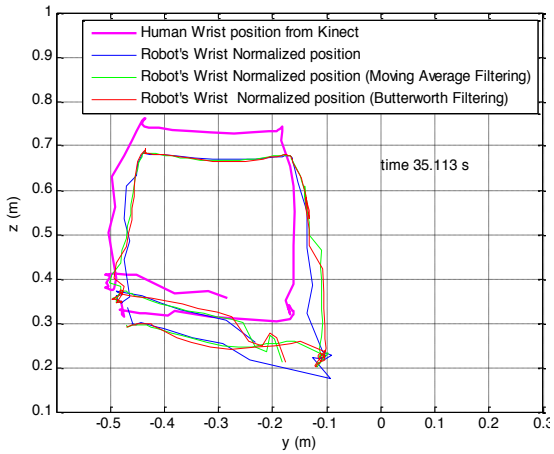


Fig. 7. Right wrist positions while drawing a square for four situations

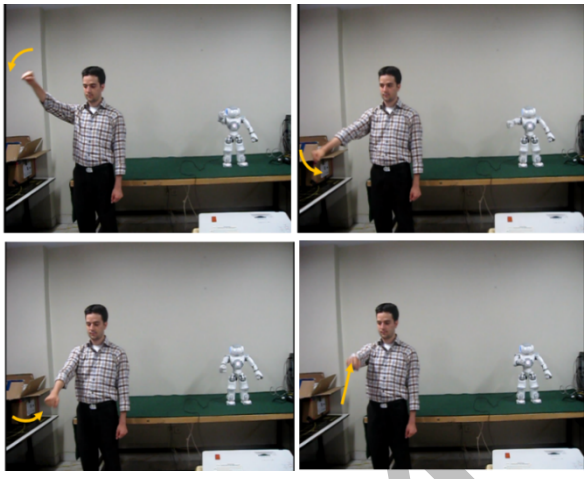


Fig. 9. Snapshots of drawing a circle by the user

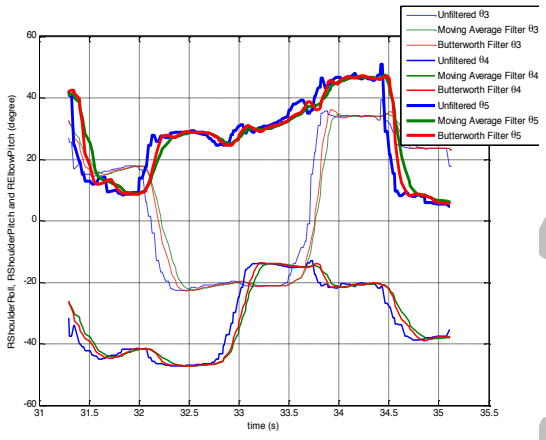


Fig. 8. Right hand's DOF's vs time during drawing a square in unfiltered and filtered situations

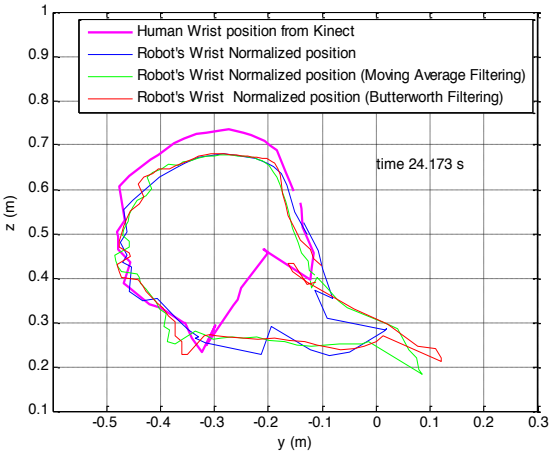
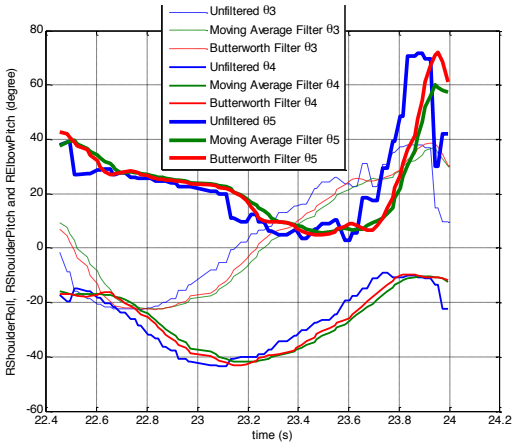


Fig. 11. Right hand's DOF's vs time during drawing a circle process in unfiltered and filtered situations



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5. Conclusion

In this paper, three main objectives were described. Teleoperating NAO using Microsoft Kinect was the first and the main goal of this article. Results showed that the imitation processes are acceptable based on good NAO movement quality and low imitation time delay. Similar to this but easier, NAO can also be teleoperated using a haptic robot as a remote controller. The same procedure can be used on the Alice robot. Finally, it was shown that real time humanoid robot imitation of a person and vice versa is possible. Using the robots' speech, movement and facial expressions capabilities, we designed different appropriate therapeutic scenarios to improve joint attention and imitation of autistic children. Clinical interventions are currently underway, and it is anticipated that the autistic children treated with this technology will enjoy faster improvement regarding making eye contact, initiating and responding to joint attention, imitation, and dyadic/triadic interactions. Moreover, a proper database associated with robotic assisted autistic treatment will be collected for comparative studies with conventional/traditional methods.

Acknowledgments

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Comparative study of self-test questions and self-assessment object for introductory programming lessons

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Abstract

Computer programming learning requires declarative and procedural knowledge. Novice learners acquire programming declarative knowledge via lectures, tutorials, and self-assessment. Cognitive overload within programming learning materials is one of several learning barriers. Self-assessing is important to assist learners to identify misconceptions and to encourage the correct construction of knowledge. Self-Test Questions (STQ) and solutions in print are common learning methods used in a typical programming learning environment. Comparatively, Self-Assessment Object (SAO) is a type of learning object used to examine usefulness in order to impart declarative knowledge. One hundred and three foundation engineering students, enrolled in a C programming module, took part in this study and were randomly assigned to two groups. A control group used STQ and an experimental group used SAO in a programming lab over seven teaching weeks. Post-test and supporting survey results suggest that SAO was able to support programming learning and mitigate the learning difficulties addressed in this study.

Keywords: introductory programming, novices, self-assessment object

1. Introduction

Learning Object (LO) is the decomposition of content into smaller pieces of information to accomplish a single learning outcome used to facilitate knowledge based and skill based courses (Wiley, 2000). It is also known as multimedia learning object (Bradley, Haynes, Boyle, 2008), knowledge object (Merril, 1998) reusable learning object (Polsani, 2003), content object (Learning Circuits, 2005), and web based learning tools (Kay, 2012). Clearly, the learning object technology suffers from agreeing to a standard definition. However, the content designers, instructional specialists, eLearning professionals, and academics involved in the design and development of learning object define the objectives, scope, and naming of the learning objects. Though various types of learning objects exist with different names, most of them conform to the main characteristics of granularity (size), reusability (technical and pedagogical), aggregation (assembly of several types of learning object), and self-contain (independent). The type of learning object used in this study is the self-assessment object. The aim of this object is to help learners improve their programming declarative knowledge.

Robins, Rountree, J, & Rountree, N (2003) pointed out that programming learning requires both declarative (knowing the programming concepts and syntax) and procedural knowledge (applying declarative knowledge to write a program). Programming courses at a beginner's level encourages learners to comprehend programming concepts, syntax and semantics, and the ability to write and test a program. A strong understanding of declarative knowledge is essential before learners attempt to write a program. Self-Test Questions (STQ) is a common approach used in many courses to help learners assess their understanding. However, the prevailing focus on self-assessment object is promising to facilitate better knowledge acquisition and enable identify misconception. The aim of this study is to explore the effectiveness of Self-Assessment Object (SAO) compared to self-test question, in order to improve

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programming declarative knowledge. This study also explores participants' learning experience to understand the usefulness of STQ and SAO in learning programming.

2. Review of literature

As there is no explicit definition of the various characteristics of learning objects, the types of LO seems to be heterogeneous. Research studies have shown that there are many different types of learning objects. However, they only follow informal classification based on experience and literature. Sicilia & Garcia (2003) noted that the types of learning objects can be classified by their structure, form of interaction, and granularity. E-learning professionals have structured the construction of objects based on four distinct types of learning modes, namely instruction, collaboration, practice, and assessment (Learning Circuits, 2005).

- Instruction objects - Explanations of theory are presented using objects like content, websites, events, activities, learner guides, etc.
- Collaboration objects - Learners discuss and share knowledge and new ideas using chat, e-mail, forums, discussion boards, etc.
- Practice objects – Opportunities are provided for learners to apply the knowledge acquired, such as role-play simulations, online labs, research projects, etc.
- Assessment objects - Learners can evaluate the depth of their acquired knowledge through pre-assessment, proficiency assessment, performance tests, and certification prep tests.

Assessment object (including self-assessment object) is comprised of try-yourself-questions that allow learners to assess their own understanding. Several assessment methods can be employed (e.g., identify mistakes in coding, fill in the correct statement, and match the correct statement) to help learners evoke semantics and the syntax of the programming language. Feedback is an important feature of the self-assessment object and enables learners to self-assess their acquired knowledge or skills (Haughey & Muirhead, 2005). When feedback is constructive and shows errors in the programming code that learners have produced, it can help them to recognize their misconceptions. Avoiding common errors or misconceptions is essential to improve comprehension (Mselle & Twaakyondo, 2012).

Learning programming is hard for first time learners (Ala-mukta, 2003). One of the reasons for this is the cognitive load in programming learning materials. Learners are bombarded with various textual and visual representations to learn the concepts of programming. These include the flow of control structure (e.g., for loop, while loop, and IF statements) and programming syntax and codes; as well as the key points and explanation, flowcharts, algorithms and/or pseudo code used to explain the concepts and programming codes. Another issue is that several programming concepts are often taught in a single lesson. Jenkins (2002) describes that programming classes are taught like a speeding train with no brakes. Therefore, it is rational to decompose lessons into several units to accomplish specific programming learning outcomes. Therefore, an SAO could be used to support each learning outcome. A single SAO includes several types of questions to help learners evaluate their understanding of both concepts and programming codes at the end of each lesson unit. A strong understanding of the concepts and related programming syntax and code is important for first time learners; before they can master programming writing itself. Self-assessing is one of the components of formative evaluation (Ramirez, 2010) and develops attributes and skills in learners to become resilient and self-motivating (Learning and Teaching Scotland, 2010).

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3. Methods

The participants of this study were one hundred and forty foundation in engineering students, enrolled in an Introduction to C programming course. Seventy (n=70) students were randomly assigned to a control group to use self-test question. Meanwhile, the other seventy (n=70) students were assigned to an experimental group to use self-assessment object at the end of each lesson.

3.1. Experimental procedure

A pre-test was administrated at the beginning of the experimental week. The pre-test consisted of ten multiple choice questions related to computer and programming terms and concepts. Six programming concepts (C integrated environment, variables and data types, operators, selection control structure, repetitive control structure, and array) were taught in three hour programming labs over seven teaching weeks. The programming lessons (concepts) were decomposed into several units and participants used STQ or SAO at the end of each lesson unit. For example, selection control structure was decomposed into six lesson units, as conditions, single IF, IF and ELSE, nested IF, linear nested IF, and non-linear nested IF. At the end of the experimental week, participants were requested to sit for a post-test; which consisted of thirty multiple choice questions related to C programming concepts, syntax, and codes. Participants' learning experience was measured using a Likert rating scale using the following five items; 1 - strongly disagree, 2 - disagree, 3 - uncertain, 4 - agree, and 5 - strongly agree. Table 1 shows the five items created to measure perceived relevance of self-assessment object and self-test questions.

Table 1.Perceived relevance of STQ and SAO.

code	item
C1	The self-test/self-assessment object helps to understand the lesson learnt.
C2	ılways finish the self-test ılways complete the self-assessment object
C3	I find the self-test/self-assessment object is an important learning activity.
C4	The self-test/self-assessment object helps me to recall the programming concepts and syntax.
C5	The solution for the self-test/self-assessment object is useful to show me my mistakes.

3.2. Experimental treatment

Fig. 1 shows the SAO screenshots for one of the programming concepts i.e., computer variables. The first task (question) was to arrange the programming codes to make a complete program. The second task was to find the correct syntax for variable declaration, and the third task was to find the syntax errors in a program. The self-test question consisted of the same type of questions and a solution sheet in print (see Fig. 2).

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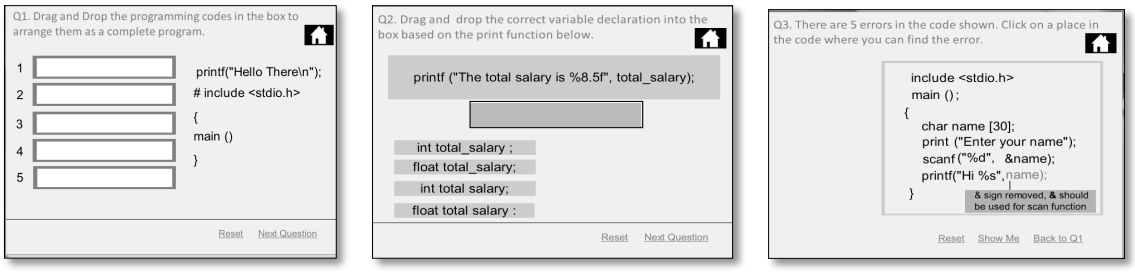


Fig. 1. Example of self-assessment object for concept of computer variables

Question 1: Arrange the programming codes to create a complete program.

1.

2.

3.

4.

5.

printf (“Hello There\n”);	#include <stdio.h>	{	main()	}

Question 2: Choose the correct syntax for variable declaration.

Variable	Syntax	
height	int height; [ ]	float height; [ ]
salary	int salary; [ ]	float salary; [ ]
Grade (i.e. 2)	char grade; [ ]	int grade; [ ]
id_no (i.e. R99345z)	char[10] id_no; [ ]	char id_no[10]; [ ]

Question 3: Rewrite the codes to avoid syntax error.

Int number; _____
int n1 n2 n3; _____
int a, float b ; _____
char gender _____

Fig. 2. Example of self-test questions for concept of computer variables

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4. Results and discussion

4.1. Participants profile

Data trimming was performed with respect to missing data in the pre-test and post-test scores. The final sample size was one hundred and three foundation in engineering students (control group n=53 and experimental group n=50). Seventy five percent of the participants were males and twenty five percent

were females. Eighty percent of the participants' in the control group (n=40) and 69% in the experimental group (n=36) were males. Ninety five percent of the participants were in the age range 17 to 19 years old.

4.2. Pretest and post-test performance

The total score for the pre-test was 10. The descriptive analysis for the control group and the experimental group in Table 1 shows that the level of prior programming knowledge was similar in both groups. Independent t-test results showed no significant difference in the pre-test mean score between both groups, $t(100) = -1.895$, $p > .05$. This result indicates that the participants in both groups were more or less on a similar level of prior programming knowledge.

Table 2. Descriptive results.

	Group	n	mean	SD	min score	max score	Equality of variance
pretest	Control	53	3.81	2.250	1	11	.912
	Experimental	50	4.66	2.237	0	11	
post-test	Control	53	6.23	2.228	1	10	.199
	Experimental	50	6.88	2.318	3	10	

The post-test mean score showed participants who used self-assessment object performed slightly better than those used self-test question. Independent t-test results showed no significant difference in post-test mean score between groups, $t(96) = .222$, $p > .05$. This result indicated that the self-test questions and assessment object were useful for learners to improve their programming declarative knowledge.

4.3. Survey results

Table 3 shows that participants highly appreciated that SAO (n=47, 94%) helped them to understand the programming lesson; compared to those using self-test questions (n=43, 81%). One of the possibilities for this is that the participants were unable to relate the usefulness of STQ to the programming learning context. Most of the participants in the control group agreed that they did not complete the self-test question at the end of the lesson (n=25, 47%); whereas satisfactory engagement with SAO was observed in the experimental group (n=39, 78%). Participants in both groups indicated that STQ (n=39, 74%) and SAO (n=41, 82%) was important to improving their programming declarative knowledge. A similar result was observed when participants were asked whether the STQ (n=39, 74%) or SAO (n=43, 86%) helped them to recall programming concepts and syntax. Participants who used SAO showed a higher positive response than those using STQ. The feedback used in SAO (n=41, 82%) and the solution to the self-test questions (n=42, 79%) was useful help them avoid misconceptions. Overall, uncertainty for all items was observed to be slightly higher in the control group than the experimental group. The survey results indicated that participant's appreciation was slightly higher towards SAO than STQ. Learners' engagement in an activity is important to promote better learning; this was more possible with SAO than STQ.

Table 3. Comparing self-test questions with self-assessment object.

Item code	Group	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
C1	Control (n=53)	15	28	8	2	-
		28%	53%	15%	4%	
	Experimental (n=50)	16	31	3	-	-
		32%	62%	6%		
C2	Control (n=53)	10	15	25	3	-
		19%	28%	47%	6%	
	Experimental (n=50)	15	24	9	2	-

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		30%	48%	18%	4%	
C3	Control (n=53)	10	29	11	2	1
		19%	55%	21%	4%	2%
	Experimental (n=50)	14	27	9	-	-
		28%	54%	18%		
C4	Control (n=53)	10	29	13	1	-
		19%	55%	25%	2%	
	Experimental (n=50)	14	29	7	-	-
		28%	58%	14%		
C5	Control (n=53)	15	27	9	2	-
		28%	51%	17%	4%	
	Experimental (n=50)	13	28	9	-	-
		26%	56%	18%		

Learning from feedback is important to overcome misconceptions and improve learning (Juwah, Macfarlane-Dick, Matthew, Nicol, Ross, & Smith, 2004). The type of questions used in both self-test question sheets and self-assessment objects facilitated learning. The solutions to the self-test questions and the feedback on the self-assessment object were relatively important features for learners to identify their misconceptions. Johan & Bull (2009) suggested that detailed information about misconceptions assist programming leaners in recognising learning difficulties and enables reconstruction of correct conception. This study supports the fact that knowing common or possible programming errors is essential for novices. Furthermore, reflective questions on programming syntax and respective codes, by means of constructive feedback or solutions, would also be useful for novices.

5. Conclusion

This study examined the usefulness of Self-Test Question (STQ) with solutions and Self-Assessment Object (SAO) with feedback to help novice leaners identify common (or possible) programming errors. Comparatively, STQ and SAO facilitated learning to improve programming declarative knowledge. The type of question used in STQ and SAO also contributed to assisting learners identify their learning misconceptions. STQ with solution used in a typical programming learning environment and SAO with a feedback feature is commonly used in a blended learning environment. The survey results of this study indicate that learners prefer SAO compared to STQ. One of the possible reasons for this is that today's modern students prefer the integration of IT in their learning context. The post-test results and the supporting survey results suggest that SAO is useful in current programming learning environments. Collectively, this study suggests that by using SAO, it is possible to reduce cognitive overload in a programming learning environment.

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Comparing instructors' and students' perceptions towards CALL in higher education

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Abstract

The purpose of this study is to analyse and compare the faculty members' and students' perceptions of a specific web-based instruction tool in a private higher education institute in Kuwait. 10 faculty members were interviewed and 66 undergraduate students filled in a survey regarding their opinions about the program. The questions posed to the faculty members and students aimed at seeking responses about faculty members' perceptions related to the strengths and weaknesses of the program, and opinions about the contribution to student learning. The analyses of the data reveal that participants, both faculty members and students have positive views towards the CALL experience. Instructors think CALL motivates students, adds variety to class, however, it also makes them question their role in the classroom, and also aggravates the already existing plagiarism problem among students. The analyses also show that most students enjoy using the program. Some disadvantages expressed by students are the workload, difficult questions and long, boring articles. Overall, students think the online program has contributed to their English skills.

Keywords: CALL; higher education; perceptions

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1. Introduction

For language teachers maintaining student attention is a challenge, and computer assisted language learning (CALL) offers new opportunities for supporting teachers to overcome this challenge. CALL can invigorate students (Lee, 2000), and offer some benefits such as the lessening the costs in the long run, and amplified opportunities for access to countless sources of information, increased opportunities for communication and personalization of the teaching process (Jorge, Jorge, Gutiérrez, García & Díaz, 2003). By using authentic materials with visuals and computer graphics, learning is not constrained in time and space. Learners are offered opportunities to communicate and learn collaboratively regardless of time and location through the internet. Students show an improved sense of achievement and interest in independent learning, with the ability to communicate and conduct research efficiently beyond the boundaries of the class (Shetzer & Warschauer, 2000).

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Recent studies have shown that the rewarding employment of educational technologies rest on the attitudes of educators, who determine how CALL is used in the classroom. Bullock (2004) found that teachers' attitudes are a major enabling and disabling factor in the implementation of technology. Similarly, Kersaint, Horton, Stohl, and Garofalo (2003) found that teachers who have positive attitudes toward technology feel more relaxed using it and usually incorporate it into their instruction. Internet based instruction can be effective only with the teacher's role as a "facilitator" who plans, designs and monitors the lesson (Brandl, 2002). In addition, scientists have also recognized the prominence of student attitudes in well-organized incorporation of ICT, and conducted research that focuses on students' attitudes towards learning language with computers. Students who see CALL as an important part of the course will also have high motivation and perceive CALL work as relevant to their needs. Therefore it seems that attitudes towards technology can serve as an alternative way to measure the efficiency of technology in the classroom, and to evaluate the effectiveness of CALL students' as well as instructors' attitudes should be considered.

For that purpose, 10 faculty members were interviewed and asked about their perspectives of the online program. Also 66 students who have used the program were questionnaires to express their opinions about the program. The questions have been designed to seek responses about faculty members' perceptions of using the branded program in EAP practice, perceptions related to the strengths and weaknesses of the program, opinions about the contribution to student learning. The objectives of the research could be summarized as finding out student and faculty perspectives of the CALL tool and to compare their perspectives.

2. Method

This study has used qualitative research methods. Within the scope of the research, in-depth interviews with semi-structured questions were conducted in order to obtain faculty views and perspectives about the commercial online tool. Apart from that, students were given questionnaires consisting of open ended questions regarding their perceptions on the program. The population of the study consists of all of the 10, 5 male and 5 female academics who used this program in 2013-2014 Fall term in the English department of a private Kuwaiti university, and 66 undergraduate students who used the program in the same term.

2.1. *Data collection tool*

10 participants were interviewed on their perspectives of the online instruction tool and asked various questions. Literature and expert opinion were consulted with in the preparation of these questions. For the purpose of the research problem, the open-ended questions posed to the participants are as follows:

1. What are your perceptions of the strengths (or advantages) of the program?
2. What are your perceptions of the weaknesses (or disadvantages) of the program?
3. Do you feel the program has contributed to your (students') English skills?

2.2. Data analysis

Audio recordings of faculty members were transcribed and converted into typed text. Interviews were analysed by "categorical analysis". The raw data was converted into codes and categories. In this context, a

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paragraph that expresses a complete opinion was specified as the unit of analysis. Qualitative research findings and their interpretation were created by analysing the views of participants under certain categories.

Student papers were anonymous, no names or identifying details were written on them. Content analysis was carried out on documents. The documents were "categorically analysed" and student responses were reduced to meaningful units, such as a word, a phrase, or a sentence. Words and phrases reflecting attitudes were identified and underlined. Qualitative research findings and their interpretation were created by analysing the views of participants under certain categories.

3. Findings

3.1. Findings related to perceptions of the program's advantages

Table 1 shows the faculty perceptions related to the advantages of the program.

Table 1. Faculty perceptions regarding the program's advantages

Advantages	Frequency
More motivating than conventional methods /students do more work	7
Differentiated instruction	6
Easy and flexible access to information / valuable database	4
Students are exposed to different types of exercises	4
Ease of making lesson plans/filing and sharing info	3

When asked the same question, students responded in a similar way. Table 2 shows that the most frequent advantages as perceived by students.

Table 2. Student perceptions regarding the program's advantages

Advantages	Frequency
Interesting and educational articles on various topics	25
Improving language skills	16
Independent learning / Freedom and flexibility	14
Multiple-choice questions	4

Students thought access to a rich database of articles on interesting topics was the greatest strength of the program. Textbooks or course books may have a wide array of reading texts but the options that students

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have in an online program is beyond comparison to the richest textbooks and the modern age students seem to be appreciating this aspect of ICT. Students tend to value the contribution of the program to their language skills, as well.

Although the program is mostly based on reading articles, students perceived the online program as contributing to multiple skills, including writing and vocabulary.

Following these two most frequently expressed advantages, freedom and independent learning was expressed as another advantage. The program allows students to work on any topic they like by using the search option, gives them the independence to read the text and answer the questions at their own pace. In addition, when they miss the class, they can still follow it by participating in the activity as not everything has to be limited to class time. Students have the chance to complete the work outside the class and they can use any device that will allow them to access to the internet. Students considered these options as independent learning and obviously appreciated them.

The advantages perceived by students and faculty show similarities as both groups agree on the richness of the database and they find reading texts quite educational and interesting. Likewise, easy access to information as perceived by faculty and independent learning, as perceived by students are similar concepts in that both concepts refer to the freedom of using the program regardless of the location and time. Faculty think students more work, which in turn improves language skills, as perceived by students. Students feel they are learning from the program as they are required to do quite a lot of work.

The only difference in advantages as perceived by two groups is differentiated instruction. Students do not consider this an advantage, in fact, some have even complained about the difficulty of the reading texts increasing in time. Students may not be aware of the fact that they receive articles tailored for their reading proficiency and faculty members should try to explain the rationale behind the difference in reading texts they receive.

3.2. Findings related to perceptions of the program's disadvantages

Table 3. Faculty perceptions regarding the program's disadvantages

Disadvantages	Frequency
Grading/technical difficulties	6
Plagiarism/Open to manipulation	6
Topics/types of articles	5
Teacher's role/ Management of the course	5
Failing to contribute in some skills	4

Table 4. Student perceptions regarding the program's disadvantages

Disadvantages	Frequency
Workload (the number of articles and questions in total)	14
Difficult questions	12
Scoring / grading issues	7

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Long and boring articles (lacking variety)	6
Technical problems (internet access, connection issues etc.)	4

The comparison of faculty and student responses reveals that workload is the biggest disadvantage of the program for both students and faculty members. For students, reaching the target poses a challenge whereas for faculty members this target represents grading difficulty. Students end up reading and writing more than they would do in a paper-pen class and instructors end up grading thousands of paragraphs, essays and calculating the averages for final grades. It is strange that both groups agree on the workload as it is generally students who make complaints on this issue. This points out to the fact that the number of reading texts students are required to do in a term should be revised.

Lacking variety or boring topics are also common concerns for both groups. Technical flaws of the program are also experienced by two groups. Whether the website has a weak technical structure or the university should strengthen its infrastructure is beyond the limits of this paper, however, constant problems experienced during the use of the program will definitely put students off using it.

Plagiarism is not considered a problem by students whereas for faculty members, it is a major concern. This could be a solution found by some students to alleviate the workload, which does not annoy their peers.

In conclusion, disadvantages or weaknesses of the program as perceived by faculty members and students show similarities, excluding the perception of plagiarism.

3.3. Findings related to participants' perceptions regarding students' feedback

Table 5. Faculty perceptions regarding the contribution to student learning

Skills	Frequency
Reading	6
Writing	5
Vocabulary	3
Not sure	3

Table 6. Student perceptions regarding the contribution to own learning

Skills	Frequency
Reading	25
Vocabulary	23
Writing	15
Other skills	4
No contribution	3

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Students and faculty members have similar viewpoints regarding the contribution of the program on their language skills. Both faculty members and students think the major contribution is in reading. The contribution in writing is the second major according to faculty members, however for students, it follows vocabulary. Among both students and faculty members, few of them think the program failed to make a contribution.

4. Discussion and Conclusion

According to user perceptions, the major strengths of the program lie within its motivating factor, its differentiated instruction, and contributing to student learning by exposing them to a variety of activities that would be difficult to pool and find materials for in a traditional class. An increase in motivation has been mentioned and established in many other studies that have been carried out in various settings. There seems to be a general consensus among teachers and students, and they mostly feel the use of ICT greatly contributes to motivation for learning. Students indeed find it more appealing to learn with computers than with traditional means (Bullock, 2001).

Differentiated instruction has been expressed by faculty members as one of the foremost strengths of the program. Differentiated instruction (DI) can be demarcated as a adjustment of the curriculum that empowers all students to learn (Theroux, 2004). Differentiated instruction is specifically useful for English language learners. English language learners (ELL) largely participate in general education programme and assessment and when students of with different traditions and linguistic qualifications are included in traditional classrooms, teachers face a problem (Stanford and Reeves, 2009, p. 3). Research that has been carried out on DI suggests that through differentiated instruction and activities, students take a greater accountability and own their own learning through activities that principally focus on students' multiple intelligences, higher-order thinking, and learning styles. DI helps students with different proficiency levels get engaged in the material (Bailey & Williams-Black, 2008).This feature of the program is valued by the faculty members because they do not have to go through the effort of abridging the content. However, students do not seem to be enjoying this feature of the program. The reason why students do not seem to appreciate this feature may be because of the difficulty level of the reading texts and the misperception that weaker students get easy texts. With this in mind, faculty members should clarify the foundations of the DI to their students and make sure students do not feel cheated when they are placed into a higher level by the program. Instead they should feel they are better than some of their peers and being placed into their correct levels will help them progress further.

Participant perceptions regarding the program's weaknesses list some grading difficulties and technical problems they experience while using the program as ICT tool's number one weakness. Indeed, integration of ICT in the classroom is not a perfect one. Jones's study points out seven major barriers in this process and 'facing technical problems' was mentioned by 13% of participants and listed as the fifth barrier in the study. Another similar study carried out on the barriers revealed "lack of adequate technical support" as one of the issues teachers face during incorporation of ICT with %39.2 of the participants (Samuel & Zaitun, 2007, p. 2). The grading load, as mentioned by the participants in this study could be associated with time pressures both outside and during class, and the technical shortcomings could be linked to lack of support or recognition for integrating computers; and inadequate training and technical support, as described in many other studies carried out by various researchers (Bordbar, 2010, p. 33). The World Bank Group report on the use of ICT in education also state that introducing and using ICTs to support teaching and learning is time consuming for teachers, teaching with ICTs takes more time, roughly 10% extra time is necessary to cover the same material. Another point the report touches upon is that the functioning technical infrastructure is critical and teachers and students alike must have adequate access to functioning computers, and be provided with adequate technical support, if they are to use ICTs effectively (Trucano, 2005).

The second weakness of the ICT tool was considered to be plagiarism by faculty members. Participants raised their concerns about students manipulating the placement test at the beginning of the term, copying and pasting internet sources or other students' responses for writing questions and even hiring others to do the homework for them. It is not unusual that this problem was not mentioned by students at all as they are not at the receiving end of the issue. With the development of information and communication technology, plagiarism has become a serious problem in the academic community. According to the

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studies, plagiarism rates among students are quite high and students mostly ignore or allow plagiarism because of a lack of knowledge, lack of consequences, or simply because ICT makes plagiarism easy to commit. Over 70% of students reported that they used the internet as the main source of plagiarism and that the main reasons for committing plagiarism were easy and unidentified access to the internet, time restrictions, procrastination, unproductive work management and work overload (Pupovac, Bilic-Zulle & Petrovecki, 2008). It is suggested that easily reachable information on the internet, the development of IT and the simple copy/paste command facilitate plagiarism. However, rather than holding ICT responsible for plagiarism, academics should form ethical relationships and academic merits to endorse an intellectual community. Attempts at eradicating academic misconduct and gratifying creativity and real acquirement of knowledge in universities and schools will contribute to achieving this goal.

Participant perceptions reveal that the management of the course is a problem area and also some users have trouble adjusting to the new role in an ICT class. Interestingly, students have not made any comments on the management of the course or the instructor's role in the classroom. They generally seem to be enjoying the newly found freedom in the class and being able to choose their own articles. This should tell the faculty members that there is nothing wrong with being a facilitator in the classroom and as long as they plan the lesson carefully, students will focus on the work in the class and enjoy independent learning. In this regard, many experts emphasize continuous training as essential to teacher development, and a slow approach, expecting teachers to take around three to five years to familiarize themselves with new technologies and related pedagogies. Similarly, partnership between the institute and private software developers is seen as effective in assuring educational software remains locally applicable to specific curricular objectives, both of which are important for encouraging teachers to make use of available ICT (Haddad & Rennie, 2005).

Currently there is great debate about how teachers should adapt current teaching skills and practice to accommodate the introduction of ICT, whether teachers are becoming redundant as a consequence of the use of ICT in education or whether a teacher-less classroom is likely. In fact, new educational technologies do not curb the need for teachers but they call for a redefinition of their profession. This redefinition elaborates on teaching methodology, assessment of learning, student supervision, communication, and evaluation. Most critically, the question of the extent to which teachers abandon control and let learners drive their own learning may create an obstacle in the adoption of ICT in the classroom (Wheeler, 2000). The roles of teachers have changed and continue to change to constructors, facilitators, coaches, and inventors of learning environments.

In conclusion, there is a noticeable similarity between faculty members and students perceptions regarding the use of CALL in writing classes. An increase in motivation as noticed by faculty members is true, as also expressed by students themselves. Students feel their language skills improved, which is also mentioned by their instructors, as documented in progress reports. Both students and faculty members noticed an improvement in reading skills.

Use of computer and internet technologies in the classroom seems to be creating a positive learning environment in freshman courses, but administrators should closely monitor student and faculty member perceptions regarding the use of the program and conduct needs analysis to ensure a smooth implementation of CALL. Teachers who have concerns regarding their roles in the classroom should be given in service training by the developers of the software and more senior users of the program. Further research is needed to assess the solid contribution of the program in achieving student learning outcomes.

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Comparison of the ICT literacy level of the Mexican and Hungarian students in the higher education

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Abstract

Communication and technology have an important role in life and especially in education. Nowadays, students generally use technology for communication. When using technology in education, there may be some communication barriers. In this research, it is studied about communication barriers that prevent teachers' candidates to use technology. The aim of this research is to find the communication barriers which teachers' candidates face when they utilize technology. First of all we have to see the ICT knowledge level of the students to make decision about the application and retraining methods. It is important to know can we find any difference in ICT literacy between the Hungarian and the Mexican students. We measured the ICT literacy level with a tool consisting of 15 items (Likert scaled. We worked with 720 students. The data analysis was performed with SPSS software using descriptive statistics and Mann-Whitney test. ICT literacy comparison has showed significant differences by countries, the Mexican students ICT literacy was on higher level (self-report) except by using learning platforms.

Keywords: ICT; knowledge; literacy; comparison; higher education; method; different; Hungary; Mexico

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1. Introduction

The aim of this research is to find the communication barriers which teachers' candidates face when they utilize technology. First of all we have to see the ICT knowledge level of the students to make decision about the application and retraining methods. It is important to know can we find any difference in ICT literacy between the Hungarian and the Mexican students to see how long is the way to finish the ICT revolution in these countries. On the other hand is it important to see which topic need more attention from the teachers in the high school to give a good knowledge for the student before they go in the higher education.

Some earlier research analyzed the ICT literacy of the students in Hungary on different levels (Kiss, 2009), (Kiss, 2010a), (Kiss, 2011a), (Kiss, 2011b). The current research analyses the ICT literacy level of the Mexican and Hungarian students in Higher Education.

2. Information technology education in Hungary

IT education is based on a national curriculum in Hungary (Ministry, E. H, 2003). According to the National Basic Curriculum (NBC) of Hungary the use of IT is to be demonstrated in the first four school grades since 2003 (e.g. search on the Internet, painting with computers etc.) and is taught in 1 class week-

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ly. According to the Information Technology curriculum the following subjects are taught from the 5th grade to the 12th grade at the schools of Hungary in 2 classes weekly:

- Word processing
- Spreadsheet calculation
- Presentation
- Algorithm and programming
- Database management

Generally the Microsoft Office packet is taught and it can be seen that teaching Word processing takes 4 years in Hungary (Table 1). Basic algorithms or rather programming appears in Information Technology sooner, but recursion, list and tree data structures are only selectable part of the curriculum. Database management begins in the 9th grade. In grades 11-12 CS is just selectable. At basic level it is taught 2 hours weekly, on a higher level 3 hours weekly and a final exam can be taken.

Table 1. The subject of IT by grades in Hungary.

Subject	Grade							
	5.	6.	7.	8.	9.	10.	11.	12.
Word processing		✔	✔	✔	✔			
Spreadsheet calculation				✔	✔			
Presentation						✔		
Algorithm and programming			✔	✔	✔			
Database management					✔			

3. Information technology education in Mexico

The primary education is six years in length and runs from grade one through grade six and the content based on the national curriculum while the National Institute for Assessment of Education but not include Information Technology as subject in education.

The lower secondary education is three years in length and runs from grade seven through grade nine. The students follow either an academic track or a technical track but not include Information Technology as subject in education.

Upper secondary education is a further three years in length, after three years of lower secondary, and runs from grade 10 to grade 12 and it is the first level where ICT appear in official education form. In the general secondary school are 6 hours per month for Computer Science on the academic track and 3 hours per month for ICT on technical track.

4. Analyzing students' ICT literacy level

The purpose of this study is to compare the ICT literacy level of students from Mexican and Hungarian universities.

The number of participants: The sample consisted of 720 students, 302 Mexican and 418 Hungarian students (Table 2.).

Table 2. The number of participants by gender and country

	Male	Female	Total
Mexican	151	151	302
Hungarian	342	76	418

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Total	493	227	720

The students filled out a self-reported questionnaire with 15 items (Table 3). We have used Likert-type rating scales to measure the ICT literacy level of students (Likert, 1932).

Table 3. ICT literacy level items

Number of item	Item
1	Handling Operating System (OS)
2	Word processor
3	Spreadsheet
4	Database Management
5	Multimedia
6	Software specific to my degree
7	Using documentary bases (Such as EBSCO)
8	Web Browsing
9	Internet Communication
10	Internet Safety
11	Website design
12	Using learning platforms
13	Image Editing
14	Video Editing
15	Creating simulations and animations

Liker scales are commonly used by self-reported questionnaire, providing a range of responses to a given question or statement (Jamieson, 2004). There were 4 categories of response : 1 = basic level; 2 = medium; 3 = advanced, 4 = „master".

The reliability of the questionnaire obtained by the technique of Cronbach-α was 0.914 it means the reliability of the questionnaire is very good.

4.1. The results of independent samples mann-whitney u test

The Likert scale is ordinary scale, and as such we can calculate mean, min, max, median, modus, std. dev. etc. We can use the nonparametic tests where we need ordinary variables. We have two independent samples so we could use the Mann-Whitney-Wilcoxon test for 2 samples [14]. The Mann-Whitney-Wilcoxon test seems better choice versus t test by Likert-type data [15], because it is testing the medians of the samples.

We used the Mann-Whitney independent sample U test of SPSS to compare the means of scores taken by the students. Monitoring was held on p=5% significancy level in the whole analyzing process.

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We used 3 different ways of comparison: by countries, by gender and by gender in Hungary or in Mexico

Table 4. The results of Independent Samples Mann-Whitney U test by countries

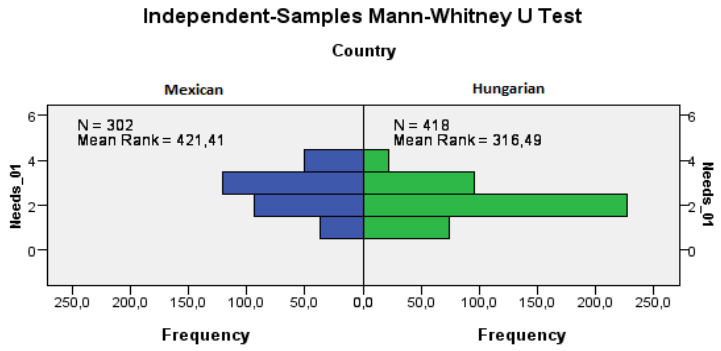
Number of item	Item	Mexican (Mean score)	Hungarian (Mean score)	p
1	Handling Operating System (OS)	2,61	2,16	0,000
2	Word processor	2,76	2,41	0,000
3	Spreadsheet	2,50	1,98	0,000
4	Database Management	2,33	1,57	0,000
5	Multimedia	2,53	2,08	0,000
6	Software specific to my degree	2,17	1,61	0,000
7	Using documentary bases (Such as EBSCO)	2,31	1,51	0,000
8	Web Browsing	3,01	2,82	0,000
9	Internet Communication	2,90	2,73	0,002
10	Internet Safety	2,52	1,96	0,000
11	Website design	2,30	1,46	0,000
12	**Using learning platforms**	**2,22**	**2,15**	**0,250**
13	Image Editing	2,40	2,04	0,000
14	Video Editing	2,21	1,60	0,000
15	Creating simulations and animations	2,31	1,29	0,000

4.1.1. The results of independent samples mann-whitney u test by countries

If we summarize the scores of all items and make the comparison we can see the ICT literacy lever of students by countries. The result of Mann-Whitney U test on the total scores has shown significant difference between the 2 group of students by ICT literacy, p=0.000.

We calculated the mean scores by items and also calculated the difference between them grouped by countries. Then we can made analysis process with Mann-Whitney U test (Table 4.).

According to the table we can find lot of significant differences just by one item can we recognize same result (Item 12th: "Using learning platforms.") in other cases the subjective ICT literacy level of Mexican and Hungarian students is different. Same examples show the frequency of the scores by different items (Fig. 1., Fig. 2, Fig.3.).



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Fig. 1. Handling Operating System (OS)

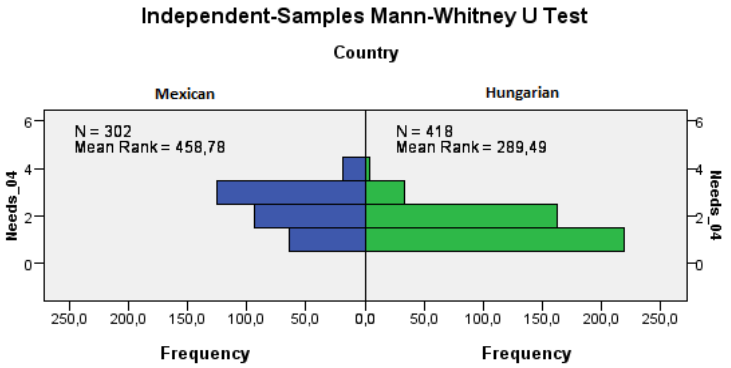


Fig. 2. Database management

According to the figures we can see the scores of the students from different countries; we can see that the subjective ICT literacy level of Mexican students is higher than the Hungarian students.

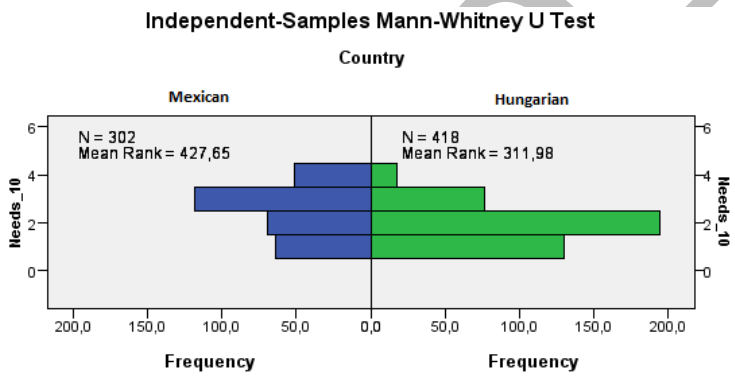


Fig. 3. Internet safety

4.1.2. The results of independent samples mann-whitney u test by genders

We calculated the mean scores by items and also calculated the difference between them grouped by genders. Then we can made analysis process with Mann-Whitney U test by boys (Table 5.) and girls (Table 6.).

Table 5. The results of Independent Samples Mann-Whitney U test by boys

Number of item	Item	Mexican boys (Mean score)	Hungarian boys (Mean score)	p
1	Handling Operating System (OS)	2,52	2,20	0,000
2	Word processor	2,71	2,40	0,001
3	Spreadsheet	2,48	1,98	0,000
4	Database Management	2,37	1,56	0,000
5	Multimedia	2,48	2,13	0,000
6	Software specific to my degree	2,16	1,67	0,000

7	Using documentary bases (Such as EBSCO)	2,36	1,52	0,000
8	Web Browsing	2,99	2,83	0,000
9	**Internet Communication**	**2,83**	**2,72**	**0,079**
10	Internet Safety	2,47	1,95	0,000
11	Website design	2,31	1,45	0,000
12	**Using learning platforms**	**2,21**	**2,10**	**0,153**
13	Image Editing	2,38	1,98	0,000
14	Video Editing	2,19	1,59	0,000
15	Creating simulations and animations	2,27	1,28	0,000

According to the table (Table 5.) we can find significant differences by the big part of items just by two items can we recognize same result (Item 9th: "Internet Communication.", Item 12th: "Using learning platforms.") in other cases the subjective ICT literacy level of Mexican boys is higher as the Hungarian boys in the higher education.

Table 6. The results of Independent Samples Mann-Whitney U test by girls

Number of item	Item	Mexican girls (Mean score)	Hungarian girls (Mean score)	p
1	Handling Operating System (OS)	2,70	1,96	0,000
2	Word processor	2,81	2,47	0,007
3	Spreadsheet	2,52	1,97	0,000
4	Database Management	2,28	1,64	0,000
5	Multimedia	2,57	1,88	0,000
6	Software specific to my degree	2,18	1,33	0,000
7	Using documentary bases (Such as EBSCO)	2,25	1,47	0,000
8	Web Browsing	3,03	2,76	0,028
9	**Internet Communication**	**2,97**	**2,78**	**0,087**
10	Internet Safety	2,56	1,99	0,000
11	Website design	2,30	1,51	0,000
12	**Using learning platforms**	**2,23**	**2,38**	**0,316**
13	**Image Editing**	**2,42**	**2,28**	**0,340**
14	Video Editing	2,23	1,62	0,000
15	Creating simulations and animations	2,36	1,37	0,000

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According to the table (Table 6.) we can find significant differences by the big part of items just by three items can we recognize same result (Item 9th: "Internet Communication.", Item 12th: "Using learning platforms.", Item 13th: "Image Editing.") in other cases the subjective ICT literacy level of Mexican girls is higher as the Hungarian girls in the higher education.

4.1.3. The results of independent samples mann-whitney u test by gender in Mexico

We calculated the mean scores by items and also calculated the difference between the students grouped by genders in Mexico.

Then we can made analysis process with Mann-Whitney U test by gender (Table 7.).

Table 7. The results of Independent Samples Mann-Whitney U test by gender in Mexico

Number of item	Item	Mexican girls (Mean score)	Mexican boys (Mean score)	p
1	Handling Operating System (OS)	2,70	2,52	0,073
2	Word processor	2,81	2,71	0,427
3	Spreadsheet	2,52	2,48	0,751
4	Database Management	2,28	2,37	0,314
5	Multimedia	2,57	2,48	0,428
6	Software specific to my degree	2,18	2,16	0,870
7	Using documentary bases (Such as EBSCO)	2,25	2,36	0,309
8	Web Browsing	3,03	2,99	0,651
9	Internet Communication	2,97	2,83	0,192
10	Internet Safety	2,56	2,47	0,370
11	Website design	2,30	2,31	0,925
12	Using learning platforms	2,23	2,21	0,908
13	Image Editing	2,42	2,38	0,811
14	Video Editing	2,23	2,19	0,846
15	Creating simulations and animations	2,36	2,27	0,530

According to the table (Table 7.) we can not find any significant differences in the subjective ICT literacy level of Mexican girls and boys. It means the Mexican girls and boys have same subjective ICT literacy level in the higher education.

The situation is not so clear in Hungary. According to the table (Table 8.) we can see that the subjective ICT literacy level of Hungarian girls is higher by Item 12th :"Using learning platforms" and Item 13th: "Image editing" in the higher education.

On other hand the subjective ICT literacy level of Hungarian boys is higher by Item 1st: "Handling Operating System (OS)", Item 5th: "Multimedia" and Item 6th: "Software specific to my degree". It means the girls

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have found the way to use the ICT by learning to be more successful by exams at universities (Kiss, 2010b) and they are more creative by image editing.

The boys enjoy same advantage in higher education like in the secondary grammar schools in Hungary (Kiss, 2010c). They are more successful by find the deeper secret of operating systems, using different multimedia tools and software connection with the learning strategy in the higher education.

Table 8. The results of Independent Samples Mann-Whitney U test by gender in Hungary

Number of item	Item	Hungarian girls (Mean score)	Hungarian boys (Mean score)	p
1	**Handling Operating System (OS)**	**1,96**	**2,20**	**0,021**
2	Word processor	2,47	2,40	0,591
3	Spreadsheet	1,97	1,98	0,759
4	Database Management	1,64	1,56	0,341
5	**Multimedia**	**1,88**	**2,13**	**0,017**
6	**Software specific to my degree**	**1,33**	**1,67**	**0,001**
7	Using documentary bases (Such as EBSCO)	1,47	1,52	0,638
8	Web Browsing	2,76	2,83	0,653
9	Internet Communication	2,78	2,72	0,486
10	Internet Safety	1,99	1,95	0,786
11	Website design	1,51	1,45	0,574
12	**Using learning platforms**	**2,38**	**2,10**	**0,019**
13	**Image Editing**	**2,28**	**1,98**	**0,015**
14	Video Editing	1,62	1,59	0,998
15	Creating simulations and animations	1,37	1,28	0,397

5. Conclusion

In this research we have tried to analyze the subjective ICT literacy level of the Mexican and Hungarian students in the higher education. We have used a self-reported questionnaire with 15 items (Table 3) and Likert-type rating.

After the analyzing process we can say the subjective ICT literacy level of Mexican students is higher than Hungarian students.

We have made more analysis by gender by countries. In the following we share the important information connection with it.

We have found significant differences by boys by all items except two items (Item 9th: "Internet Communication.", Item 12th: "Using learning platforms."). It means the subjective ICT literacy level of Mexican boys is higher as the Hungarian boys in the higher education except by using Internet as communication platform and ICT tools by learning process.

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The results by girls are almost same. We could find significant differences by the items except three items (Item 9th: "Internet Communication.", Item 12th: "Using learning platforms.", Item 13th: "Image Editing.") It shows the subjective ICT literacy level of Mexican girls is higher as the Hungarian girls in the higher education except by using Internet as communication platform, ICT tools by learning process and image editing where the subjective knowledge level is same.

We made the analysis by gender in countries too and we have not found any significant differences in the subjective ICT literacy level between the Mexican girls and boys the subjective knowledge level by gender is same in Mexico in the higher education.

The situation was different in Hungary. The Hungarian girls have higher subjective knowledge level by using ICT tools until the learning process. It means the girls have found the way to use the ICT by learning to be more successful by exams at universities and they are more creative by image editing.

On other hand the subjective ICT literacy level of Hungarian boys is higher by Item 1st: "Handling Operating System (OS)", Item 5th: "Multimedia" and Item 6th: "Software specific to my degree" so they are more successful by find the deeper secret of operating systems, using different multimedia tools and software connection with the learning strategy in the higher education.

6. Future work

In this research we have concentrated on the subjective ICT literacy level of Mexican and Hungarian students in the higher education. In the following process would be important to see the really ICT knowledge level of the students in this countries. We could use the same tool what we used by analyzing the ICT knowledge level in Hungary and Slovakia earlier. We need to translate the questions in Spanish and share with the students in Mexico.

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Computer Assisted Training on Mathematics Lesson for the 6th Grade Students on Azerbaijan Middle Schools

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stract

this study constituting a computer program was taken as basic for in Azerbaijan secondary schools 6th class students derstanding Math and personal development Computer program was prepared in HTML language. As Website, it was bro o a useful form for whole students in all school. Website contains whole subjects of 6th class Math book. e students login and choose the subject and learn. After than solve the problems about with subject. After the ·agraphs containing some subjects 15 exam questions were put for the students check himself. After solving this problem, nputer program evaluate student's knowledge 5 grades. is evoking big concern in the students was present to Ministry of Education for it was used in whole at schools in Azerbaijan.

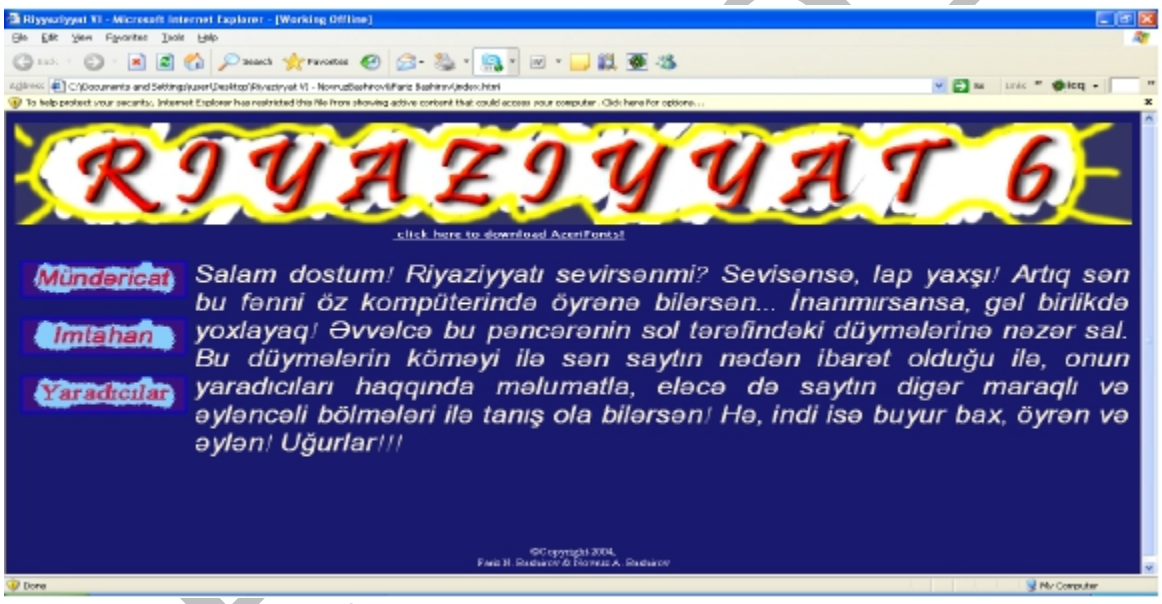
words: computer programs, math, education, website;

Main text

our modern world, computers are used as education tools where various new technologies are used together and ey present very important, creativity and productivity increasing opportunities both in the public and in the ivate sector [Dr. İsmail İpek., 2001].

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Computer based education is a modern education style used in education environments where the t eacher is
included too. The computers have characteristics of educating with activities like presenting the lesson contents,
repeating when necessary, problem solving, exercising etc. Therefore, the point of question is using the sit es which
are prepared with the purpose of education on the computer based education.
As mentioned before, according to the researches, using computer on the education process provides st udents to
develop thinking abilities, and at the same time increase their success level. In addition to this, compute rs create
positive effects on the attitudes of students towards lessons and learning [Gibbobs, A. S., & Fairweather, P. G., 1998].



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Fig. 1. Main page of the site

r this reason, a computer program has been created by us with the purpose of making the mathematics education sier for the 6th grade students in the Azerbaijani schools; arouse interest for science, to ease the teacher struggle ıich is very hard. This computer program has been prepared in the site format with the HTML language and fully vered the mathematics lesson content for the 6th grade. As the program had been prepared in terms of a site, it can sily be given to all of the schools in Azerbaijan with internet and houses using internet. That is why students can ırn mathematics easily and profoundly either at school or in their own house. The main page of this course which named as "Mathematics 6" is shown on Fig. 1.

4 different buttons have been placed to this page. Three of those take place on the left side of the page. ose are the buttons of "Mündericat" (Contents), "İmtahan" (Exam) and "Yaratıcılar" (Site Creators). The fourth tton is the button of "Click here to download AzeriFonts" written in English with lower case after the iyazziyyat 6" (Mathematics 6) subject on top and the middle of the page. There might not be AzeriFonts (the ters of Azerbaijan alphabet) in each computer. For this reason, the alphabets of AzeriFonts have been copied to e file where this program is written and recorded. When the site is opened, even if the writings cannot be read operly, when clicking to the "Click here to download AzeriFonts" button, the writings in the main page are

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e mathematics? If you like, you can learn it in your own computer very easily. If you don't believe, come and see ogether. First of all, look at the buttons on the left side of this page. With the help of those buttons, you an see e contents of the site and you can find information about its creators. At the same time, you can also meet with ıer interesting parts of the site. Now take a look. Learn and have fun. We wish you success!!!"

When we click to the "Mündericat" (Contents) button in the main page of the site, "Mündericat" is ened in a new page. Here, you can find all of the subjects that take place in the 6th Grade Mathematics school ok. If we click on any subject with mouse, the explanation of the subject will be immediately coming to the mputer screen (Fig. 2).

provided to be read Azerbaijani. Then the students can read this text written in the page. "Hello, friend! Do you

2. The contents page

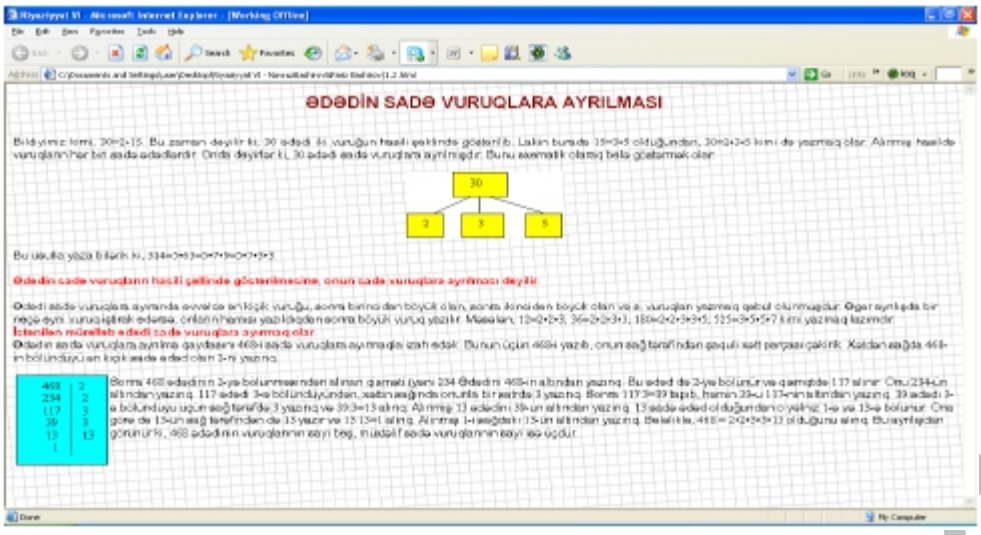


Fig. 3. The subject of simple and complex numbers

hen we click to the subject “Prime factorization of numbers, GCD and LCM” that take place in “Mündericat” with ouse, the page indicated in shape 3 is opened. The numbers are shown in the upper line of this table in here, and in

e numbers that have only 2 dividers are shown in red color. Those numbers which have the number of prime viders as 2 are also primal themselves. The dividers of other numbers are shown in black color. Those numbers are mplex numbers (Fig. 3).

the bottom line, the number of the prime factors that divides them are shown. Here, the numbers of prime dividers of

Fig. 4. The subject of prime factorization of numbers

this page, at the same time in the entire site, the rules are given in the red color. When this site was prepared, the

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quests of the 6th Grade students of that time have been taken into consideration.

After each lecturing given in the site, the solutions of various questions about that subject takes place. The estion solutions for the GCD and LCM subject that we told above is given in another page (Fig. 4). After those utions, lots of questions are given for students to make free solutions. In the site, after each subject, 15 questions e given for students to test their own knowledge.

When you click the "Exam" button that takes place under the "Contents" button given in the first page of e site, a new page is opened named as the "Tests". In this page, various subjects take place for students to do free t (Fig. 5). The student can test his/her own knowledge by solving the test questions of whatever subject he/she oose to. After the student chooses the subject, he/she should register. Afterwards, 15 test questions come about the bject he/she chose and after the student solves the current tests, the computer evaluates the knowledge of the ident. Besides, the solutions of the student's wrong solved questions are shown in red, and the correct solved sponses are shown with blue colored column.

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5. The tests page

hen you click to the "Site Creators" button of this site prepared for middle school students, the pictures of people ho had created the program and information about them comes to the computer screen. Those people are Novruz şirov, Aynure Beşirova and Fariz Beşirov.

ally, we should also remark that this prepared site has been completed with a very interesting and funny section. the "Delphi" programming system in the context of the site, as those programs that teach students the rule of ding the GCD and LCM of the numbers and that makes it possible to calculate the GCD and LCM of requested o numbers, and as the programs that inform about palindromic numbers and that show whether the given number palindromic or not could work freely, they have been presented to the Ministry of Education in Azerbaijan to take ace in the newly developed internet site of the Ministry.

Wondershare

Results and Discussion

This site is prepared for Azerbaijan schools' sixth grade students to learn mathematics online with ease and covers mathematics textbook's entire curriculum. In a step by step fashion the site is designed and the content is epared. After each step completed work is shared by mathematics teachers and active students and their opinions e regarded. After the site is finished, it is tested in parallel classes of 10 Baku schools (Schools number 7, 45, 48, , 95, 104, 118, 245, 269 and 302) in 2005/2006 school year.

Two parallel classes are chosen from each school and the test results showed that in the classes whose idents do not use the site, of every 30 students 15 students (%50) are successful. When the parallel classes are nsidered, of every 30 students who use the site to learn mathematics 27 (%90) are VERY successful. The main ason behind this success was in the site students are advised to do exercises of each chapter. These results show at the site plays an important part in improving mathematics skills of sixth grade students.

After one year of trial suggestions of the teachers and active students of above mentioned schools are

counted for and the site is established fully functional. This site is integrated to Azerbaijan's local teaching portal d has been in use since 2006-07 school years. Over 4 million of students benefited from the site ever since.

Acknowledgements

We express our great gratitude to the principals of above mentioned schools for their efforts on separating rallel classes for testing of the site. (Classes denoted 6a used the site for mathematics class and classes denoted 6b l not use the site.) We also thank ministry of education workers for integrating the site to newly opened Ministry Education Portal.

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Computers and children´s leisure time

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Abstract

This work focuses on contemporary trends in leisure time activities of children with an emphasis on the growing impact of information and communication technologies. We spend more and more time at the computer, which greatly affects the lifestyle of all of us, especially teenagers and children. This study presents the results of a quantitative research survey focusing on the place of computer games and social networks in the leisure of children - how much time children spend at the computer during the week and during the holidays; in what kinds of activities they engage; how much time they devote to playing computer games, the Internet and social networks. The contribution deals with the benefits, but also the negative effects that computers produce.

Keywords: Children, leisure time, computers, lifestyle.

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1. Introduction

The topic of leisure time raises very pleasant feelings and thoughts of a time spent according to our interest, mood and possibilities. Our lifestyle and ways of spending free time are determined by our activities and the environment in which we grow up and live. On one hand, we are gaining possibilities such as mass communication, access to information or new technologies; however, the staggering pace of the technological revolution has its darker side as well. This concerns the spread of lifestyle diseases, social pathological phenomena and more and more frequent break-up of marriage and families and their communication. Another problem of contemporary families is insufficient communication between their members, which is realized via telephone calls, SMS, e-mails, chat, the Internet and social networks. These forms of communication are very comfortable but also impersonal, the result being a deterioration of family relationships. Modern communication and information technologies can be used both in good and bad ways.

Children dispose of a wide range of possibilities of spending their free time. The contemporary generation of children are excited about the new technological conveniences. (EU Kids, 2011) This is hardly surprising considering that many parents buy for their children the latest interactive toys since their infancy. These toys make sounds, shine with bright colours and are simply irresistible. The computer is a device found in every household and it is a common and indispensable tool influencing contemporary world. Children come into contact with computers before their enter school and use them to spend free time, to engage in attractive forms of entertainment and sometimes to communicate with their families.

The objective of the research survey was to describe current trends and ways of spending free time favoured by youths at secondary schools in the Czech Republic, focussing on the use of information and communication technologies and its impacts. Secondary objectives were to find out how much time children spend at the computer and whether they use this time also for education or solely for entertainment, furthermore, the research deals with the issue of the responsibility of parents, who should be aware of

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their children's ways of spending free time as well as the risks connected with spending several hours a day at the computer.

The use of free time is affected by many factors, such as natural and social conditions, personal circumstances and possibilities. Relying in the opinions of experts, we may define leisure time as a time span enabling free choice of activities, in which the individual engages willingly and which bring satisfaction and pleasant experiences.

Pávková et al. (2008) claim that we understand the term leisure time as "the opposite of obligatory work and duties, a time when we are allowed the free choice of activities, in which we engage voluntarily and with pleasure and which raise the feelings of satisfaction and relaxation." They include the following under the term leisure time: "relaxation, recreation, entertainment, hobbies, voluntary education, voluntary socially beneficial activities and time connected with them." The need for free time varies from person to person and so does our idea of free time. The use of children's free time depends to a large extent on their parents. They should profit from the possibilities offered by various organizations providing leisure time activities and consider the child's character and talents as well as his/her interests and choose an activity which will enable him/her to be successful in it and find satisfaction of his/her needs.

Children do not make a strict division between leisure time and other activities, games, work and educational activities; it is the motivation, competitiveness, emotions and natural curiosity which are crucial. (Charvátová, 2007) Games are an integral part of free time and the child should feel that s/he is not forced to do the activities and that leisure time brings pleasant amusement developing his/her abilities. The world of computers is very attractive to children because of its interactivity, accessibility and simplicity. Moreover, for the parents, the easiest way of attracting the child's attention and keeping him/her occupied often is to turn on the computer. The result is that the parents have plenty of time for themselves, they do not need to provide any other activities and most children, even the hyperactive ones, find computers compelling. Unfortunately, parents often use computers as a substitute for other possible leisure activities. They do not realize that prolonged time spent at the computer might be harmful to the children.

The development of personality is greatly affected by education and the social environment in which the child grows up. According to Pávková et al. (2008, , p. 15) it is the family who plays the key role in education, followed by preschool and school establishments and gradually by other institutions providing leisure activities. During adolescence, there is a strong influence of relationships with peers, which determine the choice of free time activities. Other important factors which have to be taken into account are mass media and information technologies, which play a significant role in interpersonal communication and which have become a common part of our lives. All of these influences overlap and supplement one another and a problem might occur at any stage of personality development, therefore it is meaningful to support young people and help them to overcome difficulties. Still, the cornerstone of forming interpersonal relationships as well as models is the family and the environment in which we grow up. Children gain the first experience of spending free time in the family. They perceive their parents as models and imitate their behaviour and lifestyle.

Nowadays, leisure time activities are a common part of our lives and the lifestyle of the family and its surroundings. *Lifestyle* is defined by Žumárová (2001, p. 158) as "an individualized and optimal organization of life into a harmonic whole. Lifestyle is characterized as a large complex of activities and the related attitudes, norms, values and habits, which has a lasting character and is specific for every person, expressing his/her individuality. The lifestyle of every individual is embedded in the wider social context, it is affected by historical development, traditions and the cultural and economic level of society." Kraus (2014, p. 173) draws our attention to the influence of information technologies in contemporary world, pointing out the "current phenomenon of the global forming of lifestyle being affected by the World Wide Web. This medium strongly supports the spread of global or consumerist lifestyle. Today, mass media announce what is new on the market, to what we should look forward, how to make money and how to live. Sadly, this supresses creative lifestyle, which encourages imagination, delight taken in being active and satisfaction from fulfilling one's duties."

The computer has become an entirely common device for the majority of us. Children see their parents use it and are not afraid of new technologies, neither the possibilities that computers offer. It is mostly elderly people who may have such worries, since working with computers makes them feel insecure. (Palyza, 2011) Children should gain the knowledge and experience necessary to work with computers and make active use of their assets and this knowledge should be provided mainly by their parents and teachers. The world of computers is very appealing and exciting to children and young people because it opens

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nearly limitless possibilities to develop one's ideas and thoughts and present them to other people. The young generation are not afraid of new technologies, they try out new possibilities and are attracted by the increasingly sophisticated and more powerful machines. (Nešpor, 1999) Teachers as well as parents should improve their knowledge and skills concerning computers and communication in order to be able to advise the children and show them how to make use of computers for their studies or their work in the future.

2. Empirical inquiry

2.1. *Research question*

The purpose of the research was to find out how much time children spend at the computer and whether this time span becomes longer during the holidays. Furthermore, the research deals with the fact that computer activities have become one of the most frequent ways of spending free time for children. This is why we also examined how the children spend the time with computers, whether they use them to find new information and to study or solely for entertainment in the form of computer games, chat and social networks. We were also interested in the risks connected with computer games or surfing on the Internet. In all of these areas, we verified whether there are any statistically significant differences depending on gender.

2.2. Research methods

The quantitative empirical survey was based on a questionnaire supplemented by interviews with pedagogues teaching ICT at the secondary schools attended by the respondents. We distributed the questionnaires personally in printed form and the pupils were informed of their purpose and instructed how to fill them in. The pupils filled the questionnaires in in ICT classes under the supervision of their teacher. In order to assure objectivity the questionnaires were anonymous. The questionnaire comprised 26 items and was divided into four parts. Part one focused on the basic personal data (gender, age etc.) and the activities in which the respondents engage during their leisure time. Some of the questions were bipolar, some were closed and some open. Part two dealt with the time spent at the computer and the specific activities of the respondents. The respondents were asked for a subjective estimate of the average time spent at the computer per working day. Part three concerned computer games. The respondents gave the frequency of playing computer games and the types of games which they play most. The final part focused on the risks connected with computers and computer games.

2.3. Research sample

The survey was carried out at seven secondary schools in the region of Hradec Králové in the course of November and December 2013. 857 pupils from secondary schools participated, 425 were boys and 432 were girls. They were aged from 12 to 14 years.

2.4. *Results and discussion*

The objective of the research was to find out how computers affect leisure activities of children at secondary schools. The obtained data show that 83,27 % of pupils have their own computer at home. Almost one half of the parents (44,74 %) use computers in their job and more than one half (67,32 %) use them at home. Thus, it is obvious that a computer is almost in every household and it is a part of common life.Computers represent a means of spending free time, which is supported by the fact that 63,81 % of children use them every day, while mere 36,19 % do not.

We also asked about the activities in which the children engage in their leisure time. They were given the following options: I do a sport, I attend art school, I spend a lot of time with my friends, I listen to music, I

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read books, I watch TV, I enjoy cultural activities (cinema, theatre) and I spend my free time otherwise. The pupils were allowed to choose more than one option. The most frequent leisure time activity of girls is listening to music (20 %), 16 % spend their time with friends, the time at the computer comes third with 14 %, followed by sports and TV with 13 %. Activities such as reading books, art school, culture and other activities all had below 10 %. Boys spend their free time mostly at the computer (19 %), second come sports and time with friends (18 %) followed by TV and listening to music (15 %), the remaining activities having below 10 % - reading books (8 %), culture, art school and other.

If we compare the two groups we see that computer activities are more frequently done by boys than girls (the difference being 5 %). Furthermore, sport is one of the top activities of boys and is less often preferred by girls (the difference being again 5 %). Girls attend art school more often (4% difference). Other activities are favoured more or less equally by boys and girls. Nevertheless, it is not possible to state that there are statistically significant differences depending on gender. Still, the results clearly show that computers have become one of the favourite means of spending free time for children at secondary schools.

2.4.1 Average time spent at the computer and the most frequent computer activities

The obtained data indicate that on average, children spend 2,47 hours a day at the computer and there is no statistically significant difference depending on gender. The most frequent answer was that the respondents spend 3 hours per working day at the computer. Children have more leisure time during the holidays, which they spend at the computer. We asked about the time spent at the computer at the weekend (i.e. on Saturdays and Sundays). The answers suggest that in this case the average time is 3,475 hours, which is approximately 1 hour more than on working days. On average, girls spend 2,273 hours a day at the computer at the weekend, while in boys the figure is 4,752. There is a statistically significant difference this time. We suppose that the time may be even longer during the holidays, however, it would probably depend on the season. Computers offer a wide range of activities. One of the goals of our research study was to find out in which computer activities children engage. Several activities were proposed in the questionnaire with the possibility to choose more than one option and add one's own.

The most frequent computer activity in boys are computer games (26,15 %), which confirms the statement that boys play computer games more than girls. Second comes search for information (16,49 %, the nature of the information was not specified in the questionnaire). The third place was taken by chat (16,34 %), which is a form of online communication. Again, it was not specified whether the respondents communicate with friends or strangers. Chat was followed by social networks (14,71 %), which is a new and a very popular computer phenomenon. The fifth place was taken by downloading music and films, which is connected with the children's interest in music described as one of the favourite activities in part 1 of the questionnaire. The remaining activities mentioned were e-mails (6,09 %), education (5,79 %) and other activities (1,34 %). Graph 2 gives the same data for girls.

The most frequent activity in girls is the use of social networks (20,16 %) followed by chat with 19,04 %, which demonstrates the difference between the preferences of boys and girls. Girls use the computer more as a means of communication, while for boys it is rather a means of entertainment. The third place in the case of girls was taken by search for information (17,60 %). Downloads of music and films come next (16,16 %). Computer games have mere 12 %, which is almost one half less than in the case of boys. This graph therefore again suggests that girls play computer games much less often than boys. The percentages of the remaining activities are: emails (7,04 %), study (4,96 %) and other activities (3,04 %).

The results of the survey and verification of hypotheses show that children still spend a great portion of their free time at the computer. Computers are an entirely common part of everyday life and enter the world of leisure time activities of many children. What was impossible to imagine ten years ago has become commonplace today. We should approach computers as useful tools facilitating communication, work and giving access to a huge amount of information. Nevertheless, it is also important to realize that they cannot replace other leisure activities representing healthy lifestyle of contemporary young generation. Parents should certainly offer other options to their children, such as sports, interest groups or time spent with the family and friends. Too much time spent at the computer has its risks and undesirable consequences for health.

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2.4.2 Preference for various computer activities

The need for game is natural for every child. Nowadays, children are surrounded by very sophisticated technological toys practically since their birth. Interactive toys, which are very popular with children, flash, move, play melodies or even talk. The lures of publicity and various catalogues capture the attention of parents and children since very young age, the strategies of producers and retail chains are perfect and impossible to fight or resist. Therefore, it is not surprising that if the child plays with sophisticated technological toys since his/her infancy, the computer seems common to him/her. Children like to try something new, appealing and interesting. It is impossible to prevent technological development and progress or completely forbid the children to use computers, nevertheless, it is important to consider alternative possibilities. It is desirable to introduce computers to the children step by step, set clear rules restricting their use and ensure that they will be observed. (Nešpor, 1999) Games clearly are natural activities for children, who should be offered the choice of various leisure time activities, which the parents encourage and are able to take part in them. The results of our survey already showed that the computer is one of the most frequent means of spending free time in children at secondary schools. Computer games are one of their favourite activities, especially in boys. Computer games can simulate situations in which many players never find themselves in real life. Players identify with heroes and experience the feeling of dauntlessness, the games stimulate competitiveness, logical and strategic thinking. These possibilities of self-realization and active participation in the game are appealing mainly to boys. The data based on the questionnaires brought information about the number of children who play computer games, the time spent playing and their preferences for particular genres of games. The results suggest that boys play computer games more than girls. Almost 46 % of girls play no computer games, while 94 % of boys do play computer games and mere 6 % do not. 20 % of boys and 23 % of girls play one game, 24 % of boys and 19 % of girls play two games. It is alarming that 50 % of boys play more than two games, while the same figure for girls is mere 12 %. A statistically significant correlation between playing computer games and gender was confirmed.

It is clear from the survey that computer games are still very popular with boys at secondary schools. We also intended to find out which types of games children prefer. We worked with the categorization of games devised by Černochová, Komrska & Novák (1998), who differentiate between the following genres: combat games, simulations, strategy games, puzzles, 3D-action games, sports games, adventure games, online games and other. The respondents were allowed to select more than one option. Boys like mainly online games and combat games, simulations and strategy games follow. Girls also prefer online games, followed by puzzles and strategy games.

Another area of our research was the average time spent playing one of the computer games. According to the results 12 % of boys and 48 % of girls play one game for less than 30 minutes. The next option (30 minutes to 1 hour) was selected by 41 % of boys and 28 % of girls and the last option (I play the game for more than one hour) was selected by 47 % of boys and 24 % of girls. We may therefore state that on average, almost one half of boys (47 %) who play computer games spend more than one hour a day playing. Moreover, a statistically significant dependence on gender in this area was confirmed.

2.4.3 The awareness of the risks connected with the use of computers and social networks

Computer games are becoming more and more sophisticated thanks to new technologies and lifelike graphics capable of drawing the player into their reality. Furthermore, the games are more accessible, even very young children being able to download them from the Internet. According to the opinions of experts, computer games can be a springboard for crimes, pathological behaviour and increased aggression in the society. The player feels as a mighty hero and is incapable of separating the virtual reality from the real world. S/he does not perceive the suffering of victims in combat and action games and consequently killing in reality does not appear frightful to him/her. The experts further point out the connection between the increasing violence in virtual reality and very frequent bullying and aggression in young people. One of the aims of the study was to learn whether children are aware of certain risks connected with playing computer games, whether they have been told about them and know something about them. 70 % of girls and 62 % of boys have already heard or know about the risks of frequent playing. Nevertheless, it is difficult to estimate whether the information is sufficient to dissuade children from playing.

The limitless possibilities which the computer brings are largely due to the Internet. It is a huge world of

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information which the children navigate skilfully and fearlessly and which offers communication, entertainment and freedom. This is truly compelling for most children, which many experts, schools but also responsible parents realized in the past few years. That is why one of the objectives of this study was to find out whether children are aware of the risks connected with computer use and communication via social networks. (Palyza, 2011) We assumed that the majority of children know the risks or at least heard about them, nevertheless, it is important to observe certain rules and be responsible. 92 % of girls and 79 % of boys have a profile in one of the social networks. These figures confirm the significance of social networks as a phenomenon of the present day, which is very popular, especially with young people. Social networks have become a trend mainly among children and young people, they enable communication with the whole world. The Interned is flooded with countless webpages used by people from the whole world to meet in virtual reality, communicate, share information, videos and pictures, exchange contacts and discuss their hobbies. The list of activities and possibilities at social networks is very long and beside a number of assets it brings a relatively large number of risks and dangers. Experts (Šmahel, 2003; Palyza, 2011) warn about the danger of personal data being stolen and abused. Children willingly share private information, e.g. about their interests, studies, activities or friends and the information spread very fast among a large number of people. Data of this nature as well as photos and videos may be easily abused. Another danger consists in the creation of fake profiles designed to gain the children's trust. Therefore, children should know about these risks, which may produce more problems. Many young people defend themselves claiming that their profile is not public and their messages and photos are only accessible to their friends. However, they do not realize that even their friends and family may abuse the data. It is desirable to warn the children but also their parents about the risks and explain how to protect themselves from possible consequences.

Further inquiry focused on whether children used social networks for what is considered high-risk behaviour, such as chatting with strangers and discussing their personal problems with them. The results showed that 40 % of boys and 45 % of girls chat, i.e. communicate, with strangers whom they never met in person. Another finding is that respondents do not talk about their private matters and worries with strangers – 86 % of boys and 95 % of girls do not write about their problems on the chat. Another risk consists in making personal photos public at social networks. Contemporary young people take pleasure in photographing anyone and anything that they find interesting. The popularity of taking photos is further supported by the fact that modern mobile phones are equipped with a quality camera and photographing and videotaping is easy even for young children. People possess large numbers of photos which they never get printed but simply upload them to a server designed for storing and presenting photographs. These photographs are only accessible to those who know the password. Another possibility to share photos is to use the application at Facebook enabling the upload of a nearly unlimited number of photographs to one's profile. Children do not consider sharing of photographs risky – 69 % of girls and 45 % of boys stated that they upload their photos to public servers. It is clear that girls share photos more than boys. The connections between profiles of friends make the photos accessible to a large number of users, which young people and children often fail to realize. They risk the loss of anonymity and potential abuse of their personal data.

We further verified whether parents know with whom their children chat, which might lower the risk of the abuse of personal data. The results clearly show that parents are no longer really in control over their children's communication via social networks. 35 % of boys and 41 % of girls answered that their parents know about the people with whom they chat. We may compare these figures with a related question asking about whether parents check their children's e-mails. The answers suggest that parents are unaware of whom their children write to over the Internet – the parents of 89 % of boys and 92 % of girls do not check their e-mails at all. We may consider e-mails to be a substitute for traditional written letters protected by privacy of correspondence. This makes us assume that the majority of parents find it improper to read someone else's letters. Moreover, e-mails are not connected with some of the risks of using chat at the social networks.

The Internet also provides access to information inappropriate for children. Such dangerous webpages may have erotic content or advance violence. (Konečný, 2011) Children are relatively skilful in Internet surfing and capable of circumventing simple measures blocking the inappropriate webpages. Our intention was to ascertain whether parents restrict the access to some unsuitable webpages. The answers show that parents of 46 % of boys and 39 % of girls check the visited webpages, while 54 % of boys and 61 % of girls stated that their parents are not aware of which webpages they visit. These results make it evident that the control on the part of the parents might be much stronger. We must hope that education

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and prevention in this area increase and parents become more responsible. Furthermore, there are organizations founded specifically for the purpose of protecting children from the dangers connected with the use of the Internet. In total, 76 % of boys and 80 % of girls claim that they observe the rules and do not put their personal data on the Internet. This means that 77,82 % of children observe the rules of safe handling of personal data on the Internet.

2.4.3 The awareness of the risks connected with the use of computers and social networks

The final part of the survey asked about the pluses and minuses of computers and activities connected with them. The respondents were allowed to select more than one option and add their own. As for the pluses of computers, the option most frequently selected by girls was the use of computers in many different fields, while boys selected mainly the option of the computer as a means of entertainment. The second most frequent answer given by girls was easy text processing plus access to information and entertainment, followed by storage of data. Boys put access to information second, followed by storage of data, easy text processing, and the use in many fields coming as the next-to-last option. Other options frequently added by the respondents include downloading of films and supplementary tool of education.

As far as the minuses are concerned, both boys and girls put addiction to computers first, possible criminality and pathological phenomena second and loss of communication and real relationships third. Both genders further selected time consuming nature of computer use, followed by the loss of anonymity. The most frequent other options included mainly medical issues caused by computers such as deterioration of sight, headache and backache.

The overview of answers clearly indicates that children are aware of certain risks and dangers connected with computers. On the other hand, the pluses of computer use prevail. Children cannot imagine their lives without computers, which is a development that we cannot stop.

The interviews with teachers suggest that information technologies entered the teaching of almost all subjects at secondary schools. The teachers use projectors connected to the computer to present information, pictures and videos. The teachers teach the children to make efficient use of the advantages of computers and also warn them about the possible risks. However, schools do not use software blocking inappropriate webpages. Another desirable thing is the cooperation with parents, which helps them not to underestimate the risks connected with the use of computers and the Internet.

3. Conclusion

Computers have become a common tool in our households, therefore parents should be aware of all the risks connected with their use by children. In functional families, computers are regarded as creative toys providing entertainment for the child but also access to information and essential help with study and work. It is useful to set clear rules of computer use, which the children should observe from the very beginning. The world of computers may have a positive educational influence on children and we cannot forbid the children to enter it or ignore it. It is desirable to explore it and spend our leisure time at the computer together with the children. Nevertheless, the computer cannot replace face-to-face communication and real family relationships, therefore, parents should know about the computer activities in which their children engage.

Černochová, Komrska & Novák (1998) summarized some of the recommendations for parents concerning the work with computers:

- Choose computer games for the children carefully, try to be well informed about the supply and respect the child's preferences.
- Monitor how much time the child spends at the computer and provide alternative activities, such as going out, sports or other hobbies.
- Work with the computer together with the child, be interested in his/her computer activities and the people with whom s/he communicates.

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- Require specific results of work with the computer, help the child to search for information and process it;
- Set time limits restricting computer use.
- Do not use the computer as a reward or punishment.

The objective of the present study was to draw the attention to the time spent by children by playing computer games as well as the possible problems which computer games might cause. Playing of computer games have no significant benefits, it is often a mere means of combating boredom or making up for bad relationships and communication in the family. Parents are very busy and the present global unfavourable economic situation contributes to fact that children spend little time with their parents and do not engage in more appropriate leisure time activities. Therefore, it is important that experts and teachers should warn about the risks connected with too frequent use of computers.

Healthy lifestyle and good use of free time should be a priority for all young parents, especially given the possibility to spend the time in a meaningful way and with minimal expenses. All we need is to find the time. Still, it should clearly be very easy to find considering how much of it we devote to entertainment and communication over the Internet.

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Concept of legal protection of intellectual property rights

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Abstract

Evolutionary processes of political system of society inevitably influence a condition of structure of the public relations, first of all, on formation of a new legislative platform of the state. Finding of the state sovereignty of the Republic of Kazakhstan promoted creation of objective public prerequisites for creation of the new legislative norms governing the public relations in qualitatively changed socio-political conditions.

Keywords: concept intellectual property, exclusive rights, patent, scientific works, industrial sample

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1. Introduction

In the context of joining International organizations, multilateral international agreements, which have mandatory requirement for equal protection of intellectual property right for both domestic and foreign authors, anticipating entrance of the Republic of Kazakhstan to the World Trade Organization (WTO), verya actual is the problem of improving measures, aimed at fighting problems of legal protection of intellectual property, in particular, providing their legal protection, preventing crimes in the spheres of using results of intellectual activity.

Professor Dzhekebayev U.S. is right claiming that "the new economic relations in our country are inseparably linked with formation and development as the states, and is right. Processes of cardinal updating of public life are accompanied by revaluation of many parties of legal life of the Republic, including methods and ways of the organization of fight against crime, improvement of the criminal, criminal procedure legislation. In this regard high-quality changes undergo criminal and legal and criminological theories. A number of the theoretical provisions which were considered until recently as firm, such as the bases of criminal liability, category of crimes, fault forms, the subject of a crime, the purpose of criminal penalty, are critically reinterpreted taking into account social changes, concrete requirements of law-enforcement activity".

The laws governing the public relations, arising at creation, use and operation of objects of the intellectual property, the systems which have laid to the main legislative foundation for protection of objects of intellectual property were consistently adopted. First of all, the Constitution of the Republic of Kazakhstan, which article 20 proclaims a freedom of speech and creativity, and also some other acts.

It should be noted that the legal language used in the sphere of a turn of creative results of human activity, such as, for example, the concept "intellectual property", "exclusive rights", "piracy" arose recently.

Now illegal use of objects of intellectual activity by various enterprise structures causes great damage not only to authors, founders and performers of objects of intellectual property, but also a significant

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damage to the state as in the budget of the state taxes for production, use and trade of counterfeit production don't arrive.

"In the participating states of the CIS level of counterfeit production fluctuates from 73% to 94% (Ukraine – 90%, Belarus – 94, Kyrgyzstan – 86, Georgia – 73%, and two last countries are members of the WTO), and in such countries as the USA, Great Britain, France, the Czech Republic it makes less than 10%, Finland and Italy – 10-25%, Poland and Brazil – 25-50%".

In legal literature illegal use of intellectual property rights also is called as "piracy", and production used by "pirates", not license production is called counterfeit or "piracy". The word "pirate" occurs from the English word "piracy", having following value:

1). piracy; piracy action;
2). author's offense of author's, publishing or patent law; plagiarism; counterfeiting;
3). illegal activity (especially unregistered radio station, private bus).

The concept of counterfeiting by scientists is understood as various illegal actions in relation to objects of intellectual property. So, for example, according to Shershenevich G. F. "distribution of the literary work for this purpose reproduced completely or in large part by the person which has no copyright and didn't get permission to that from the author or his successor, is called as counterfeiting and makes a criminal offense. However the room in anthologies of articles or fragments from other compositions, at least and more printed page isn't forbidden.

Pilenko A.A. opening counterfeiting questions in relation to patents, I meant the following: "under patent counterfeiting certainly deliberate and unauthorized implementation of the rights implementation of the rights belonging to the patentee, made in the territory of the state which has granted the patent, at such moment when this patent had prohibitive force and in the form of such activity which aimed at systematic contact with uncertain number of the third parties".

Besides, "violations of the right for works of art can happen doubly: a) any repetition, for monetary benefits, a work of art in its whole structure, without formal consent of the person having not of it the exclusive right, is called as counterfeiting, or illegal copying.

Counterfeiting will be, for example, the copy pictures, being at an exhibition, for its room in the magazine, the statue image on medals, creation of the building according to someone else's plan or a facade. However our law doesn't consider as counterfeiting that case when work of painting is represented by means of a sculpture and vice versa; c) repetition of separate parts from others work of art in the work is called as plagiarism, or illegal loan. The choice from others picture of groups, figures, the heads, a landscape, a sea look and their room in the picture with observance of the same drawing and lighting".

Defining the circle of people, carrying out counterfeiting, Pilenko A.A. considers that "first of all, the one who made this invention can be a countrefactor, certainly; and, in particular, in two cases: 1) as in, when the patentee declared the invention, him independently made and only incidentally coincided with what was also independently made accused (parallel creativity), and 2) also in, when the patentee borrowed – in this or that (even dishonest) – a form at accused the invention made this by last".

Use of counterfeit work without extraction of material benefit also is the fact of violation of intellectual property rights as exclusive rights of the author or the owner are thus violated.

Now the majority of the countries which are carrying out legal protection of objects of intellectual property, are guided by the term approved by the World Intellectual Property Organization (WIPO) by point VIII of Art. 2 from July 14, 1967. In particular, in it is specified that the intellectual property includes the rights relating to:

- to literary, art and scientific works;
- performing activity of actors, sound recordings, radio - and to telecasts;
- to inventions in all areas of human activity;
- to discoveries;
- to industrial samples;
- to trademarks, service marks, trade names and commercial designations;

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- to protection against unfair competition;
- and also all other rights relating to intellectual property in production, scientific, literary and art areas.

"The term "intellectual property" in this convention is used in collective sense, designating itself all rights for results of creative activity and some objects equated to it. The list of concrete types of exclusive rights containing in the Convention has approximate character and can be easily added with other results of intellectual activity. That the obligation to provide protection of all rights listed in the Convention in the countries isn't imposed on members of VOIS is obvious also and they define a circle of protected objects of intellectual property. That the obligation to provide protection of all rights listed in the Convention in the countries isn't imposed on members of VOIS is obvious also and they define a circle of protected objects of intellectual property".

According to some scientists, for example, Dozortseva V.A. "the term "intellectual property" is submitted legally insufficiently incorrect. It can make impression about distribution on results of intellectual activity and in general on non-material objects of the mode established by the law for the property right. This impression would be wrong". However, despite it, this term is legislatively fixed and gained rather wide circulation.

Merzilkina R. A. considers that "the intellectual property differs from real property that it possesses dual character: it is non-material, spiritual, however objected by means of the material carrier and when using results of intellectual activity certain material benefits not only for satisfaction of needs of the founder, but also all society" are created.

National legislations define distinction in concepts and norms about intellectual property, "existence of various legal systems and concepts, according to Churin N. F. complicates elaboration of definition of this concept exact, comprehensive and satisfying all as it is unequal in various countries".

The legislation of the Republic of Kazakhstan defines the list of objects of intellectual property in the new Civil Code where in section 5 called "Intellectual property right" all known types of objects of intellectual property, the bases of emergence of the rights for objects of intellectual property, personal non-property and property rights, exclusive rights and the property right to objects of intellectual property, validity periods and transition of exclusive rights to other person, ways of protection of exclusive rights are characterized.

According to Civil Code Republic of Kazakhstan Art. 961 objects of intellectual property right treat:
1) results of intellectual creative activity;
2) means of an individualization of participants of a civil turn, goods, works or services.
Results of intellectual creative activity treat:
1) works of science, literature and art;
2) executions, soundtracks and transfers of the organizations of a broadcasting;
3) inventions, useful models, industrial samples;
4) selection achievements;
5) topology of integrated chips;
6) unsolved information, including know-how (know-how);
7) other results of intellectual creative activity in the cases provided by the present code or other acts.

Means of an individualization of participants of a civil turn, goods, works or services treat:
1) trade names;
2) trademarks (service marks);
3) names of places of an origin (indication of an origin) goods;
4) other means of an individualization of participants of a civil turn, goods and services in the cases provided by the present Code and acts.

Objects of copyright, according to the Law RK "About Copyright and Adjacent Rights" of June 10, 1996 No. 6-1, Art. 7 are:
1) literary works;
2) drama works;
3) scenario works;

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4) choreography and pantomime works;
5) pieces of music with the text or without text;
6) audiovisual works (film, TV and video movies, filmstrips and others film and teleworks);
7) works of a sculpture of painting, graphics and other works of the fine arts;
8) works of applied art;
9) works of architecture, town planning and landscape gardening art;
10) photographic works and the works received in the ways similar photo;
11) cards, plans, sketches, illustrations and the three-dimensional works relating to geography, topography and to other sciences;
12) computer programs;
13) other works.

Objects of copyright also treat: derivative works (translations, processings, summaries, papers, summary, reviews, performances, musical arrangements and other processings of works of science, literature and art); collections (encyclopedias, anthologies, databases) and other compound works representing on selection and (or) an arrangement of materials result of creative activity.

As specifies Serebrovsky V. I., "copyright governs only those relations which are connected with creation and use of works of science, literature and art".

"Object of copyright, - Shershenevich G. F. wrote. - the literary work as the product of spiritual creativity given a written or verbal shape and intended to the address in society is. Reports on court sessions, scientific societies, zemstvoes, etc., not expressing spiritual creativity of their originators, can't be considered as such objects".

In the dictionary of russian of Ojegov S. I. there are two semantic values of work: 1. Creation, product of work, creativity, nature work, work of art, literary work. The second value of this word means result, a result of multiplication .

Generalizing work as a material benefit in a counterbalance of the philosophical category combining the material and ideal phenomenon, Militsin A. gives the following definition of work: work in author's and legal sense – object of a material world, a product of creative activity of the person, existing or existing in the objective form, protected by copyright as individual connection of a matter and a form and as that or in the form of the copies capable to be object of the real rights.

Necessary criterion of object of copyright is creative character and an objective form of its expression. There are different formulations of concept of creativity. According to Yurchenko A.S. creativity is not "intuition", not sudden "inspiration", not unconscious inspiration when the invention or an improvement suggestion appears suddenly, without labor efforts of the person. Creativity is a work, besides work difficult and laborious, caused by social requirements of society. Technical creativity as is natural as development of technology" is natural.

Creativity is peculiar only to the people possessing creative thinking. This circumstance needs to be considered in the course of identification of perpetrators, involvement of suspected persons to the criminal liability, intellectual property rights carrying out violation, and also the characteristic of the identity of the studied criminal.

Necessary indicator of creative activity is the novelty of work which is expressing as in an external form (objective signs of work), and in the internal contents (subjective signs of work). There are the works which value can be shown in the most part in an external form. Works of the fine arts belong to such works.

For work creation the author sometimes needs certain time. The author, in search of the new image, a new form of work, the solution of any task, abstracts, dreams, analyzes information arriving from world around and comes to the new decision, before, born in consciousness of the person, and then, are embodied in a material subject. But the law protects only what have a material embodiment in various forms, allowing to perceive work by sense organs. The ended work may contain some parts which can be separate independent independent works or to be visually and are ideologically interconnected with each other, are addition of the following or the previous component.

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"Copyright and related rights, - Pankeev I.A. fairly notes. - can exist and be protected fully only when they will be effectively protected. Numerous researches, acts etc. are devoted to ways and methods of such protection. It is a question not only of a piracy, unauthorized the print out and reprints, plagiarism, illegal sale, etc., but also of fair terms of the contract, high-quality execution of the taken obligations".

In the Law of the Republic of Kazakhstan "About copyright and related rights" of June 10, 1999 in article 6 of item 2 it is specified that copyright extends both on the published works, and on the unpublished works existing in any objective form: 1) written (manuscript, typewriting, musical notation, etc.); 2) the oral; 3) sound-or videos; 4) images; 5) volume and spatial and in other forms. In the same article it is said that copyright doesn't extend on actually ideas, concepts, the principles, methods, systems, processes, opening and the facts [13, Art. 6].

Also, copyright of work isn't connected with the property right to material object in which work is expressed. Transfer of the property right or the right of possession of any material object doesn't attract transfer of copyright of the work expressed in this object.

Copyright arises at the time of creation of work of science, literature and art in an objective material form, and for objects of copyright it isn't required to obligatory registration of work, other special registration or observance of any formalities. The author and (or) the owner is enough for the notification about the exclusive property rights has the right to use a sign of protection of copyright which is located on each copy of the work, consisting their three elements:

1) Latin letter "C" in a circle ©;
2) Name (name) of the owner of exclusive copyright;
3) Years of the first publication of work.

The author or the owner can register the rights in official registers. Registration is carried out by authorized body according to the legislation of the Republic of Kazakhstan, namely according to the Instruction about the state registration of the rights for the works protected by copyright and the adjacent rights.

The subject of copyright is the natural person which creative activity created work. If work is created by joint work of two or more persons in a co-authorship, the right for the created work belongs to authors in common irrespective of, whether forms such work one indissoluble whole or consists of parts, each of which has as well independent value.

Questions of the theory of development of copyright as subjective civil law by the legislation of the Republic of Kazakhstan Ikhsanov E.U. brought.

The part of the rights for work can pass to the legal entity on the basis of the author's contract, according to the current legislation of the Republic of Kazakhstan "About copyright and related rights". In more detail questions of transition of copyright under the contract reveal in Abuova R. Z. scientific works.

Features of transfers of rights at the conclusion of the author's contract for works of the fine arts are in details shined in Ikhsanov U.K. scientific works.

With the advent of new technologies and forms of fixing and reproduction of sounds and the image, transfer to air, a cable broadcasting, there was an opportunity to extend works in unlimited number that in turn promotes illegal use of works without the knowledge of authors and performers. In this regard, there was a new form of fixing of the rights of authors and performers, is called as the adjacent rights. The adjacent rights are regulated by the Law of the Republic of Kazakhstan "About copyright and related rights".

According to article 34 of the Law of the Republic of Kazakhstan "About copyright and related rights" the adjacent rights extend on statements, executions, soundtracks, transfers of the organizations of an on-air and cable broadcasting irrespective of their appointment, the contents and advantage, and also from a way and a form of their expression.

Subjects of the adjacent rights are performers, producers of soundtracks and the organization of an on-air and cable broadcasting.

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As well as for copyright, for emergence and implementation of the adjacent rights it isn't required observance of any formalities. The manufacturer of a soundtrack and (or) the performer for the notification about the rights has the right to use a sign of protection of the adjacent rights which is located on each copy of a soundtrack and (or) on each case containing it and consists of three elements:

1) Latin letter "P" in a circle: ®;
2) name (name) of the owner of the exclusive adjacent rights;
3) years of the first publication of a soundtrack.

Actions of the adjacent rights is carried out in case of observance of the certain conditions stipulated in article 36 of the Law of the Republic of Kazakhstan "About copyright and related rights".

Further, the following group of objects of the intellectual property, protected Art. 184-1 of Criminal Code Republic of Kazakhstan, is objects of industrial property. The inventions, useful models, industrial samples belong to industrial property.

The public relations, namely, property, and the related non-property relations arising in connection with creation, legal protection and use of objects of industrial property, are object of regulation of the Patent law of the Republic of Kazakhstan, No. 427-1 accepted on July 16, 1999.

The device, way, substance, strains of microorganisms, cages of plants and animals, and also use of the device known earlier, a way, substance, a strain on new appointment can be objects of the invention.

Other objects of intellectual property (selection achievements, topology of integrated chips, trademarks, service marks, names of places of goods origin and others), are regulated by other acts.

The significant contribution in formation and development of science of intellectual property right to the Republic of Kazakhstan, mainly Patent law, was brought by professor Kaudyrov T.E. In particular, it defines system of the legislation on protection of intellectual property rights in two main directions: statistical and dynamic aspects.

All normative legal acts concerning results of intellectual creative activity, make separate subsector of the civil legislation – the legislation on intellectual property. This subsector including according to electronic legal base about 70 regulations of various level, was finally created and assumed logically verified air with acceptance in 1999. Special part of the Civil code of RK. In system of institutes and sections of civil law this subsector it is accepted to call "intellectual property right".

Over time the public relations concerning protection of intellectual property rights developed step by step and supplemented with new laws, normative legal acts. Historically, intellectual property right shared on two main types: copyright and related rights and patent law.

Forming concept of legal protection of intellectual property rights, we will consider contents of the word "protection of intellectual property rights". In Ojegov S. I. dictionaries. Dalya V. I. legal dictionaries there is no separate independent concept of protection of intellectual property rights.

In the dictionary of russian of Ojegov S. I. under the word protection, is understood four different values: in the first understanding it is meant "protecting, to protect from encroachments, from hostile actions, from danger, to protect the child, to protect the city from the enemy, to protect, secure against something, to defend (opinion, views) before someone's criticism, objections, to protect the point of view, to defend the dissertation, the project, the diploma – publicly at meeting of an academic council or before the special commission to defend provisions of the thesis, the project, the diploma.

In the second understanding: protection is that protects, serves as defense, to look for protection, be to me protection, to take under protection.

In the third understanding: the word protection makes the collective sense, the protecting party in trial.

In the fourth understanding: the word protection has collective value: part of team (football, hockey) which protects gate to play in protection.

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In Dahl V. I. explanatory dictionary. under the word to protect, protect it is meant to preserve, protect, defend, defend, to intercede, not to give in offense; to close, block protecting, to protect itself, to protect himself. Protection – anything, the subject hiding, protecting, protecting whom or something; defense, protection, board. God – my protection! Protect, defender.

In the legal encyclopedia under Tikhomirov M. Yu. edition. also there is no concept of protection of intellectual property rights. In this encyclopedia the word "protection" (English defense, protection) is understood in two aspects: in the first aspect protection is a complex system of the measures applied to ensuring free and appropriate realization of the subjective rights, including judicial protection, legislative, economic, organizational and technical, etc. means and actions, and also self-defense of the civil rights. In the second aspect protection is the right accused or suspected to be protected from charge by means of statements and petitions, uses of legitimate rights, etc. in the resolved way, and also at any stage of process to demand presence of the defender. The defender has to watch strict observance of formalities during process and, without breaking a duty to give truthful evidences or without applying the proofs forging truth, to take measures to that the accused wasn't condemned without sufficient proofs.

About the importance of protection of inventions Shershenevich G. F. notes as follows: "the exclusive situation created in favor of the inventor by the right provided to it, puts it in especially advantageous position in comparison with other producers".

According to Gavrilov E.P. "about protection of copyright speak when they are violated or can be broken, i.e. there is a threat of illegal invasion into the sphere of copyright belonging to a certain person (including the organizations). [28, p. 50].

Historically, intellectual property right shared on two main types: copyright and related rights and patent law. "The patent law, - according to Kaudyrov T.E. is a set of the norms regulating an order of registration or other registration, use, the order, protection of the rights for objects of industrial property".

Other subsection of institute of intellectual property right Kaudyrov T.E. calls copyright.

This formulation, certainly isn't applicable to protection of intellectual property rights, and in our opinion demands some completion since, specifies only certain narrow part of the public relations.

Besides, word "set" often applied in legal literature makes the sense consisting in biological interaction of live organisms therefore, in our opinion, replacement of the word "set" by the word "complex" in this connection, we offer the following formulation is more ethic:

The legislation on intellectual property represents a complex of the rules of law, regulating public legal relationship in the sphere of the intellectual property, arising in the course of creation, registration, realization, use, protection of intellectual property rights.

Thus, proceeding from the above, legal protection of intellectual property represents a complex of the rules of law, regulating public legal relationship in the sphere of the intellectual property, arising in the course of creation, registration, realization, use, protection of intellectual property rights.

Copyright – a complex of the rules of law covering public legal relationship in the course of creation, registration, use, protection of the rights for objects author's and the adjacent rights.

Patent law – a complex of the rules of law covering public legal relationship in the course of creation, registration, use, protection of the rights for objects of industrial property.

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Conceptualizing security measures on mobile learning for Malaysian higher education institutions

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Abstract

The paper examines the existing researchers view on security measures on mobile learning. In general, it discovers related measure on security which includes reliability, trust, privacy and security itself. Each measure is widely used as determinants in previous studies and its range in some environments and perspectives. Reliability and security determinants are widely adapted to measure in terms of the infrastructure of mobile learning environment, while trust and privacy mostly measure behaviours and perceptions from the user or human towards mobile learning. Furthermore, the study will also investigate the infrastructure and components of mobile learning itself in order to determine the security vulnerabilities that may involve in the mobile learning environment. Other security features that are discussed at glance include the key distribution and management, information confidentiality and privacy, secure routing, intrusion detection, data integrity, entity authentication and secure data aggregation. However, at the end of this study, mapping on the relevent security measures with each component of mobile learning will be formulated for further study.

Keywords: Secured Mobile Learning; Trust; Reliability; Privacy; Users Loyalty; Malaysian Higher Education Institution;

1. Introduction

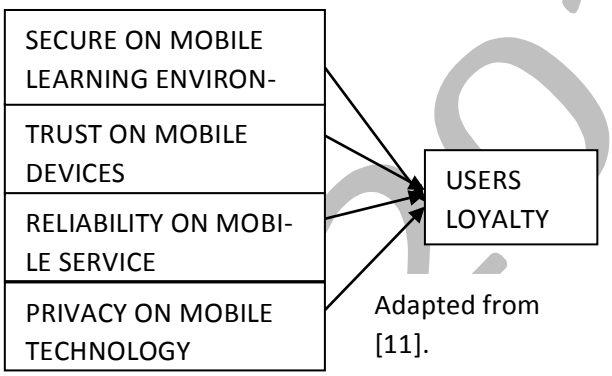
Since in the year 2006, people were moving to webs 2.0, therefore teaching and learning were expanding towards the e-learning style. The birth of Y generation which hunger of online communication supporting with the existence of gadgets such smart phones and tablet PCs in the market also drive the trends of mobile learning to take in part. Malaysians nowadays are also accepting the new era of online communication and heading towards mobile computing. Thus, mobile learning is an initiative for Malaysians to have/engage lifelong learning especially for those who are employed and those who have anxiety in information seeking. The term M-learning approach is given to the delivery of learning materials by the means of mobile devices that can be accessed from anywhere at any time. Currently, some of the higher institutions use the Mobile Learning Systems (M-LS) as a complementary to obtain the aforementioned advantages. Due to the varieties and limitations of mobile devices, there is no conventional standard or specification to develop the M-LS. Thus, there are various types of M-LS using different specifications depending on the case study. Nevertheless, evaluation has been made according to their capabilities and services that they support using some of the indicators which are specified in (Dye and Torstein 2008; Attewell 2005; Evgeniya et al. 2005; Naismith et al. 2005; Riaza & Fazilah 2010). This include the types of supported mobile devices; availability of content; supported types of data and tools used; and types of information. (Devinder and Zaitun, 2006) have developed the M-learning application for wireless classrooms at the University of Malaya which aims to facilitate the educational opportunities of teaching in a real time wireless classroom using the Pocket PC, notebook and mobile phone as learning instruments on the Windows platform. Moreover, (Anang et al., 2006) have also developed the M-learning management tool in campus-wide environment by using the Microsoft.Net infrastructure which is the Windows platform. Learning theories have also been proposed to be included in the IDM. Amongst them include the

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Behavioral theory, Cognitivism and Constructivism. All these learning theories serve an essential part in the students' learning and understanding (Riaza and Halimah, 2011).

2. The proposed framework

The model below was conceptualized when studying existing literature on security and related variables. Based on the literature reviewed, we adopt the measures that cover the components of people, hardware, software, data and procedures that govern the mobile learning environment. (Rob, coronel, 2013) stressed in their database management book that in order to secure data in the database management system, we need to entirely secure the whole component of information system itself. Thus, elements secured on mobile learning represent the people's perception on mobile learning and the element of privacy will look at the data side or information privacy on the mobile learning framework, where trust on mobile device is associated in identifying how secured the hardware and software used in mobile learning are. In addition, the reliability indicator on mobile service will investigate the availability of the process flow (procedure) in mobile learning.



Adapted from [9], [10].

The dependent variable for the proposed study is selected based on the review and comparison of literatures on previous studies and it is named as the user's loyalty. This variable widely exists in the study on related areas of the marketing field. Most of the studies are related to loyalty no matter in the context of services, product or technologies as it is always associated with the element of trust (Zhou Dou, Hongxiu Li and Yong Liu, 2010) and (Roostika, Ratna, 2011).

3. Secured on mobile learning

The element of security plays a major role in any type of application. Higher institution members are concerned about the authentication and security of mobile learning. A secure mobile communication should possess the following security features: key distribution and management; Information confidentiality and privacy, secure routing, intrusion detection, data integrity; entity authentication and secure data aggregation. All of the above features must be provided if we want to have a fully secured transmission of learning materials by the means of the mobile devices mentioned as well as wireless computing. The two important security requirements - confidentiality and data integrity can be fulfilled by implementing simple link-layer security mechanisms that encrypt packets and employ message authentication codes. The Authentication is also an important security property as it ensures the receiver that the message did came from the originated or right sender.

(Catalin Boja et'al, 2011) proposed the Secure SMS Communications for the M-Learning Services in 2011 where the SMS communication delivers in real time different announcements, information, alerts,

tasks. Basically, the use of SMS is to define a mobile assessment architecture based on short quiz tests where students receive questions and submit the answers via SMS.

(B. Schneider,1996) briefs the transmission of encryption and decryption key through a secured channel. The Advanced Encryption Standard (AES) is also known as Rijndael. This is a standard algorithm for symmetric encryption, adopted as a standard algorithm by the US National Institute of Standards and Technology (NIST) which defines data security procedures in governmental institutions.

(Lirong He, Lisha He, Ian Rogers.) proposed a Network Assisted Authentication Protocol (NAAP) for the M-Learning in low cost computational, communication and storage requirements on mobile devices in an asymmetrical approach proving pear-to-pear authentication and key establishment. However, it has not been proven suitable for other security requirements like confidentiality and data integrity.

4. Trust on mobile devices

(Lu, June et al. 2008). described mobile trust as a complex social phenomenon that reflects technological, behavioral, social, psychological, and organizational interactions between various agents. It is further proven by (Mohamad Noorman Masrek, Nor'ayu Ahmad Uzir and Irni Iliana Khairuddin, 2012) in their study on the adoption of mobile banking which covered on the trusting belief in mobile technology, trusting belief in mobile devices and trusting belief in mobile services.

Hence, as this study is related to mobile learning, we will adopt a trust element for mobile devices (Choi, K. J. Kim and S. J. Ahn, 2012) which used 4 items. The two items selected will discover the smart phone application provider is reliable and trustable. Another two items constructed to know level of confidence towards application and security applications produce by smart phone provider.

5. Reliability on mobile services

Most literatures relate reliability of the technical aspect of the security such as the mobile applications reliability and network reliability: (Anang Hudaya, Ahmad Mahmud, Ahmad Izuddin, Miziani Abd Rahman, 2006), (Mahalingam, S., 2012) and **(**Wolfinbarger, M., Gilly, M.C., 2003). The reliability of network for example technically will study on secure routing, authentication, instruction detection, Access control and other network issues. On other perspective which involves human behavior towards the technology (Cho, Jin-Hee Cho, Swami Ananthram and Chen, Ing-Ray., 2011) in defining electronic retailer service quality have grouped reliability/fulfillment as involving accurate representation of the product, on-time delivery, and accurate as what have been ordered.

However, in this study, the reliability measure will look into mobile learning services that are used for obtaining and use of information available in the mobile learning environments for the purpose of learning process which includes learning discussion in forum threads, uploading assignments, online quiz or assessing scores and results and others. Thus, items that are appropriate to adopt are from (Du Jiang, Lu Jong, 2013) which generally cater for the objective of selected measures. The listed items are as follows: REL1: My mobile services quickly deliver what I order. REL2: My mobile service runs on reliable and secure networks and platforms. REL3: My mobile service makes services available for delivery within a suitable time frame. REL4: My mobile service insists on providing a long-term service.

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6. Privacy on information and mobile learning technology

The element of privacy is always related to data and information. (Parasuraman, A., Zeithaml, V.A., Malhotra, A., 2005) defined privacy as the Degree to which the customer believes the site is safe from intrusion and personal information is protected. Privacy become one of the measures in this study and can be leverage into three division of information privacy: personal information, credit card information and purchased information.

(Carlos Flavián, Miguel Guinalíu, 2006) provided an example on web commerce-related mobile users where over 40 percent of consumers feel that their privacy is jeopardized and that the government probably monitors their transaction through web filtering. In detailed, their study analyzes the effect of privacy and perceived security on the level of trust shown by the consumer in the internet which is includes honesty, benevolence and perceived competence. Instead, this study also tests the relationship between trust in a web site and the degree of loyalty to it.

In slightly differ perspective, (Parasuraman, A., Zeithaml, V.A., Malhotra, A., 2005) had studied on electronic services quality on web that process online purchase which include privacy as one of the measure. However, in this context of study it will use information as context and the selected items such as in the list: PRI1: It protects information about my mobile learning behavior. PRI2: It does not share my personal information with other sites. PR3:1 I feel like my privacy is protected at this mobile technology (Carlos Flavián, Miguel Guinalíu, 2006). PR4: I feel safe in my transactions with this mobile technology (Parasuraman, A., Zeithaml, V.A., Malhotra, A., 2005). PR5: This mobile technology has adequate security features (Parasuraman, A., Zeithaml, V.A., Malhotra, A., 2005). PR6: The mobile service has adequate security features (Cho, Jin-Hee Cho, Swami Ananthram and Chen, Ing-Ray., 2011).

7. Privacy on information and mobile learning technology

Loyalty has been widely measured in many perspectives and fields of studies. It is supported by (Hur, Y., Ko, Y. J., & Valacich, J., 2011). who mentioned that loyalty covers all the behavioral and attitudinal aspects which can also be expressed in many ways depending on the products/services and situations, such as retention, making re-purchase and financial/non-financial contributions. In web site perspective, (Insh, Andrea., 2008) the E-loyalty to a sport website was defined as a sport consumer's intention to revisit a sport website which contains both the conative phase and the action phase. Both phases are focused on to assess whether the consumer is expected to revisit the website and make decision whether to engage in purchasing behavior or vice versa.

In another context, loyalty is also associated with customer satisfaction and the term is widely used in the marketing field of study. (Yee, Beh Yin and Faziharudean, T.M, 2010) studied on the relationship between customer satisfaction, customer complaint and customer loyalty in the context of place satisfactions among Scotland city residents. Thus, for our study we decide to have a dependent variable of the user's loyalty in order to determine whether students in the Malaysian higher education will continuously use mobile learning.

In this article, we identify overall measures that should be including securing all components of mobile learning. We therefore proposed framework to be used as a predictive tool for assessment of secured mobile learning environment from the user's perspective. Next, we researcher plan to conduct a survey among the Malaysian local university located at Klang Valley area using the measures identified in the proposed framework. Then, an improved framework will be take place based on the findings gathered from the survey soon.

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8. Conclusion

In this article, we identify overall measures that should be including securing all components of mobile learning. We therefore proposed framework to be used as a predictive tool for assessment of secured mobile learning environment from the user's perspective. Next, we researcher plan to conduct a survey among the Malaysian local university located at Klang Valley area using the measures identified in the proposed framework. Then, an improved framework will be take place based on the findings gathered from the survey soon.

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Conservation education techniques: the role and importance of modern technology

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Abstract

Between all of the professional education disciplines, architectural education is an interdisciplinary model that acquires a different character due to the transfer of design consciousness process and necessity of being carried out in a coordinated manner with other disciplines. As a result of differentiation, education and teaching process is getting a difficult situation, intellectual background for implementation of training intensity causes time issue. According to this fact, different methods in different schools of architecture are being tried even every faculty members are developing strategies that can be called subjective. Developed in different ways from each other, the common point of all this training strategies should focused on modern technology based student-centered education to increase the quality of education.

Restoration is one of many major fields of science, located under the discipline of architecture that transfers past to the future by reflecting the characteristics of its age and maintaining cultural continuity in history. Owing to the fact that restoration defines multi-dimensional, multi-faceted and very problematic area it needs collaboration of different disciplines such as architecture, urban planning, sociology, art history, archeology and engineering.

A successful restoration practice can be achieved by group of experts, well educated in their fields. Thence, restoration education should be given in this context. Documentation and building survey works, is at the basis of restoration practice and in our country carried out by conventional methods. The mentioned systems' excess of workload and the high error margin reduces the reliability of the documentation and survey works. Conversely revealing accurate, reliable and fast data with modern methods increase necessity of preference of these methods require. Due to education of the target audience is the generation of the technology era that gave birth to modern methods, the use of technological equipment for students interested in the course will increase the susceptibility of the education will ensure successful.

Erciyes University Faculty of Architecture is improving its "restoration training" in the light of this approach. Technological surveying methods have been examined, most compatible program packages for student knowledge and architectural education have been investigated and Tachycad, Point Cloud and Photoplan programs were preferred. Necessary background produced by getting trained on pointed programs and purchased technical equipment. Educational strategy, supported by the established background, has been used primarily in the education of graduate students and has been applied on the sample American College Building which located within the Social Establishments region of Erciyes University. Our faculty aimed at improve technology-assisted learning strategies on behalf of achieving accurate and reliable restoration practices and implementing this method in undergraduate education. With this proceeding, the implementation process performed and the necessity and practicability of these methods will be described and be presented.

Keywords: conservation, education, modern technology

1. Introduction

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Historic surroundings in which cultures are built that identify a process, a way of life and the development of society as the most obvious example of the level of production and significant savings should be handled down to future generations. In a globalized world in which cities have quickly begun to resemble each other, the distinguishing depicting of the history of mankind that makes it special and historic buildings and environments are now recognized as world heritage sites the conservation of which is managed by international decisions.

We cannot deny the role of notion in architectural practice which goes beyond designing and building process. In renovation studies concerning the maintenance, repair and protection of existing buildings, notion is meaningful when it is fed by knowledge which comes from practice, because the most important point is to preserve structures for the future without damaging their unique features. Determining, describing and documentation of the historical structure's plan and façade schemes in their own ratio in an accurate way is the most important phase of the conservation process.

The importance of the renovation phase, which can be defined as establishing the present situation of a historical structure and transforming it to drawings, is very significant in the total process. The simplest mistake made during this phase can cause major problems like miscalculating building ratios which cannot be fixed even if all the other phases are performed correctly. In this point we can clearly see the importance of the measuring process which forms the basis of renovation. The simplest mistake made while taking measurements will affect all the whole process in a negative way and cause waste labor and money. As can be understood from the explanation, conducting renovation work according to international standards is directly related with minimizing the error margin in renovation. In order to achieve more accurate results it is essential to use modern methods instead of traditional methods.

However in this point, we must not forget that to improve the quality of work in keeping with international standards the problems faced should be solved with instant decisions, responsibility, sensitivity and knowledge because every structure has its own unique problems. In the process the renovator chooses or combines the hardware and methods he/she will use.

2. The importance of survey studies and the methods used

Structures need to be protected and their close surroundings, which is defined as cultural heritage, is a process which exemplifies the lifestyles, education, technological levels, social, political, physical and economical conditions of civilizations which are in cultural persistence in a concrete way. While reflecting the mission of the period in which they existed, at the same time these structures also give information about that period's building materials and techniques. The historical formations which need to be protected as the most important treasures of nations are today not able to resist the effect of time and are losing their unique features which have been spoiled, by serious corruptions, even some are even on the point of destruction. In this context we can clearly see the necessity of protecting the monuments and documentation.

Survey is not only a part of protection; at the same time, it is also done so it can be used by documentation and scientific researchers. Thus, lots of researchers like Alby, Grussenmeyer, Perrina (2005) and Eruzun (1989) have stressed on the importance of cultural continuity and protection, introduction, archiving, etc. for in the purposes of documentation. It is possible that, with the potential of the students they have, universities can achieve documentation and inventory formation steps in a rapid and reliable way and create an open database for the use of researchers. Because of the impossibility of providing protection in the short term to our rapidly perishing historical heritages and also because of the risk of losing unique features while the restorations are being done, universities which only focused on scientific concerns far removed from budget and commercial pressures have to take a role in this field in a more effective and active way. In this way it would be possible to form extensive archives which other disciplines could use.

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The surveying methods used in survey studies are divided into two main categories, traditional methods and high technology supported methods, both of which are explained with their advantages and disadvantages below.

2.1. Traditional methods

Constructions built by using methods such as dividing in triangles, Cartesian coordinates methods and gridding, which are described as traditional methods, are measured by tape measure, plumb, compass, range rod, leveling rod, nivo, etc. The project planning is done by the drawing teams with these measurements. Because of problems like, working separately as surveying and drawing teams, processing the measurements taken on site to the plot, the coordination malfunction between the reader and writer while processing it on the plot, not stretching the steel measuring tapes enough on wide areas or shifting the zero point while stretching result in reducing the sensitivity of the work, and contribute to the error margin. We cannot talk about one hundred percent successes in the outcome in the measurements performed with these methods. A disadvantages of traditional methods, high error margin, the exponential increase in millimetric faults, damage to the accuracy of documents and generating a chain of problems by causing errors which are difficult to compensate in the outcome can be listed. However, despite of all these negative aspects, survey studies and training activities conducted at the universities in our country are mostly performed using traditional methods.

2.2. Advanced-technology assisted methods

Pakpen (2013) classified advanced-technology assisted methods as

- Tachometric and Laser Measuring Instruments
  - Laser meter
  - Line laser
  - Protractor
  - Advanced Nivos
  - Advanced Theodolites
  - Total Station
- GPS (Global Positioning System)
- Laser Scanning
  - Tellural Laser Scanning
- Geographical Information Systems and Photogrammetry
  - Sky photogrammetry
  - Tellural photogrammetry
  - Close up picture photogrammetry

In addition to this classification, Hanke and Grussenmeyer (2002) discussed architectural photogrammetry methods by classifying them in to basic theory, procedures and items. Turan (2004) however classified the architectural photogrammetry methods as,

- Single image (monoscopic) method
- Stereo image (stereoscopic) method
- Beam of rays (bundle) method

There are many methods, technical tools and equipments which named as advanced technological methods in today's terminology. However the program, hardware and methods which are used surveying structures will be mentioned. Advanced technology assisted methods are computer-aided methods which allow the progress of surveying and drawing process together. Survey studies with conventional methods, consists of roughly measuring and drawing teams. However the fact that both the office team is far away from the works done on the site and the measuring team does not have the necessary details for drawing results in increasing error margin, thus damaging credibility. In the survey studies done with advanced-technology supported methods, these methods prevent the teams from being divided and provide site and office collaboration, bringing the site to the office venue.

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The most important device to use with the advanced-technology based methods in survey studies, with positive properties like sensitivity, credibility and providing multiple purpose usage, is the laser scanner. The data obtained by this method, include documentation on the whole structure, provide the data like photographs, sections, plans and details which cannot be obtained with other methods.

Another advantage of using advanced-technology based methods is being able to position the devices which are going to survey at a definite distance to the area which is going to be measured and thus being able to take the measurements of places which are at risk of collapse or hard to reach in a correct and safe way. Using these methods also minimizes the error margin which is caused by taking measurements from a close distance with traditional methods and devices which have low sensitivity and they also protect the team from risky situations.

When the laser scan is completed with the laser measuring devices, with the gathered 3 dimensional data we can take positions from every point and create unlimited sections. Also in despite of their high initial investment costs, in documentation studies done with these methods less human power and time are required. Therefore in the long term there is a reduction in time and human effort however the most important thing that they provide information to scientists from different subjects with this real documentation. Gathering the documentation in a numeric way and which is digitized enables us to keep, store and update this information better when necessary and in an interdisciplinary context to utilize the documents in the most effective manner.

3. Restoration education at present

3.1. Restoration education in the architecture faculties in Turkey

Architecture is a special profession which involves engineering, design, art and social studies. The architecture education given has to be multi-dimensional, dynamic, varied and connected with technology. This situation is causing problems, for the students, who have learned lots of things in a short time, as they become overwhelmed and very often cannot use the necessary information he/she has learned, at the required place and time. Renovation art is one of the various disciplines in architecture and has its own rules and terminology. Using technological methods in protection applications, which need multi-partnered study platforms, is unavoidable. In fact in this context researchers like Taşlı, Pektaş and Erkıp (2006) declared the importance of using computers and programs in architecture education and their positive effect on productivity.

Table. 1. Restoration education programs of the top 10 government-run universities of Turkey.

University Name	Obligatory lessons (hours per week)	Obligatory lessons (total ECTS)	Elective lessons (total count)	Practical Traning (total weeks)
İstanbul Technical University	6	8	8	0
Middle East Technical University	3	4	6	0
Mimar Sinan Fine Arts University	2	2	10	15
Yıldız Technical University	4	3	8	0
İzmir Institute of Technology	0	0	4	6
Dokuz Eylül University	6	7	11	6
Uludağ University	7	9	5	0
Eskişehir Osmangazi University	0	0	0	6
Abdullah Gül University	6	6	4	0

When renovation education in licensed degree courses in Turkey is inspected overall it is seen that the education is given in a traditional way but when the students graduate and started to work in this field it is seen that they cannot use the knowledge they have learned in an effective way. The most important reason for this is that the professionals have forsaken traditional methods and continued their studies with advanced-technology supported methods.

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When the education programs and lesson contents of the top 10 government-run universities are inspected we can clearly see that restoration disciplines are not an offer in their curricula. The reasons for this maybe budget cuts and not having the necessary equipment and correspondingly, not offering these disciplines in the lessons available.

3.2. Erciyes university architecture faculty and renovation education program

The lessons on offer in Erciyes University Architecture Faculty's renovation departments include 9 hours of obligatory lessons and 23 elected lessons of 2 hours each. The first obligatory lesson, Protection and Documentation of Historical Environment I, involves 2 hours of theoretical and 3 hours of practical lessons making a total of 4 credits. Within this lesson framework students are given instruction in how to conduct renovation, survey, restitution, and classify monument types and to take measurements and make drawings in this context. The other obligatory lesson, Protection and Documentation of Historical Environment II, involves 2 hours of theoretical and 3 hours of practical lessons making a total of 3 credits. The content of the lesson involves taking measurements and making drawings of a structure or a whole street in a historical setting. Also there are 26 elected lessons offered at the renovation department which are in different subjects like New Functions for Old Structures, Design in Historical Textures, Architectural Elements in Traditional Textures, Material Protection in Traditional Textures and Protection Theory. In applications in this area, the targets are to protect cultural heritage, determine the historical structure stocks of Kayseri and its surroundings, make inventory studies, conduct archiving, protecting the present cultural heritages potential and bringing it to a more perceptible situation.

To avoid giving education in a traditional way in licensed degree renovation education, research has been conducted and funds provided. However, for reasons such as crowded classrooms, the equipment being expensive and the problem of providing this equipment to the students, instead of making it available to licensed degree students, it has been decided to use it with those who have architecture degrees, in graduate degree classes with fewer students. With the equipment and programs available, graduate students have the opportunity to learn advanced-technology supported methods using the example of the American College which is registered and used as the Erciyes University Social Facilities building. The training for reading the surveying data, program and survey devices is given by the "Kubit" company, from which the programs are obtained.

4. New searches in renovation, the american college experience

4.1. American college structures

At the present day, the structure complex used as the Erciyes University Social Facilities site is occurred from 7 buildings and is located in Kayseri's Talas district. The oldest structure of the campus, the dormitory building, was built in the 19th century and was used as a bond house until it was donated to the American Board foundation in 1889. The other buildings located on the campus were built after the agreement of the American Board Foundation and were used to meet of accommodation and sleeping needs of students. In the education break given because of World War I, the buildings were used as orphanage for children who lost their parents during the war and were returned to the foundation at the end of the war and used as a hospital. The complex continued as a hospital until the American Hospital was closed in 1972. In 1974 the structure complex was bought by Ankara Hacettepe University and transferred to Erciyes University in the same year.

With the feature of being the oldest structure on the campus, the dormitory building also gives an example of the traditional residences of the area. The structure, with its cross-like plan scheme, with additions on its left and right sides has a 480 m2 area of usage. Unique components like the stones used in

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the exterior, the windows and top windows which form the façade, the wooden and stone ornaments in the structure, the dices, the marble basins and the 2 different caves which are entered from the basement are forming the characteristic features of the structure.



Fig. 1. (a) Entrance door from courtyard, (b) Main entrance

4.2. Renovation studies

The campus and the structures on the campus are used to show the graduate students the difficulty of taking measurements with traditional methods due to the structure's physical features. The increase in error margin and concern for ruining the work quality necessitated the use of advanced-technology methods. Of the advanced-technology methods, the laser scan, laser measuring devices and photographic methods, called multiple methods, were chosen and for use in survey studies. With the support of the university, which owns the area, the necessary equipment was bought and this made scientific research project possible.

The project started with the overlays taken with traditional methods and measuring studies using in different methods have started.

4.3. Laser scanner phase

With the laser scanner method, which was chosen to minimize the error margin in measurements because of the structure's unique details, a 3D model is prepared and transferred to digital media. Due to high prices of the devices we employ laser scanning services from a well-known and experienced firm. For 3D laser scanning a device, which can scan 360o horizontally and 320o vertically, is preferred and the sensitivity rate is set to 4mm-2mm. In the measurement process 360o panoramic photography is possible and dataset gathered from these photos is used. While applying the laser scanning method "Faro Focus 3D Laser Scanner" device and "Kubit Lupo Scan Pro" software to read the data are used. For the purpose of fitting the laser scan to a coordinate system on the campus "Focus 6 Total Station" is used. After accomplishing the measuring phase, the data are collected on computer with "Kubit Point Cloud Pro" software and "Kubit TachyCAD" software which works with the "Focus 6 Total Station" device.



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Fig. 2. 3D digital model of the building

At the end of the applied method, a 3D model of the structure which can be read in AutoCAD and fits the satellite coordinates, in other words the "point cloud" data and the "ortho-image" images formed in dots of black and white, in the scan of the façade, are provided. The laser scanning data which provide the transfer of the project area to digital media are read by "Kubit Point Cloud Pro" software which is attached to "Autodesk AutoCAD 2013" and with the same software plan, section and detailed drawings are done.

The laser scanning method, because of its advantages, is used for the dormitory building and the exteriors of the other structures in the area and for the layout plans of the near surroundings. For the interior measurements of the other structures the Total Station measuring method is used.

4.4. Surveying phase with laser devices (total station) method

"Kubit TachyCAD" software and "Focus 6 Total Station" are used to obtain the plan, sections, detailed surveys and its designated coordinates which are determined by laser scanning. In this phase of the renovation study, the team is supported by intern students of licensed degree level. During this phase the intern students are given training for the program and devices which will be used and have the opportunity to earn experience in using such a method.

With "Kubit TachyCAD" software, which allows the data to cultivate on "Autodesk AutoCAD 2013" software simultaneously, the distinction between the office and the site disappears. As a result all the team members participate in the measuring and drawing phase, the error margin which occurs while transforming information is avoided and at the same time drawing speed is increased, thus the time to achieve final product is reduced.

The measurements made with "Focus 6 Total Station" are done with the "Autodesk AutoCAD 2013" software where the "point cloud" is gathered by the laser scanning data of the structure. Documentation of the structure is done by studying 3D over one file and with this system both the plan and section data are gathered. However during the studies, in the measurement of organically formed caves traditional methods are applied because of the sensitivity of devices and the unsuitability of the working site for advanced-technology methods. This occasion shows us that traditional methods should not be discarded totally and there is need to use different methods together.

4.5. Photographic method

"Kubit Photo Plan Pro" software, which is also used in renovation studies performed with traditional methods in documentation with photography, is preferred for documentating the points which cannot be determined by the laser scanning method in a sensitive and detailed way.



Fig. 3. (a) Original image , (b) Flatten image with Photoplan software

The photos, which are taken with a high resolution camera, with the mediation of "Kubit Photo Plan" software in AutoCAD media, are transformed into planes and with this method; details like doors, windows, ceiling ornaments, syrup holders, and quick and reliable drawings of other unique components are realized.

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5. Result

The transition from one approach to another is always precarious and painful. It is possible to see people who affirming, object to or not embrace a measuring method and the programs related to this. At this point the most important thing is the editing of the chosen measuring methods which have a successor-premise relationship with each other by a person who is specialized in protection and renovation studies. The method and the program which will be chosen may be varied according to each structure's own attributions. In this context recommending an approach which is suitable for all structures is not a good idea. We must not forget that every method has positive and negative sides and the method or methods, considering the structure's attributions, must be determined by a specialist.

However the main point to be dicussed here is the position of universities, which need to be in touch with society in a more dynamic way and their qualifications. When the subject is protection and renovation programs it is obvious that the universities are looking in terms of both academic programs and technological hardware. On the subject of using up-to-date measuring techniques and technology, university renovation programs cannot compete with the private sector's speed while they continue to teach future architects with conventional methods. Universities, due to their autocratic approaches and temporal impossibilities, in terms of the new technologies and technologic hardware which are used and internalized by private sector have been, in application site can not compete with the private sector, nor they can achieve the same speed or success ratio. This situation has to be changed immediately and universities, which are created for producing knowledge and giving education, have to acquire the hardware to follow up-to-date developments.

A university which is not integrated with 21st century's instruments, methods, techniques and technologies, which does not claim responsibility for its own cultural heritage, which is lacking in the use of modern technology, techniques and methods, which cannot develope r&d studies and does not have a position between urban relations and have a active role in transformation and development decisions, may not perform its basic function and it cannot be considered as being in a successful position.

As understood from the arguements given above, protection the notion of and using technology connected to this notion in architectural education is an important area and our country has been unable to solve this problem completely. The main reason behind this is that notions like protection, urban identity and sustainability are not seen as problem of the community in general or as a priority. These notions, which are the concerns of a sensitive elit group, have a lack of support and substructure even in universities.

However, traditional structures, the symbol of social memories and local textures, are the most valuable assets of the countries which have to be protected as treasures. Until this fact will be understood and the norms become priority issues of the broad masses, built environments, which are away from notional background, non-creative and non-constructive, which can not use the possibilities of science and technology, which destroy, may be the most important feature of historical value, the orginality, which do not pay respect to the past, will continue to be produced. The qualified historical environments and urban spaces which obtained by the centuries of expenrience and knowledge, will be enforced while compared with the world's leading conservation practices.

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Correlation between cultural perceptions, leadership style and ICT usage by school principals in Malaysia

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Abstract

School leaders are key factors in implementation of information and communication technology (ICT) in schools. They need to understand the capacities of the new technologies, to have a personal proficiency in their use, and be able to promote a school culture which encourages exploration of new techniques in teaching, learning and management. However, there is less information about the current status of ICT use by Malaysian school principals. This paper investigated the extent to which secondary school principals use computers in Malaysia and determined factors related to level of computer use by principals (cultural perceptions and leadership style of principals). Initial report also highlighted analysis of a baseline data gathered from 520 secondary school principals in the state of Selangor and Wilayah Persekutuan, Malaysia. Findings indicate that school principals are using computers for instructional and administrative purposes and they have moderate competency in computer applications and spent a few times a week working on their computers. Also, cultural perceptions and transformational leadership contributed significantly to the level of computer use by principals. It is anticipated that the data obtained from the study will open new lines of inquiry about the crucial roles of school leaders in the adoption of ICTs and will contribute to decisions about future developmental needs because more will be known about their preparedness for change. Hence, policy makers must design professional development programs, such as leadership studies, in order to teach the components of transformational leadership; idealized influence, inspirational motivation, intellectual stimulation and individual consideration to future administrators.

Keywords: ICT; school principals;leadership style;cultural perceptions and Malaysia.

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1. Introduction

ICT industries have proven to be the backbone of national development in many countries. Malaysia as a developing country is also experiencing a similar trend. Malaysia's total ICT expenditure indicates that more and more local organizations are incorporating ICT into their business activities. The government has prioritized ICT as an issue of national importance and established new agencies and policy initiatives to accelerate its implementation and thereby transform Malaysia into a developed and knowledge-based country (Tipton, 2002). It also accelerates the economic development and quality of life of the society (Lu, 2001). The rapid development in the ICT sectors beyond the expectation has created a vacuum in the employment trend. The ICT industry in Malaysia has enjoyed highest employment growth of 27.9% in 2010 and is expected to register 31% growth in 2013 compared to other industries (Employment Outlook, 2012). Beaumont et al. (2004), however, reported that there is an increase in shortage of skilled workforce in the country despite the increased demand for qualified ICT employees as more and more organizations continue to rely on ICT for their effectiveness and competitive advantages (World Employment Report, 2011).

ICT has pervaded almost every facet of our society. Around the world, ICT is ubiquitous in the business world, the workplace and at home. To ensure that schools keep pace with these developments in the larger society and to tap the enormous potential of ICT in teaching and learning, many countries have invested considerable amounts of resources to integrate ICT into education. Malaysia, for instance had

invested RM1 billion between 1999 to 2005 to facilitate ICT integration in schools, spending mostly on hardware, software, infrastructure and training of teachers (Ministry of Education, 2001).

In discussion about the potential role of technology in education, Fiske and Hammond (1997) stated that instructional technology is considered to be a key to educational quality as we enter the new millennium. Many educators believe that computer use for instructional purposes can be employed effectively to enhance teaching and learning. In other words, computer technologies can change the teacher's role from information giver to facilitator, counselor, advisor, guide, coach, co-learner, mentor, resource and technology managers, and mediator to the students (Jonassen et al., 1999). Similarly, Attaran and Vanlaar (2001) pointed out that technology reduces record keeping time in schools and simplifies administrative tasks. Also, computer networking is creating a professional band between teachers and administrators. On the other hand, it offers teachers valuable methods of enhancing successful instructions. Besides, computer use assists students in meeting basic educational requirements and it fulfills an instructional need by individualizing the material to the competency level of the learner. In this way, computer use provides an active cooperative learning environment and offers the flexibility that is now mostly absent in the traditional classroom.

In addition, Otto and Albion (2004) reported that although ICT are now widely available in schools, it does not integrate fully into teaching and learning. In line with this idea, Sheingold and Hadley (1990) pointed out that integrating technology is not about helping people to use computers but it is about helping teachers to integrate technology as a tool for learning. In fact, in the ideal teaching and learning setting, technology should be as transparent a tool as a pencil. Therefore, technology integration in classrooms is more about teaching and learning than it is about technology (Mills & Tincher, 2002).

Unfortunately, the implementation of ICT into the Malaysian schools has not been guided by research. The "initiation stage" (Rogers, 1995), which demands information gathering and planning, has been overlooked in the urgency to implement ICT in schools. A key element that has been left out understands the cultural perceptions of the end-users toward these new tools. Such inattention to the principals' cultural perceptions may generate unforeseen repercussions for ICT diffusion in Malaysian schools. Many technology experts have pointed out that the integration of ICT in education should occur in the light of the cultural conditions of the country and the prevailing school culture (Watson, 1998; Harper, 1987; Thomas, 1987). Obviously, unless principals recognize the importance of ICT for their school and national cultures, they will not use it in their classes. This study is poised to investigate the extent to which secondary school principals use computers in Malaysia and determine the factors related to the level of computer usage by principals (cultural perceptions and leadership style of principals).

2.0 Literature review

2.1 Leadership style and integration of ICT at schools

Integration of ICT into education, as Eib and Mehlinger (1998) define it, is a procedure in which instructional technologies such as computers and software are applied regularly to support both teaching and learning across levels and subject matter. There has been a significant amount of research devoted to the integration of ICT in schools, its effects on student learning and attainment, and hindrances that prevent its successful use (Becker, 1993; Butzin, 1992; Cafolla & Knee, 1999; Cradler, 1999; Kozma & Croninger, 1992). While some researchers have indicated the benefits of integrating ICT into education (Holinga, 1999; Taylor, 1992; Wibur, 1997), others have found that applications of ICT in the classroom conferred little or no positive improvement in student attainment (Slavin, 1991; Stevens, 1992). Picciano (1998), on the other hand, observed that the benefits that ICT integration confers on student attainment are not uniform at all grade levels.

While Baily (1997) suggested that the focus of ICT application should be teaching and learning due to its potential use in the classroom, Levinson (1990) pointed out that in addition to providing support in teaching and learning, ICT may be used to alleviate common problems in school such as teacher shortage and high costs of education. Technology could also create new solutions to cope with the spect-

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rum of needs that arise in the classroom in this information age (Krajcik, Soloway , Blumenfeld, & Marx, 1998).

In the age of information, principals must be able to integrate ICT into their daily practice and to provide consistent and positive leadership for technology use in the teaching-learning process. In fact, they must be technology leaders. According to Hope, Kelly and Guyden (2000) technology leadership involves both understanding the technologies and how they can be applied to accomplishing tasks. In a study that examined the role of administrators in the integration of technology into the learning environment of three United States school districts, Gibson (2002) stated that school principals must focus their energies on ten technology categories: existing practice, planning, curriculum, resources, staff issues, communications, support, obstacles, staff development, and implementation. In this way, principals need to understand the capacities of the new technologies, to have a personal proficiency in their use, and be able to promote a school culture which encourages exploration of new techniques in teaching, learning and management (Schiller, 2003). Therefore, schools need leaders who can facilitate the change process and support a learning community for technology integration.

According to Fullan (2003), no successful large-scale change or school reform effort has advanced very far without the support of the school leaders. Similarly, Schiller stated that "principals have a key role to play in the facilitation of educational change" (p. 4). In his studies of the elementary school principal as a change facilitator for ICT, Schiller (2003) concludes that principals who take an active approach to innovation can foster an environment that has greater benefits for their students and staff. Hence, principals' awareness, understanding and use of ICT are essential for effective use of computers in the school (Smith et al., 1999). A school administrator needs to be familiar with ICT and know what to look for in the classroom if effective supervision, evaluation or support for a classroom teacher is to be made (Fleit, 2000). This view is supported by Hope, Kely and Guyden (2000) who noted that school leaders should use technology themselves, developing an awareness of how technology can be used and modeling the practice to the school staff. Similarly, Stegall (1998) stated that it is important for principals to use computers, to seek assistance and advice from experts, from a technology committee, visit other schools, brainstorm ideas and hire and train technology 'savvy' teachers. Therefore, successful ICT development within the school will require the leader to be aware of the possibilities and future development of technology and how the school might integrate these into teaching and learning.

Given the enormous potential of ICT to impact upon education, it is imperative that factors that influence the success of ICT integration efforts be explored. Many researchers have identified effective leadership as a key ingredient of, and vitally important to, the success of any innovation in education (Bennett, 1996; Fullan, 1993). In particular, Becker (1993) contends that leadership is even more critical for successful integration of ICT in schools today. Rieber and Welliver (1998) also recognize that effective leadership is needed to enhance the transformation of our education system by taking advantage of the potential of ICT. Others go so far as to say that the success or failure of integration efforts rests on the shoulders of school leaders (Salzano, 1992). Substantiating the view that leadership is a critical factor in ICT integration efforts, Lockard, Abrams, and Mary (1990) explain that ICT integration is an enormous task that entails considering many issues and making many decisions. Agreeing, Dede (1992) points out that as leaders influence, make decisions, provide support, and model behavior , the possible impact leadership can have upon successful ICT integration is obvious.

2.2 Transformational leadership

Transformational leadership is seen as a promising form of leadership for advancing educational institutions because it can cause essential change, resolve major concerns, and create new paradigms (Banerji & Krishnan, 2000). Such a leader supports open communication which creates team motivation. S/he also helps build the confidence of her/his team members by providing necessary training and encouraging team building. Dimmock and Walker (2000) too affirm the link between team motivation and goal-setting and visioning. Teamwork then, calls for participatory leadership and proactive support for change (Walker & Dimmock, 2000). To this end, a transformational leader possesses the necessary drive to initiate and maintain transformational processes within the organization. S/he must be capable of articulating a convincing and realistic vision and focus others towards a new critical path. If required, the organization may need to be redesigned to support the transformation (Banerji & Krishnan, 2000).

Charbonneau (2004) noted that the popularity and attractiveness of this leadership style stems at least in part, from its consistent association with superior performance in a range of organizations. Trans-

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formational leaders facilitate the thinking of old problems in new ways. They are often capable of communicating a vision and mobilizing the energy necessary for change. Their behaviors and traits include empathy, the need for power, good rhetorical skill, intelligence, and the consideration for others. The effect of this leadership style is that it inspires or motivates followers, gains commitment from followers, changes attitudes and supports the goals of the individual and organization.

According to Schein (1992), the most intriguing leadership role in culture management is one in which the leader tries to develop a learning organization that will be able to make its own continuous diagnosis and self-manage whatever transformations are needed as the environment changes. The learning leader must exhibit the self-confidence that active problem solving leads to learning and thereby set a suitable example for other members of the organization. The process of learning must eventually be made part of the culture and not seen as any given solution to any given problem (Schien, 1992).

Despite its limitations, there are certain elements of transformational leadership which do lend themselves to educational and ethical consideration. It appears to be very important for leaders and educators to have a clear vision of what they want to achieve and how they want to achieve it. Moreover, when its heroic implications are reduced or eliminated, transformational leadership can advocate for processes that involve the contributions of all parties, rather than being a matter of one person "doing leadership" to others (Bottery, 2004, p. 19). Future leaders will be their ability to instill a learning mindset into their organization. The upcoming generation of leaders will have to be a generation of learning evangelists by highlighting the importance of learning and establishing a context where employees want to and are able to learn. Corporate leaders will have to be more capable of strengthening their organizations for future challenges and increasing competitive and innovative abilities (Brown & Posner, 2001).

Educational professionals are being objectified and stratified into leaders and followers according to neo-liberal versions of the performing school. Leadership is being defined as particular tasks and behaviors that enable those who are responsible and accountable for learning outcomes and measures of school improvement. However, this objective definition of leadership does not float free of organizational and personal histories that also shape and enable agency, and how real people with real lives struggle within and through the contradictions that challenge their values (Gunter, 2001).

According to Northouse (1997), one of the best styles of leadership is transformational leadership that can change and transform individuals. Transformational leadership occurs when one or more persons engage with others in such a way that leaders and followers raise one another to higher levels of motivation and morality (Burns, 1978). An important goal of a transformational leader is to develop followers beyond their potential (Lee, 2005). Hence, transformational leaders try to develop and satisfy the higher-order needs of followers to gain their followers' commitment to the organization (Rowden, 2000).

The concept of transformational leadership has acquired wide popularity among leadership researchers during the past decade (Lowe, Kroeck et al., 1996) because of its qualitatively different approach to motivating followers as compared with other leadership styles (Howell & Avolio, 1993). Bass and Avolio (1994) described transformational leadership as being composed of four unique but interrelated behavioral components: inspirational motivation, intellectual stimulation, idealized influence, and individualized consideration. Several empirical and theoretical studies have found that leaders who display these four behaviors are able to realign their followers' values and norms, promote both personal and organizational changes, and help followers to exceed their initial performance expectations (Jung & Avolio, 2000). Therefore, transformational leader is noted as one of the most important factors affecting the integration of educational technology and has input into all the essential conditions that promote the integration of educational technology (Brooks-Young, 2002; Ross, McGraw & Burdette, 2001).

2.3 Transactional leadership

Transactional leaders focus on the interpersonal exchanges that occur between themselves and their subordinates. Bass (1998) argued that transactional leaders are motivated by what is easily identifiable and measurable. According to Bass (1985), transactional leaders are more reactive than proactive; less creative, novel, and innovative; more reforming and conservative; and more inhibited in their research for solutions. Yukl (1999) postulated that transactional leadership includes a diverse collection of mostly ineffective leader behaviors that lack any clear common denominator. Lowe and Galen (1996) reported that transactional leaders operate within an existing system, avoid risk, prefer effective answers

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and are less likely to support the status quo. Bass and Avolio (2004) delineated the following key aspects that include transactional leadership.

- Contingent Reward – providing others with assistance in exchange for their efforts; discussing in specific performance targets; and making clear what subordinates can expect to receive for their efforts and expressing satisfaction when subordinates meet expectations.
- Management by Exception (active) – focusing attention on irregularities, mistakes, exceptions and deviations from standards; closely monitoring failures and punishing subordinates for their failures; and anticipating problems and making changes before those problems become too bothersome.
- Management by Exception (passive) - failing to intervene until problems become serious; avoiding specifying agreements, clarifying expectations and providing goals;
- Laissez – Faire – showing a total absence of leadership ; avoiding getting involved when important issues arise ; being absent when needed ; avoiding making decisions ; and delaying response to urgent questions subordinates are given.

Burns (1978) espoused that transactional leaders motivate followers by appealing to their self-interests and needs. In order for this exchange to occur, goals and objectives, as well as contingency rewards and inducements; must be offered.

Researchers have sought to identify which leadership style or which elements of particular leadership styles can be linked to positive outcomes such as job satisfaction, follower motivation, and organizational performance. The body of literature in this field is vast; Judge and Piccolo performed a meta-analysis of 626 correlations from 87 sources to relate transformational, transactional, and laissez-faire leadership characteristics to the aforementioned outcomes (Judge and Piccolo, 2004). Their findings support a link between effective leadership and all dimensions of transformational leadership (idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration), as well as a single dimension of transactional leadership, contingent reward. Though transformational and transactional leadership are often presented as being at opposing ends of a spectrum, a combination of select elements from both leadership styles may yield the best results.

2.4 Cultural perceptions

In the headlong drive to incorporate educational technology in schools, the accommodation of the new tools has often taken precedence over the end-users' cultural perceptions toward the media. Many researchers have cautioned about the current lack of attention to cultural beliefs and their impact on ICT adoption in developing countries (Loch, et. al., 2003; Hill et. al., 1998). Researchers suggest that force-fitting the culture to the technology can create an unfavorable climate for the acceptance of ICT in different organizations in the importing country. In fact, Hill et. al. (1998) asserts that, unless taken into consideration, socio-cultural factors may put ICT transfer at risk in certain developing countries. Apparently, the changes developing countries are opting for cannot be attained by simply placing more computers in their schools. Martinez (1999) suggests that one of the major challenges facing developing countries is to make technology an essential part of the culture of the people. In fact, the reverence with which technology is held in technologically developed countries may be in contradiction to the perceptions of cultures that are relationship-oriented (Roblyer, Dozier-Henry & Burnette, 1996: p. 9). Harper (1987, p. 47) contends that cultural factors play an important role in creating negative perceptions toward computers: "One direct cultural cause is people's apprehension that life is becoming too mechanized, so they resist contributing to a "computer culture."

The study of cultural perceptions has been found essential for accounting for teachers' overall attitude toward ICT and for anticipating their future adoption of the new tools (Thomas, 1987; Harper, 1987). In fact, Chen, et. al. (1999) considers cultural perceptions among five main factors that may determine ICT adoption by educators. Unfortunately, however, only a few studies have tried to study the impact of cultural perceptions on the reception/rejection of ICT in education. Apart from the effect of the national culture on technological diffusion in schools, the micro-culture of the school itself may affect such diffusion (Hodas, 1993). Williams-Green, et. al. (1997) contends that the culture developed within an institution or within an organization can act as a barrier to change. For a new technology to be placed into an organization's culture there must be a match of organizational and technological values (Hodas, 1993). Within the school organization, if the technology is not received well by teachers, there must be a mismatch of values between the culture of schools and that of the technology. Watson (1998) found that teac-

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hers' inability to negotiate the role of the computer in their practice resulted in their resistance to its use in their classrooms. Therefore, he warned that the mismatch between the culture of techno centric mindedness and the teachers' pedagogic culture results in the alienation of the teachers from the use of technology. On the other hand, Coppola (2000) found that because the norms of school and community encouraged innovation and autonomy, teachers learned not only how to use computers in their teaching but also how to operate them within the constructivist framework. It seems that the integration of ICT in schools cannot be effective unless escorted by supplementary programs that would foster a culture of acceptance amongst teachers, students, and administrators.

From both theoretical and empirical perspectives, cultural perceptions seem to have a significant impact on teachers' adoption of ICT. Unfortunately, much of the early research on computer uses in education has ignored teachers' cultural perceptions toward the new machines (Harper, 1987). Studies focused on the computer and its effect on students' achievement, thus overlooking the psychological and contextual factors involved in the process of educational computerization (Clark, 1983; Thompson, Simonson & Hargrave, 1992). The delicacy of this situation calls for an investigation of teachers' cultural perceptions regarding the introduction of ICT into their schools and society at large.

3.0 The study

In view of the current state of the literature, this study explores how leadership affects the use of ICT in schools. Specifically, it determines the extent to which Malaysian principals use ICT in their schools and identifies their perceived ICT competencies and their leadership style. These are empirical questions, and we provide some preliminary findings for supporting the efficacy of our expectation.

4.0 Methodology

This was a descriptive study of an exploratory nature. Creswell (2003) suggests that exploratory studies are most advantageous when "not much has been written about the topic or the population being studied". The target population in this study was secondary school principals in the state of Selangor and Wilayah Persekutuan, Malaysia during the 2011-2012 school years. The list of school principals was based on the school principal's directory by Ministry of Education. In this study, a quantitative method was employed to collect data from the population of secondary school principals in Malaysia. Using a survey instrument, quantitative data were collected from a random sample of 520 secondary school principals. The questionnaires are divided into two parts. Part A measures the perceived level of computer use by principals. Part B measures the principal's characteristics; perceived computer competence; and leadership style (transformational and transactional leadership). Face and content validity of the instruments were established by the panel of experts. Moreover, Cronbach's alpha was used to measure internal consistency and calculated via the SPSS 19.0 statistical package. The Cronbach's alpha coefficients for these scales were: Cultural Perceptions Scale=0.611, Transformational leadership style Scale=0.812, Transactional leadership style Scale=0.596 and Level of computer use Scale=0.917.

4.1 Findings

Of the respondents, 42% were males while 58% were females. About 14% (n= 5) of the respondents were 41 or younger, 45% (n=13) were within the 42-47 age range, 33% (n=9) were within the 48-53 age range, 8% (n=3) were 60 or older. Participants' responses on their work experience showed that 38% of them had less than 19 years of experience, 42% were between 20 and 25 years, 17% had 26-31

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years and 3% had more than 32 years. More than half of the respondents (>70%) held bachelor degrees, 27% held Masters' degrees, and about 3% held a Doctorate degree. Nearly 90% respondents owned a home computer. Moreover, all of the respondents reported that they have had computer training.

5.0 Discussion

5.1 Computer use by principals

It can be seen from Table 1 that principals' perceptions of the level of computer use were moderate; with an overall mean score of 3.29. Also, findings showed that principals spent a few times a week working on their computers. It would seem that Malaysian principals need effective and extensive trainings to raise their proficiency in computer use and integrate technology into their schools. Training needs to be ongoing so principals can continue to learn how to use hardware and software applications within the context of their administrative and instructional responsibilities (Brown, 2001).

Table 1: Percentage, Mean and Standard Deviation of Computer Usage

Scale	Percent (%)			Mean	SD
	Low	Moderate	High		
Internet Use	10.1	44.2	46.7	3.49	0.78
Hardware & Software Use	11.7	49.8	43.2	3.27	0.67
Instructional Use	17.6	37.2	44.1	3.36	0.89
Administrative Use	17.2	49.1	36.3	3.19	0.93
Overall Computer Use	12.1	54.2	32.5	3.29	0.79

5.2 Leadership style

5.2.1 Transformational leadership

As a composite variable, transformational leadership (refer to table 2) received a mean rating of 2.79 (on a five-point likert scale). Bass and Avolio (1990) suggested that ideal ratings for the transformational variables should be greater than three (>3.0). Principals did not meet this benchmark. Moreover, we found that a representative sample of Malaysian secondary school principals provided fairly often some elements of transformational leadership. This result suggests that some professional development programs should be provided for principals. In fact, if Malaysian principals want to initiate and implement school change through the use of information and communications technology, they must be eager to model the transformational components of charisma (idealized influence), inspirational motivation, intellectual stimulation and individualized consideration in their schools.

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Table 2: Mean and Standard Deviation of the Transformational Leadership Style

Scale	Mean	SD
Idealized influence (attributed)	2.97	0.68
Idealized influence (behavior)	2.87	0.67
Inspirational motivation	2.69	0.79
Intellectual stimulation	2.56	0.83
Individualized considerations	2.86	0.71
Overall Transformational leadership style	2.79	0.62

5.2.2 Transactional leadership

Descriptive analyses revealed that the respondents (refer to table 3) have a mean score of 2.38 (SD=0.31). It seems that principals display sometimes some elements of transactional leadership. In other words, this result suggests that principals sometimes tend to focus on task completion and teacher compliance, rely quite heavily on organizational rewards and punishments to influence teacher performance, and emphasize work standards, assignments, and task-oriented goals (Bass, 1998).

Table 3: Mean and Standard Deviation of the Transactional Leadership Style

Scale	Mean	SD
Contingent reward	3.13	0.55
Management-by-exception-active	2.89	0.62
Management-by-exception-passive	1.12	0.59
Overall Transactional leadership style	2.38	0.31

5.3 Cultural perceptions

Participants were asked to respond to 10, likert scale type questionnaire dealing with their perceptions about computers' cultural relevance to and impact on Malaysian schools. Cultural perceptions were represented by a mean score on a 5 point likert scale where 5 (strongly agree) represents the maximum score of the scale and 1 (strongly disagree) represents the minimum score. Table 4 illustrates the frequency of respondents' feedback to the cultural perceptions scale.

Table 4: Frequency Percentages on the Cultural Perceptions Scale

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N	Cultural Perceptions Scale	SD (%)	D (%)	N (%)	A (%)	SA (%)
1	Computers will not make any difference in our classrooms, schools, or lives	23.3	50.7	17.3	7.9	0.8
2	Principals need to know how to use computers for their future jobs	1.1	3.3	9.7	60.6	25.3
3	Students prefer learning from teachers to learning from computers	2.8	28.3	39.1	23.6	6.2
4	Knowing about computers earns one the respect of others	0.5	13.7	21.3	48.9	15.6
5	We need computers that suit better the Malaysian culture and identity	2.5	3.4	8.7	63.1	22.3
6	Computers will improve our standard of living	2.5	6.1	8.7	50.4	32.3
7	Using computers would not hinder Malaysian generations from learning their traditions	0.5	3.3	8.2	59.7	28.3
8	Computers are proliferating too fast	16.7	31.1	29.7	16.1	6.4
9	People who are skilled in computers have privileges not available to others	1.3	12.9	21.3	48.9	15.6
10	The increased proliferation of computers will make our lives easier	0.5	6.1	8.7	53.5	31.2

Scale: SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree

From a school culture perceptive, the majority of the respondents agreed or strongly agreed that school principals need to know how to use computers for their future jobs (85.9%), and that the increased proliferation of computer will make our lives easier (84.7%). Also, a high percentage of the respondents disagreed or strongly disagreed with the negatively stated item 1, indicating that computers will make difference in their classrooms, schools, and lives (74%). However, a high percentage of them (39.1%) were neutral about whether or not students prefer learning from teachers to learning from computers. From a national culture viewpoint, the majority of the respondents agreed or strongly agreed that knowing about computers earns one the respect of others (64.5%), contribute to improving their standard of living (82.7%), and computers would not hinder Malaysian generations from learning their traditions (88%).

As can be seen from Table 5, the overall mean on the cultural perceptions scale was 4.0, with a standard deviation of 0.53, indicating that principals' perceptions of the cultural relevance of computers were positive. In other words, principals had positive perceptions of the value, relevance, and impact of ICT as it relates to the cultural norms in Malaysian schools. So, principals did not feel ICT as a threat for Malaysian culture.

Table 5: Percentage, Mean, and Standard Deviation of the Cultural Perceptions

Scale	Percent (%)			Mean	SD
	Negative	Neutral	Positive		
Cultural Perceptions	0.0	26.7	73.2	4.00	0.53

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5.4 The relationship between the level of computer use by principals and the independent variables

The association between computer use and independent variables were explored by using the correlation analysis. The Pearson Product-moment was performed to identify independent variables that individually correlate with the dependent variable. The correlation matrix shows a number of significant relationships between level of computer use by principals and the independent variables (Table 6).

Table 6: Summary of the Correlation Matrix of Independent Variables and Computer Use

Variable	Pearson Correlation	Point-Biserial/ Biserial Correlation	Sig. (2-tailed)
Computer Use	1		
Cultural Perception	0.47**		0.000
Transformational Leadership	0.63**		0.000
Transactional Leadership	0.14		0.08

** p<.01; *p<.05

5.5 Cultural perceptions and the level of computer use

The relationship between cultural perception and the level of computer use was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. There was a moderate and positive correlation between the two variables [r =0.47, n=520, p<0.05], indicating that as principals' perceptions of the value, relevance, and impact of computers as it relates to the cultural norms in society and school increase, level of computer use will improve as well. As shown in Table 6, the p-value was smaller than the alpha value (p = 0.0001 < 0.05) so it can be concluded that there was significant relationship between cultural perception and level of computer use at 0.05 level of significance. The study's results are consistent with Rogers' premise regarding the role of social norms in the diffusion of innovations, and also with Thomas's "Cultural Suitability" hypothesis, which posits that the acceptance of a new technology depends to a large extent on its compatibility with the existing culture. Specially, principals in this study acknowledged the importance of ICT for their educational system and society. It reflects the influence of their cultural norms on their perception of ICT.

5.6 Transformational leadership and level of computer use

According to Table 6, there was a moderate and positive correlation between the two variables [r =0.63, n=520, p<0.05], indicating that as the level of principals' transformational leadership increase, their level of computer use will improve as well. Also, the findings showed that the p-value was smaller than the alpha value (p = 0.0001 < 0.05) so it can be concluded that there was a significant relationship between transformational leadership style and level of computer use by principals at 0.05 level of significance. This result suggests that transformational leadership has a positive effect on the level of computer use by prin-

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cipals. In this way, the applicability of the transformational leadership to information technology projects was well supported by the results of this study.

5.7 Transactional leadership and level of computer use

The relationship between transactional leadership and level of computer use was investigated using Pearson product-moment correlation coefficient. Based on r = 0.14, there was negligible relationship between transactional leadership and level of computer use. This result implies that transactional leadership style cannot influence the level of computer use by principals. This result is consistent with Leithwood's (1994) arguments that transactional practices alone do not lead to systematic improvement and benefits in transactional leadership can only be seen when paired with characteristics of transformational leadership.

6.0 Conclusion

This paper raises some issues about the role of principals in technology integration, determines the extent to which Malaysian principals use ICT in their schools and identifies their perceived ICT competencies and their leadership style. Findings indicate that principals are using computers two or three times a week for a variety of instructional and administrative tasks. In fact, if Malaysian principals want to be successful for their new role as technology leaders, they must understand the role of ICT in their work life and acquire appropriate skills to use this knowledge. In other words, they must be proficient in utilizing the computer to assist in administrative and instructional functions. For example, they should understand word processing, how to construct and report from a data base, how to use a spreadsheet to solve financial problems, how to create reports and link them with a mail-merge package, how to create and maintain files on a disk, how to use hardware available in their district, and how to use specific applications programs in use in their school.

Hence, principals should use of technology and realize the role that technology can play in teaching and learning process. Successful adoption of computer is important for school principals who must use computers and model their use for their staff (Tiede, 1992). If this modeling is successful, the staff may then model the use of computers for students. In this way, principals who do not have positive expectations for computer use or do not instill or support a culture of technology use; integration is inhibited (Anderson & Dexter, 2000). Therefore, principals should have knowledge, skill and positive attitudes towards implementing ICT in schools and also they must know new administrative techniques to manage their schools effectively.

In the age of technology and information, Malaysian principals should become competent in using computers. They should use computers effectively to perform their daily responsibilities. In fact, their ability to use computers helps them become more effective managers in using and analyzing the information that is available to them. The effective use of the computer in management, communication, and decision-making can increase their accountability. Findings of this study indicated that Malaysian secondary school principals are lacking in proficiency on database, spreadsheet, presentation/ multimedia software, the Internet, and information seeking as compared with other technology competencies. Hence, school districts and principals' centers should provide professional development for principals to become proficient in all the competency areas. Also, they should implement an evaluation system that ensures school principals are working with the technologies at a proficient level.

It is also imperative that the Ministry of Education comes up with policies that will guide the use of ICT in schools. The government seems to be lagging behind because whereas computer studies has been introduced in secondary schools as part of the national curriculum, it has not kept up with the provision of the necessary infrastructure both physical and human resources. For example, there has been no

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teacher training course with computer studies as a teaching subject. ICT therefore seems to have been left to the ingenuity of the schools. This may explain the low levels of ICT integration among classroom teachers and the apparent advantage that schools with a principal who has ICT knowledge have. The principals have therefore a professional responsibility and accountability to ensure that they are well trained in ICT and that their institutions have management strategies to enable them to achieve appropriate ICT integration in teaching and learning. At a time when information and communication technologies are being integrated into the classroom as learning tools, and when teachers are being asked to incorporate technology into their teaching practices, principals who are more competent in ICT are more likely to achieve success in their schools.

Attention to cultural beliefs and their impact on ICT adoption are very important in developing countries (Loch et. al., 2003) because socio-cultural factors may put ICT transfer at risk (Albirini, 2006b)."Duplicating strategies from other developed countries without any consideration about cultural adaptations of technologies might be less effective and successful" (Kousha & Abdodi, 2004, p.8). According to Awamleh and Gardner (1999), implementation of a new technology is not finished with installation of the technology and explanation of how to use it. In fact, the new technology should be accepted by the receiving society (Asemi, 2006). It must not contradict the values of society. Findings from this study indicated that principals had positive cultural perceptions of ICT in society and school. Such principals could use technology and create a suitable environment and culture to the integration of technology in schools. This cultural perception relates the principals' success to their individual ability to articulate and influence norms and values. Hence, understanding the cultural values is as important as understanding the technological benefits. Principals who are responsible for adopting and implementing technology in school must be aware of its societal and organizational cultural impacts.

7.0 Limitations

Although we have found several encouraging results, it is important to recognize that the current findings also have limitations. First, the sample size should be increased because using data from a larger number of respondents will permit more powerful findings. Second, participants of this study completed a self-reported instrument. Given the self-reporting nature of this instrument, it was quite possible that principals overrated their proficiency or underrated their proficiency. These ratings may not reflect the true proficiency levels of the principals. In spite of these limitations, this study will be useful for policy makers, providers of professional development programs for principals and for system level decision makers to support mechanism and strategies to assist principals to develop their knowledge, skills and their leadership style. Thus, principals will understand the critical role that they play in facilitating the implementation of ICT in schools to improve teaching, learning and administrative processes. Therefore, we need leaders, not bosses, who help us develop a clearer vision and shed light in the moments of dark confusion (Wheatley & Margaret, 1992).

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Democratic Education and Administration

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Abstract.

In any society education is assumed to be a basic welfare pillar. The society, culture and politics of a country greatly influence education in schools. On the other hand, the education also influences the society. Therefore, in order to turn in a well developed society it is essential to strengthen the foundation of education in schools, colleges and Universities .Almost the citizens of each country across the globe believes in democracy. However, for achieving a democratic society it is necessary to create awareness among people about democracy and its benefits. The best way to educate people about democracy is to incorporate democratic education and administration in schools. This research paper is an effort to develop an understanding of democratic education and administration and its significance in today's era. This research has focused on historical overview of democratic education and administration and recognized its importance in today's era. A mixed study design including primary research and secondary research was incorporated to conclude the results.
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Keywords: Democratic Education ; Administration

1. Introduction

Democracy as a respected system greatly influences the structure of societies as it provides an opportunity to place the individual person on a subject position of life. Moreover, democracy helps to transform the ideologies of many areas from law to economy and from reorganization of government to a routine life of a person. This attribute of democracy has led many societies to adopt a democratic environment. The main features of democracy include equality, social and political participation, freedom of decision via voting, the demise of violence method in the realization of social and political goals, the practice of compromise. In addition to includes the elementary value of human as a human being and a free atmosphere to ensure this value. Tolerance to cultural differences and the value of free thought also forms the democratic values. However, the democracy that has to be perceived as basic principles and way of life can only be achieved by effective education. Implementing the fundamental democracy values can only be achievable in educational institutes that incorporates democratic education practices and with a democratic administration. In this term, the management style of educational administrators in managing their organization plays a crucial role. It is vital that people who involved in the administration of any organization follow democratic principles because the implementation of these principals plays a major role in the success of an educational institute.

In order to achieve a democratic society it is crucial that students should be encouraged to practice their rights and be aware of their responsibilities. Democratic education helps to achieve the stated goals(Loflin, J. 2005) Democratic education is characterized by democratic policies, organizational structures, curriculum, and teaching methodologies that incorporate relevant content and present various opportunities to students to practice the concepts they taught carfully Moreover, this type of education system is concerned with the purpose of education that what people wish to achieve from their education sector. There are several questions raised by researchers and people to understand the fundamental goal of education. Some of these questions are: education simply a strategy to earn wealth or maintain a healthy economy? Is it simply a bridge that guides us towards our future profession? It is note worthy that these questions only highlight the sarcastic view about education. In the contrast, questions such as:

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Is education a mode to develop awareness about the importance of knowledge? Is it an approach that helps to build a realistic view of the world? and helps to understand the need of democracy in education.

2. Problem Statement

Democratic education and administration in educational institutes plays a significant role in building a democratic society. However, most of the educational institutes lack in incorporating democratic administration and providing democratic education to students. This paper aims to develop an understanding of democratic education and administration. It also creates an awareness of the importance of democratic education and administration in era today.

3. Research Aim

The aim of this research is to develop an understanding of democratic education administration and create awareness about its importance in today's era

4. Research Objectives

The objectives of this research are:

- Identify the building blocks of a democratic society
- Understand what democratic education and administration is?
- Create an awareness of the importance of democratic education and administration in today's era

5. Research Questions

Keep in mind the final goal of this research is to create an understanding of democratic education and administration in the era today, this study has focused on the following questions:

- What is democracy?
- What is democratic education?
- What role does a democratic education plays in creating a democratic society?
- What are various teaching methods used in most of the schools and up to what extent these methods fulfill the requirements of democratic education?
- What type of mode of communication is adopted between students and teachers in schools?
- What is the role of administration in an educational institute?
- How can a democratic administration contribute in the success of an organization?

6. Significance of Research

This research is tended to be equally imperative for the management of educational institutes and academic region since it has furnished an understanding of democratic education and administration and

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its importance. The comprehensive literature review on democratic education and administration will lead the educational institute to adopt democratic practices in education process and administration. Moreover, this research will also create awareness in students for their democratic rights. It will help them to understand the importance of studying in a democratic environment.

7. Literature Review

7.1 What is Democracy?

The word democracy might be familiar to the most people. However, the concept of democracy is still not clearly understood and often misused by single party regimes, military leaders or dictators in order to get large support of people which in turn leads them to a strong a political position (Biesta, 2007). Nevertheless, the power of democracy has succeeded to survive a long and turbulent history. Regardless of prevailing challenges, democratic government in many countries continues to grow and flourish. The word democracy was derived from a Greek word demos which means people. Democracy is defined as the existence of government that has been chosen by people. In some societies democracy can be practices by the citizens directly. On the other hand, nations with huge population democracy are practiced by people who are elected by the public (Parker, 2003). According to President Abraham Lincoln, democracy is the government of people, by people and for people. Frequently the words democracy and freedom are used interchangeably; however, these words are not synonymous. Democracy is certainly a set of principles and concepts about freedom. In other words democracy is the institutionalization of freedom. In addition, the democracy also includes the processes and practices that have been transformed throughout a long and turbulent history. It is essential for people who are living in a democratic environment to be the decisive guardian of their freedom. Freedom is characterized by recognizing one's intrinsic dignity and absolute rights in a society (Crick, 2002).

7.2 Importance of Democracy

As stated in the previous paragraph, democracy indicates the existence of the government that has been chosen by people, it provides numerous benefits to its citizens. A democratic government provides its citizens the best opportunities, maximum freedom and a happy life with greatest prosperity. So far it is considered as the most stable form of government. In a democratic environment the individual person is free to practice religion of his choice. Woman is free to choose spouse of her choice and even student are free to select the form of education they wish to achieve. In a democratic society a person has complete freedom, he can freely move around without getting anyone's permission, he is free to watch any movie or listening to any type of music. Moreover, in a democratic society minorities are given equal right of participating in politics and influence society as anyone else. They are provided with complete protection against violation and assault. In democracy, woman is presented with equal rights and opportunities as a man. They have equal right to get education, they were allowed to work in offices and they can enjoy maximum freedom as men do. Every person in a society desires for freedom and security and both of these are only possible in a democratic environment. Therefore, democracy should be encouraged everywhere and the best way to create awareness about democracy is to incorporate democratic education and administration in educational institutes (Lappé,2006).

8. Characteristics of Democratic Education

Democratic education plays a vital role in creating awareness about democracy therefore it should be open for all citizens of a democratic society. Apart from being open to everyone it is essential for a democratic education to make maximum efforts for providing best education to children. It helps to build healthy relationship between teacher and student (SIDA, 2001).An education system with democratic education should help increase freedom as power to select and in achieving satisfactory life. It should also encourage the intensification of individuality. Democratic education should extend the scope of student's interest. It should involve comprehensive knowledge on history, painting, literature, music and sciences as

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these are the basic tools that help in diminishing the barriers among classing and in turn developing a form for wider shared interests. Nevertheless, democratic education plays a major part in the development of habits that involves caring for others and notifying others needs before making any personal decisions. Democratic practice is characterized by the habit of taking into account other people's views and considering the consequences of an action and its impact on others beyond its advantage to the agent. In order to establish a flourishing educational system of personalized learning it is essential to consider the fact that providing each student with the opportunity to prove their talent is not the disloyalty towards excellence instead it is the accomplishment of it(Colville,Hall, 2000) .The phrase personalized learning indicates high teaching quality which is approachable to various ways that can facilitate students in accomplishing their best. It involves responding to individual students by establishing a mode of education and realizes the needs of the students and focuses on their interests, this type of approach has acquires strong moral and educational support.

9. Democratic Education's Historical Background

In order to understand , to prepare or to produce anything properly it is necessary to know about its ups and down, its future aspects as well as the little historical background of that particular thing that we are going to prepare or make, In other words we can say that happenings of today or future are directly dependent upon past. So due to this reason it is mandatory to have a brief discussion on historical background of democratic education. For the very first time in the world, the philosopher named "Plato and Socrates" made links between education and democracy. The idea of democratic education was alluded without precedent for Rousseau's and Dewey's writings(Dewey,1938).Rousseau belongs to the "romantics" of education (18th century) whose thought was to completely educate and instruct all citizens so that effective integration of individual in society is effectively achieved.. He had introduced the thought of 'social contracting' that ensures ones' opportunity and the right of others. According to him if everybody is included in the society, there is a state of accurate majority rules system or democracy. Rousseau's and Plato's analysis were putting all their efforts on policies, rules and regulations of education and politics in the education sector. Rousseau was inspired by Plato however; Rousseau's status contradicts Plato's perspective. Plato exerts pressure on thought that the principle point of education is to discover the skills of each person and spot them in a profession and in a position in society that everyone deserves. Thusly, he seems to be energetic about meritocracy, stratified groups as per the way of every person and stability in society. It was the opinion of Plato that each member of society should be completely provided with all the knowledge and information that is useful for an individual and in benefit of community. On the other hand, Rousseau believed that education should be fair for all because this would be helpful in the creation of a rigid and developed society. Moreover, it would also contribute in development of personality of each individual equally. There should be equal opportunity for everyone in the community or society. Everyone should be free from all limitation in order to explore his /her abilities and capabilities.

Democracy in any society is reflected by social freedom, while social freedom is considered as a warning element for a society because according to Plato, social freedom and mobility may alarm the disturbance in social order due to the human selfish nature. This unwanted disturbance may put a mark on discipline and respects of authorities of a community. Hence Rousseau and Plato both held conflicts in their view about contribution of social freedom in a society (Curren, 2007) in any perspective; democratic education adopts and takes in record both of the philosophies specified previously. The provision of elements of the philosophy of democratic education in a grade schools aims to join and pass democratic values to its students by using two ways. First, that the authorities responsible for education ensure that syllabus for students includes such subjects that diverges interests of students towards citizenship affairs and towards the role that an individual is responsible for in a society. In addition the curriculum should be designed in such a manner that students put interest in public matters and problems and in finding solutions to those problems. Secondly, by reflecting democratic system and environment in every process such as admissions, teaching, documentation and every other process involved in schooling of a student. School plays a role of micro society for young generation, so it should reflect democratic system. Therefore, this micro-society (school) should help the students to learn, practice and get them familiarized about the way of living in a democratic society. Obviously, this does not imply that there should be no discipline in educa-

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tional institutes or the instructors should play a role of a carefree member letting the students to perform experiments without any direction.

Proceeding onward to Dewey, the father of the American theory of education and a logician that depicted a finished idea of democratic education and in continuation connected these democratic plans and hypotheses in educating in practice with great success. Deway's ideas have thrown light on various aspects of education and learning along with the importance of fair education which have been discussed previously. The philosopher focuses on two aspects of constitution of democracy in a community. First, he give opinion to authorities to put efforts on the things which are mutually beneficial for all members of society rather for a certain group or special classes of people ,in order to maintain social order. And second, to establish interactions among social groups. He explained the links between political democracy and democracy in education, and also explained how political democracy effects democracy of education in various aspects.. Deway has explained the meaning of democracy more clearly than its definition, he explained democracy in its simplest form as thy way of living in a society peacefully ,according to him we cannot establish a real democratic education system unless and until we understand that in which type of society or social system we would like to establish. He also applied his views of democratic education practically by establishing "John Deway's Laboratory School" at Chicago University. Amy Gutmann, a theorist expressed her view that educational democracy is reciprocal to political democracy. She also supported theories of Deway and expressed her views that aims of democratic education is to make student ,a democratic citizen and that the student should understand the democratic perspectives, which they used to follow in their lives, while behaving as a good citizen. Amy felt that education must include such syllabus that creates sense of respect, love cooperation tolerance and peace and responsibility in a student. There are some other famous theorists who also concentrated their efforts on democracy in education such as Paulo Freire. He analyzed the relationship between student and teacher and concluded that course teachers are giving knowledge to students in an old and traditional manner without creating motivation and interests. Teachers should show some creativity and should change the methodology of giving education. They should give lectures according to level of an average student rather on their own level. Authorities should try to create friendly relation between teachers and students. Steps should be taken in order to improve communication between student and teacher because relationship between teacher and student is very important in order to establish a good and successful democratic education system in a society.

9.1 What is Democratic Education?

The definition of democratic education is bounded by three perspectives:

- Freedom to choose learning without any obligations.
- Democratic processes, civic values, citizenship and school governance.
- Global aspects and self-actualization.

Democratic Processes, Classroom/School Governance, Civic Education

Democratic education refers to the fact that all the individuals regardless of their economic status should get hold of civic values, knowledge and skills that are required to establish democracy in a society. In order to fulfill these requirements the educational institutes should incorporate a kind of education that actively engages students in activities that helps to build their personalities and develop skills. (ASCD, 2002). In a democratic education process students are allowed to participate actively in making decisions regarding the classrooms. These decisions involve making rules of a class, curriculums and assessment rubrics. Other features of democratic education include a bill of rights and responsibilities, daily or weekly class meetings (Gathercoal, 2000) and classroom constitutions. And all of these features encourage student's participation. In democratic educational institutes, participation of students can go ahead of traditions students' council where involvement in classroom decisions restricted to decisions regarding party menus, picnic arrangements or academic status. In contrast to traditional schools systems in the democratic schools the students are encouraged to participate in making school rules, in design effective core curriculum, in scheduling, in hiring decisions and in budgeting(Grandmont's ,2002)

Freedom to Choose, Learning Without Compulsion

In democratic education system in today's era students were given equal rights to make decisions regarding how, what, where, when and with whom they study. They were presented with equal right to decide how their education should run and which sanctions and rules are essential. This type of approach provides experiences to students who are unable to make their own decisions. Thus making decision

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themselves (Styles, 2001). Moreover, democratic education promotes the progressive development from a more dependant stage towards a self-directed learning stage (IDEC Resolution, 2005)

Aspects Emphasize Self-Actualization, Human Rights, And Environmental Awareness According to the ideology of democratic education, the primary purpose of education is to create a continuous learning process that accompanies person all over his lifetime. This ideology of democratic education is appreciated globally because such a process helps in multi-facet development of an individual's personality. It promotes freedom and legitimacy and encourages respect for human rights and increases environmental and social responsibility (Hecht, 2002).

9.2 Characteristics of Teaching for Democracy

In 2008, Sleeter has described a number of principal characteristics of teaching for democracy (Sleeter, 2008).These key characteristics include creating awareness in students regarding social issues for achieving public include. Allowing students to make democratic decisions related to class issues. Instructors engaging the students in different perceptions about a topic and in various sources of knowledge, instructors embedding content in critical thinking about factual issues (Perry, 2009).

9.3 Education for Democracy Is Education Freed from Authoritarian Relationships

The concept of democratic education fails if it does not take into account the actual purpose of schooling that is to form a community life and if it does not considers education as a social process .Schools should be considered more as a place that promotes learning (Cimer et al , 2010). On contrary the democratic system views educational institute as a community where deliberation and communication is flourished, according to Winch and Gingell in 1999, if an educational institute wants to encourage democratic values, they need to eliminate hierarchy. Education for democracy thus becomes education freed from authoritarian relationships (Winch, Gingell, 1999).

10. Pros and Cons of Democratic Education

Criticisms play a crucial role in determining the pros and cons of anything. Therefore in order to visualize and compare the pros and cons of democratic education it is necessary to state and analyze the criticism on this type of education system. The first criticism is regarding the absence of discipline in democratic education institutes. This criticism is based on the fact that students are studying in a democratic education system and they are not interested in their course and doing homework; instead they are more fascinated towards games. In the context of democratic education ideology that is being practiced today by several schools, the students are free to play. Keeping in view this ideology of democratic education the questions arise that Is freedom to play not a social dander for students? Will not these students regret the time which they have spent in playing instead of studying and in turn are not able to accomplish the goals and achieve the skill that other children of their age posses. Is it not the primary responsibility of the educational institutes to assure that all their students' progress with the same pace rather leaving on students to decide the time they wish to start studying? (Barlett, 2007).Furthermore other critic argue that the progressive approach adopted by the democratic educational institutes globally results in the decline of academic standards. Dyson and Cox had claimed that this type of situation was observed in the 60s era and it must not be repeated (1969, cited in Bartlett, 2007).This period was assumed to be the era of full employment in which majority of the individuals were only interested in enhancing their wealth. This increasing affluence showed a way of pleasure to individuals and resulted in the formation of laissez-faire society. However, it has led to the occurrence of many economic and social problems in 1970s.

11. Democratic Schools

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At present there are 208 schools across 29 countries and 85 schools were listed in 33U.S states and Puerto that practice democratic education and administration in their management (Education Revolution, 2000a). The characteristics that these schools exhibit include a student centered teaching approach that is characterized by maximum involvement of student in the learning process. In democratic schools there are communities that organize various activities to encourage student's participation. Moreover democratic schools also provide students equal share in decision making (Education Revolution, 2000b).

11.1 Democratic Administration

In the era today individuals are more concerned with getting rights, responsibilities and freedom at their work place similar to what they enjoy outside the work environment. This highlights the fact that workers of an organization must be treated as citizens. A person comes to his work place not only with his skills and knowledge but also with his feelings and social necessitates. And for this reason managers of today's era are obliged to manage the whole organization in a framework of values of democracy. Therefore it is essential to create a work space where workers are considered as a part of organization and free to exercise their view points. This type of work environment should also be practiced in educational institutes to promote democracy (Manville, Ober, 2003).In any type of organization; leaders have to make numerous decisions on daily basis. However, these decisions are not always subjected to choose between good and bad. Occasionally the decisions are subjected to select one of the two bad choices. In the view of the fact that solutions of these issues were not stated in policies, laws or any other guide lines, decision making can be really tough task (Duignan,2006).In such circumstances democracy plays a crucial role and indeed democratization of educational administration becomes essential. A robust management style in educational institute's management can be attained if the administrator takes into account other view points at the time of making decisions. This in turn promotes a democratic environment in schools.

Establishment of democratic administration will be possible in school only if the head of school follows the rules and regulation of democracy in the management activities. A true democratic head will take all decisions with justice and distribute the work equally according to everyone's ability and capability and distribute responsibilities according to it among student's workers parents in order to form the successful education system in school. He will consider every person related with school management equally important for and would provide equal opportunities for everyone working in school. Nowadays, it is very difficult to survive and maintain a reputable position in a society for an antidemocratic organization. Managements have to take some effective steps in order to influence human resources successfully, to achieve organizational objectives. These steps include development of the organizational structure, teamwork, beneficial use of information and technologies, leadership and involvement of employees into decision-making. This new organizational structure is more clearly open and simplest for innovations (Lawler, 2001). According to Lawler (2001) for organizations to be more productive, high officials and boss of the organization reflect elements of democratic leadership in their attitude with subordinates a brief and necessary behavior for a democratic school management are as follows:

- Employees should have rights to free express their views and share their thoughts with management with comfort.
- Environment should be provided in which management consider the appropriate ideas of employees, in benefit of both employees and management.
- Staff should be encouraged for taking initiatives, responsibility and risk issues.
- Rejecting the wrong rules and orders which accuses students, employees and parents,5)
- Establishing a cooperative culture, where the responsibilities are shared, support should be provided to staff in their hard times

Management should take effective steps to create a working environment in which respect, cooperation, and all possible assistance is provided within the organization, where the responsibility is shared, where the failure and success is not the responsibility and not depend upon any individual, where teamwork is appreciated, such steps will enhance the solidarity between the organizations' employees. Such steps will motivate employees even in difficult situations. As understood, certain conditions must be fulfilled in order to implement a democratic management approach educational organizations as implemented in the ancient Greek city-states where all of the citizens participate administration actively. The most important of them is the simplification of organizational structure, as bureaucracy-free as possible. The other most important need is to state a democratic leadership behavior in management department. Such

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educational environments in which elements and principles of democracy are fulfilled and every individual can survive successfully in today's competitive environment.

12. Methodology

This research is based on both primary resources and secondary resources. The primary data is obtained through semi structured question whereas; the secondary data is obtained through extensive literature review. The methodology that is used in the primary research to achieve the defined aim is qualitative data collection method that comprises of semi-structured questions which are used while interviewing teachers of randomly selected schools. Moreover, the framework of the selected educational institutes was analyzed deeply to support the results of the interviews. Semi-structured method was considered as the most appropriate method for tracing the democratic values in educational institutes. The questions of the interview are categorized into three sections:

12.1 Section 1

The first section includes the questions commencing the discussion regarding the topic:

- According to you what does democratic education mean?
- What are the pros and cons of democratic education?
- What is the importance of democratic administration in any organization?
- Do you categorize your school as an institute with a democratic character?

12.2 Section 2

In this section the judgmental form of questions are included in order to identify how well democratic values are integrated within classroom:

- According to you what academic method or practices are considered as democratic?
- According to you which democratic practices should not be exercised within a classroom? Why?
- How would you describe your relationship with your students?
- Is democracy practiced in your school's administration?
- What role is your institute's management playing in managing a democratic administration?
- In your point of view up to what extent does a democratic administration contributes in the success of an organization?

12.3 Section 3

This section comprises of general questions regarding democratic education and administration in today's era:

- Do you believe that globalization influence democratic education and administration? And if yes then up to what extent it does?
- What is your point view about the concept of democratic education and administration today?
- Why it is more important to incorporate democratic education and administration in educational institutes in this era?

A random sample of 10 teachers from each of the three schools was selected for interviewing. The interview was continued for 15 days and three different schools were chosen to assess that up to what extent people are educated about democratic education and administration and understand their importance in today's era.

12.4 Reliability

The reliability of data denotes that same methodology can be used for repeated results. However, the results and interviews are not considered as reliable if different results are obtained every time the research is conducted to trace the democratic values in the same schools. According to Barlett et al optimistic perceive reliability as repeatable outcomes to huge number of people interviewed (Barlett , Burton,

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2007).On the other hand interpretivists view it on whether the explanatory data of each person interviewed is reoccurring or not. It is noteworthy that a reliable data does not necessary have to accurate. According to Bryman the concept of reliability is more concerned with qualitative research as compare to quantitative one (Bryman,2008)

12.5 Validity

It highlights the accuracy of the research outcomes. It is essential for the research methodology to measure exactly what the researcher had claimed to be measured in his research design (Beach D. et al, 2003). As per the optimistic view consistency of data must occur using pilot test. Some interpretivists argue that validity of data is evident while observing the strength of the research power to guard the elucidation of the data. In order to achieve high validity, the research paper should provide extensive explanation about the methodology used to obtain the desired data. The second method that can be used to enhance the validity of results is triangulation method. The validity of this research greatly depends on the extensive literature incorporated and the detailed explanation of the research methodology.

13. Ethical Considerations

It is crucial that every action-research should carry out within moral framework of the respect of participant (BERA, 2003a). One significant ethical issue that different action researchers cannot avoid is the use they make of knowledge that has been generated throughout the analysis. For this essential moral excuse the principal of any study but particularly those carried out by action research should be transparent. The interviews that were conducted in the educational institutes are completely anonymous and neither the names of the education institutes nor the names of the participants are revealed in this research paper. All the draft notes, research diary and data that was collected is protected by the researcher .The results of the study are handled in such a manner that aim of the research and results are patent and cannot be utilized in different manner. Moreover, the researcher has ensured that impacts of this research on the respondents are null.

14. Data Analysis and Discussion

Thematic analysis method was used to analyze the data collected by semi-structured interviews. In thematic analysis the data is categorized according the research question, themes of topic and the content of the data. Thematic analysis supports the division of the most important parts of the data (Seidman, 2006).After the data was divided thematically it was analyzed and interpreted in the light of the literature discussed. The results interpret that democratic values are embedded in the schools visited. The results also highlighted that educational institutes are aware of the importance of democratic education and administration .They are effectively practicing democratic educational processes. The answers of the interview questions also perceived that a healthy relationship exist between teachers and students. Furthermore, the environment of the educational institutes and facilities were promoting the democratic education and presenting the students freedom to choose and be creative. Moving on to the negative aspects of integrating democratic education in educational institutes, this criticism was also supported by the answers of respondents. They claimed the democratic values are often misused by the students, teachers and parents. These stakeholders often take advantage of the democratic values and try to enforce their preferences in a non-democratic manner. Another negative consequence of democratic values was represented by the difficulties faced by the teachers while explaining the concept of democracy to young children .It was also argued by the teachers that democratic education leads to lack of discipline and decline in academic standards. Most of the respondents agreed to the fact that rights presented to the students must be limited to avoid violation of basic rules and regulations.

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15. Conclusion

The aim of this research paper was to develop an understanding of democratic education and administration and its significance in today's era. It has focused on historical overview of democratic education and administration and recognized its importance in today's era. Democratic education plays a significant role in building the personal characteristics of an individual and its way of learning. In this context, education is assumed to be an approach that leads to the development of self determination in an individual. It is also considered as the mean of encouraging self learning and creating self awareness in an individual which in turn helps an individual to recognize his values, personal needs and responsibilities. Democratic education also results in healthy minds and satisfaction with life. Furthermore, a democratic education system encourages the integration of a person in a society. Moving on to the importance of democratic administration, democratic administration promotes a human centered management approach in an organization. In terms of management, a democratic school should pay attention to participation of all associates to the important decisions. According to Bellingham (2003: 6), to create a democratic climate in the organization, the school leaders should be consistent, create trust, think in a long-term manner, be fair, respect for different thoughts, ensure the solidarity, share the power, be honest, give value to people and consider the issues in a broader perspective. It is clear that school administrators have a greater responsibility in creation of a democratic climate in schools. Democratic attitudes of school administrators will create a sense of confidence in school staff and students. This will increase the power of school administrator on influencing and binding people around a specific purpose. A mixed study design including primary research and secondary research was incorporated to conclude the results. The primary research was based on qualitative method; the qualitative method used for this research was semi structured interviews. A random sample of three educational institutes was selected for conducted interviews. The results of the interview show that educational institutes are practicing democratic values and promoting democracy.

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Design a serious game to teach teenagers with intellectual disabilities how to use public transportation

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Abstract

Public Transportation supports independence and encourages social, educational and vocational inclusion. It is a sure means to gain access to the city, its services and activities, but using *fixed-route*[*] requires knowledge and know-how that all travelers do not master, such as people with intellectual disabilities. Indeed the many barriers in the *fixed-route* prevent accessibility for this service. Therefore, teaching them how to use this service is important. Our project aims to design a serious game for people with intellectual disabilities in order to support their learning of using the *fixed-route*. In this communication we will present the methodology use to design the serious game.

Keywords*:* intellectual disabilities, inclusion, *fixed-route*, travel training, Serious Game.

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Introduction

Public transportation supports independence and encourages social, educational and vocational inclusion. It has an impact on health, economics, vocational and social life of individuals (Markovich, & Lucas, 2011). It is a sure[*] Services include any transit service in which vehicles run along an established path at pre-set times. Trains, subways and buses are the most common examples of this type of service (ctaa.org). means to gain access to the city, its services and activities and it is often an alternative for those whom driving is not an option available (Wilson, 2003). In other words, Public Transportation promotes autonomy, independence and social participation (Chen Wu Y., 2011; Co-Operation, & al., 2009; Fisher G., 2002; Grönvall O., 2005; Koppa R.,

1998; Lambert H, 2011; Rosenkvist J., 2009; Venter C., 2002.). However, the use of Public Transportation in the *fixed-route* requires knowledge and know-how that not all travelers, such as people with intellectual disabilities, masters. In fact, the lack of accessibility of the *fixed-route* excludes people with intellectual disabilities from its services. Indeed, it seems that the fixed-route environment may present some obstacles that can affect these users during their journey. While for most of us, travel learning is done through personal experience, for people with intellectual disabilities there is a need for travel training in order to build up travel experience and confidence.

I- Fixed-route and intellectual disabilities

Questions around the use of Public Transportation arise from the deinstitutionalization. As a matter of facts, institutionalization without any chance to be active in the society has not encouraged neither the intellectual stimulation nor improves life quality for people with intellectual disabilities. Quite the contrary, institutionalization has promoted dependency (Ionescu, & al., 1990).

Deinstitutionalization has ended precarious livelihood and has also promoted inclusion of people with intellectual disabilities. However, all these years of institutionalization has not helped people with intellectual disabi-

lities to develop appropriate skills to function in society. Moreover, for the new generation, whom escape this poor and precarious lifestyle, it is difficult to evolve, learn and live in a world built by and for people without intellectual disabilities (Langevin, 1996). This is the reason why during the seventies a lot of initiatives were developed in order to learn social skills. Among those initiatives, we can find the learning of "communication skills", "pedestrian skills" (Laus, 1974 ; Melching & O'brien, 2010) and also "money management" (Lowe, & al., 1976 ; Langevin, & al., 1994), time management (Welch, & al., 1985 ; Boutet, & al., 2000) or even initiation of Public Transportation in *fixed-route* (Kubat, 1973 ; Laus, 1974 ; Certo, & al., 1975 ; Neef, & al., 1978 ; Welch, & al., 1985 ; Chen Wu, 2011).

Regarding the use of *fixed-route* system, interaction between the characteristics of people with intellectual disabilities and those of the environment often led them to experiencing disadvantages and failures, which can limit their use of this service. Indeed, because of the numerous instabilities (Langevin, & al., 2007) (semantic, morphological, procedure, etc.) and of diverse barriers (social, physical, cognitive, personal, etc.) the *fixed-route* appears to present a lack of accessibility, which may explain why it can be difficult for people with intellectual disabilities to use this service without a pedagogical support.

Consequently, setting up Travel Training in order to initiate people with intellectual disabilities to the use of *fixed- route* seems necessary.

II- Travel training

Travel Training is an answer for social inclusion approach and encourages the development of self-determination, which will influence fulfilment and sense of control among people with intellectual disabilities. Wehmeyer (1992), define self-determination as "the attitudes and abilities required to act as the "primary causal agent in one's life and to make choices regarding one's actions free from undue external influence or interference" (pp. 305). Travel Training is necessary, because apart from initiating people to the use of *fixed-route*, they also offer a rewarding experience in which they can develop many skills and have a better perception of themselves (self-esteem). However, Travel Training may present some constraints such as costs (Lewis, & Gerard, 2011), the fears of parents or caregivers related to safety (Davies, & al.), some dangerous situations in the practical training (Marsden, & al.,

2011) or even impossibility to experience in the real context a lot of scenarios. Therefore, proposing and encouraging innovative strategies in order to overcome those constraints is necessary. The use of a digital media such as Serious Game seems to be an interesting introductory tool for the initiation of the use of fixed-route and also to encourage the transition between the theory and the practice.

III- Digital media key challenges for people with intellectual disabilities: serious game case.

Several authors were interested to game as a cultural phenomenon and also as a useful mean for the intellectual and social development of children, thus fostering learning (Callois, 1958; Vygotski, 1967; Winicott, 1975; Piaget,1976). this is still accurate, nonetheless, the coming of New Technologies of Information and Communication (NTIC) noticeably changed the approach by learning with game, by introducing computer applications. It is the case for example with Serious Game. Serious Game is defined as "any meaningful use of computerized game/game industry resources whose chief mission is not entertainment" (Sawyer, 2007, p.12).

In Education, this media has shown different benefits when using them, such as encourage active learning, increase motivation and collaboration, encourage creative thinking or the adjustment of teaching strategies, etc. All those reasons make us think to the use of Serious Game with people with intellectual disabilities for the initiation of the use of *fixed-route* in order to enhance teaching strategies, facilitate learning and to overcome some constraints discussed in the previous paragraph.

However, there is little information currently regarding the use of Serious Game by people with intellectual disabilities and thus few data regarding their efficiency and also the main benefits of their use by this people. Nonetheless, some authors (e.g. Sik Lanyi, & al. 2009; Langone, & al. 2003; Melching, & O'Brien, 2010; Standen,

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& al., 2009) have put forward with Serious Game the possibility to work with complex concepts and in safer environment, to live failure differently, to experience many solutions in the game with an immediate feedback and also improve choice decision and time reaction.

Researches on Serious Game and Intellectual Disabilities are at their beginning and even if these authors criticize their results (e.g. Small simple size, non-standardized tests, short intervention time, etc…) the conclusions seems promising and bring us to think that it would be interesting to generalize these results by proposing a design of a serious game for people with intellectual disabilities, which may answer the trainees and trainers needs. Therefore the research question for this project is: How to design a Serious Game, which may answer adequately to the needs of different users (trainees = people with intellectual disabilities and trainers)?

IV- Methodology

1. Participant

Participants of this study are 6 teenagers with mild intellectual disabilities aged between 14-21 years old as well as 1 trainer. Participants are recruited in a special needs school (Centre François Michelle). However, for the stage 1 of the Game Design Document (creating a library of problematic situation) we will work with 2 other trainers working in an association (CEREMH) in order to collect as much data as we can. The participation for this research is based on volunteering. The methodology we use is based on pedagogical engineering and video game design. This methodology of this research is organized in 3 stages describe in the following paragraph.

2. Needs analysis

The Needs Analysis is a necessary stage in any design project. According to Mayer, & al. (1991), the need is related to "physiological, psychological, spiritual, etc. (…). It may be linked to a problem, an absence, a deficiency, an insufficiency or just a temporary disturbance."(pp.95). In sum, it is a gap between the actual state and the desired state. Currently, Travel Training presents some constraints (e.g. costs, fears, etc…) which may limit their use for some individuals, this is the **actual state.** Therefore, for the desired state, the goal is to find strategies or tools which can overcome those constraints in order to enhance teaching strategies and facilitate learning. By introducing a Serious Game as a pedagogical tool, we are looking to reach the desired state. In order to determine the users' needs, a need analysis is necessary. Therefore, our analysis is focusing on the educational needs and more precisely on teaching needs and learning needs.

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- Teaching Needs: through interviews with trainers, the objective is to identify the difficulties they have to face during the training and also to identify the themes that they use more often with people with intellectual disabilities.

- Learning Needs : through the design of a Persona the objective is to identify the learning needs (in terms of knowledge, skills and attitude) in order to adapt the learning content to the characteristics of people with intellectual disabilities.

3. Functional Analysis

The functional analysis consists to determine the roles that we want for the Serious Game and identify the different costs that thereof will generate (e.g. financial costs, time costs, emotional costs, etc.). The roles characterization is done in view of trainees, trainers and the Serious Game in order to propose a functional analysis which will be complete and whose objective will be to propose an efficient tool which can answer the needs of everyone.

The functional analysis encourages specification of the development goals and it is also a pledge to objectivity and creativity. Our functional analysis will be carried out by a distinctive product analysis whose role is to identify the strength and weakness of similar game as the one we want to design. Therefore, an analysis of 3 video games (simulation, visual novel and adventure game) in order to understand the game mechanics and an analysis of 3

Serious Game to identify how to create a perfect harmony between the entertaining content and the educational content and also how the learning objective are included in the game will be carried out.

4. Game design document (GDD) elaboration: instructional design

For Ryan (1999) Game Design Document purpose is "to express the vision for the game, describe the contents, and present a plan for implementation" (pp. 1). In this research, the Game Design Document is composed of teaching scenarios, learning objectives and learning strategies (educational content) and game design (entertaining content). The elaboration of this document is structured by 4 steps:

- To create the problematic situation library: our goal is to collect from trainers the difficulties that the trainees have to face during the training and how do they manage the situation. All the data collected will be used to create a database of problematic situation which is going to help us built the story and also give the chance for the players to experience different ends in the game.

- To identify the learning objective and the learning strategies: identify learning objective for each skills to master at the end of the training and also to adapt strategies to the characteristics of the participants.

- To create the design content: this stage concerned the implementation phase. The problematic situation, the learning objectives and the learning strategies are brought through the gameplay and the mechanics of the game.

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- To verify the relevance and coherence of the design content: the story, the rules and the way to play are submitted to the trainers in order to verify the relevance, the coherence and also the flow.

Our methodology is part of a partnership work and aims at covering all educational and entertaining aspects in order to propose an optimal experience to the players. The next step of this research will be the data collection.

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Design of a learning module for the deaf in a higher education institution using padlet

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Abstract

Deaf students have communication and learning problems which is amplified when they attend higher education institutions which do not have facilities which cater to their needs. Padlet is a web application for interactions, may be used for communication among deaf students. This exploratory implementation study for the design of a learning module for deaf students used the Fuzzy Delphi technique among 27 experts. The prototype of the module was evaluated with data collected from observations and interviews of four deaf students. Findings indicate that Padlet could be used for communication among deaf students. However, further studies could be done to investigate its suitability in other contexts.

Keywords: Padlet; Web 2.0; Fuzzy Delphi technique; deaf learners; higher education institutions

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1. Introduction

The use of technology namely information communication technology (ICT) can facilitate teaching and learning. The National Higher Education Action Plan (NHEAP) (2011-2015), which steers the direction for the national higher education agenda to strengthen and enhance higher education institutions (HEIs). E-Learning is identified as one of the Critical Agenda Projects (CAPs) and a Key Result Area (KRA) for the government transformation program in the NHEAP. This is because learners are more active and responsible for their own learning when using ICT (MOHE, 2011). As a result, a national e-Learning policy was formulated, aimed at providing quality education at all levels of HEIs with equal and fair access for the people, and instilling a culture of innovation among the academic staff (MOHE, 2011).

In line with its commitment to ensuring better access to quality education, the government of Malaysia has passed several policies. People with disabilities should not be excluded from the formal education system on the basis of disabilities but should have equal access to vocational skills training and life-long learning programs under the education system (People with Disabilities Act, 2008). In addition, Salamanca Statement (2004) and Framework for Action on Special Needs Education states that schools should accommodate all regardless of their differences (UNESCO, 2013).

However, the implementation of the NHEAP seems to cater for the mainstream population and does not take into consideration special learners. Although the Ministry of Education Malaysia, (MOE) has a division to cater to the needs of special learners, the Special Education Division focuses on the needs of primary and secondary students. In Malaysia, there does not seem to be a concerted effort among the HEIs in addressing their needs, including those of the hearing impaired. Among the HEIs, there seems to be only

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three polytechnics which cater for hearing impaired students (MOE, 2008). The use of technology namely information communication technology (ICT) can facilitate teaching and learning. The National Higher Education Action Plan (NHEAP) (2011-2015), which steers the direction for the national higher education agenda to strengthen and enhance higher education institutions (HEIs). E-Learning is identified as one of the Critical Agenda Projects (CAPs) and a Key Result Area (KRA) for the government transformation program in the NHEAP. This is because learners are more active and responsible for their own learning when using ICT (MOHE, 2011). As a result, a national e-Learning policy was formulated, aimed at providing quality education at all levels of HEIs with equal and fair access for the people, and instilling a culture of innovation among the academic staff (MOHE, 2011).

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Chapter 2 Nomenclature

A	radius of
B	position of
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Table 1. An example of a table.

An example of a column heading	Column A (*t*)	Column B (*t*)
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And another entry	3	4
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The figure number and caption should be typed below the illustration in 8 pt and left justified [***Note:*** one-line captions of length less than column width (or full typesetting width or oblong) centered]. For more guidelines and information to help you submit high quality artwork please visit: http://www.elsevier.com/artworkinstructions Artwork has no text along the side of it in the main body of the text. However, if two images fit next to each other, these may be placed next to each other to save space. For example, see Fig. 1.

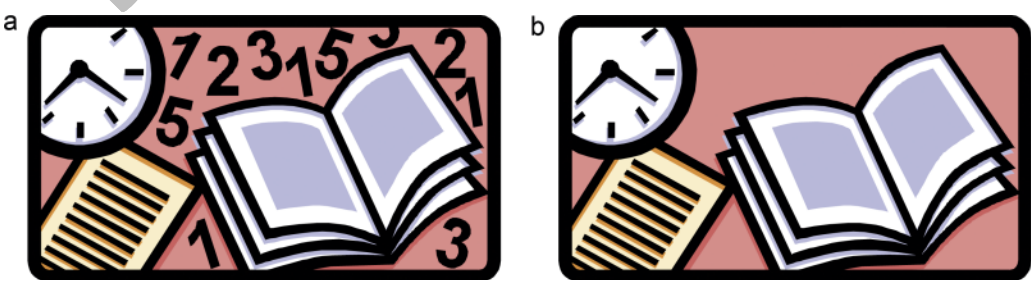


Fig. 1. (a) first picture; (b) second picture.

[1] Footnote text.

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4. Equations

Equations and formulae should be typed in Mathtype, and numbered consecutively with Arabic numerals in parentheses on the right hand side of the page (if referred to explicitly in the text). They should also be separated from the surrounding text by one space.

$$\rho = \frac{\vec{E}}{J_C(T = \text{const.}) \cdot \left(P \cdot \left(\frac{\vec{E}}{E_C} \right)^m + (1 - P) \right)} \tag{1}$$

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Acknowledgements and Reference heading should be left justified, bold, with the first letter capitalized but have no numbers. Text below continues as normal.

Appendix B. An example appendix

Authors including an appendix section should do so before References section. Multiple appendices should all have headings in the style used above. They will automatically be ordered A, B, C etc.

A.3. Example of a sub-heading within an appendix

There is also the option to include a subheading within the Appendix if you wish.

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Designing a social network to support elearning activities at the department of communications, university of Žilina

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Abstract

Internet communication is connected with social media and especially with social networks in the recent years. This phenomenon we can notice also in the sphere of education. The educational processes are significally impacted by this because social networks are slowly becoming part of teaching. The aim of this work is the research of possibilities of using social networks at Žilina University in Žilina, which primarily should serve for the communication between teachers and students

Keywords: Social network; Community; Teachers-students communication; Social groups

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1. Introduction

There are a lot of views and definitions that describe the concept of Internet social medias. Generally there are Internet media, the content is produced and shared by users of social networks and it is not possible to determine if the content is true or not (Janouch, 2010). Internet social media form part of new web technologies, which allow creating and distributing their content to the users. They replace traditional media like newspapers, television or radio, which are generally imitated sources of information, because users cannot provide their feedback like with Internet social media (Zarella, 2010).

Internet social media are divided according to their target to social networks, business networks, social bookmarker systems and sites where you can vote for the quality of their content.

1.1. Social networks

Social networks started to be the phenomenon that controls the Internet communication in the recent years. To create huge communities, to create their content ant it's shearing to other users is important for social networks. The terms social networks and social medias are often considered to be the same ones, but we should distinguish them. The agency ENISA (European agency for information and network security) says that social network is the on-line community which allows to its users to meet with other users of the social network, communicate with them, and share the information content by their accounts within a single space.

Generally there are three basic assumptions of social networks:

- The users themselves create the content,
- Users comment information content and create community groups

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- Providers of social networks do not enter to the social networks respectively they enter but not significantly (Bednar, 2011).

Social network is the kind of subset of social media, because the term social media is larger and more complex. There are many social networks; they differ in appearance, functions or in other characteristics. Often they have common elements, but each one is unique. This is the reason why the breakdown of social networks is complicated and it is not possible to say that the certain social network is of only one type because it contents also functions and elements of another type of social network. This is the general division of social networks (Madlenak, 2007):

- *Professional* – this type is used mainly by companies, used for the communication among employees and employers, or even for the communication of the company and the customers. They are used also for carrer development or for looking for a job. They can be designed for professionals or they could be oriented to certain discipline or in another way. LinkedIn or SQL Monster may be considered as the examples.

- *Community* – this is the most widespread and the most known community of social networks. The users communicate with their friends, family and acquaintances. Facebook, Twitter, Google+ etc., may be the examples. Here we can include also networks that allow sharing multimedia like photos, videos and other contents, networks as Youtube or Flickr.

- *Information* – Information social networks are dedicated mainly to inform the users about daily problems. It includes SuperGreenME and DoItYourself.

- *Education* – They are used by students who used them to communicate among them for the study purpose of certain school. They are dedicated to a communication between teacher and student too. Students share and change the study materials or they can cooperate on diffrent school projects. These networks are normaly used by smaller communities and they are not so known. We can mention social networks Sophia or ePals as an example (Madlenakova, 2005).

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1.2. Electronic support of education at the university of Žilina

University of Žilina use e-learning system "e-Vzdelavanie" for the electronic support of education. This system contents module Moodle, which we can call primitive social network because it can be used for the communication among users, but primarily it is used for provision of electronic study materials in on-line courses and for teaching tests. Of course, functionality of the system could be expanded by suitable application of plugins but this need is not accepted yet.

2. Objectives and methodology

The absence of University social network at University of Žilina and the lack of potential of IS e-learning "e-Vzdelavanie" is the basic problem that underlies this contribution. The basic research aims were established, which tried to solve this problem. The research aims were examination of student satisfaction with communication and providing information through the portal of "e-Vzdelavanie", detection of using the commercial social networking sites, comparison of the study information provided at social networks and in the environment of Moodle and finding the need to create the own social network. All these data are described in Table 1.

Table 1. Problem and objectives of the research.

PROBLEM	Absence of University social network and lack of using the potential of Moodle

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	in the environment of e-learning
OBJECTIVE	To examine the satisfaction of students with communication and sufficient amount of provided information dedicated to the study in Moodle.
OBJECTIVE	To find in which form the social networks are used for the needs of studying at University of Žilina.
OBJECTIVE	To compare the differences between information provided by commercial social networks and Moodle.
OBJECTIVE	To find the need of creation of private social network for the electronic support of education at University of Žilina.

2.1. Methodology and research

The suitable method of research for the needs of fulfillment of objectives was selected - a questionnaire survey. Data were collected from respondents in February and March 2013; they were collected by e-mail and social networking. The structure of questionnaire was formulated into two basic parts – the main part and the identification part. Identification part (4 questions) was dedicated to collect the information about age, gender, level of study and faculty and the main part (10 questions) was dedicated to collect information about the issue of absence of social network. Mainly closed and semi-closed questions were used for creating the questionnaire and options of verbal and numerical scaling types were used for answers (Madlenak & Strba, 2013).

Table 2. Methodology of research.

FACTOR	TYPE OF FACTOR
Type of research	Quantitative
Collected data	Primary
Methodology of collecting	Standardized data collection
Technology of collecting	Written and electronic data collecting

To determine the target sample of respondents was important. The essential conditions that they had to fulfill were:

- to be a student of Žilina University in Žilina,
- to use at least one commercial social network,
- to have experience with using the Moodle environment of e-learning.

These conditions had to be fulfilled together, it was important. If the potential respondent did not fulfilled one of the conditions he was excluded.

Calculation of the target sample was done by known mathematic formulas to calculate the size of the sample and to calculate the standard deviation.

The desired confidence interval expresses the reliability of the estimate, we have been working with 95% level estimate, according to the critical values of a standard normal distribution reflects the value of 1.96. Permissible margin of error h expresses the maximum estimation error, which we could make in the selection of the sample. We worked with the value of 10% of this quantity. Standard deviation expresses how the values are spreaded in the set. Proportion of the character p represents the proportion of the selected number of total value.

Set of hypotheses was formulated to find answers for the questions of the research and they were verified on the basis of the answers to questions of the questionnaire survey. The following hypotheses were determined:

- *Hypothesis n.1 - We suppose that at least 51% of respondents, regardless of gender, are not dissatisfied with the quality of provided information and communication of environment Moodle.*

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- *Hypothesis n.2 - We expect that the education level does not have statistically significant effect on using the groups of social networks for the educational purpose and communication dedicated to study.*

- *Hypothesis n.3 - We suppose that at least 60% of respondents gain study information primarily from groups created in commercial social networks.*

- *Hypothesis n.4 - We suppose that more than 50% of respondents would like to have own University social network, which is not statistically significant in terms of the degree of study.*

The statistical method χ^2 (chi square) test correlation, which is based on the Pearson distribution of a random variable was used for testing the hypotheses in the research.

3. Results and discussion

The research involved 238 respondents of the age from 18-29 years old. 111 (46.6%) of respondents were men and 137 (53.4%) were women. The significant part of the respondents was of the age from 22 to 25 years old. The most common respondent was woman of the age from 22-25 years old. 82 (total 34.5%) of the respondents were students of bachelor degree, 145 (total 60.9%) of the respondents were students of master degree and 11 (total 4.6) of PhD degree.

To know the representativeness of the survey was necessary to calculate the composition of the ideal sample of respondents on the basis of existing data. The values of standard deviations for all types of study degrees were calculated on the basis of the real data of the number of students of 1st, 2nd and 3th degree of study at Žilina University. The calculation of the required representative sample of respondents at 95% confidence interval value (value 1.96) and 10% of admissibility errors was done subsequently. From the calculations we found out that the needed number of respondents of bachelor degree with the noticed conditions was 43. The calculations of the number of needed respondents of master study (39 respondents were needed) and the number of needed doctoral students (10 respondents were needed) were done analogously. It means that in total 92 respondents were needed, in total 238 respondents were used to find the relevant results. The above calculations show that the sample of respondents was representative. Verifying the hypotheses was done at the end of the evaluation of the research. We tried to find if the real results match with the preconditions that were formulated in the hypotheses.

3.1. Verification of the hypothesis No.1

Hypothesis No.1 supposed that at least 51% of respondents (regardless of gender) are dissatisfied with the quality of provided information and communication in the environment of Moodle. This hypothesis was verified by 3 questions of questionnaire. Results found out that 56% of respondents visit Moodle regularly more times per week and also that 56% of respondents are dissatisfied with the quality of provided information and 75% are dissatisfied with the communication in the environment of Moodle. These facts confirmed the hypothesis.

The statistical method Chi-square was used to determine the independence of views of both sexes. Alternative hypothesis was formulated, which was opposite to the null hypothesis. This means that the alternative hypothesis expressed different views of both sexes. The relationship for the calculation of chi-square showed that individual measured and expected values do not differ so much. In the freedom stage 1 and the significance level of 5%, the critical values of the distribution have the value of 3.84, which means that both values of our test, which were provided study materials (0.11), and the quality of communication (3.04) are lower than the critical value. It shows that it was necessary to dismiss the alternative hypothesis and accept the original hypothesis. If the critical values of distribution would be higher than the measured values, we should accept the alternative hypothesis and reject the zero hypothesis.

Table 3. Verification of the hypothesis No.1.

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Study	Social networks	Measured number	Expected number	χ^2
Study materials - men	Satisfied	37	35.77	0.04
	Dissatisfied	59	60.22	0.02
Study materials - women	Satisfied	42	43.22	0.03
	Dissatisfied	74	72.77	0.02
TOTAL				**0.11**
Communication - men	Satisfied	10	14.46	1.38
	Dissatisfied	88	83.53	0.24
Communication - women	Satisfied	21	16.53	1.21
	Dissatisfied	91	95.46	0.21
TOTAL				**3.04**

3.2. Verification of the hypothesis No.2

We supposed that the level of study of the respondents does not have statistically significant impact on their membership in the groups for supporting the education in the environment of social networks. This was the reason why we determined the alternative hypothesis, in which we supposed that the level of the studies has statistically significant impact on the using the groups of social networks.

Table 4. Verification of the hypothesis No.2.

Study	Social networks	Measured number	Expected number	χ^2	TOTAL
Bachelor	Use	74	72.35	0.04	**82**
	Dont use/dont know	8	9.65	0.28	
Master	Use	129	127.94	0.01	**145**
	Dont use/dont know	16	17.06	0.06	
Doctoral (PhD.)	Use	7	9.71	0.75	**11**
	Dont use/dont know	4	1.29	1.83	
TOTAL			238	**2.97**	**238**

The calculated chi-square values are shown in table 4, which also represents various real and expected frequencies and results of the tests. The degrees of freedom in a given assay acquired value of 2, which means that with 5% level of significance the critical values of the distribution have the value of 5.99, which is more than 2.98, calculated by us. We can say that the true hypothesis is the zero one and we had to reject the alternative hypothesis. It means that the level of studies of the respondents does not have statistically significant impact on the using the groups at social networks within educational purpose.

3.3. Verification of the hypothesis No.3

We supposed that at least 60% of respondents primarily gain the study information from the groups of commercial social networks. We verified it by question 7 and 8 of the questionnaire. Evaluation of the question No.7 found out that 78% of respondents primarily gain information about their study from social

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networks but by the second question we found out that only 41% of respondents think that social networks are more rewarding than Moodle. Respondents still think that the best way to gain information is the combination of social networks and Moodle. We had to dismiss the hypothesis because we did not confirm that it is true.

3.4. Verification of the hypothesis No.4

We supposed that more than 50 % of respondents would like to have the own University social network and the level of studies does not have the statistically significant impact. The questions No. 9 and No.10 of the questionnaire did the verification of this hypothesis. The results say that 86% of respondents like the idea of creating their own University social network. 79% said that they would use the social network. In terms of statistical calculations using the formula for calculating chi-square we calculated the values at a significance level of 5% and degrees of freedom 2 the critical value of the distribution is 5.99, which is much more than the found value 1.08 (Table 5). It means that the zero hypothesis is the right one and the alternative hypothesis was dismissed. Analogously we found out that the formulated hypothesis No.4 is true.

Table 5. Verification of the hypothesis No.4.

Study	Social networks	Measured number	Expected number	χ^2	TOTAL
Bachelor	Use	68	65.12	0.13	**82**
	Dont use/dont know	14	16.88	0.49	
Master	Use	112	116.15	0.09	**145**
	Dont use/dont know	33	29.85	0.33	
Doctoral (PhD.)	Use	9	8.74	0.01	**11**
	Dont use/dont know	2	2.26	0.03	
TOTAL				**1.08**	**238**

4. Conclusion

We can summarized the results of verifications of the hypotheses in this conclusion:

- We consider that at least 51% of respondents regardless on gender are dissatisfied with the quality of provided information and communication in the environment of Moodle – *True hypothesis*.
- We expect that the level of the study does not have statistically significant impact on the using the groups of social networks for educational purpose and communication dedicated to study - *True hypothesis*.
- We believe that approximately 70% of respondents primarily gain the information for their studies from the groups created in commercial social networks – *False hypothesis*.
- We suppose that more than 50% or respondents would like to have the own University social network, which is not statistically significant in terms of the level of study - *True hypothesis*.

From the results of the realized studies we know that the respondents are dissatisfied with existing state of provided information in the environment of Moodle and there is no connection between the level of study and using of social networks. The assumption that more than 2/3 respondents use commercial social networks for gaining and changing the information about study was not confirmed. The most important finding was that more than one half of respondents would like to have own social network of University of Žilina. In terms of the results of the research we have suggested 2 main variants of realization of the social networks for the electronic support of education at University of Žilina.

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The first variant is the suggestion of using the social network Facebook in the combination with eLearning and with its application Moodle. Basically, the current status would be maintained, as it is apparent from the answers of questionnaire. Even 89% of respondents use the groups designed to promote education of social networks and 99% of them use social network Facebook for it.

The second one and the more interesting one for the implementation is the suggestion and creation of the new structure of social network only for the needs of Žilina University in Žilina. This new social network is available at http://fantasy.uniza.sk from August 2013 and it is designed for real users – students of he Department of Communications (see Fig. 1).

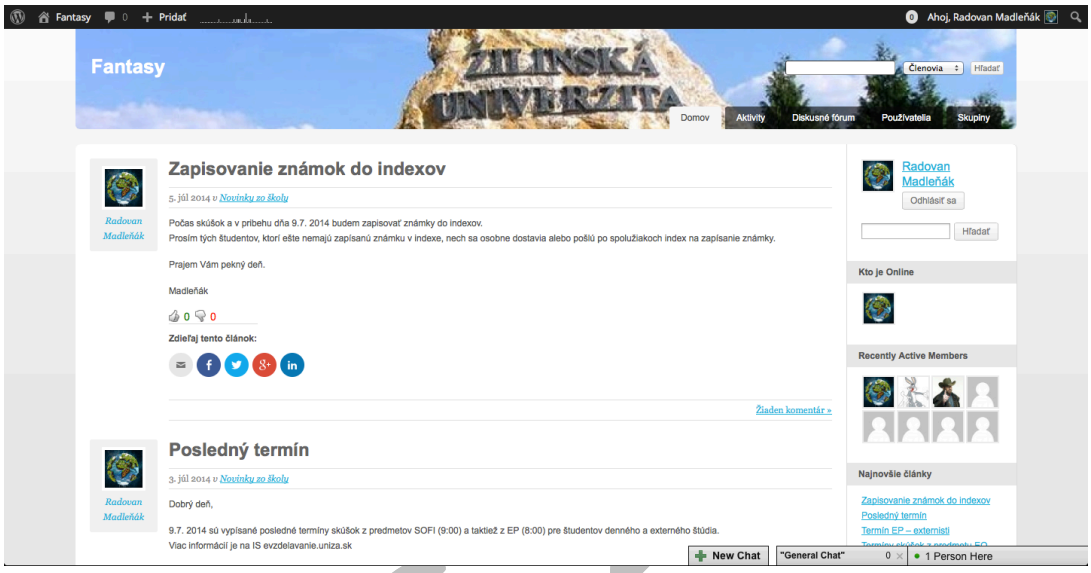


Fig. 1. Web page of social network fantasy.uniza.sk.

This network is closed and it is intended for students, teachers and administrators. 322 users were involved, including 315 students and 7 teachers until the 1st of July 2014 (see Fig. 2). This network is used only for educational and communication purpose not only among students but mainly for the relation student – teacher, educational and study material are still provided by University network based on IS Moodle.

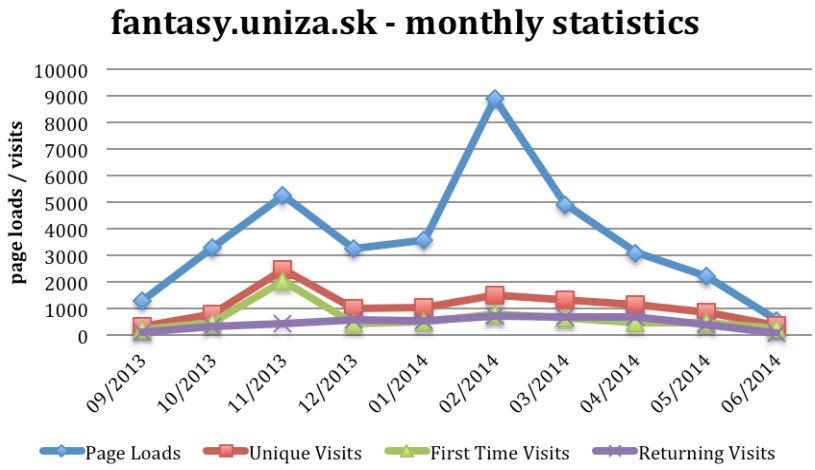


Fig. 2. Statistics of monthly visits of web page - fantasy.uniza.sk.

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Designing tools for numerical integration

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Abstract

Visualization, the ability of generating mental images from abstract concepts, is developed in students when technological resources are incorporated in teaching and learning processes, especially in mathematics. In this paper some tools for teaching numerical integration, developed by the authors, are shown. They are included in a set of customized applications designed for the issues studied in courses of Numerical Analysis at the Facultad Regional San Nicolás, Universidad Tecnológica Nacional, Argentina. With a simple interface, so as students can focalize on the concepts taught, these tools combine different semiotic registers in their design.

Keywords: Visualization; numerical integration; learning objects

1. Introduction

When teaching numerical methods, the emphasis is often placed on algorithmic developments and procedural and mechanical handling of the symbolic aspects of mathematical objects. In this way students do not achieve meaningful learning. Moreover, the numerical analysis has its own characteristics because the appropriateness of the use of different tools to solve a problem depends heavily on the context in which they are used. The emphasis on mechanical routine, plus the fact that understanding the essence of Numerical Analysis is usually a trouble for students, has resulted in various learning difficulties (Rodríguez, 2004).

The Virtual Laboratory of Numerical Analysis is a collection of personalized windows that let students work with all the issues included in the different courses of Numerical Analysis at Facultad Regional San Nicolás: resolution of nonlinear equations, resolution of linear equation systems, resolution of nonlinear equation systems, interpolation and curve fitting, numerical integration and resolution of ordinary and partial differential equations (Caligaris, Rodríguez & Laugero, 2010). Tools were initially developed in MAPLE, and later it was decided to use free software SCILAB. SCILAB is not symbolic software but it accomplishes the requirements of the designed tools, although there are some issues that are impossible to get, like derivatives or integrals. Therefore, all windows have been redesigned so as students can have access to them without restrictions. Also, some modifications that arose in their use were incorporated. Finally, some applications developed in MATHEMATICA were incorporated to the Virtual Laboratory of Numerical Analysis. These tools are CDF files that can be run in any computer, it is only needed the CDF player, which is freely available on Internet.

The objective of this paper is to present some customized windows developed to help students to understand the basic concepts and differences of numerical integration methods, where students can visualize and compare different approximations in different representations.

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2. Visualization

Visualization is a wide concept, in fact, it is a notion on which there are different conceptions on investigation in mathematics education. For example, Arcavi (2003) expresses that "visualization is the ability, the process and the product of the creation, interpretation, use of and reflection upon pictures, images, diagrams in our minds, on paper or with technological tools, with the purpose of depicting and communicating information, thinking and developing previously unknown ideas and advancing understandings". With visual arguments, students can conceptualize ideas. For Zimmermann and Cunningham (1991), visualization is a way for supplying depth and meaning to understanding, being a reliable guide to problem solving, and inspiring creative discoveries. In this sense, visualization cannot be isolated from the rest of mathematics; in other words, symbolic, graphical and numerical representations must be connected. From a didactical point of view, only those students able to perform conversions between these representations do not confuse a mathematical object with its representation and can transfer their mathematical knowledge to other contexts different from the one of learning (Duval, 1999).

Visualization is related with the ability of interpreting, transforming and understanding representations, generating mental images from abstract concepts. It is developed in students when technological resources are incorporated in teaching and learning processes. Therefore, it is possible that the use of graphical interphases in the learning process will not only help students to develop the ability to visualize, but also the dynamic interaction with them will let the different semiotic representations of mathematical object under study be connected, thus promoting conceptual learning.

3. Numerical integration and visualization

In Calculus, when teaching the concept of integration, the ability of visualization is used, even without technology. Some studies were performed, so as to identify the types of visual image students use when solving integral problems (Huang, 2013). Also, in Souto Rubio and Gomez Chacón (2011), the study of visualization processes from a cognitive point of view is presented along with a discussion of examples of empirical data relating to the concept of integral.

Rösken and Rolka (2006) analyzed an example from integral calculus focusing on visual interpretations emphasizing that visualization should be accompanied by reflective thinking.

The evaluation of integrals is required in many problems in engineering and science. But it is not always possible to find the exact value in an analytic way: here is where numerical integration arises.

There are two groups of numerical integration formulas. The first group is based on equally spaced points, these are frequently called Newton-Cotes formulas. The second group is formed by the Gauss-Legendre quadratures, which use points not equally spaced, but points that optimize the approximation, the roots of the Legendre polynomials. It is supposed that the integration formulas are known, that is the reason why they are only briefly described here (Burden & Faires, 2003; Mathews & Fink, 2000).

The first three Newton-Cotes formulas are the trapezoid rule, and Simpson`s 1/3 and 3/8 rules. The trapezoid rule is obtained by fitting a first order polynomial to two discrete points, Simpson`s 1/3 rule is obtained by fitting a second order polynomial to three discrete points and Simpson`s 3/8 rule is obtained by fitting a third order polynomial to four discrete points. Composite rules methods first subdivide the original interval in several subintervals and then apply the selected rule in each subinterval. When choosing n subintervals, different numbers of points are considered: for the trapezoid rule: n + 1 points, for the Simpson`s 1/3 rule: 2n + 1 points and for the Simpson`s 1/3 rule: 3 n + 1 points. As the amount of calculation increases with n, these numerical methods must be programmed so as to obtain good solutions.

Visual tools implementing these methods can be developed, so as to help students in the understanding of the concepts being shown. The main purpose of these applications is the fact that users may get a nu-

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merical solution for different mathematical problems with the corresponding methods, in a friendly graphical interface, without worrying about the commands needed for this solution.

In this way, students will not only focus attention on the object under study but, through visualization, they will also be able to compare the methods under study, analyze the pros and cons of applying them to discover math concepts, make generalizations; thus developing and promoting a different kind of mathematical thinking.

3.1. 3.1 Existing tools

Numerical integration formulas are easy to program. They are usually used as examples in programming courses in engineering careers. The appearance of symbolic software yielded better graphics and animations to visualize in a dynamic way, the convergence of the methods. For example, in the website of the University of Fullerton, California (mathfaculty.fullerton.edu/mathews//numerical.html) animations of different numerical methods are presented. These animations run directly in the Internet browser: no additional software is needed. In particular, for Newton-Cotes formulas these links are available:

- mathfaculty.fullerton.edu/mathews//a2001/Animations/Quadrature/Trapezoidal/Trapezoidalaa.html
- mathfaculty.fullerton.edu/mathews//a2001/Animations/Quadrature/Simpson/Simpsonaa.html
- mathfaculty.fullerton.edu/mathews//a2001/Animations/Quadrature/Simpson38/Simpsonaa.html

Also, Wolfram demonstrations (http://demonstrations.wolfram.com) is a collection of thousands of interactive demonstrations created using MATHEMATICA. These tools are CDF files that can be run in any computer, it is only needed the CDF player, which is freely available on Internet. Several tools explore numerical integration with Newton-Cotes quadrature formulas, comparing and analyzing the error. For example:

- http://demonstrations.wolfram.com/NewtonCotesQuadratureFormulas/
- http://demonstrations.wolfram.com/ComparingBasicNumericalIntegrationMethods/
- http://demonstrations.wolfram.com/NumericalIntegrationExamples/
- http://demonstrations.wolfram.com/NumericalIntegrationUsingRectanglesTheTrapezoidalRuleOrSimps/
- http://demonstrations.wolfram.com/NewtonCotesQuadrature/

Each of the links above was last visited on September 2014.

3.2. 3.2 Customized tools

Sometimes, the available tools do not satisfy the professors' requirements when preparing their classes. Since 2010 the authors have been developing graphical tools for the teaching of numerical analysis. Programs such as MAPLE, SCILAB and MATHEMATICA were used for this purpose (Rodriguez, Caligaris & Laugero, 2014). Some tools will be shown here, highlighting their potential. Others can be seen in www.frsn.utn.edu.ar/gie, by clicking the button corresponding to resources (Recursos). All the tools were developed in Spanish; the applications presented in this work were translated into English.

Figure 1 shows the application designed using Mathematica, which implements the first three Newton-Cotes formulas for numerical integration: the trapezoid rule, and Simpson`s 1/3 and 3/8 rules. To use this interface, the corresponding function, the integration interval and the number of subintervals to be considered in each method must be selected.

The number of points, the exact value of the definite integral and the approximate value for the rule, together with the graph of the function and the corresponding fitting polynomials, are shown for each Newton-Cotes formula. The red points are the endpoints for the subintervals and the green points are the interior ones.

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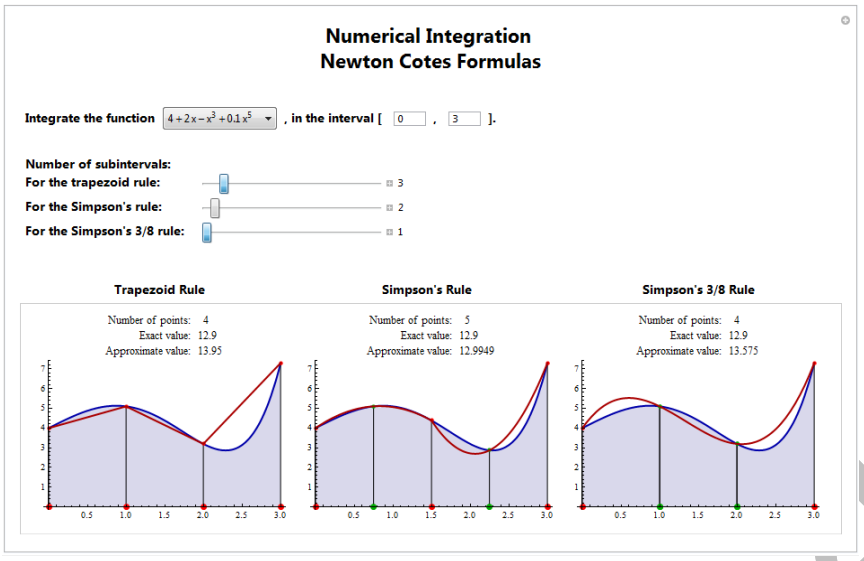


Fig. 1. Mathematica application for numerical integration.

Figure 2 shows other application designed using Mathematica. In this interface the first three Newton-Cotes formulas are also used, to analyze the error in the approximation formulas. The corresponding function and the integration interval must be selected, so as to obtain results.

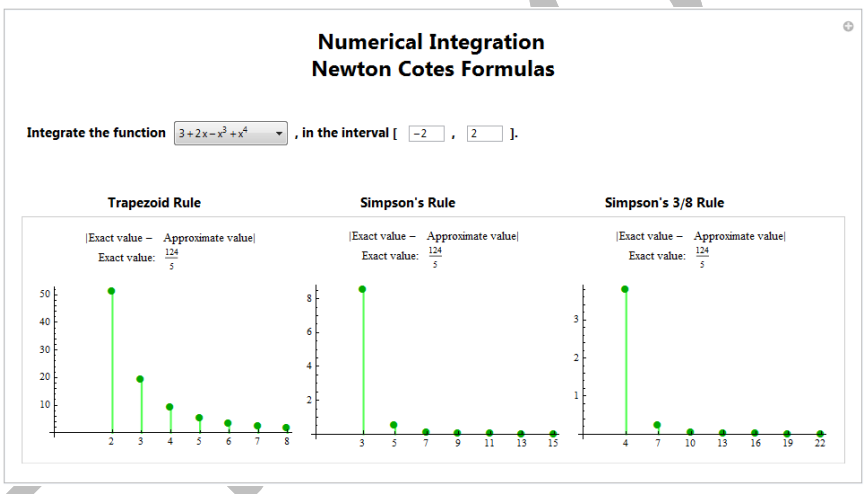


Fig. 2. Application for analyzing errors in numerical integration.

The exact value of the definite integral and the difference between this exact value and the approximate value for the rule, in absolute value, as the number of points increases, are shown for each Newton-Cotes formula, in the application shown in Fig. 2.

Numerical integration algorithms estimate an exact value by an approximation, having an error that depends on h, the distance between two consecutive points. Increasing the number of points, this error decreases. To make a proper comparison of quadrature methods, the same number of function evaluations in each method should be used.

Figure 3 shows the application designed using SciLab for working with numerical integration (Caligaris, Rodríguez & Laugero, 2013). It presents four different methods to achieve an approximation of a definite integral: the first three Newton-Cotes formulas and the Gauss-Legendre quadrature.

To use this interface, the corresponding function, the integration interval and the number of subintervals or points, as required, to be considered in each method must be entered. By pressing **Calculate**, each of the approximations is shown. With the **Graph** button, the function is plotted in the specified range.

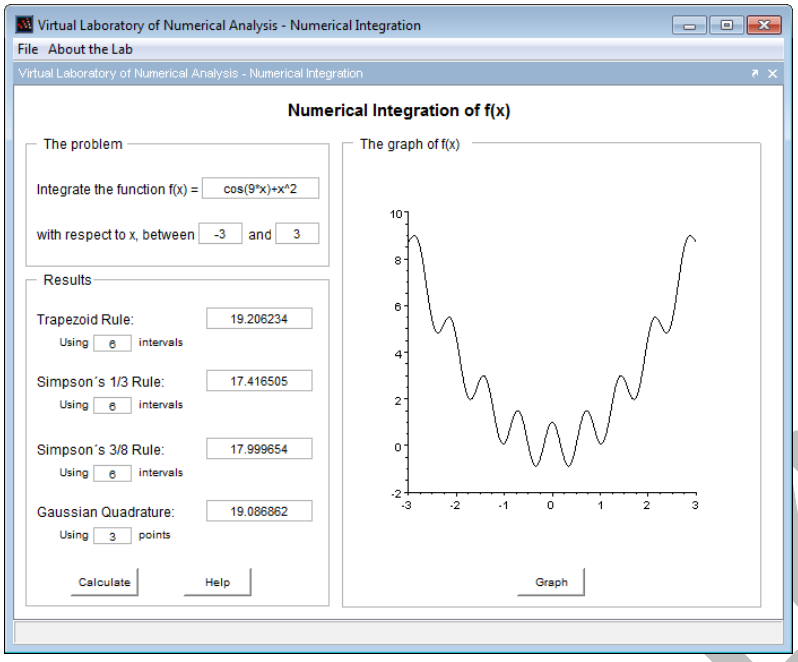


Fig. 3. SciLab application for numerical integration.

4. Conclusion

Nowadays, learning objects are becoming didactic resources for supporting learning & teaching processes. Some of the reasons exposed by Chan (2002) for integrating learning objects when teaching are: gradual change of the educational paradigm focused on teaching and learning-oriented, recognition of the need for flexible curriculum in educational institutions of higher education, greater acceptance of technology as a factor in educational innovation by teachers and, certainly, by students and pressure to continually updating the educational content because of the vertiginous technological advancement.

Programming this kind of tools either in Mathematica or SciLab is not an easy task, but there are many applications available that can be downloaded and used. In particular, the tools presented here are available at http://www.frsn.utn.edu.ar/gie/an/in, in Spanish.

However, it is not enough just to incorporate this type of learning resources in educational processes. It requires teachers to use and apply them at the appropriate time within didactic sequences.

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Determination of the level of being cyber bully/ victim of eighth grade students of elementary schools

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Abstract

The main aim of this research is to examine the cyber bullying and cyber victim which transforms into a big problem by extending more and more between young generations in 21st century. The research has been carried out related with general survey model to relationship survey model. The dependent variables of the research are cyber bullying and cyber victim, its independent variable gender. The population of the research is formed of Sakarya city Hendek province, the sample is formed of 80 female, 87 male totally 167 students being educated in three elementary schools in Hendek. Cyber bully/ victim scale which has been developed by Ayas and Horzum (2010) has been applied to the participants. The data taken from the measurement devices have been transferred to SPSS and descriptive analysis and free groups T test and regression analysis statistical procedures have been realized. It has been determined that the level of cyber bullying and cyber victim of the eighth grade students has been low. According to the gender when the level of cyber bullying and cyber victim has been examined, it is resulted that the boys have been more cyber bully and have been more cyber victim when compared with the girls. According to the regression analysis the results between cyber bullying and cyber victim, the student who face cyber bullying is more inclined to be cyber bully.

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Keywords: Cyber bully, cyber victim, cyber bully and victim

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1. Introduction

The human beings can be exposed to bullying in different periods of their lives. Especially school bullying is frequent lived situation. School bullying is exposing a student to negative actions and behaviors continuously by more than one student in social life or in any activity. Traditional peer bullying has been explained by Olweus(1994) as physical, verbal, psychological attempts or threats which have been reviewed on the victim who is not able to defend himself as he is physically and psychologically weak . Olweus (1993) stated that bullying has two kinds. These are direct bullying in the form of verbal, physical attempts and indirect or relational bullying made in the form of social exclusion. The male children mostly use physical tyranny, female students use verbal bullying such as defamation or sexual commenting (Nansel, Overpack, Pilla, Ruan, Simons-Morton, Scheidt, 2001; Olweus 1993). Olweus (1993) determined in a study which includes 150.000 students between first classes and ninth classes in Norway and Swiss that %15 of the students are exposed to bullying events more than once as a victim or a bully.

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In a research made by Nansel and his colleagues (2001), 30% of 15.686 students stated that they mostly or frequently faced up with bullying 11% of these students have been victim, %13 of them have been bully and 6% of them have been both victim and bully. There has been meaningful relationships between violence and low ego respect, depression and negative psychological functions in the students who take place as a victim in bullying fact. Anxiety, loneliness idea, suicide, leaving school early, decreasing of learning ability are the other negative effects. (Craig, 1998; Hoover and Oliver, 1996; Rigby and Slee, 1999; Mason 2008).

Olweus (1994) states that the children of the adolescents who bully their friends have been generally physically older or stronger than their friends. Popularity, physical power, status, social rivalry power, self-trust, being extraverted, socioeconomic status properties have been effective on being dominant over the victim by the bully The victim is generally weaker as physically and power than his friends and has a lower ego and he is the person who has been tortured. (Limber 2002, Olweus 1993).

A new kind of bullying has been added to the kinds of bullying as cyber bullying between the students in parallel with the technological developments. Cyber bullying is also more than once like the traditional bullying, it includes psychological violence and is made intentionally (Dehue, Bollman and Vollink 2008). According to Patchin and Hinduja (2006) cyber bullying is a behavior of giving damage which has been realized intentionally or reviewed again by electronic texts.

Verbal bullying, emotional bullying and threatening bullying situations can be lived in Cyber bullying as it has been in traditional bullying (such as nicknaming, abasement, gossiping about the individual, joking , making bad jokes, exclusion from the group, abasement about the nationality. Emotional torturing, requesting his money, belongings or a copy of the homework, to request something by blackmailing, etc). Whenever cyber bullying reaches a moment that it cannot be stood, it transforms to the behaviors such as attacking, violence, etc as a kind of physical bullying by reflecting in private life (Manap, 2012).

In a research Juvonen and Gross (2008) made on the young people between the ages of 12-17 in America, 72% of the participants stated that they have been victim at least once in the last previous year. According to research results, it has been determined that 85% of the participants lived a victim experience at school and the bullying at Internet can be accepted as the continuation of the bullying at school. 2/3 of the cyber bullying victims who participated in the research stated that they knew the people who bullied them. Half of these at the same time are the people who bully at school.

In a study realized by Li (2007) in Canada, a questionnaire has been applied to 177 people of sampling who have been students at 7th grade , at the result of the research it has been stated that there is a meaningful relationship between traditional peer bullying and cyber bullying in the frame of being a victim and a bully. According to Li (2007) the ones who realize traditional bullying are more inclined to torturing by using electronic communication devices when compared to the ones who do not behaviors like these Dehue, Bolman and Wollink (2008) stated in his study which is realized with 1211 students with 11-12 aged students in Netherlands the students who participated in traditional bullying is also bullied in cyber environment , there is a meaningful relationship between two kinds of bullying.

In a study which 11-16 aged young people participated in England by Smith and his colleagues, they found that the young people who have been bullied traditionally are also being bullied in cyber environment or the ones who tortured others traditionally also tortured others in cyber environment. In a study realized with 360 students between 12-20 aged individuals at a school in Sweden, Slonje and Smith (2008) found that the ones who faced up with cyber bullying is 5,3% and the ones with traditional bullying is %10. The victims knew the ones who tortured them and they stated that these people were from the school. At the same time, the participants stated that as the cyber bullying has more followers in cyber environment, its effect has been more than the traditional one.

Ybarra, Diener-West and Leaf (2007) found in a study they made together that the rate of the ones who faced up with both cyber and traditional bullying has been %36. Wolak, Mitchell and Finkelhor (2007) on the other hand tried to show the similarities about bullying event realized on internet and outside in a study they made with 1500 young individuals between 10-17 ages. They stated that there are not standard definitions such as a revision of force inequality; attack in internet bullying events which have been existent in school based bullying.

The frequency of the existence of cyber bullying has been researched by many researchers. Kowalski and Limber (2007) found in a study they realized with 3767 students from 6th, 7th and 8th grades in America that 511 of the participants participated in electronic victim events as victim, 7% of them both as a

victim and a bully , %4 of them as a bully. Ybarra and Mitchell (2007) found in an interview they made with 1501 regular internet user between 10-17 ages that 19% of them were concerned with bullying events at internet, 4% of these were victims, 12% of them were bullies and 3% of them were both victim and the bully.

Patchin and Hinduja (2006) determined in a study they made that 29% of the participants lived bullying experiences such as being disturbed in internet, intentionally being teased, nicknaming, being scared , taking messages with sexual content, theft about their private life, 11% of them stated that they realized bullying to others. In a study realized by Moessner (2007), it has been stated that 43% of the young individuals between the ages of 13-17 told that they have been sent messages or posts with the aim of injuring or shaming them by mobile phones or and internet.

Dehue, Bolman and Völlink (2007) found in a study they realized with 1211 people from elementary and secondary school students that 16% of the participants bullied others with mobile phone messages or at internet, 22% of them have been at the role of victim. While 35% of the victims mentioned that they did not know the people who victimd them, the bullies stated that they participated in bullying events mostly when they were alone at home or when they were with their friends. According to the findings of the research, the mostly used bullying style is nicknaming and gossiping.

Li (2006) stated that one of the four students in Canada have been faced with cyber bullying in a study he made with 264 seventh and ninth grade students. Nearly half of the victim students told that they knew the ones who bullied them. 15% of the participants told that they bullied others by using electronic communication devices. Juvonen and Gross (2008) stated that 72% of the young individuals between the ages of 12-17 have been faced with bullying event at internet at least once a year.

At the result of a study which Aricak, Siyahhan, Uzunhasanoğlu, Sarıbeyoğlu, Çıplak, Yılmaz and Memmedov (2008) realized with 269 Turkish students between the ages of 12-19, they found that 36% of the students showed bullying behaviors in internet. 24% of the participants are at the role of both victim and the bully. 6% of the participants in the research are at the role of victim. %23,7 of the students stated that they have been disturbed by mobile phones. Aricak (2009) stated in a study which he realized with 695 university students that 19,7% of the students realized a bullying event at least once in their life,54,4% of them has been at least in the role of a victim, 17,7% of them has been cyber bully-victim .

1.1. The aim of the research

This study has been realized with the aim of determining the eighth grade students' situation of being bully/victim. The reply to the problems below has been searched to reach this aim:

1. What is the level of facing with cyber bullying of the eighth grade students?

2. What is the level of showing cyber bullying of the eighth grade students?

3. Does the level of facing with cyber bullying change related with the gender?

4. Does the level of realizing cyber bullying change related with the gender?

1.2 The importance of the research

The most important negative aspects of the technology is the behaviors including bullying. The situation named as cyber bullying causes serious problems in emotional and social lives of the individuals. Because of this reason the research is to be made on the subject of cyber bullying gains great importance in the frame of decreasing cyber bullying, giving information about this concept to the young people to gain them struggle skills and using technology in a more healthy way. It is observed that the research is on cyber bullying have been realized mostly at high school and university. However, the individuals who take place in younger group spend their time at internet environment. There is a need of making studies related to determination of cyber bullying/victim of elementary school students in the context of determining what they will meet at internet while spending time on it and taking precautions against the situations

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which can affect them negatively. Because of this reason, the situation of 8th grade students' being bully/victim has been tried to be determined with this research.

1.2. Limitations

1. This research is limited with 8th grade students who are being educated at Sakarya City Hendek Province in 2012-2013 period.

2. This research is limited with the scores in the applied scales.

2. Method

The research model, study group, collection of the data and data analyses information have been given in this section.

2.1. Research model

The research has been realized in survey model. Survey model is based on the revision of past and daily data related to object, fact, event, individual, etc.

2.2. Population and sample

The population of the research is formed of 8th grade students who are being educated at Sakarya City Hendek Province. It has been determined according to the sample aimed sample method. The sample of the research is formed of 167 students, 80(47.9%) girls, 87(52.1%) boys who are being educated at 8th grade 3 different schools in Hendek. Having a psychological consoler and permission of the authorities have been important at the schools which the application has been made.

2.3 Data collection instruments

Cyber bully/victim which has been developed by Ayaş and Horzum(2010) scale has been used. This scale is formed of 2 parallel scales named as "cyber bullying scale" and "cyber victim scale" and in the formed of asking the same items in different ways. This cyber bully/victim scale is formed of 19 items and 3 factors. The distribution of items in the scale according to the factors has been found as; 1., 2., 3., 4., 5., 6. and 18th items sexual bully and victim at cyber environment; 7., 8., 9., 12., 13., 14., 15. and 16th items bully and victim for prevention and damaging at cyber environment; 19., 20., 21. and 22nd items bully and victim of gossiping at cyber environment. 5 Liker type grading to state the participation level related to the items taking place in the scales has been used. This grading has been formed as "(5), frequently (4), Sometimes (3), rarely (2) and Never (1)". It is expected from the students to choose in which frequency they realized the actions taking place in the scale in cyber bully scale in which frequency they met these actions in cyber victim scale. The minimum score to be taken from cyber bully and victim dimensions of the scale is 19, the maximum is 95. As the score increase, the situation of being cyber and victim increases. (Ayas and Horzum, 2010).

2.4. Collection of the data

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Cyber bully/victim scale has been applied to the 8th grade students in Hendek province of Sakarya after the school management, teachers and students have been informed about the study and permission has been taken from the authorized people. It has been applied to only volunteer students after getting into contact with the school guidance teacher of the schools.

2.5. Analysis of the data

SPSS 17 package program has been used for the statistical procedures of the data analysis. Descriptive statistics analysis has been made with the aim of determining the level of students' being cyber bully and victim. T- test has been applied for the free groups with the aim of determining the difference between gender and cyber bully and victim.

3. Findings

The findings and comments about the analysis of the collected data take place in this section.

3.1. Sub-findings related to first sub problem

Table 1. Cyber victim level statistics

	N	$\overline{X}$	sd	V%
Total	164	25.4329	8.36009	32,87

Statistical data related to the level of cyber bullying of the students at the 8th level has been given in Table 1. According to the results of descriptive statistics taken from the data from 167 8th level students, averagely ($\overline{X}$) "25.4329", standard deviation (ss) "8.36009" and dependent change coefficient (V%) "32,87" have been taken. It can be stated that the level of being cyber victim of 8th grade students has been low according to this data. In case of dependent change coefficient is more than 25%, it has been determined that the students showed a different distribution from the average. In other words, the students do not have the same idea in the context of meeting cyber victimized.

3.2. Sub-findings related to second sub problem

Table 1. Cyber bullying level statistics

	N	$\overline{X}$	sd	V%
Total	163	24.0859	6.81719	28,30

Statistical data related to the level of cyber bullying of the students at the 8th level has been given in Table 1.According to the results of descriptive statistics taken from the data from 167 8th level students,

averagely ($\overline{X}$) "25.0859", standard deviation (ss) "6.81719" and dependent change coefficient (V%) "28.30" have been taken. It can be stated that the level of being cyber victim of 8th grade students has been low according to this data. In case of dependent change coefficient is more than 25%, it has been determined that the students showed a different distribution from the average. In other words, the students do not have the same idea in the context of meeting cyber victimized.

3.3. Findings related to third and fourth sub problems

Table 3. T-test results

Free variable		N	$\overline{X}$	sd.	t	df	p
Victim	Male	88	25.9091	7.45351	.784	162	.434
	Female	76	24.8816	9.32090			
Bully	Male	87	25.6092	8.34901	3.134	161	.002
	Female	76	22.3421	3.83163			

When being victim line is being examined in Table 3, it can be seen that being cyber victim level does not show a meaningful difference (t(162)=.784, p< .05) at 0,05 grade according to the gender. When being bully line is being examined, it can be seen that being cyber bully level does not show a meaningful difference (t(161)= 3.134 p<.05). It has been determined that being cyber bully level of male students is more than ($\overline{X}$ =25,6092) female students ($\overline{X}$ =22,3421).

4. Discussion, result and proposals

In this section, the discussion of the findings reached and results and proposals related to these take place.

4.1 Discussion

In case of researching whether there is a change in cyber bullying total points of elementary education eighth grade students related to the gender, it has been determined that there has been a meaningful difference between he genders, male students shew more cyber bullying than the female students, but there is not a meaningful difference between male and female student in the context of exposing to cyber bullying. It is also observed that there are different results between gender and cyber bullying/victim.

In this study, it has been determined that there is not a meaningful relationship between the gender of eighth grade students and the level of being cyber victim. This finding does not correspond with Batmaz's (2012) research result which he has made with 6th, 7th and 8th grade students. The result which Batmaz (2012) reached in his research is that male students have been more cyber victims than the female students, male students realized cyber bullying more than the female students. In the study which has been carried out by Batmaz with 6th, 7th and 8th grade students the finding of "male students realized cyber bullying more than the female students" shows a parallelism with the findings reached at the end of this

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research which has been made with 8th grade students. Williams and Guerra (2007) could not find a difference between males and females in the frame of participation in bullying in internet in their studies named as extensity and factors of bullying in internet.

Many researches state that there is not a meaningful relationship between the gender and cyber bullying. The research findings of Aricak (2009), Juvonen and Gross, (2008); Patchin and Hinduja, (2006); Slonje and Smith, (2008); Smith (2008); Wolak vd., (2007) show a parallelism in this direction. Aricak (2009) stated that there is not a meaningful relationship related to the gender in participating in cyber bullying in a study which he made with Turkish university students, but male students have a more bullying role than the female ones. In the same way, Juvonen and Gross, (2008), Patchin and Hinduja, (2006), Slonje and Smith, (2008), Smith and his colleagues (2008), Wolak and his colleagues (2007) could not find a gender difference in participation in cyber bullying. Topçu, Erdur-Baker, Çapa-Aydın (2008) stated there is not a difference between male and female students in Turkey in the frame of bullying and being victim in their studies in which they researched cyber bullying events.

Kowalski and Limber (2007) reached the result in their studies that 15% of the female students and 7% of male students have been victims in electronic bullying experience. In other words, they stated that there is a meaningful difference between gender and being cyber victim. Li (2006) has taken findings which correspond with this study in his study named as "cyber bullying and gender differences" in the study he realized at schools. According to Li (2006) 22% of males and nearly 12% of females have been cyber bully, but there is not a meaningful difference in the context of being victims between males and females.

4.2. Results

1. The level of being cyber victim of elementary school eighth grade students has been quite low.
2. The level of being cyber bully of elementary school eighth grade students has been quite low.
3. There is not a meaningful relationship between the gender of eighth grade students and being cyber victim.
4. There is a meaningful relationship between the gender of eighth grade students and being cyber bully. It has been determined that the level of being cyber bully of male students is higher than female students.

4.3. Proposals

At the result of this study which has been realized with elementary school 8th grade students, it has been reached that the level of being cyber bully of male students is higher than female students. Many researches which have been realized in Turkey gave the same result. The determination of this situation and studies related to preventing this situation should be made with the cooperation of parents and students.

Seminars and guidance activities for the parents and the school management should be realized and follow up studies should be made by concentrating on the studies related to being cyber bully/victim situations at schools.

This one and similar studies have been carried out by taking gender and school level into account. If the studies from now on is carried out by taking the marital status of the parents, the geography where they lived, their professions into account, the effect of these factors can also be searched on the level of being cyber bully/victim.

The reasons underlying that cyber bullying is more existent on male students can be searched by other researchers.

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Develop and evaluate the effects of multimodal presentation system on elementary student learning effectiveness: within classroom English learning activity

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Abstract

This study is to develop a multimodal presentation software integrated with interactive whiteboard (IWB) as a multimodal presentation system (MPS) to support the classroom English learning in the elementary English as second language (ESL) course. It focuses primarily on techniques and tools to enhance the students' ESL learning achievement and learning satisfaction in the classroom setting. This paper utilizes the MPS, based on Mayer's cognitive theory of multimedia learning (CTML), to present the multimedia instructional materials in auditory and visual modalities. An experimental research designed was conducted. The results revealed that there were statistically significant differences between the students in experimental group and control group on measures of learning effectiveness (i.e., academic achievement and learning satisfaction).

Keywords: Interactive Whiteboard, Multimodal, Cognitive Theory of Multimedia Learning

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1. Introduction

English is regarded as a second language in Taiwan. Teachers usually present text-centered materials with little pictures on blackboards and the students read directly following the teachers. This blackboard teaching provides an inflexible presentation of teaching materials in the way of colors, styles, as well as multimedia formats. The language learning process is a complicated, intelligible and meaningful activity. Students are unable to effectively internalize language as parts of the cognitive system via mechanical exercises and repetitive operations. According to Mayer's (2001) cognitive theory of multimedia learning (CTML), learning from distinct channels leads to a general improvement in learning. Also, the modality principle of multimedia learning (Mayer, 2001) suggests that students learn better when words in a multimedia message are presented as spoken text rather than printed text. Since the last 20 years, e-learning has become a modern teaching method in using information technology within the classrooms. The e-learning includes all forms of electronically supported learning and teaching, by taking advantage of computer technologies and software, to enrich and improve the teaching and learning quality (Hussein, 2011). Recently, information technology has enabled an explosion in the availability of visual ways of presenting materials. Large amount of multimedia English learning materials and computer assisted language learning software have been developed to enhance the learning performance of English pronunciation, spelling, phonics, and word attack skills (Beatty, 2010; Lee et al., 2005; Towndrow, 2007). Therefore, many English

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teachers have started to make use of technological tools to present teaching materials in multimedia formats.

Recently, interactive whiteboard (IWB) has been used to replace the traditional blackboard in the classroom. It provides medium to display teaching materials including files, educational software, web sites, and others for providing powerful multimedia/multimodal presentation (Ekhami, 2002; Isman et al., 2012; Jang, 2010; Smith et al., 2005; Türel & Johnson, 2012). Using IWB brings the change of linking technology and pedagogy in the classroom (Beauchamp & Kennewell 2010; Glover et al., 2005; Smith et al., 2005). Many studies related to the use of IWB in educational settings have shown that IWB technology can promote teacher-student interaction and student participation in classroom (Higgins et al., 2007; Kennewell et al., 2008; Schmid, 2008, 2010; Smith et al., 2005). For example, Smith et al. (2005) claimed that the pedagogical potential of IWB technology is to provide higher level of interactivity and participation over traditional blackboard. Also, some research on IWB prove the positive improvement of learning achievement (Digregorio & Sobel-Lojeski, 2009; Jang, 2010; Lewin et al., 2008; Slay et al., 2008; Thompson & Flecknoe, 2003). Although the aforementioned positive effect of IWB, there are some controversial point of view about IWB use. For example, Coyle et al. (2010) analyzed the influence of IWB technology on the language use of a primary school and revealed that the failure to promote verbal interaction for the group of non-native speaker (NNS) in an English language immersion classroom. In addition, in the claim of interaction improvement, many teachers tend to dominate the IWB lesson without inviting the students to interact with the board themselves (Levy, 2002).

Storytelling by adults is considered as a critical step that can facilitate comprehension and increase interest in teaching (Smith, 1988). Especially for language learning, storytelling is a practical and powerful teaching tool (Tsou et al., 2006). Chien and Huang (2000) claimed that predictable storybooks are effective in building ESL kindergarteners' oral and literacy development. Recently, storytelling as a way of teaching children English has been flourishing in Taiwan (Lee, 2012). In addition, researchers have demonstrated successful usages of computer assisted English learning in significantly facilitating teacher's storytelling and children's learning in ESL classrooms (Lee, 2012; Tsou et al., 2006). However, to the best of our knowledge, research of exploring the effectiveness of IWB in English vocabulary learning through storytelling teaching method is rare, and therefore this has become an important issue of research.

As a result, this study develops a multimodal presentation system (MPS) to present multimedia instructional materials and manage interactive learning activities in the classroom. More specifically, the MPS is used to support the verbal instruction materials (e.g., printed words, spoken words) and the corresponding visual instruction materials (e.g., illustrations, photos, video, and animation) in the interactive instructional activity. In addition, learning achievement and satisfaction are the major objectives of learning activities (Long, 1985; Lu et al., 2003), this study thus to explore the learning achievement and satisfaction of English learning activity by use of the MPS.

The remainder of this paper is organized as follows. Section 2 reviews pertinent literature on the research of Mayer's cognitive theory of multimedia learning (CTML) and learning effectiveness. Section 3 then describes the architecture of the multimodal presentation system (MPS) and section 4 presents the experimental design and process. Section 5 presents the experimental results, as well as discussion on the findings. Finally, Section 6 addresses conclusions, limitations and directions for future research.

2. Literature review

2.1. Mayer's cognitive theory of multimedia learning (CTML)

Multimedia is defined as the presentation of materials using both words and pictures and thus focused on the auditory/verbal channel and visual/pictorial channel (Mayer, 2001, 2003, 2005). Mayer (2001, 2003, 2005) presents a theory of multimedia learning in terms of an information-processing model, called cognitive theory of multimedia learning (CTML), by integrating Sweller's cognitive load theory (Chandler

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& Sweller, 1991; Sweller, 1988), Paivio's dual-coding theory (Clark & Paivio, 1991; Paivio, 1986), and Baddeley's working memory model (Baddeley, 1986, 1993, 1999).

The CTML provides empirical guidelines to promote instructional design to achieve meaningful learning (Mayer, 2001). Based on three main assumptions (dual channel, limited capacity, and active processing), seven principles (multimedia principle, spatial contiguity principle, temporal contiguity principle, coherence principle, modality principle, redundancy principle, and individual differences principle) are proposed in this theory. The modality principle suggests that as textual information, presented in an auditory mode, with concurrent visuals are displayed, students have greater knowledge acquisition (Ginns, 2005; Mayer, 2009). The visual information processing channel may become overloaded when students must process on-screen graphics and on-screen text at the same time. Van Someren et al. (1998) suggested that the educational representations should be developed to utilize this multimodality approach to allow learners to learn by exploring and linking different modalities. Also, some literatures show supporting evidence that presenting information in auditory mode with concurrent visual mode leads to deeper understanding (Mayer, 2003; Mayer & Sims, 1994; Paivio et al., 1998).

2.2. Learning effectiveness

In general, learning effectiveness can be measured using two variables: academic achievement (e.g., semester grade, test score) (Alavi et al., 1995; Shih et al., 2012) and learning satisfaction (Knowles, 1970; Maki et al., 2000; Piccoli et al., 2001). Correspondingly, the study of Huang et al. (2012) took academic achievement and learning satisfaction as two criteria for measuring student's learning effectiveness. Learning satisfaction can be regarded as the learners' feeling (Long, 1985; Tough, 1982), the learners' attitude (Long, 1985), or the learners' sense of pleasure (Johnson et al., 2000) toward their learning activities. Piccoli et al. (2001) and Maki et al. (2000) believed that learning satisfaction expresses learners' satisfaction derived from the learning process and learning results. Hence, learning satisfaction is a very suitable criterion for assessing learners' satisfaction with classroom learning. In summary, we can obtain better understanding of a student's learning effectiveness according to both academic achievement and learning satisfaction. As a result, academic achievement and learning satisfaction are considered as two important criteria for measuring student's learning effectiveness in this study.

3. The architecture of the multimodal presentation system (MPS)

In multimodal learning environments, students are presented content knowledge with a verbal representation and one or more corresponding visual representations. According to the modality principle of instructional design, learning outcomes will be optimized by presenting the verbal and visual representations of the knowledge in auditory and visual modalities (Moreno & Mayer, 2007). An interactive multimodal learning environment is the one in which the presented words and pictures depend on the learner's actions and the communication is multidirectional during learning. Figure 1 shows the architecture of the multimodal presentation system (MPS). The MPS in the environment consists of four primary components, which are Office Card Component, Media Card Component, Annotation Card Component, and Manager Card Component. This multimodal presentation software was designed to bring students to the interactive whiteboard, more directly involving them in the lesson.

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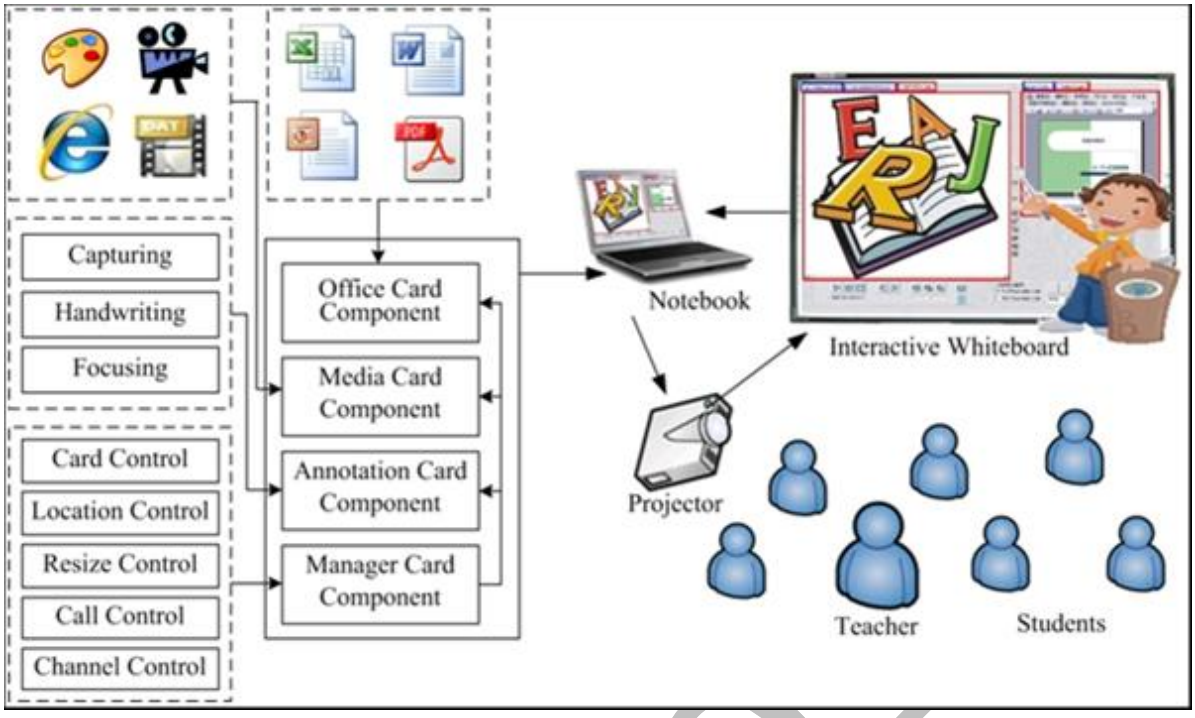


Fig. 1. The architecture of the multimodal presentation system (MPS)

Office Card Component is used to manage software applications simultaneously, especially for Microsoft Word, Excel, and PowerPoint software. Normally, for multiple PowerPoint presentations there is only one PowerPoint application can be activated at the same time. By using the functions provided by Microsoft OLE and COM Automations, Office Card Component is able to support the control of document, such as page up, page down, page jump, and change the view of document, etc.

Media Card Component is used to manage media object containers. For example, Digital Video is used to connect video devices and audio devices to display and record as a real-time streaming. Media Player Control provides scroll bar with play, stop, pause, etc. Browser Control and Image Control provides users with connecting Internet and image objects, respectively.

Annotation Card Component supports three major functions. Capturing is used to record screen operations and sounds into video movie files. Handwriting is used to support teacher's lecturing handwriting with notebook without electromagnetic digitizer. Focusing is used to emphasize the teaching materials by changing the background or frame color of the object containers.

Manager Card Component is used to manage authoring and presenting containers of materials. It includes five major control functions. Card Control is used to create, add, copy, rename, and delete the object containers. Location Control is used to move, switch, and arrange the location of object container. Resize Control is used to change the size of object container. Call Control can create the relation between related materials such as the major container and the child containers. It can record the numbers of object containers, show the previous pages of containers, and call the containers back to the primary monitor. Channel Control is used to present the object container to different monitors. Teachers can present instructional content in one or more columns scenario.

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4. Experimental design

4.1. Procedures

This study aims to evaluate the elementary students' learning achievement and satisfaction within classroom English vocabulary acquisition by utilizing the multimodal presentation system (MPS). At the end of the learning students took a post-test for measuring the learning achievement and questionnaires for measuring the learning satisfaction. Procedures of the experiment are are described as follows.Section headings

Section headings should be left justified, bold, with the first letter capitalized and numbered consecutively, starting with the Introduction. Sub-section headings should be in capital and lower-case italic letters, numbered 1.1, 1.2, etc, and left justified, with second and subsequent lines indented. All headings should have a minimum of three text lines after them before a page or column break. Ensure the text area is not blank except for the last page.

4.2. Participants

The participants were 134 pupils (72 boys and 62 girls) from six classes of two public elementary schools in Taiwan. All subjects, ranging in age from 11 to 12, were fifth-grade students. The instructional approaches were assigned randomly to six classes. The experimental group (68 students, 37 boys and 31 girls) was lectured with MPS and the control group (66 students, 35 boys and 31 girls) was lectured with blackboard. A summary table describing the distribution of participants is shown in Table 1. The experiment was held in the "English as a second language" course and lasted for two months from mid-March 2011 to mid-May 2011. Lectures were given twice a week, and each was taught for 40 minutes. Both groups were taught with the same learning materials by the same teacher. Although this type of experimental design is not completely followed by a randomized selection and assignment, it is often necessary in educational settings because intact classes are already constructed before the research is begun.

Table 1. The distribution of participants.

Groups	*Boy*	*Girl*	*Total*
Experimental group	37	31	68
ontrol group	35	31	66
	72	62	134

4.3. Three phases of learning

Step 1: The warm-up phase

Both groups were taught with the same story but provided with different tools for presenting the contents. In the learning setting of experimental group, the teacher presented the story in video media form with Media Player to guide the thinking of students about the learning vocabularies. In contrast, the teacher managed the storytelling and drew the learning contents on the blackboard in the learning setting of control group.

Step 2: The implementation phase

Both groups were taught with the same English vocabularies but provided with different tools for presenting the contents. In the learning setting of experimental group, the teacher presented the learning vocabularies and video media materials with the MPS. Also, while the teacher instructed, the whole teaching process on the IWB was recorded. This offered the students a chance to play back the recordings for refreshing their previous learning or inducing reflective learning.

Step 3: The application phase

In the learning environment of experimental group, the learning contents including text, videos and graphs were presented on the IWB. The MPS provided convenient ways for students to practice or discuss through pictures or videos. For example, the students could use the MPS to review the unfamiliar vocabularies, pictures, or videos that have been recorded. The teacher was required to make comments or suggestions while students were practicing or implementing. For example, if the students were ever in doubt, they could enquire the teacher about how the new knowledge is related to other course materials.

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4.4. Post-test

At the end of the three phases of learning the students took a post-study test of the vocabularies taught. The test score is used as the objective measurement of academic achievement, one of the criteria for measuring student's learning effectiveness in this study.

4.5. Satisfaction assessment

At the end of the post-test the students completed a self-questionnaire with regard to the learning satisfaction. A questionnaire, as shown in Table 2, was employed to understand the students' learning satisfaction. Particularly, our assessment of learning satisfaction is based on the questions proposed by Hui et al. (2008), with additional translations into Traditional Chinese to tailor the questionnaire to Taiwanese students in this study. Two professors were asked to pretest the questionnaire in order to ensure its clarity. Their feedback was incorporated into the final version. This questionnaire was composed of 6 items and each item was measured on a 7-point Likert scale where 7 indicated a strong preference and 1 indicated a weak preference for student's satisfaction. Internal consistency reliability, as represented by Cronbach's alpha, was 0.82, revealing an acceptable level of reliability (Chin, 1998).

5. Results and discussions

The t-test is used to test the null hypothesis that the population mean in each of the two groups is equal (Hair et al., 2010). Given the need to measure the differences between the experimental group and the control group in this study, regarding to the learning achievement and satisfaction, the independent samples t-tests were carried out.

5.1. Learning achievement

Table 2 shows the statistical results of the experimental group and the control group on measuring the post-test scores concerning learning achievement. The mean of scores was 79.78 (SD = 11.13) for the experimental group, higher than the 76.20 (SD = 8.61) for the control group. There is a significant difference between these two groups, t(125.794) = 2.087, p < .05.

Table 2. *t* test result of the test scores.

	Groups	*N*	*Mean*	*SD*	*df*	*t*	*p*
score	Experimental group	68	79.78	11.13	125.794	2.087*	.039
	ontrol group	66	76.20	8.61			

*$p < .05$

The empirical analysis results reveal that the students who used the multimodal presentation system (MPS), a multimodal presentation software integrated with interactive whiteboard (IWB), obtained a better result on average, implying that the system is able to lead students to significantly better learning achievement in English vocabulary learning, and is therefore useful. Previous studies of IWB (Digregorio & Sobel-Lojeski, 2009; Jang, 2010; Lewin et al., 2008; Slay et al., 2008; Thompson & Flecknoe, 2003) proved the positive improvement in developing the learners' learning achievement. The study of Lopez (2010) also indicated that a digital learning classroom project, using interactive whiteboard (IWB) technology, contributed to increase the English language learners' achievement, compared to those in traditional classrooms without IWB technology, in 3rd grade mathematics and 5th grade mathematics and reading.

5.2. Student satisfaction

Table 3 shows the statistical results of the experimental group and the control group on measuring the 6 survey items related to the learning satisfaction. The mean of overall satisfaction was 35.90 (SD = 4.91) for the experimental group, higher than the 25.91 (SD = 3.91) for the control group. There is a significant difference between these two groups, t(127.120) = 13.049, p < .001.

Table 3. Means (*M*), standard deviation (*SD*), and *t* value for learning satisfaction.

tems	Experimental		Control		*df*	*t*	*p*
	M	*SD*	*M*	*SD*			
like the idea of learning English in a class like this;	4.78	1.38	3.62	1.03	124.113	5.507***	.000

i.e. the one I have this semester.							
,earning English by taking a course like this is a good idea.	5.56	1.20	4.41	0.99	128.704	6.047***	.000
/y learning experience in this course is positive.	5.07	1.11	2.42	0.91	132	15.063***	.000
)verall, I am satisfied with the course.	5.03	0.85	4.21	0.95	132	5.254***	.000
,earning English in a class like this is enjoyable.	5.10	1.12	3.91	1.08	132	6.281***	.000
ıs a whole, the course is effective for my learning.	5.18	0.95	3.67	1.11	132	8.468***	.000
'otal	35.90	4.91	25.91	3.91	127.120	13.049***	.000

*p < .05, **p < .01, ***p < .001

6. Conclusions

The purpose of this study was to develop a multimodal presentation system (MPS) to support the English learning in the elementary English as second language (ESL) course to enhance the students' learning effectiveness in the classroom setting. The results show that there are statistically significant differences between the students in experimental group and control group on measures of learning achievement and learning satisfaction. Here the mean of test scores was 79.78 (SD = 11.13) for the experimental group, higher than the 76.20 (SD = 8.61) for the control group. In addition, the mean of overall satisfaction was 35.90 (SD = 4.91) for the experimental group, higher than the 25.91 (SD = 3.91) for the control group. The MPS facilitates the ESL learning effectiveness at the interface of technology, providing high level of interactivity and multimodal presentation, which are critical to the improvement of the whole-class teaching and learning processes.

This study contains several limitations that suggest future research directions. First, this study does not completely follow a truly randomized selection and assignment. Although the instructional approaches were assigned randomly to classes, this study nevertheless is limited in the way that in educational settings the intact classes are already constructed before the research is begun. Efforts to replicate this study using a truly random design would be helpful. Second, this study evaluates the post-test scores concerning learning achievement. Further research should examine whether and the extent the MPS is able to help ESL students learn more materials in the same unit of time or learn a given unit of materials in less time than students in traditional classrooms. Finally, this study evaluates the learning effectiveness of elementary student in the context of ESL subject. Further research should investigate the potential of its use in other subject areas, such as art or math, or for students at other elementary grade levels or in higher education to generate empirical evidence with greater generalization.

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Differential calculus teaching through virtual learning objects in the field of management sciences

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Abstract

This paper examines the use of Virtual Learning Objects (VLO) in the teaching of differential calculus in the area of Management Sciences as a teaching strategy to improve the assimilation of the theoretical knowledge acquired in the classroom courses. This is accomplished by the construction of virtual pedagogical practices concerning to optimization problems through GeoGebra. It is free software that generates VLOs with an adequate contrast between the theoretical mathematical knowledge and its practical application in Management Sciences. Thus, different dynamic, algorithmic and heuristic processes are encouraged, being useful for logic and constructivist student training. The proposed methodology is based on the construction of VLOs (Virtual Learning Objects). It allows choosing variables in the GeoGebra software where students can interact with the formulation of mathematical problems applied to their curricula. So, they strengthen their knowledge and have a greater autonomy in the analysis of optimization problems in financial and management field. The results show how these teaching strategies facilitate the assimilation of the concepts of differential calculus in Management Sciences students. This allows a greater development of student skills in front of the understanding of the geometric behaviour of a curve.

Keywords: Virtual Learning Objects; Teaching practices; Management Sciences; optimization problems.

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1. Introduction

In differential calculus, the topics addressed can be arid and very disturbing when they are explained with traditional problems or situations. Indeed, there are available certain VLOs (Learning Virtual Objects) to make the learning process more pleasant and successful. An example of VLOs is GeoGebra, where it has established important dynamic interactions between student-machine to learn geometry, algebra or calculus.

This kind of tool can be very useful in the area of Administrative Sciences, where optimization problems often resources are discussed. For the differential calculus are important this kind of maximum and minimum exercises (Larson & Hostetler, 1989). In this way, these elements are appropriated to illustrate the learning process in software.

Furthermore, students can self-assess using these tools to solve lot problems with the same characteristics. As proposed by Stewart (1999), "In the solution of these practical problems, the biggest challenge is often convert the problem in words to a mathematical optimization problem, by setting the function to be maximized or minimized".

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After knowing with more depth the basic characteristics of the software, it will set out examples of particular cases that can be addressed with this tool. Also, an explanation will be proposed by the teacher to convey to students through a video.

The GeoGebra aims to improve the teaching and learning of mathematics for all educational levels. It combines the dynamic and interactive forms of subjects such as geometry, algebra, calculus, analysis and statistic. This software was chosen because is dynamic, free, usable, didactic, and providing good mathematical basis. It is easy to create a dynamic and interactive website with incorporated applets, and wiki are available to share achievements with other users. These elements allow creating networking of collaborative knowledge that improves the learning process.

2. Virtual learning objects

With the development of different approaches in learning processes, contexts have been built to make them dynamic. Among these contexts, the constructivist trend has been one of the most prolific in research and proposals arising from the use of technology in the teaching-learning process of students. Literature has confirmed that the use of computing and new technologies provide a creative environment that improves student performance (Potter & Johnston, 2006 cited by Montagud & Gandia, 2013).

The emergence of internet, microprocessors, tablets and digital blackboards, friendly software and 2.0 have generated a change in the traditional model of teaching masterful character to another based on self-learning though learning objects and new educational tools LMS like Moodle, Dokeos o Sakai (Poveda, 2011).

Therefore, learning for digital media is characterized by the convergence of methods, technologies, applications and services oriented to facilitate learning process, that considerate as most fundamentals aspects: learning theories, skills development in the use of technological platforms, in didactic tools and learning objects (Garduño, 2006).

The Virtual Learning Objects (VLO) become as facilitators of learning processes in different levels of education. They emerge in 1994 by the need to share and reuse content in any area of knowledge. They are among the most widely used solutions to achieve reuse, accessibility, durability and interoperability of educational resources (Colomé, Estrada & Febles, 2012).

These objects are defined by Wiley (2000) as "digital or non-digital entities that can be used, reused or referenced during learning supported by technology" and extended by the IEEE (Institute of Electrical and Electronics Engineers) as "any digital resource that can be reused to support learning " (Chiappe, 2006). These objects guide at all times the student in his learning process, encouraging his autonomy with the management of his self-learning and facilitate the role of the teacher as a mentor, guide and evaluator of the teaching-learning process (Montagud & Gandia, 2013).

In this order of ideas, De la Torre & Dominguez (2012) emphasize that learning objects should have certain characteristics that allow the fulfillment of its purposes, among them are: reusability, interoperability, educability, durability, independence, flexibility, functionality, accessibility and adaptability.

In the same way, learning objects are classified according to their learning object as (De la Torre & Dominguez, 2012):

- Objects of instruction such as articles, workshops, seminars, courses, cases studies and others.
- Objects of collaboration such as forums, chats and on-line meetings.
- Objects of practices such as simulations, software, on-line labs, research projects and others.
- Objects of evaluation such as partial exam, final exam and certification 2.0.

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Considering that the development of learning objects is emerging as one of the fundamental tasks of online training, it is essential to define and identify the handling of messages in the content. Also, discriminate and structure them to integrate them with the suitable media to carry the content. In the development of these environments should be consider the course objectives, learning activities, the media, the possibilities of their reuse by teachers and students, and parameters of students evaluation (Garduño, 2006).

Learning objects have been designed to facilitate these learning processes in areas of knowledge such as: medicine, veterinary science, agronomy, mathematics, among others. Thus, it is proposed that technology is essential in teaching and learning of mathematics by improving student learning (NCTM, 2000). Taking this into account, it is designed a tool that helps students to gain a better understanding in this area of knowledge, oriented to solving problems and promoting mathematical experiments and discoveries in the classroom and at home. This software "was created by Markus Hohenwarter in 2001-2002 as part of his master's thesis on the teaching of mathematics and computer science at the University of Salzburg in Austria. In July 2006, GeoGebra continued been development in the Florida Atlantic University in the Norm National Science Foundation – NFS" (Hohenwarter & Preiner, 2007).

Hohenwarter & Preiner (2007) expose that GeoGebra is designed to teaching and learning Mathematics in middle school to higher education, providing basic functions in computational algebra systems, algebra and calculus. Additionally, this tool was developed on open source.

In order to develop this research, it is proposed the construction of VLO, allowing the choice of variables in the GeoGebra software, where students can interact with the formulation of mathematical problems applied to their curricular programs. So, they strengthen their knowledge and have a greater autonomy in the analysis of optimization problems in financial and management field.

3. Optimization problems modeling in field of management sciences

An approach to methodological design for mathematics learning is the heuristic. It consists of defining hypotheses supported by specific cases, rejecting or giving the key to justify it. Logical reasoning is used as a process of mathematical thinking, where students of the area of Administrative Sciences interact with the concepts and elements, helping to make decisions in real life (Politécnica, 2009).

In general, the student should evaluate each element of the problem situation, and depending on context, translates them into specific mathematical terms. Apply correctly derivation techniques, with its first and second derivatives and the theory of curve sketching with its points of maximum and/or minimum is useful for modeling optimization problems. For example with some data from a problem situation could maximize profit or minimize some costs.

The first step is to decide precisely what is wanted the optimization. The point is expressed as a function of a single variable (independent variable), the quantity to be maximized or minimized. It is convenient to choose a letter that is closely related to the amount, as I for incomes or A for area. Then, this function is derived respect to the independent variable and it is equalized to zero to find the critical values. To find out if these critical values are maximum or minimum, they are replaced in the second derivative. However, it is logical to think that critical value should be maximum or minimum by the nature of the problem (Haeussler & Richard, 1997). Figure 1 shows an example of maximum and an example of minimum.

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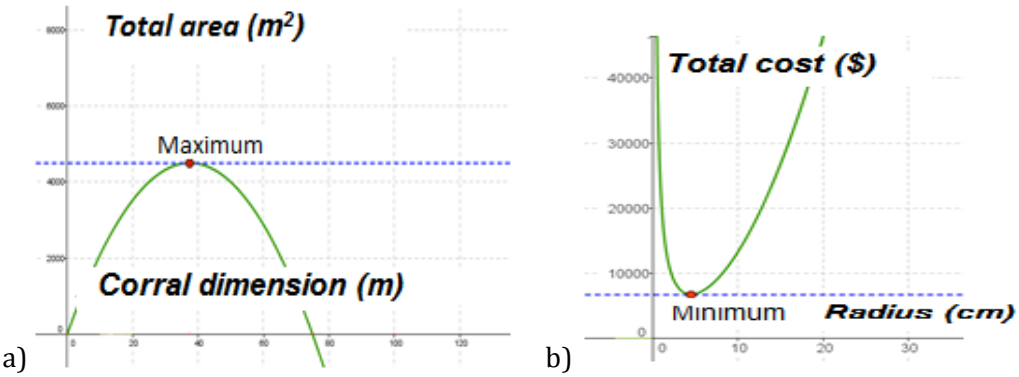


Fig. 1. (a) Maximum Problem; (b) Minimum Problem.

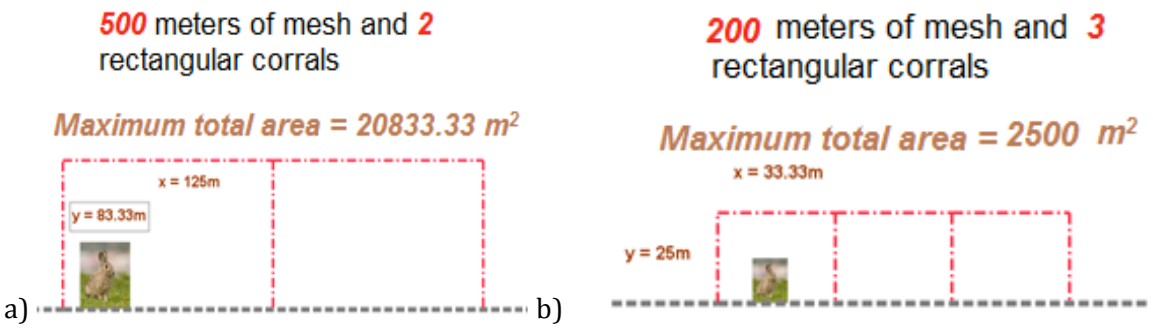
4. Methodology

One way to reach students, and teach using the VLOs is by audiovisual means. Ferrés (1988) proposes three important elements to enhance learning by these means: A video-lesson is a program in which some content in a systematic and comprehensive is exposed. It would be like a masterclass, but given for video. As video is a kinetic-audio-visual technology, video-lesson will be particularly suitable for the transmission of audio-visual-kinetic content, becoming a very effective method. Moreover, motivational program provokes, interpellates, questions and arouses interest. Video-lesson works with pedagogy of "during" and motivational program works with pedagogy of "after" (learning takes place thanks to the interest generated by the program). On the one hand, a good motivator program has two advantages: it ensures motivation (no motivation, no learning) and it is inserted into the frame of an active pedagogy. On the other hand, the video-support is a set of images that illustrate the verbal speech of the teacher. They are moving images that can elicit student participation during the viewing. The video-support can be used with informative, motivational, evaluative or research function (Ferrés, 1988).

For this particular case, it is very common to find optimizing problems of available resources. For this, an optimization example is presented to show the whole process through appropriate teacher explanation to transmit in an audiovisual manner.

Problem situation: "A student of cattle industries wants to start a sales business meat rabbits with "X" meters of mesh. He wants to use another mesh of 1000 meters in length, which already exists. To build "n" rectangular corrals of equal size, what should be the dimensions of these corrals to take the largest possible area? "

What is underlined in the above statement refers to boxes in windows of GeoGebra software. There, students should define the desired values that are logical with the modeling of the problem. To illustrate, Fig. 2 shows two cases where the statement is the same, but the values of each variable are different.



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Fig. 2. (a) Model 1; (b) Model 2.

In the first model (Fig. 2.a), in the windows were placed "500" m of mesh to build "2" corrals. Immediately, the values of the side dimensions of the corrals appeared: x =125m and y= 83.33m. The same as the maximum total area=20833.33 m^2. In the second model (Fig. 2.b), in the windows were placed "200" m of mesh to build "3" corrals. Immediately, the values of the sides dimensions of the corrals appeared: x = 33.33m and y= 25m. The same as the maximum total area= 2500 m^2.

At first it seems simple, but the important thing is that the student solves the problem first with paper and pencil and then corroborates his answer with VLOs answer to know if he worked well or not.

In order to *promote* this learning behavior, it is desirable that teachers make a video where it is explained the manipulation of GeoGebra software and also how the problem is solved mathematically for the student do it by hand. A possible explanation to show in the video is:

"To learn to manage this VLO, we must identify with the reading of the situation problem that is an optimization problem. It is necessary to obtain an equation based on what will be maximum or minimum. In this case, it is necessary maximize the total area of lands. The total area is in function of two variables ("x" and "y") which is shown in Figure 3, but it should be in function of a single variable to be able to derive and equalize to zero, finding the critical value(s).



Fig. 3. (a) Dimensions of the land.

We have the equation:

$$A_t = 3xy \quad (1)$$

Then, we have to obtain another equation that relates these variables ("x" and "y",) to isolate one variable in function of the other, and replace it in the equation of the area (1). As we have the value the perimeter (200m), we can use it as well:

$$P = 200m = 3x + 4y, \ then \quad 200 - 4y = 3x \quad (2)$$

Replace (2) in (1), we have:

$$A_t = (200 - 4y)y, \ then \ A_t = 200 - 4y^2 \quad (3)$$

In this way we have the total area At in function of one variable. Then, it is possible to differentiate and equalize to zero, and finding the critical value(s):

$$\frac{dA_t}{dy} = 200 - 8y = 0 \rightarrow y = \frac{200}{8} = 25m \quad (4)$$

We find the second derivative and replace that critical value to corroborate that is the maximum:

$$A"(y) = -8, \ then \ A"(25) = -8 < 0 \quad (5)$$

As the second derivate is less than zero, y=25 is the maximum. To find the value "x" we replace y=25 in (2):

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$$200 - 4 \times 25 = 3x \Rightarrow \frac{200 - 4 \times 25}{3}, \text{ then } x = 33.33m \quad (6)$$

To find the total maximum area, we replace y= 25m in (3):

$$A_t(25) = 200 \times 25 - 4 \times 25^2 = 2500m^2 \quad (7)$$

The idea is that you, as a student, just assume values to place in the windows and try to solve the problem with pencil and paper".

Finally, Figure 4 shows a comparison between the graph VLO and a curve where the maximum point is evidenced. Thus, the student can see the optimal result of a particular case, and simultaneously can realize a mathematical analysis of the obtained results.

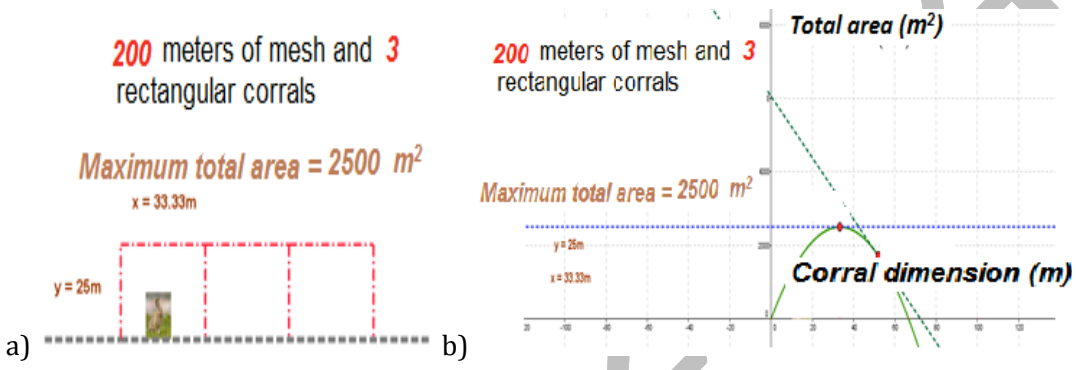


Fig. 4. (a) VLO graphic; (b) VLO curve.

5. Results

This article wants to show how easy it is to work with the free software specialized in mathematics: GeoGebra, where concepts are easier to understand. It is an environment where a heuristic dialogue is propitiated, not only between teacher and student but also student and the VLO. It motivates to research what can happen and the reason of each change that make in its interface.

They are diverse the experiences in international conferences and classrooms, where the authors of this article have worked VLOs with situations-problems in the area of Administrative Sciences. Different models have attracted the attention of the audience, wanting to learn how to model mathematical problems with this software.

One way to reach students and teach using the VLOs is by audiovisual means. Ferrés (1988) talks about how to integrate video into the school in video-lesson, motivating program and video-support. These elements act as a great motivator and as effective means for all students to learning, allowing expand the educational coverage in time and space.

6. Conclusion

The education should be improved to benefit students - and therefore the country, and institutions should have greater coverage. In this sense, it is necessary to renewal in teaching methodologies. The VLOs as GeoGebra are excellent tools that allow students to have an interactive and dynamic autonomous learning. Through the exercise proposed and explained by means of a video, student will become familiar with the software and acquire skills to treat resource optimization problems. Furthermore, with the increasing use of technological tools for the academic community, there is an incentive for updating and creating new projects for education and research.

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Digital divide within the context of language and foreign language teaching

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Abstract

Digital divide, the existence of which is commonly familiar but unknown as a concept, influence the lives of human beings to a notable extent. Access to information and communication technologies is one of the most significant indicators revealing digital divide. Within this framework, digital divide has a remarkable influence in various areas ranging from education to economy and from art to industry. In this paper, the links between digital divide and language and foreign language teaching are explained taking the cause-effect relationships into account. Under its links to language, the factor of "English" and multilingualism are emphasized. Under its links to foreign language teaching, subjects like teaching materials, language testing, multiple intelligences and learning styles, and foreign language education for physically-handicapped students are discussed.

Keywords: digital divide; language; foreign language teaching; information and communication technologies

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1. Introduction

Millenniums ago people lived on agriculture which took physical effort as its fundamental source. Everything was slower ranging from communication to transportation. Also, as a result of the very nature of conditions available at those times, the terms 'difference' and 'gap' cannot be said to have been in question within the framework of people's livings and relations to the extent it appears today. However, with the advent of Industrial Revolution in the late 1700s in England, the whole understanding of the world began to change and many practices in daily life from agriculture and manufacturing to communication and transportation turned out to have technical dimensions within only a few decades. Following this industrialization process, it did not take long to introduce the two most striking profiles for human beings: 'wealthy' and 'poor'. These profiles cut for 19th and 20th century people posed the core motive behind the most violent conflicts among human beings. Though, on the other hand this quite fast industrialization process was paving the way for a totally new era: Information Age.

In the late 20th century the world began to take on a completely different appearance. The term 'technology' initiated its reign and it has maintained its dominance at an increasing pace since then. This new age has turned out to be quite different from the preceding processes the humankind has gone through in that its speed of progress has been unbelievable. While a walkman was viewed as a great gadget approximately thirty years ago, the existence of pocket computers are taken for granted today. As a direct result of this characteristic of the new digital age, the gap among people around the world has undertaken distinct dimensions. Since such development of information and communication technologies

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(hereinafter ICTs) has brought out the well-known 'globalization', everything throughout the world has become closely interlinked. Therefore this novel conjuncture and its direct and indirect reflections have introduced many positive and negative outcomes for almost every field from education and medicine to sports and transportation.

2. The term 'digital divide'

Being a quite novel concept, digital divide can be roughly defined as the gap between those having enough access to ICTs and those who do not have. It is defined by Mossberger et. al. (2003: 1) as "the patterns of unequal access to information technology based on income, race, ethnicity, gender, age, and geography". As it is clear from the definition, ICTs constitute the basic criteria for the measurement of digital divide. As for the scope of ICTs, television, phone (mobile and landline), computer and access to internet can be seen as the main determinants. Digital divide can show itself in different contexts resulting from various factors. Considering this multi-faceted characteristic of it, the methodologies formulated to measure digital divide are quite changeable. Therefore, while measuring it the aim should be specified clearly and the criteria should be selected accordingly.

2.1. Factors behind the digital divide

Digital divide is resulted or exacerbated by some factors that also shape the way people live. These factors can be counted as income level, literacy, age, geography, gender, language, population, disability, and so on. These factors are, in most cases, inherited characteristics or conditions on which people generally do not have a right, indeed, an opportunity of decision-making. It is just like being born into poverty or prosperity. What is worse, they are rather hard to improve due to the multi-dimensional nature of the issue.

2.2. Basic contexts for digital divide

One of the most striking gaps in terms of access to ICTs arises between countries. From a more general perspective, an apparent divide can be observed between continents. Secondly, digital divide can arise domestically, between regions, areas and even individuals. As the socio-economic and educational factors can vary with different regions and areas in a country to a notable extent, level of access to ICTs cannot be homogenous in every part of a country. Actually, the issue has its roots at the individual level. Everybody has their own socio-economic and educational background and the needs and routines of people vary radically even within families. Thus the manner of people in terms of ICT use poses differences ultimately leading to domestic digital divide. Finally, time is another important variable in terms of the way digital divide shows itself. Change of time directly means change of things and so the inevitable result is the change of life. Hundreds of years ago, the divide was characterized by possessing tools like ploughs for agriculture. Likewise, just a few decades ago, televisions pioneered a radical change after radios and the digital gap displayed itself under having or not having access to this novel technology. However, today the major context for digital divide is marked by access to computers and internet. After several decades, probably, the world will see new technological discoveries access to which will constitute the gap between people's lives. Actually, time resembles a magic tunnel; as you get ahead, you come across totally new and unusual things and conditions. It does not take long for new conditions to become solely a part of the near past. Similarly, digital gap throughout the world perpetually adopts different faces in accordance with the circumstances posed by the time.

3. Digital divide and language

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Language is a highly complex and multi-faceted system composing the essence of people's lives. That is the origins of language dates back to the origins of human beings. A number of languages have existed throughout the history. While some of these have become extinct, some others have been able to exist up to now. In addition, some of these living languages are spoken by billions of people like English and Chinese whereas some address solely to thousands like Abkhaz and Adige languages.

Since language is so included in our lives, it is also an indispensable part of ICTs. The use of ICTs almost always requires a language system. On this point the difference between the languages set in the electronic devices or sources and the language the addressees of these ICTs speak pose a problematic situation.

3.1. Dominance of English

After the beginning of American dominance in politics and technology around the world, English began to be used as the lingua franca almost everywhere. It is widely used even in many countries where it is not an official language. This "universality" of English has been blamed for killing local languages and corrupting local and intact cultures. As a matter of fact, many words of English origin belonging to fields like technology, medicine, botanic, etc. have invaded and tarnished the originality and image of languages like even German, Turkish and French. Because most people believe in the necessity to have a good command of English in our century, it is likely to see more and more controversies as to the debilitating effect of English on other languages and cultures.

The interference of English lexical items is not the only problem faced by users of other languages. English is widely seen and used as the most prestigious language of science. The status of English as a science language is consolidated by the fact that it is commonly used as a prestigious language of education. For example, Middle East Technical University and Bosporus University, which are among the most reputable higher education institutions in Turkey, are teaching in English. Consequently, new scientific findings, major scientific articles and proceedings are almost all communicated to the world via English. Publishing and presenting such studies in English are thought to enable researchers to address broader masses of people and such studies are viewed as "more scientific". Thus, attaining access to new scientific findings and so planning future roadmaps in accordance with them requires the knowledge and usage of English. As a result, in many cases, people who cannot speak English stay unaware of recent scientific and technological developments or at best they wait for the translation of the researches even if they are conducted in their home countries. Because science and technology are inseparable realms, people without English knowledge and countries which do not make effective use of English are drifted towards a more severe digital divide.

In addition to the above characteristics of it, English turns out as the most prevalent language under the framework of computers and internet. As access to internet is the most fundamental indicator in terms of digital divide of nowadays, the language factor gains more importance on this point. Considering the proportion of web-pages by language according to the data of 2007, 45 % of all internet media is in English and it is followed by other European languages like German (5.90 %), French (4.41 %) and Spanish (3.80 %) (http://funredes.org/lc/english/inicio/). Similarly, latest data from Internet World Stats (2010) indicate that English is used in the internet by 536 millions of people and it is succeeded by Chinese (444 millions) and Spanish (153 millions) (www.internetworldstats.com/stats7.htm). It can be apparently deduced from both researches that English has an overwhelming rule in the realm of internet. That is, non-speakers of English have a rather limited scope in the digital world and they are left in a necessity condition that they learn English and only then get access to the innumerable benefits provided by internet.

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The problem is worsened by the fact that most software and hardware belonging to computers and related technologies are designed and formulated in English. Until new computer-related devices and programs become ready for the use of non-English speaker communities, they go through a challenging translation process. This relatively technical translation job not only retards the delivery of technology but also produces new problems. Since, most terms and concepts related with technology are of English origin and many other languages, particularly less spoken ones, do not have their equivalents. Moreover, words like format, update, wireless, etc. are preferred even in languages like Turkish which has their native equivalents. Therefore, components of key significance like user manuals and software instructions turn into an incomprehensible load of borrowed words and terms. The result is then a mounting digital divide again for less educated and those with a lower socio-economic status.

3.2. Multilingualism

The nature of human beings requires them to interact with each other. Throughout history, many nations, states, empires, colonies and communities have appeared in differing locations on Earth and members of these have all made use of a language system to communicate with each other and even to talk to themselves. Following the rise in interactions between people with activities like trade and war, it was understood that knowing only one language was not adequate. From this point on, the world began to see the cases of multilingualism and plurilingualism almost everywhere people live.

Even though multilingualism is a direct indicator of cultural and social wealth, it may become a disadvantage in dealing with digital divide in communities where the number of languages exceeds a few. While the rule of English is an undeniable case, it would be weird to expect that more than three languages in a country can receive equal shares in terms of technological developments. The existence of each more language means a new challenging translation process. Furthermore, every language in a multilingual system does not have the chance of being seen worthy enough for translation. In India and South Africa, for example, there are more than ten official languages and in addition to them dozens of other local languages. When a novel technological system or software enters into such countries, the official languages (even some of them may be neglected) are naturally given priority for the translation of related documents and systems. Thus, speakers of less common languages become digitally isolated and they are somehow forced to employ other prevalent languages in order to keep abreast of technology.

4. Digital divide and foreign language teaching

Each passing day brings a new paradigm and the conditions of effective learning are shaped in accordance with these new paradigms. The century we live in has introduced a number of facilities for the realm of education and most of these are closely related with the use technology. In the book "The World is Open" Bonk (2009: 51) lists ten openers that make learning more effective and prevalent in the 21st century:

Ten Openers: (WE-ALL-LEARN)

1. Web Searching in the World of e-Books
2. E-Learning and Blended Learning
3. Availability of Open Source and Free Software
4. Leveraged Resources and Open Course Ware
5. Learning Object Repositories and Portals
6. Learner Participation in Open Information Communities
7. Electronic Collaboration

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8. Alternate Reality Learning
9. Real-Time Mobility and Portability
10. Networks of Personalized Learning

These points listed by Bonk (2009) put a strong emphasis on the integration of technology and computers in to education. This clearly shows the extent to which internet and new technological developments hold potentials for learning in the 21st century. In the same direction, Warschauer et al. (2000: 7-8) state that the integration of the internet brings ALIVE (Authenticity, Literacy, Interaction, Vitality, Empowerment) to the learning process. However, the problem here is the identification of the extent to which learners have access to ICTs on an equal basis. As a mater of fact, digital divide remains as a serious threat in front of having equal learning opportunities. The results of a recent report by the World Economic Forum indicate that Turkey ranks 45th after Kazakhstan and Hungary in The Networked Readiness Index 2013 (http://www3.weforum.org/docs/GITR/2013/GITR_OverallRankings_2013.pdf). This statistical datum is simply related with the between-countries context and it shows that Turkey is not in a desirable place in terms of network readiness. Even developed countries face inequalities among students concerning access to ICTs (Castaño-Muñoz, 2010).

Foreign language teaching differs from second language teaching in many respects. First of all, learners do not have enough opportunities to have access to the authentic uses of the target language in foreign language contexts. This is mostly because of the fact that there are not enough native speakers around to practice and to be exposed to the target language to an adequate extent. Therefore, language learners and teachers need to exert extra effort to compensate for this disadvantage. Under this framework, the significance of making use of technological aids increases. If there is digital divide faced by the learners in different countries, regions, cities, schools, and even families it is hard to mention equal chances of developing foreign language skills. The importance of the use of ICTs for language learning and teaching purposes is discussed below under separate subheadings.

4.1. Instructional materials

The effective use materials is quite important in foreign language teaching. In order to raise the efficacy of the learning process, teachers can make use of internet, computers, smart boards, and projectors in the classroom. This is especially important in terms of raising the authenticity of the learning. Through internet, learners can have access to limitless authentic reading, listening, writing, and speaking activities and tasks. In disadvantaged schools, for example, listening activities are still done through cassette players, which challenges students due to factors like poor voice quality, the absence of a visual aid, and so on. However, a computerized listening activity provides the students with supporting visual aids, a perfect-like voice quality and even a script. Alongside their benefits to the improvement of language skills, the use of technological aids in the classroom can contribute remarkably to the motivation of the learners. Actually, this is not something completely related with the within-class conditions; on the contrary, these learning aids render learners autonomous and make learning free of time and place restrictions. The posh term, 'Computer-Assisted Language Learning (CALL)' puts a strong emphasis on this autonomy dimension with its direct reference of *learning* instead of *teaching*. Nevertheless, in order to benefit from these opportunities adequately, you have to possess these types of ICTs. A technologically-advantaged student, for example, can look up an unknown lexical item on a smart phone instantly while a technologically-disadvantaged student has no alternative than a paperback dictionary the use of which is relatively time-consuming compared with digital and online dictionaries.

4.2. Testing

Assessment is an integral part of all learning processes and language learning is not an exception within this context. Computerized systems enable language teachers to prepare more interactive and content-rich tests. However, the learning environments that suffer from digital divide are bound to paper and pen tests. Internet media do not only bring benefits for the teachers in terms of preparing quality tests, they also bring considerable contributions to the learners in the self-preparation process for the tests. Moreover, the international tests of English like TOEFL and IELTS are now carried out mostly on internet-based basis. If a learner is not familiar enough with computers and online systems, this constitutes a seri-

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ous disadvantage. Even if such students are good enough at language skills, their inadequate digital literacy may put them in a difficult condition.

4.3. The recognition of multiple intelligences and different learning styles

In a foreign language class, it is very important to understand the different intelligence types of the learners in order to address their different learning preferences. It is wrong to expect every learner to have the same sources of motivation to learning. Through the recognition of different types of intelligences and learning styles in a single classroom, the teachers can adapt the language and accompanying activities to suit the needs and intelligence types of the different language learners in their classes. The integration of technology can make teachers more powerful in addressing the distinct needs and expectations of their students. A video display, for instance, can enhance the motivation and learning performance of a visual learner while a nature-related video can contribute to both to learners with visual and natural intelligence. Every small addition will help the teachers touch more students in their classrooms and this holds a strong potential in enhancing the quality of learning. However, in a technology-deprived setting, teachers do not have many alternatives at hand in addressing the different expectations of the learners.

4.4. Foreign language teaching for handicapped students

A more crucial point as to the integration of computer and internet technologies into foreign language learning is the potential of helping people with disabilities by providing them broader range of opportunities during the whole process, thus ultimately assisting them in integrating more with life. Some specific websites and software that are specifically designed for the visually-impaired learners can be quite useful if there is a chance of having access to internet. Even screen readers can bring priceless uses to such disadvantaged learners in their foreign language learning process. The availability of a computer and access to internet can also save other physically-handicapped students from going and participating in language courses in person. Thanks to internet, they can benefit from the limitless language resources to develop different language skills in accordance with their own needs and preferences and even attend online speaking sessions. However, these are not so possible in settings where digital divide unfortunately shows itself.

5. Conclusion

In this paper, the term *digital divide* is covered within the context of language and foreign language teaching. After a general introduction with the basic factors behind and basic contexts for it, digital divide is linked to language under the titles of the dominance of English and multilingualism. Its relation with foreign language teaching is established under the titles of instructional materials, testing, the recognition of multiple intelligences and different learning styles, and foreign language teaching for handicapped students. It is obvious that digital divide is not something that can be ignored. In this paper we have looked at its apparent relations with language and language teaching, and it becomes clear that we all have to strive to bridge this gap in order to let language teachers and learners experience better and higher-quality processes. Technology is developing at an unbelievable pace and the benefits it brings hold a significant potential for everyone. However, if we cannot manage the struggle against digital divide, these invaluable benefits can easily turn into huge disadvantages for many people.

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Digitalization of upbringing and education in relation to shifted socialisation of Polish students

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Abstract

The article discusses modern children's/students' space of life which is outlined by electronic media. They tend to determine the process of upbringing, education as well as socialisation. The above mentioned processes, including primary socialisation which is typically initiated by the family, are now influenced by media. Undoubtedly, mass media and hypermedia provide numerous educational opportunities. On the other hand, they may have negative implications for children since virtual reality, which is obviously different to the real world, tends to generate new threats or risks especially to psychological and physical development. Children might be put at risk of Internet abuse or addiction. The closing part of the article emphasises the necessity for media education such as learning media skills and competencies as well as raising the Internet awareness.

Keywords: mass media, hypermedia, socialisation of children and young people, opportunities and risks in upbringing and education, media education.

Introduction

Modern person's space of life is outlined by media which determine the process of children's upbringing and education as well as socialisation. Contemporary media involve among others television, films, advertisement or the Internet. Nowadays, mass media have become an integral part of our everyday life. They influence people's way of thinking, feelings and imagination. The importance of media cannot be overestimated, especially because young people devote a lot of time to the use of media. According to public opinion surveys, media have greater influence on young people's behaviours and attitudes than family, school or other socialising agents. It might be claimed that "traditional upbringing and education" does not meet modern life requirements concerning the young people's need to increase their awareness and experience (Cudowska, 2005, p. 180). New media have become recent and most influential social environment for all young people over the world and certainly those living in Poland, the country which also participates in transformation and globalisation processes. Media offer rich and axiologically diversified content which has a significant influence on children's/student's life, their upbringing and education at each level of development. It should be emphasized that media, in spite of their advantages, may threaten upbringing and socialisation processes.

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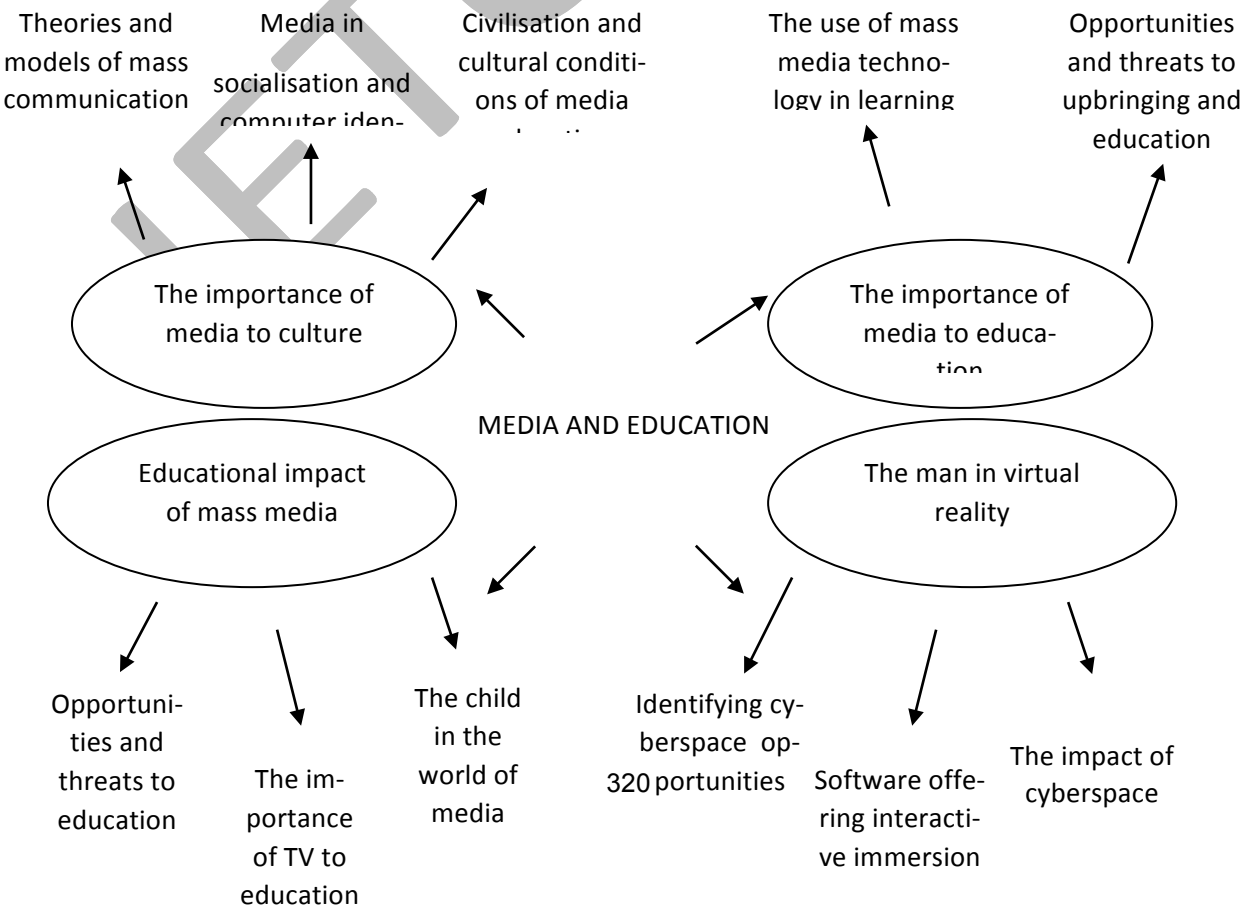
Educational and upbringing opportunities offered by new media

It is worth noticing that the term "new media" means both mass media and hypermedia. However, there is a slight difference between these two types of new media. Mass media are the tools intended to reach large audience by mass communication; they provide direct contacts when broadcasting the content from the centre to the mass of the people. Hypermedia, whereas, are technical assets based on a computer with internet access which is connected to such hardware as a monitor, a DVD or a CD player, a scanner or a printer etc. This system enables users to gain access to the texts of different types as well as to create and process them via the Internet. (J. Gajda, 2003). As opposed to mass media which, as mentioned earlier, broadcast information from the centre, hypermedia have numerous sources and their senders - single persons - are able to send and receive information at any time. Hypermedia unlike mass media are active. Here, socialisation function of media must be emphasized since in both mass media and hypermedia the receiver is active and uses information transmitted by media intentionally, being driven by expectations concerning the content of media. The user is not directly influenced by media as they do not operate in isolation.

Media create great upbringing and educational opportunities, they facilitate education without borders. A. Cudowska (2005, p.174) indentifies four basic areas of interrelations between media and education: the importance of media to culture, the importance of hypermedia to education, the educational impact of mass media as well as the situation of a person in virtual reality. The details of the above-mentioned areas are included in the chart below.

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Figure 1. Map of essential issues concerning the analysis of media and education



From: A. Cudowska, Media i edukacja – wzajemne relacje (in): Dziecko i media elektroniczne – nowy wymiar dzieciństwa, Vol. I, ed. J. Izdebska, T. Sosnowski, Wyd. Trans Humana, Białystok 2005.

Among all the above-mentioned areas of correlation between media and education, pedagogists are mainly interested in the application of new multimedia technologies to learning. They also focus on opportunities and threats to the process of upbringing and education.

J. Gajda (2005, p.146) mentions the following upbringing and educational opportunities (chances) facilitated by media, which are visible:

- firstly: in a wide range of TV programmes offered by numerous, specialised TV channels which, as a result of competition for viewers, will meet requirements of different groups of people and satisfy various tastes;

- secondly: in possibilities for education in its broad sense, particularly in terms of axiology e.g. education for such universal values as the truth, good, beauty, love, freedom, tolerance etc.;

- thirdly: in higher level of education in Poland, which allows us to take an optimistic look at the reception of media content, according to the uses and gratifications theory, in a selective and critical way, resistant to different forms of manipulation and directed to higher standard of cultural content, as opposed to behavioural theories which assume passive attitudes of receivers who tend to be under the influence of media.

Let me refer briefly to the above-mentioned issues. As far as accessibility to media content is concerned, it should be noticed that there is a wide choice of different programmes which tend to meet children's and young people's requirements as well as to satisfy their needs and interests. TV programmes are available at any time since, thanks to recording equipment, TV or radio programmes do not have to be watched or listened to at the time of broadcasting. What is more, the receivers appear to be more creative in processing ready texts and creating new ones through the use of DVD technology or a computer connected to such hardware as a scanner or a printer. Hypermedia are interactive as they enable the users to establish interpersonal contacts. They also blur the line between senders and receivers.

Nowadays, computer has become an essential tool in our everyday life, for children and young people it offers a nice way of spending free time. Information providers enable receivers to establish contacts with other users, make them creative and even influence their way of thinking. There are a lot of valuable educational games and TV programmes, for instance "Sesame Street", a long-running children's TV series, which is known for its educational content relevant to almost all school subjects. With providing knowledge in an easy and nice way, such programmes teach children powers of observation, deduction skills and logical thinking (B. Siemieniecki, 2002).

Huge educational possibilities of mass media and hypermedia are applied to educate children with disabilities, particularly those who are deaf, blind, and chronically ill or socially disordered (educational, therapeutic, counselling games etc.). Electronic media are used in distant learning schools (e-learning). Thanks to numerous types of media multimedia programmes on DVDs or e-books are created.

Mass media and hypermedia facilitate not only pre-school and school education, but also beyond school, parallel education. Children watch programmes intended for them as well as programmes for adults, which may be also valuable for young people such as nature documentaries or programmes related to human existence. Such content is not usually offered by schools. Interesting and attractive form of passing information makes the process of acquiring knowledge occasional and unintentional. It is television which provides (may provide) children with information concerning different areas, encourages young people to develop their interests and passions, delivers entertainment and various forms of relax, influences attitudes, shows the meaning of life, teaches understanding and love to other people as well as stimulates imagination. In this sense, TV offers a great variety of programmes (see: J. Gajda, 2005, p. 148).

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Educational programmes are broadcast through numerous specialised and popular digital TV channels such as Discovery Channel, Animal Planet, National Geographic Channel, Travel Channel and sports or religious channels. Thanks to its special features, television (similarly to other mass media and hypermedia) is able to influence all aspects of people's lives (T. Purayidathil, 1998). TV programmes with educational content help children develop their cognitive skills, provide young people with information, teach them pro-social behaviours, encourage them to act constructively, develop interests and hobbies, influence children's attitudes and opinions. Therefore, they may facilitate socialisation and upbringing processes.

The Polish system of education (new core curriculum) offers relatively new area of education – "computer classes" which also involve the use of multimedia programmes. As a result, parents more and more frequently buy their kids computers with multimedia software. They hope that computer hardware and software will increase learning effectiveness, guarantee educational success and additionally fill up children's time when parents are absent (compensation function). Computer programmes are used in schools for almost all subjects: to teach mathematics, languages or science, among other subjects. They potentially increase teaching effectiveness as well as children's and young people's life chances, including educational ones.

Selected threats or risks to socialisation and upbringing associated with the use of media by children and young people

Dominating and constantly extending media, multimedia and ICT aspects of child's life provoke pedagogical and social reflections. The questions arise: what is happening to the child in the world of electronic media, who the child is becoming, how can the child benefit from media, what kind of destructive changes occur in the child's personality, when the variety and diversity of media content becomes a new educational chance and when media pose a threat to the child. Pedagogists notice negative impact of mass media and hypermedia, particularly television, computer games and the Internet on upbringing. According to J. Gajda (2005, p. 144),

1. Mass media and hypermedia present reality in a biased way through projecting a false image of the world: they exaggerate social pathology by excessive display of violence e.g. rape or terror scenes, they also overuse sexual content, without deep social analysis or convincing examples of any ways to prevent negative issues.

2. They promote and strengthen consumerism, encourage materialistic values and popularize brilliant careers of people with no moral values. The notion of success is limited to wealth.

3. Media make us indifferent to numerous problems. What is more, they decrease cultural standards, the level of arts and cultural tastes, through promotion of dominating pop culture.

Projecting false sense of reality tends to be extremely dangerous (see: B. Matyjas, 2008). Pedagogists are concerned about the scenes of violence and cruelty which appear to be the most devastating to upbringing and education. Electronic media such as TV or the Internet rushed into the child's life and disorganised it by reducing the amount of time devoted to learning, reading and other duties or hobbies. This means that media threaten family life and family education. As pedagogists and educators, we would

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like to identify some risks or threats that arise from the use of media and hypermedia by children and young people. Negative impact of media involves:

- disorganisation of everyday life; media affect daily routine tasks and free time activities;

- harmful effects on health, physical and psychological development;

- family disintegration;

- performing care, educational and socialisation functions as substitute for parents (B. Matyjas, 2008, p. 96).

M. Wawrzak-Chodaczek's (1997) research reveal that television often enters children's lives to perform educational functions, and even wins over peer groups and other institutions. Children's and young people's everyday life is strongly influenced by multi-hour, frequent and regular TV watching. The way TV content is passed to the viewers stops children from active and creative thinking. To make matters worse, it favours passive attitude, and mental laziness as well as decreases ability to think creatively. Watching violent TV programmes strengthens violent and aggressive behaviour in everyday life.

TV or internet commercial which does not include educational content may also have negative influence of children and young people. Children are uncritical, credulous, they cannot judge or assess the TV content they watch. These make young people easy to manipulate by commercial producers. Advertisement creates the standards of mass consumption rather than individual tastes. In such conditions it seems to be difficult for young people to create their own lifestyle. Advertisement appealing to children's needs which due to different reasons cannot be satisfied appears to be particularly dangerous. This causes frustration, aggression and often desire to possess advertised items (e.g. clothes, electronic equipment) whatever the cost.

Computer and the Internet pose also a threat to socialisation and upbringing. P. Aftab (2003, p. 84) identified the following threats or risks:

- children may find unsuitable content online (pornography, hate, violence, deception, false or exaggerated information);

- easy access to instructions e.g. how to buy a house, how to construct a bomb, how to take drugs etc.);

- children may become restless, they may be exposed to hurtful, vulgar content and threatened by hackers, virus senders or other cyber offenders;

- it is risky to disclose personal information (e.g. while taking part in online competitions or completing online forms);

- young people might be deceived while doing online shopping (e.g. when buying software, music files, pictures, games etc.);

- children may be unaware of online stranger danger when invited to meet a stranger face to face in reality;

- risk of becoming addicted to the Internet.

Among other media-related threats computer games played by a lot of children and young people should be mentioned. There are games full of cruelty and violence that promote hate or cybersex. Pedagogists emphasise the fact that children are seriously hurt online. Different types of cyber crime include: cyber paedophilia, cyber pornography, cyber sex, cyberbullying, grooming and cyberstalking. Pornographic online content strongly influences children because it is mispresented and distorted in order to reach higher popularity and powerful effect. Children sexual abuse by paedophiles can result in long-term harm

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also for the child's parents who feel guilty that they were not able to protect their kids. The younger a victim is, the more serious psychological and social disorders will he/she exhibit.

Children are particularly threatened by cyber pornography or cybersex, especially in the areas of cognition, emotions, motivation as well as morals, which may lead to inner conflicts, fears and finally to personality disintegration. Sex therapists claim that cybersex and cyber pornography (similarly to above mentioned cyber paedophilia) pose a serious threat to proper sexual development of teenagers. The powerful impact of online sexual content results from the fact that it is mispresented and distorted. It occurs through the impression that people seen or met online appear to be interesting and they enjoy high standard of living. These make them easy to identify with. Internet users seeking sexual experience online want to get in touch with people characterised by strong personality so that they could imitate their attitudes, patterns of behaviour, the ways they talk or even dress. They are very realistically presented in films or photos, and therefore Internet users get the impression that it is possible to copy them in the real world. (W. Kornas – Biela, 1998). However, we should remember that the film or story content does not make us to condemn the characters for their actions. It is very important that these characters do not suffer any consequences of their actions (e.g. becoming infected or disappointed by a relationship). On the contrary, sexual contact is presented only as a source of sensual pleasure, satisfaction and the sense of fulfilment as well as success in life. Therefore, all these can have long-term, cumulative and subconscious effects on the child's psychological development that will affect his imagination, interests and moral values. The impact of strong stimuli influence as well as the fact that Internet users remain anonymous may hinder taking up normal sex life in the future (Ł. Wojtasik, 2003). It is emphasised in pedagogical literature that lonely children who are looking for new or different experience as well as kids who have difficulties in making friends in the real world or face problems with personal identity, those who lack adults' interest and love and young people with problems at home become an attractive target for criminals.

Proper socialisation and upbringing tends to be also threatened from cyberbullying, which is intended to harm or harass other people. N. Willard (http://www.cyberbullying, 2014) mentioned the following examples of cyberbullying:

1) flaming,
2) harassment or electronic mobbing,
3) denigration,
4) impersonation,
5) outing and trickery,
6) exclusion
7) cyberstalking.

Cyberbullying may enter through Instant Messengers (IM), e-mail, text messages, social communication services, chat rooms, blogs, websites, bash boards and online games. In virtual reality bullying often occurs within groups of peers who are developing antisocial and aggressive behaviour. According to A. Andrzejewska (2009, p. 148), the most common types of cyberbullying include:

- hacking of e-mail accounts or chats;

- creating humiliating websites;

- insulting and making a person the subject of ridicule in online forums;

- identity theft;

- blackmail and threats;

- mobile phone hacking and stealing personal information, addresses, text and multimedia messages' content which are then published or spread (e.g. at school) without the consent of the phone's owner.

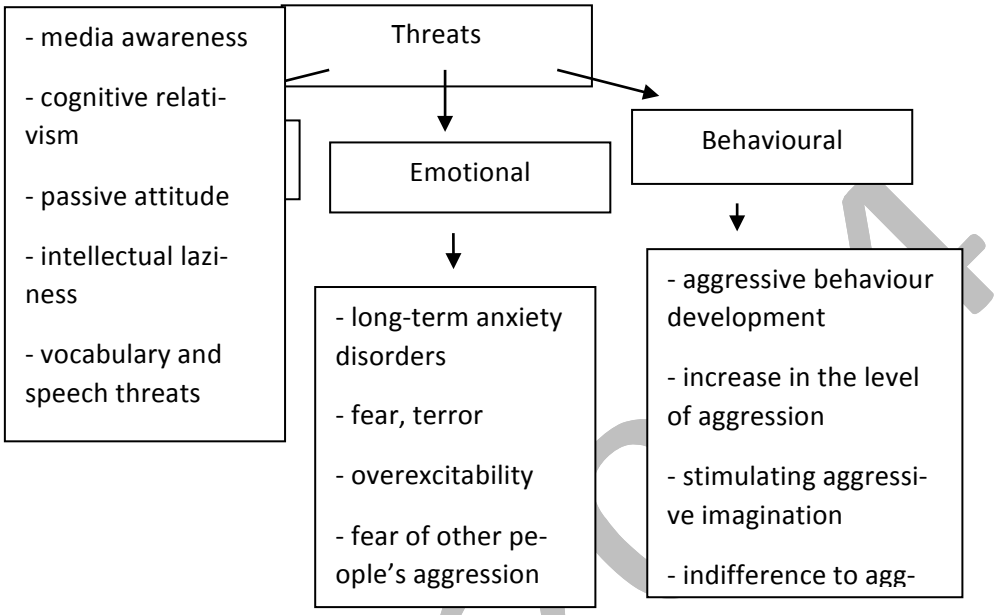
Grooming and cyberstalking are other types of cyber crime which seriously threaten children's education. Child grooming is directly linked to cyber paedophilia, cyber pornography and cyber sex. Thanks to the Internet, sexual criminals are equipped with interactive communication technologies which help paedophiles achieve their goals. Sexual grooming is harmful and dangerous since the child is made to feel at fault or complicit in the abuse. This may result in neurotic reactions and premature sexual involve-

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ment which often leads to sexual obsessions. Cyberstalking, whereas, is the repeated use of electronic communications to harass or frighten other people. Children often become the victims of cyberstalking. The cyberstalker can be another child or someone motivated by revenge.

Online threats and risks may affect cognitive, emotional, behavioural aspects of children's and young people's development. J. Izdebska identified the following media-related threats:

Figure 2. Media-related threats to child development



Source: J. Izdebska, Dziecko w rodzinie u progu XXI wieku. Nowy wymiar dzieciństwa (in:) ed. H. Cudak „Roczniki Pedagogiki Rodziny" 2002, Vol. V, p. 77 quoted after: B. Matyjas, Dzieciństwo w kryzysie. Etiologia zjawiska, Wyd. Żak, Warszawa 2008, p. 97.

One of the computer and internet-related threats is netoholism (P. Forma 2009, p.31-38). Similarly to other disorders, Internet addition requires long-term therapy so as to "wean" children from spending a vast amount of time online.

J. Szafraniec (1997, p. 2-6) characterized the world of value presented in everyday media coverage and emphasized that this world does not reflect the rules, values and morals that should be commonly recognised and applied. On the contrary, it denies, distorts and ridicules the most important values through the content, images, attitudes and opinions presented in media. Value-illness, which results from living without values, is manifested by amorality, cynicism, helplessness or apathy and may lead to somatic disorders and illnesses. This "cool world" has negative impact on socialization and education processes which affect young generations of children and students. Therefore, young people should be educated how to use media and mass media properly as well as become aware of online threats and risks.

Media-based socialisation in education and upbringing

Generally speaking, socialisation refers to the influence of society on an individual which results in acquiring competencies to ensure full and effective participation in social life. (P. Forma, 2012, p. 25). Socialisation involves the process of influencing an individual by other members of the society. The influ-

ences occur in such socialisation and education environments as family (primary socialisation), pre-school and school institutions as well as mass media and hypermedia (secondary socialisation). The process of socialisation is determined by all above-mentioned environments characterised by interrelations of micro and macro worlds which influence children and young people's personality (J. Modrzewski, 2007, p. 121).

As mentioned above, media (mass media and hypermedia) are currently very important environment of socialisation, education and upbringing since they are present in children's and young people's everyday life. Unfortunately, they sometimes become dominant socialising environment when parents are pushed into the background. Hence, the term "shifted socialisation" emerges which denotes socialisation shifted from the family that is primary living environment and the source of traditional, relational and common upbringing to beyond-family environment such as media (e.g. television, the Internet). From pedagogical point of view, it is important that particularly parents, educators and teachers take under control the media and hypermedia-based influences which may bring both positive and negative results to children and young people. The diagnosis of media-related threats and risks, that is identifying and describing problems, should begin taking up preventive measures, such as media education intended not only for children and young people, but also for their parents and teachers. It seems to be essential to develop critical and discursive attitude towards media content. In our opinion it is one of the main tasks of modern education. Therefore, specialists should create emancipatory competencies for children, young people and other users of media concerning virtual world and media content. Media education ought to accompany an individual in their development so that a person becomes aware of media importance in everyday life. Media education involves the knowledge of relationships with media, associations of media with reality context as well as the awareness of the roles a person - an addressee of media content, takes in a sophisticated chain of communication (A. Cudowska, 2005, p. 181). Therefore, media education should be understood as pedagogical activity intended to develop a certain attitude, the way of thinking and acting in life, based on universal values. It is indispensable in the process of children socialisation (family, school) to develop media competence. In pedagogical literature parents may find useful guidelines concerning children safety in the Internet. They provide information that helps parents keep their kids safe online.

Conclusions

Modern life of children and young people is nowadays different from the life a dozen years ago. At present, a TV screen and a computer with Internet access tend to be important elements of life. Digitalisation of life occurs in all its aspects including education and upbringing as well as makes mass media and multimedia more influential than family. Media impact on young people, their personalities, attitudes, behaviours and opinions may be positive along with all educational, therapeutic or compensatory opportunities provided by media. On the other hand, media pose threats to intellectual, moral, emotional, physical and practical spheres of life. To prevent the above-mentioned threats media education addressed to parents, teachers, and primarily to children and young people should be introduced in order to develop media competencies as well as the awareness of opportunities and dangers that media pose to socialisation, education and upbringing.

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Discovering Big Data Modelling for Educational World

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Abstract

With the advancement in internet technology all over the world, the demand for online education is growing. Many educational institutions are offering various types of online courses and e-content. The analytical models from data mining and computer science heuristics help in analysis and visualization of data, predicting student performance, generating recommendations for students as well as teachers, providing feedback to students, identifying related courses, e-content and books, detecting undesirable student behaviours, developing course contents and in planning various other educational activities. Today many educational institutions are using data analytics for improving the services they provide. The data access patterns about students, logged and collected from online educational learning systems could be explored to find informative relationships in the educational world. But a major concern is that the data are exploding, as numbers of students and courses are increasing day by day all over the world. The usage of Big Data platforms and parallel programming models like MapReduce may accelerate the analysis of exploding educational data and computational pattern finding capability. The paper focuses on trial of educational modelling based on Big Data techniques.

Keywords: Big Data; NoSQL; Data Mining; MapReduce; Association Rule Mining,;MongoDB

1. Introduction

Today the horizon of education is expanding electronically. Various educational institutions are developing electronic learning modules, books, quizzes etc., to enhance understanding of concepts amongst students. They also provide assessment of students in systematic, real-time ways. Educational institutions are generating huge volumes of data, from grades or test scores to admissions or enrollment numbers while doing online evaluations and admissions respectively.

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Futuristic approach emphasizes the scenario that many students will work on tablets or mini computers in educational e-classrooms, for example, in finding meaning of concepts from online repositories, generating assignments at a particular difficulty level that matches student's ability etc. Also the digital tools could help parents and teachers, understand student learning patterns, which is vital to educational attainment (Luján-Mora, S.,2006). Data mining and analytics software helps in identifying and applying pedagogic approaches to analyze large amounts of stored activity of students and teachers on the web server of an educational institution for visualizing and predicting student performance, generating recommendations for students, student modeling, developing courseware, planning and scheduling other activities (Bienkowski, M., Feng, M., Means, B., 2012). It may also provide feedback to students as well as to teachers about academic performance to support the scope for improvement (Nicol, D. & Macfarlane, D., 2006).

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But the online learning and educational modules are producing server activity that is reaching to terabytes. E-learning portals or online educational systems receive many hits in a month as numbers of students are increasing day by day. Standard analytical programs are slow to meet analysis requirements; as data requirements are exploding. Thus a need to use Big Data models has been realized to accelerate the analytical procedures. Today many NoSQL platforms like Hadoop, Cassandra, MongoDB etc. (Wassan, J.T., 2014) have emerged supporting MapReduce paradigm (Dean, J., Ghemawat, S., 2008). These provide a basis for a large number of parallel computations and analysis on educational data to extract relevant patterns. Educational institutions are gaining insights from approaches based on Big Data analytics tools, to make education better amongst heterogeneous large populations of student demographics**.**

2. Background

Online educational data help in analyzing student and teacher behaviors and generating recommendations for them. Many researchers have used the Social Networks Adapting Pedagogical Practice (SNAPP) to analyze student interactions based on educational forum postings (Bakharia, A., Heathcote, E., & Dawson, S., 2009). This software proved to be effective in benchmarking student progress and promoting activities of the pedagogical intent. Many educational institutions across the world; use eAdvisor system in which a learner can opt for courses under broad areas of study such as arts and humanities or sciences and engineering etc. The software identifies student's interest and sends them to an advisor for selecting a suitable course (Parry, M., 2012). A number of educational institutions have also developed dashboard software and data warehouses that allow them to track learning, performance, and behavioral issues for students (West, D.M., 2012). Since online education is in demand, it's useful to focus on approaches for analysis and visualization of large amount of educational data records.

3. Big Data in Education

With more and more online courses commencing at various websites such as Coursera, Udacity, etc. and with the increasing population of learners, vast amounts of data are getting generated. Many educational institutions are now providing more and more learning material online, giving rise to Big Data storage requirements. PSLC data-shop, one of the World's leading public repository for educational software interaction data; suggests that there is an approximate usage of more than 250,000 hours of students using educational software online with more than 30 million students' actions and annotations (Koedinger, K., Cunningham, K., Skogsholm A., & Leber, B., 2008). The Big Data is not just about huge data volumes; it's also about the diversity and heterogeneity of data, delivered at various speeds. Various online educational data sources deliver near real time data. Streams are the manifestations of the same. Educational data also are heterogeneous in terms of variety like videos, text, oral lectures, images, diagrams etc. Thus three V's: Volume; Variety and Velocity as depicted in Figure 1, have impacted the overall horizon of Big Data in education (Russom, P. , 2011).Two new V's: Veracity and Value have been added in today's Big Data world (Marr, B. , Feb 2014). It is good to access Big Data but is useful if it could be turned into value. The volumes often lead to lack of accuracy, trustworthiness and quality. Thus, it is important to add the feature of veracity to Big Data exploration for educational mining. The exploration of Big Data is beneficial for studying social, cognitive and emotional aspects w.r.t to both learners and the instructor, and supporting them in real-time. It is desirable to develop a model from which one can infer valuable aspects (like whether student will pass or fail the course), from data with some combination of variables already existing in the data. Various learning analytics methods are emerging for Big Data in education to improve the educational system and soft wares.

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Big Data platforms focus primarily on i) data storage that is schema-less and highly scalable, and ii) data analytics that deals with management, processing and distribution of data. Various NoSQL data stores like Hadoop, MongoDB, and Cassandra etc. are emerging to **acquire, manage, store and query** Big Data**.**

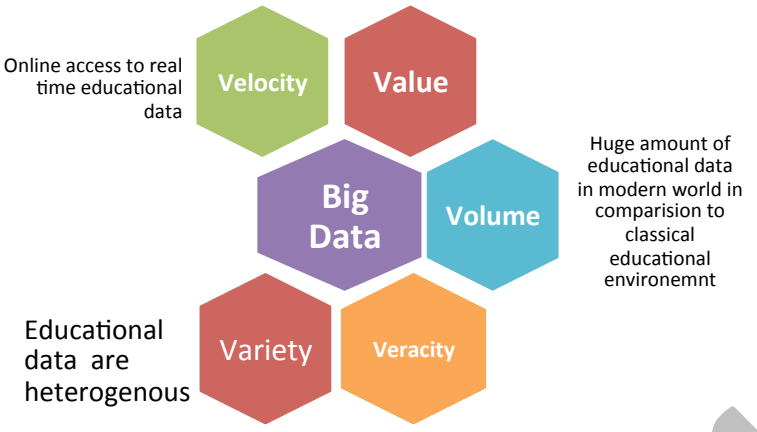


Fig1. V's of Big Data

3.1 Data Storage: Database supporting Big Data

NoSQL databases are inherently schema-less and highly scalable. These databases support frameworks like MapReduce, Dryad etc. for processing of large amounts of data in parallel fashion. The Map-Reduce framework deals with data mapped on distributed file systems, with intermediate data being stored on local disks and can be retrieved remotely by reducers. Google's proprietary MapReduce paradigm reads and writes to the Google File System i.e. GFS. But recently certain platforms like MongoDB, Apache Hadoop HDFS, Hive, Big Table, and HBASE etc. have emerged to store large amounts of data. (Russom, P., 2011, http://nosql-database.org). This section will discuss "MongoDB" that may prove useful for storing educational data.

MongoDB (from "hu**mongo**us") is a NoSQL, open source document-oriented database system developed by 10Gen Company. MongoDB stores structured data as JSON-like heterogeneous documents with dynamic schemas. MongoDB scales horizontally through sharding. It also has a functionality of querying database. MongoDB is suitable for storing educational data due to its scalability and flexibility in structural format for storage. The platform is useful for content management and delivery and is attractive due to features listed in Table 1 (Chodorow, K., 2013 & http://www.mongodb.org/).

Table1. Features of MongoDB

S.No.	Features
1	Data are stored in the form of JSON style documents and uses simplified Java Script engine.
2	It supports GridFS for storing data.
3	MongoDB is document database in which one collection (i.e. data store) can hold variety of documents. Number of fields, content and size of the document can be different from one document to another.
4	Conversion of application objects to structural format of database objects not needed.
5	No complex joins, as in traditional database systems.
6	MongoDB supports dynamic queries on documents using a document-based query language.
7	MongoDB is easy to scale.
8	Uses internal memory for storing the (windowed) working set, enabling faster access of data.

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9	Index on any attribute could be made and fast In-Place Updates on data.
10	It supports Replication, Sharding & High Availability

JSON objects are passed to MongoDB for storage. For example student profiling could be passed as a JSON to Mongo server from a mongo client with just a simple interface command for inserting. MongoDB supports basic CRUD (create, read, update, delete) operations on documents subject to a maximum of 16MB size (Chodorow, K., 2013, http://www.mongodb.org/).The JSON objects are exemplified as follows that store students and department information.

Student A =

{ "Student_id": "12356"

"Deptid": "DA1"

"Name": "John",

"Age": 18,

"Contact": [

"Address": "105, Park Street, LA venue, Mumbai, India."

"Email": "w_john@gmail.com"

"Telephone no": "091-98760569346"] ,

"Courses Opted": ["Programming in C++", "Machine Learning",

"Data Structures", "Computer Networks"],

"Tests Scores": [20, 80, 70, 10]}

Student B =
{ "Student_id": "12357"

"Deptid": "DA1"

"Name": "Mary",

"Courses Opted": ["Programming in C++", "Machine Learning", "Data Structures"],

"Extra Activities": ["short term course on Web Designing"],

"Tests Scores": [40, 80]

}

Department=

{ "Did": "DA1"

"Name": "Computer Science",

"University": "University of Delhi"}

To create the database for storing the above profiles, it's needed to give following commands on the Mongo Client.

db.studentrecord.save (Student_A);

db.studentrecord.save (Student_B);

db.studentrecord.save (Department);

The above sample java script objects reflect that MongoDB has the flexibility with storing documents and thus have dynamic schemas. Documents are not needed to have the same number of fields and the same basic structure. This helps in aggregating and storing student information in dynamic form enhancing portability and accountability. The CRUD operations on data stored in Mongo database can be performed easily. They are comparable to traditional SQL formats and are illustrated in Table2.

Table2. CRUD Operations in MongoDB

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Traditional SQL's in Relational World	**MongoDB CRUD Queries in NoSQL world**
CREATE TABLE STUDENT (Name String, age Number, Department_id Number, Score Number) CREATE TABLE DEPARTMENT(Id Number, Department_ Name String); INSERT INTO STUDENT VALUES("John",19,D105,90); INSERT INTO DEPARTEMENT VALUES(D105,"Computer Science") Schema Design for RDBMS student= { id: 100, Name: 'John' age: 19 Department_id: 105} Department = {Id: 105, Department_Name: 'Computer Science'}	db.createCollection(" student") Schema Design for MongoDB student = { Name: 'John', age: 19, Department: [Id:D105 name: 'Computer Science'], Score:90} db.student_entry.save(student) * MongoDB supports Embedded Objects unlike RDBMS and hence there is no need of join queries.
INSERT INTO STUDENT VALUES("Joy",18,D106,60); INSERT INTO DEPARTMENT VALUES(106,"Mathematics")	db.student.insert({'Name':"Joy",'age':18,{Department: ['Id':D106, 'Name': 'Mathematics']},Score:60);
SELECT * FROM STUDENT	db.student.find()
SELECT * FROM STUDENT WHERE Score>70AND Score<=90	db.student.find({'Score':{$gt:70,$lte:90}})
SELECT * FROM STUDENT ORDER BY Name DESC	db.student.find().sort({Name:-1})
SELECT COUNT(*) FROM STUDENT	db.student.count()
UPDATE STUDENT SET age=18 WHERE Name='John'	db.student.update({Name :'John'}, {$set:{age:18}}, false, true)
DELETE FROM STUDENT WHERE Name ="abc"	db.student.remove({Name :'abc'});

3.2 Data Analytics: MapReduce Modelling Supporting Big Data

MapReduce is a programming model used for processing large data sets with a parallel and distributed algorithm supporting simple computations in the form of Map () and Reduce () operations (Dean, J., Ghemawat, S., 2004). This hides messy complexities of parallelization, data distribution, load balancing, and fault-tolerance w.r.t to Big Data. The input to the model is a set of key/value pairs (Dean, J., & Ghemawat, S., 2008).

Map (k, v) → emit (k1, v1)

Reduce (k1, list (v1)) → v2 where (k1, v1) is an intermediate key/value pair. The output is the set of (k1, v2) pairs.

The key idea behind Map Reduce is to split the problem into a set of smaller problems that perform the same operations on a subset of the data in parallel (Map phase) and subsequently solutions from multiple Map phases are synthesized to get final results (Reduce Phase) , as depicted in Figure 2 (Dean, J., & Ghemawat, S., 2008).

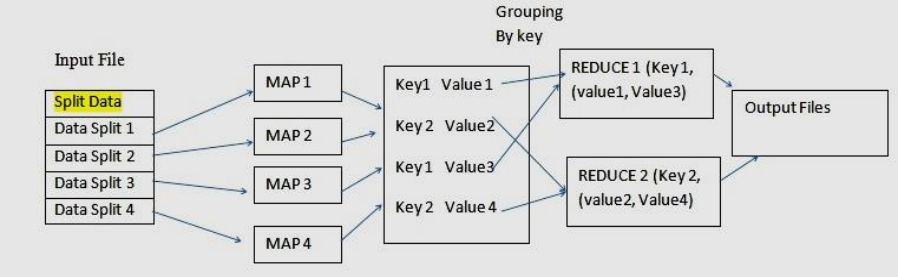


Fig2. Illustration of Map Reduce

MongoDB provides the mapReduce database command for MapReduce operations (Chodorow, K., 2013, http://www.mongodb.org/). mapReduce command takes two primary input functions, the mapper function and the reducer function. A Mapper reads the input data and tries to build a Map with required fields of interest and group them into one array based on the key. And then this key value pair is fed to a Reducer, which processes the values. The concept is illustrated with the help of an example discussed below.

Example: To count the number of students enrolled in each course (Mensuration, Calculus, Geometry, English, Physics, and Chemistry).

Mapper:
It emits a new key value pair for each course of a student with a count of 1 maintained for each student.

```
var mapper = function () {for (var i in this.course) {
      emit (this.course[i], 1);} }
```

Reducer:
It maintains a count of values for each course.

```
var  reducer = function (key, values) {
   var count = 0;
   for (index in values) { count += values [index];}
return count; };
```

Mapper and Reducer were run on simulated data stored in a collection "student_data.find ()" in MongoDB.

> db.student_data.find() #Sample Transactions

{"_id": ObjectId("53d8b432f27288795fec3f47"), "Stud_Tran_ID": 1, "Courses Opted": ["Mensuration", "Calculus", "Physics", "English"]}

{"_id": ObjectId("53d8b432f27288795fec3f48"), "Stud_Tran_ID": 2, "Courses Opted": ["Geometry", " Mensuration", "Chemistry", "English"]}

{"_id": ObjectId("53d8b432f27288795fec3f49"), "Stud_Tran_ID": 3, "Courses Opted": ["Geometry", " Mensuration", "Calculus"]}…… upto 10000 records

> db.student_data.mapReduce (mapper, reducer,{out: "result_student_data" });

The following results were displayed on running the simulation of mapReduce command over the sample database on a single node.

```
{  "result" : "result_student_data",
    "timeMillis" : 701,
    "counts" : {
        "input" : 10000,
        "emit" : 36679,
        "reduce" : 600,
        "output" : 6w },
    "ok" : 1,}
```

```
> db.result_student_data.find()
{"_id": "Calculus", "value": 6661}
{"_id": "Chemistry", "value": 3339}
{"_id": "English", "value": 6679}
{"_id": "Geometry", "value": 6660}
{"_id": "Mensuration", "value": 10000}
{"_id": "Physics", "value": 3340}
```

This reflects course on Mensuration is most popular amongst students and may be recommended to new users.

Mongo DB also supports aggregation pipeline is a framework for data processing. Documents may enter a multi-stage pipeline that transforms the documents into aggregated results. The aggregation pipeline provides an alternative to map-reduce in complex operations (Chodorow, K., 2013, http://www.mongodb.org/).

4. Data Analytics in Education

In recent years, there has been increasing focus on the use of data analytics to investigate scientific questions within educational domain research, termed as Educational Data Mining (also referred to as "EDM"/ "LA" i.e. Learning Analytics)(Bhullar, M. S., & Kaur, A. ,2012). EDM helps us to better understand students and their learning behaviors (Kulkarni, S., Rampure, G., Yadav, B., 2012). There are wide varieties of current methods popular within educational data mining like prediction/classification, clustering, association mining, and discovery with models etc. (Baker, R. S. J. d, 2011, C. Romero, S. Ventura, 2010).

Association Rule Mining (ARM) is a well-researched field based on relationship mining that helps to uncover hidden or previously unknown connections. A rule in the form of X=>Y denotes an implication of element Y by an element X i.e. how two items (X and Y) are co-related with each other. *Association rule mining* is useful for educational data also (C. Romero, S. Ventura, 2010,). This usually tries to find simple if-then rules in educational data set for formulating hypothesis to study further. The few sample rules are listed as follows:

- "Students learning activity is low" => "Students grades and performance is not so good."
- "Students who perform poorly in exams => "Fail the course"
- "Students who took a course" => "Took prerequisites for the course"
- "Teacher is putting good efforts" => "He/she will be promoted soon"

The goal of ARM modelling is to determine frequent item sets. The interestingness of each finding is assessed and used to reduce the set of rules and correlations causal relationships communicated to the data miner for analytics. In very large data sets, hundreds of thousands of significant relationships may be found.

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Interestingness measures like Support, Confidence, etc. (Agrawal, R., Imieliński, T., & Swami, A , 1993) may try to determine which findings are the most distinctive, useful and well-supported by the data, but we need supporting Big Data technologies to deal with large amounts of data that are increasing by leaps and bounds. The use of Big Data paradigms like MapReduce can greatly reduce the processing time with parallelization of tasks.

4.1 Map Reduce Paradigm for Association Rule Mining

The associated items can be paired with MapReduce (Moturi, C. A., & Maiyo, S. K., 2012) approach to find frequent item sets from Big Data sets. The proposed MapReduce functions are listed as follows.

Map Function

Map (key= educational data log file, value=courses offered)

{ for each line=itemno_1… itemno_n in courses offered

for (i=1; i<n; i++)

for (j=i+1; j<=n; j++)

Emit (<itemno_i, itemno_j>, 1)}

Reduce Function

Reduce (key= <itemno_i, itemno_j>, value = counts)

{ Total=0

for each count in counts

Total += count

If (total >= threshold [i.e. min value for interestingness measure]) Emit (total)}

The sample step wise simulation of MapReduce approach using a sample transactional set is discussed as follows. This simulation is to give an idea how the proposed modelling of ARM using Map Reduce will work when replicated in large datasets environment.

1. Courses Accessed Online recorded in sample transactional logs.
   t1: Geometry, Calculus, Mensuration

   t2: Geometry, English

   t3: English, Physics

   t4: Geometry, Calculus, English

   t5: Geometry, Calculus, Chemistry, English, Mensuration

   t6: Calculus, Chemistry, Mensuration

   t7: Calculus, Mensuration, Chemistry
2. Logged data are distributed to Mappers.
3. Pair of Items is structured in each Mapper
   t1 :< (Geometry, Calculus), (Mensuration, Calculus), (Geometry, Mensuration)>

   t2 :< (Geometry, English)>

   t3 :< (English, Physics)>

   t4 :< (Geometry, Calculus), (English Calculus), (Geometry, English)>……and so on
4. Data Aggregation/ Intermediate Step is performed
   (Key, <value>): (pair of items, list number of occurrences)

   ((Geometry, Calculus), <1, 1, 1>)

   ((Mensuration, Calculus), <1, 1, 1, 1>)

   ((Geometry, English), <1, 1>)…and so on

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5. Reducers will sum up the total number of occurrences.
   (Key, value): (pair of items, total number of occurrences)

((Geometry, Calculus), 3), ((Mensuration, Calculus), 4), (Geometry, English), 2) and so on

The number of occurrences of each course could be used to infer recommendations for the new students

Chapter 3 5. Conclusion and Future Proposal

The field of education is gaining insight from large volumes and variety of real time data known as *Big Data*. Educational institutions are generating huge volumes of data, from grades or test scores to admissions or enrolment numbers. With the advent of online courses offered by many universities, the amount of data available to educational officials and students has exploded. Various data mining approaches and analytical soft wares help in identifying relevant pedagogic approaches. The Big Data paradigms are needed in today's world to support data mining approaches for increasing the efficacy of educational institutions. The usage of MongoDB platform for data storage and MapReduce paradigm for analysing educational data is proposed in this paper. In future the usage of various Big Data platforms like Hadoop, MongoDB, Cassandra etc. and parallel programming models like Hadoop MapReduce, PACT etc., for various data analytics techniques could be explored to accelerate the analysis of educational data. This will help in building scalable models in the field of education and may provide a better scope of improvement in the field of educational analytics.

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Distance education accounting students' perceptions of social media integration

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Abstract

Online student support is frequently used by distance education institutions worldwide, but in South Africa it remains a challenge to educators as not all students have access or can afford using the internet regularly. However, as most students at the University of South Africa (Unisa), a distance education institution, have mobile phones, opportunities emerge for academics to make use of social media. Accounting lecturers incorporated a number of social media applications into a second-year module and on the basis of the evidence provided it is evident that using social media can enhance the teaching and learning of Accounting.

Keywords: Accounting; BBM; distance education; Facebook; Holmberg's theory; MXit; social media; South Africa; student perceptions; Whatsapp

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1. Introduction

There is a crying need for professional accountants in South Africa. This has been confirmed in a study commissioned by the South African Institute of Chartered Accountants (SAICA) in 2008 who then estimated that South Africa was short of 17 000 accountants and 5 000 chartered accountants (CAs) (Enslin-Payne, 2011; Innocenti, 2009; PricewaterhouseCoopers, 2012). A CA candidate can qualify within seven years, but this is not the norm in South Africa as on average only one out of five students who start will successfully pass through university within the allotted timeframe (Van der Post, 2010). This results in an annual growth in the CA profession of only around 5% (Bates & Poole, 2003; Bates, 2005; Bean & Eaton, 2000:48; Enslin-Payne, 2011) which will definitely not ease the shortage soon.

Before a CA candidate can write SAICA's qualifying examination (QE) in South Africa, the candidate must obtain a BCom Accounting (CA stream) degree and pass a Certificate in Theory of Accounting (CTA) postgraduate qualification at an accredited university (Van der Post, 2010). These undergraduate and postgraduate qualifications are offered by most residential universities as well as the University of South Africa (Unisa), the largest distance education (DE) and open distance learning (ODL) institution in the country (University of South Africa, 2013). Although Unisa has been offering its undergraduate BCompt degree (the required BCom Accounting degree for the CA stream) and the CTA postgraduate qualification for many years, the number of Unisa students passing the QE examination has been low (2009–37.8%) when compared to residential universities (2009–62.2%) (Olivier & Bulman, 2009). There is thus an urgent need

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to increase the success rate of both the BCompt and the CTA postgraduate DE students at Unisa as this will inevitably help to alleviate the shortage of accountants and CAs in South Africa.

Research by a variety of scholars in the DE and ODL fields have established that students' success depends not only on the quality of the learning package, but also on the quality and scope of support given to these students (Bates, 2005; Birch & Volkov, 2007:291; Garrison & Vaughan, 2008; Simonson, Smaldino, Albright & Zvacek, 2012; Simpson, 2008:159; Waddoups & Howell, 2002:1). An important theory which focuses on students' support and success is Holmberg's theory of didactic conversation (Saba, 2003:4). Holmberg is of the opinion that if facilitators practice an empathetic approach in DE, their students' learning outcomes will improve (Bernath & Vidal, 2007:432; Simonson et al., 2012:48). Holmberg further argues that communication within a natural conversation can be understood and remembered easily and that the concept of conversation can be successfully translated for use by media and made available to DE students (Holmberg, 2003; Simonson et al., 2012). Holmberg's theory further states that this feeling of connectedness tends to promote study pleasure and motivation, particularly if well-developed instructional materials exist and two-way communication supports study (Holmberg, 2003; Simonson et al., 2012).

Two-way conversation is indeed necessary in the field of accounting studies, as students often struggle to understand different concepts and calculations. Although the use of computers and the internet have given DE a new dimension, this is not always the case in South Africa as many of the registered students at Unisa come from historically disadvantaged backgrounds and live in remote areas which have poor infrastructure and lack sustained electricity supply. Research conducted in the past confirmed that not all the students in a second-year Accounting course (FAC2602) have access to computers and to the internet (Prinsloo & Van Rooyen, 2007:59). If the FAC2602 lecturers thus want to increase communication between lecturers and students, they have to consider making use of a technology to which almost all students have access and which they can afford. As previous research indicated that most students have a mobile phone (Van Rooyen, 2010:47), the FAC2602 lecturers decided to make use of mobile phones and social media application software (apps) such as Facebook, Twitter, Blackberry Messaging (BBM), Whatsapp and MXit to assist students. The FAC2602 students registered during the first semester of 2012 were invited to make use of the apps to ask the lecturers questions and to communicate with other students via these platforms. This research project explored the possibilities of assisting these students in a more synchronous manner. Students were able to discuss problems with their lecturers during the day, at night and over weekends via these social media apps. Students also formed study groups and regularly communicated with other students on the same module. Limited research has been conducted on the use if social media to enhance student support through deductive conversation in the field of accounting education and more particularly in South Africa. The research project reported in this paper was part of a case study examining the impact of technologies on Accounting students' retention and success rate at Unisa. Obtaining both quantitative and qualitative data from students, this paper reports on Accounting students' perceptions on the possibilities of using social media apps to support them with their studies.

2. Research design and method

As explained previously, during the first semester of 2012, social media was introduced in the FAC2602 module to assist students with their studies. At the end of the first semester of 2012, these students were asked to provide feedback regarding their perceptions and experiences on the possibilities of using social media to assist with teaching and learning.

2.1. Research design

As part of a case study, this project used a mixed-method design which combined both qualitative and quantitative approaches for data collection and analysis. An online LimeSurvey questionnaire (LimeSurvey, 2014) with both closed and open ended questions was designed and the link to the questionnaire was send to all students registered for the FAC2602 module. In addition to a few demographic questions, the students were asked to give feedback on the following five questions:

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a. With regard to the use of different technologies in the FAC2602 module, with which one of the following statements do you agree?

- I would prefer to study without technology interventions.
- I would prefer fewer technology interventions in the module.
- I would prefer the use of technology as is currently the case.
- I would prefer the use of more technologies in the module.

b. What are your perceptions with regard to the use of technologies in the FAC2602 module?
c. With regard to the use of technologies in a Unisa module, with which one of the following do you agree?

- I think the use of technologies makes studying at Unisa easier and more interesting.
- I do not think the use of technologies in Unisa modules is helping me.
- I think the use of technologies interferes with my studies.

d. What would you change with regard the use of technologies at Unisa?
e. What are your perceptions on the use of social media (Facebook, Twitter, BBM, Whatsapp, MXit etc) in academic support?

2.2 Participants

The participants in the study were the second-year Accounting students registered in die first semester of 2012. The link to the questionnaire was made available to students between 2 June 2012 and 6 August 2012. A total of 2 121 students were registered for the FAC2602 module during the first semester of 2012; 155 students completed the questionnaire which represents 7.3% of the registered students during that semester. Although this was a small percentage, the data obtained assisted the lecturers to plan future student support strategies.

2.3 Data analysis

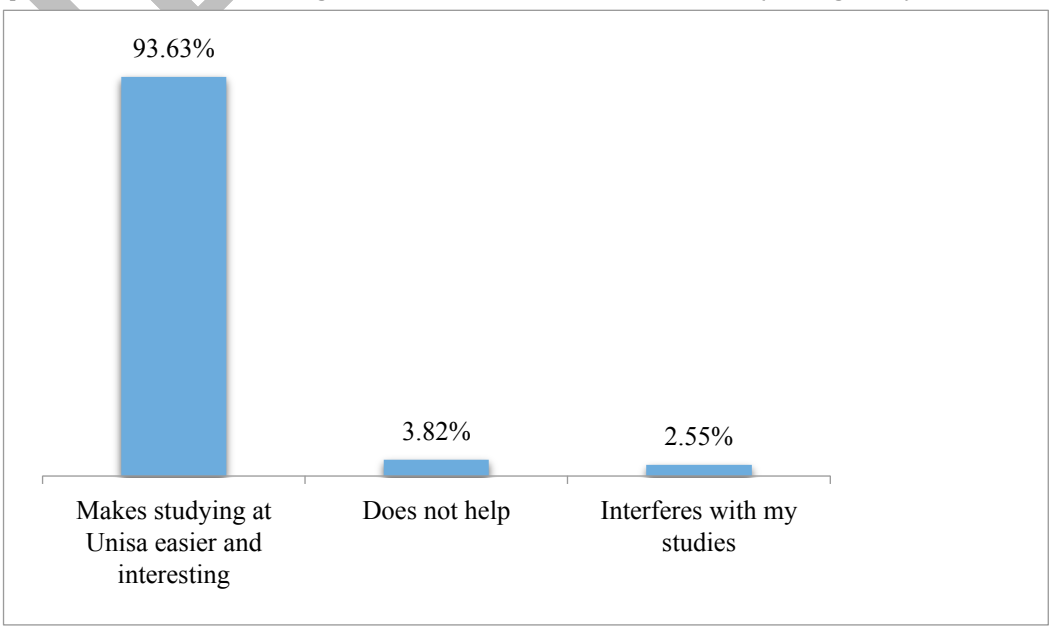
The quantitative data were analysed using SPSS Statistics version 21 and the three open-ended questions using Atlas.ti®. All data are reported anonymously, the extracts are direct quotes and grammar, punctuation and spelling errors have not been corrected.

3. Findings

Both quantitative and qualitative data were received from the FAC2602 students and are discussed below.

3.1. Results and discussion of the quantitative data

Feedback from the first question regarding the use of technologies in the FAC2602 indicated a large number of participants in favour of the use of technologies in the module. The fact that almost 94% of the participants supported the use of technologies in the FAC2602 module, created opportunities for lecturers to incorporate even more technologies into the module to assist students (See Figure 1).

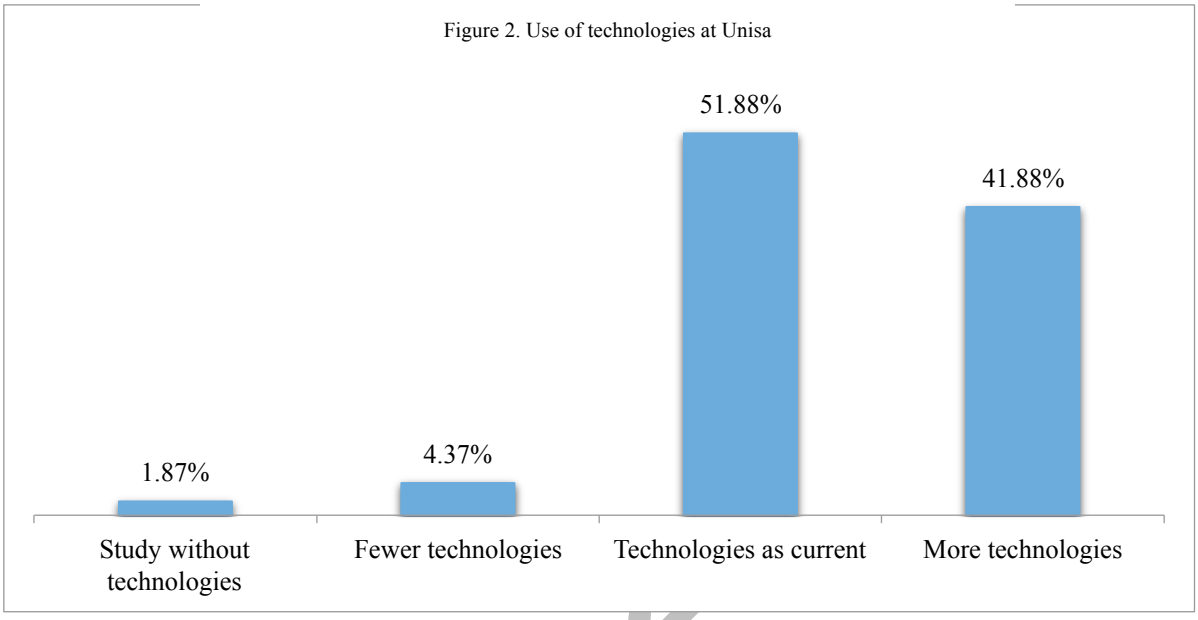


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Figure 1. Use of technologies in the FAC2602 module

Subsequently, the participants were asked to indicate the effect the use of technologies had on their studies at Unisa. Once again a large number of participants (93.63%) said it made studying at Unisa easier and more interesting (See Figure 2).

Figure 2. Use of technologies at Unisa



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3.2 Results and discussion of the qualitative data

The results from the open-ended questions are briefly presented here according to three main themes that emerged:

- Perceptions on the use of technologies in the FAC2602 module
- Perceptions on the use of social media for academic support at Unisa
- Possible changes regarding the current use of technologies at Unisa

It was evident from the feedback that most of the participants perceived the current use of technologies in the FAC2602 module positively. Many of the participants emphasised the greater access they have to study materials, as may be seen in the following responses:

The use of technologies in the FAC2602 module was very helpful and something I would like to see more of. It created greater access to more study material and tools.

as well as

It is helpful. Not everyone has access to all technologies. Therefore it is good to try and accommodate all technologies so that you can have access to those you do can use.

Some of the participants confirmed the problems they often encounter with online technologies but by using mobile technologies they could overcome some of these problems, for example

As a full time working student, I do not always have access to my e-mails, but with the mobile technologies, it was much easier, as I believe that 95% of all students have cell phones, so it is much more accessible.

and

Problems are solved anywhere and anytime students don't have to go home or cafe to access computers and internet.

Participants were of the opinion that students enjoy the use of social media, as expressed by one participant *Students always got smile when they get messages from their social media, this reduces the frustration and emotional tension not to able to access information as required .*

and others praised the incorporation of mobile technologies in the following manner

The world is fast becoming all online and it is enterprising of UNISA to try adapting and keeping up by making use of mobile technologies and social networks and cell phones, and I am sure many students appreciate this.

as they perceive this way of communication being effective at Unisa as is evident in

Mobile technologies are an excellent form of communication, as almost every UNISA students has a cell phone and it brings the students at different places.

On the other hand, there were also some negative comments from participants regarding the current use of technologies, as seen in the following responses:

using a mobile phone is not my preference to communicate with the lecturer or other student.

as well as

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Those would interrupt my studies. You can not seriously expect me to follow FAC2602 on twitter. Sorry I do not agree with that. Social media and studies do not go together.

Concerns regarding connectivity and access were once again emphasised, as one participant mentioned

internet and cell phone connectivity may not be available in the more rural area.

and another said

As much as the facilities are there on the FAC2602 but I do not have access to some always.

However, perceptions obtained from the participants regarding the use of social media for academic support at Unisa were generally positive, as may be seen from the following responses:

It is beneficial because the technology is within reach and can be accessed at any time.

and

Easier and cheaper form of communication and fast access. Much preferred.

Many of the participants also highlighted the fact that they use some of the social media apps already and are thus familiar with the apps, for example

I like it, especially BBM and Whatsapp, because I got access on them.

and

I found BBM very useful, and also found the group to be inspiring and supportive.

as well as

It is a great idea as some of us use it and some are cheaper most students can afford them. I Prefer BBM, Twitter and Whatsapp.

Participants were of the opinion that mobile technology can play an important role, as some of the participants emphasised

Well the use of mobile technologies is the way to go, because student and/or employees are working off their blackberries, ipads, smartphones.etc but what about the students who don't have access to these technologies.

and

I also think that more students have access to MXit, Facebook, etc. via their mobile phones than they have to a computer with internet connection, which also makes it a better form of communication.

and also

Mobile technologies are an excellent form of communication, as almost every UNISA students has a cell phone and it brings the students at different places.

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Once again some of the feedback reflected a less enthusiastic view on the possibilities of using social media for academic support, as some were saying

I hate chatting apps, especially blackberry, I do have Facebook but I hardly log on.

as well as

Some are a waste of time, I only use Whatsapp to communicate with my family and colleagues and the few close friend I have.

and

None - I am not on Facebook, Twitter etc. AND I do not want to be on it.

Regarding the changes participants would recommend on the use of technologies at Unisa, the following are ideas received from the participants:

I won't really change anything, and UNISA can certainly use technology to communicate with students as much as they can, just don't take away our good old fashioned hard copy study material!!!!

and

Great potential. Lecturers who can be actively (on a daily basis) be involved on something like a Facebook page for the module can build a relationship with the students in the same way public questions in a classroom situation can be addressed. Great potential there. Also build a student community feeling.

Some of the participants also want other modules to make use of these apps, as was seen in the following responses:

Facebook page per module will be useful. Students can have conversations on the page's wall post suggestions in the same way as the myUnisa forums, just with better usability.

and

I think it is a wonderful idea and definitely think the other modules should consider doing this as wel.

as well as

I would recommend the use of technologies in other modules, because it makes it easier, for student to stay encouraged and abreast with the module and schedule.

Three of the participants almost summarised the whole project by saying

Most of students almost all do have the mobile and social media you have mentioned so it for their convenience to have good quality of communication and clear contact with their lecturer. Whatsapp and Facebook are good two-way of communication, but not all students might have access to Whatsapp because certain type of cell phones can accept Whatsapp.

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and

Because most students have social media, and with Unisa being a distance learning institution; mobile technology plays an important role that serves a link between the lecturer and student. Firstly it's cheaper to write a message/comment/questions/clarity regarding the module, and the lecturer can then answer/advise, thus making it an interactive session.

and finally

Most students are more familiar with MXit, Whatsapp, etc., than with email - I think they also feel more comfortable using this type of media to communicate, which will give them the confidence to speak up if they struggle with a concept. I also think that more students have access to MXit, Facebook, etc. via their mobile phones than they have to a computer with internet connection, which also makes it a better form of communication.

4. Conclusion

In general, feedback received from the participants were positive regarding the possibilities of using technologies and more specific social media for academic support at Unisa. The fact that Accounting modules at Unisa need to increase students' success rates and the possibilities these social media apps now provide to lecturers, make this indeed an opportunity to explore more rigorously. These readily available and affordably technologies have the capability to increase didactic conversation, which is a critical ingredient for student success in the DE and ODL environment. Technologies are fast becoming a part of the instructional process and although the use of social media for academic support has only just begun, it can be a valuable tool as can be seen by the response of a participant who said *I have not used social media for academic support but I believe there is a place for it seeing that social media is part of our everyday life.* Therefore lecturers need to remind themselves that students are, as a participant correctly stated, *part of a generation that mostly communicates via mobile technologies.* Social media can indeed assist Accounting lecturers at Unisa to answer to the cry for more professional Accountants in South Africa.

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Distance Education Applications and E- Learning The Viewpoint of Students for E- Learning in Turkey

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Abstract

Internet has changed all the World. Music industry has been transformed to mp3s from records. Video has gone to streaming on line instead of VHS. The specifications of web 2, 0 did not change only media but also the structure of all industries. One of these industries that had a big effect from internet technologies is education. Internet brought a new outlook to education. The 'new distance' of 'distance education' have killed all the 'distance' between the education institutions and learner. Distance education which had started with letters is now done with networks. These new networks created the steps of E- learning which brought speed, interaction and borderless specifications to education. E- Learning brings new opportunities to education. The learner is now out of the building. Everywhere and every time is possible for education with e – learning. The aim of this paper is to make a determination for the views of Turkish young learners for e-learning. In the first part of the paper there is a conceptual and historical explanation of distance education and the role of e-learning as a new subhead tool of distance education. The paper makes a research with a questioner applied to university and high school students about e-learning. The questioner aims to find out the view of learners for e-learning. In the conclusion of the paper there is a brief underline that internet is changing the demand of education as well as other industries. The learners believes that e-learning brings them freedom and better opportunities for learning in their education life.

Peer-review under responsibility of the Sakarya University

Keyword: New Media, Distance Education, E- Learning

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1. Introduction

The increased importance of knowledge in today's world caused a dramatic increase in the need for education. The inability of traditional educational institutions to meet this increased demand created the education deficit. This need led societies to seek alternatives to traditional education. Distance education has started to fulfill this need. While distance education was delivered through different means of communication such as mail, telegram, telex, radio and television in the past, today, it is usually offered via Internet. Developments in the Internet technologies contributed to the emergence of e-learning concept as a form of distance education. The developments in the Web 2.0 technologies, which made it easier to share audio and videos, gave rise to the multimedia-based e-learning. The developments in the Internet technologies have added a new dimension to education. With e-learning, the need for specific locations disap-

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peared and the limited education format between the student and the educational institution gave its place to an interactive education that continues 24/7.

2. The Concept of Distance Education

Distance education is defined as an economical and interactive form of education in which information technologies are used and which is independent from time and space (Gökçe, 2008: 2). İşman (1998: 18) explained the concept of distant education as a system of education in which students and teachers conduct the activities of learning and teaching through communication technologies and postal services. The U.S. Department of Education's Office of Educational Research and Improvement defines distance education as "the application of telecommunications and electronic devices which enable students and learners to receive instruction that originates from some distant location." (Çakmak, 2013: 264). According to another definition, distance education is a planned educational process in which the teaching is conducted by someone removed in space and/or time from the learner and which is achieved by bridging the physical distance between student and teacher by means of technology in a virtual classroom (Ertuğrul, 1999: 7).

As it can be seen from the definitions above, the fundamental characteristic of distance education is the separation of the teacher and learner. Most often, separation is in geographic terms—teachers are in one location and students are in another. Also the separation of teachers and students is in time. Other components of distance education are that; different communication technologies are used, equivalent learning experiences are provided to each student and it is an education system or model in which learning-teaching activities are conducted.

Distance education is a hypernym referring to different concepts used for any formal approach to learning in which the instruction occurs while the educator and learner are at a distance from each other. Correspondence courses, home study, independent study, external studies, distance teaching and distance learning are classified within the scope of this concept (Kaya, 2002: 9–13).

E-learning is a type of education that is positioned in the system of distance education. In this type of education, Internet networks are used to connect teachers and students who are separated in terms of location and/or time. This education system is supported with video, visuals, audio recordings and graphic design. As the students can access to the educational materials and data anytime from anywhere by using Internet, this education system is independent from physical space (Gökdağ, 1986: 11–13).

Distance education practices started with correspondence courses. In time, along with the developments in the technology, other tools, such as radio, television, telephone and computers were used in the delivery of education. Today, in addition to the media mentioned above, electronic mails, computer conferences and Internet are used to offer distance education (Kaya, 2002: 11). According to Holmberg, distance education methods are grouped as follows (Can, 2004: 2–3):

- Course planning
- Development of course material
- Establishment of education communication
- Student counseling

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- Course development, distribution of course materials, education communication and consultancy management
- Creating an organizational structure for distance education
- Functional evaluation of the system

3. Characteristics and Goals of Distance Education

Although there are some similarities between formal (traditional) education and distance education, there are also several differences among them. The major characteristics of distance education can be summarized as below (Kaya 2002: 13):

- During the course of the education, the learner is physically separate from the teacher.
- Planning and preparing the teaching materials, providing student support services
- Communication tools, computers, audio and visual recordings are used in order to connect students and teachers and to the deliver the content of the course.
- Heavy use of technology
- Teaching is individualized since the learner and the instructor are separated during the course of the education.

As it can be seen in the definitions the main goal of distance education is to allow the individual to receive education in any field that the learner wants, anywhere and anytime. Distance education systems use technology and have efficient systems in accessing and delivering information, therefore the student and the instructor can act free from time and space (Çiçekdağı and Tekin, 2014: 81).

In 2006, the U.S. Department of Education's Office of Postsecondary Education released a report in which the characteristics of a qualified distance education program were stated (Gökçe, 2008: 6):

- The mission statement of the distance education program should identify the purpose of the training;
- Distance education program should be under the supervision of the faculty delivering formal education;
- Faculty delivering formal education should actively take part in the content of the distance education course;
- Technological support should be provided 24/7;
- There should be academic advisers for distance education students and the course and programs of distance education should be assessed continuously

4. Methods of Distance Education

Distance education can be delivered through several different methods. In general, communication environments for distance education are print materials, audio devices, television and television technologies and information technologies. It is necessary to decide which technology to use when designing the distance education program. The compatibility of the technology and the education program and differences between different technologies should be considered carefully. Distance education programs can be efficient if only they are delivered via appropriate technology. Several factors such as; the communication technology appropriate for the education program, target audience's ability to access to this technology, the teacher's ability to use this technology in the presentation of the course, corporate technical infrastructure and its usability for the program, cost of the technology and budget of the program should be

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analyzed. If the technology were selected by considering these factors, it would contribute more to the education program. The advantages and disadvantages of using different technologies can be summarized as in Table 1.

Table 1. Distance Education Methods

Technology	Advantages	Disadvantages
Printed Materials	Mobile, cheap, easy to access, well-organized	There may be delays in the delivery of the materials. Low attention to the courses
Videotapes **(can be transferred to CD-ROM and DVD)**	Mobile, it contains motion video and audio. It allows the learners to easily review the content by using VCR devices.	The tendency for monotonous lecturing and presentation. It can be boring unless the content is interesting or supported with video
Video Conference	Synchronous and two-way communication is established between the instructor and the learners. Sufficient audio and visual quality can be achieved by using advanced technological systems	Expensive. It requires the preparation of a special environment. It allows interaction but this interaction should be supported. The image quality can be low if low-quality systems are used.
Steaming Videos or Presentations	It allows for image transfer or graphic and audio transfer. It can be watched with interest. The material can be viewed again. It can be updated without the duplication of the band. It doesn't take as much time as the video recordings to produce.	The tendency for monotonous lecturing and presentation. It can be boring unless the content is interesting or supported with video. It requires the teacher to plan the presentation. The students have to have a computer and internet connection that meet the requirements
Web	It is possible to access to the computer anytime and anywhere by becoming online. It encourages communication through different course management software (such as chat, bulletin boards)	It requires access to computer and some basic technical skills.
Online discussion tools, bulletin boards, chat sessions	Online connection with the teacher and other students. It could be synchronous (chat) or asynchronous (bulletin board). Discussions can be included.	Talks are limited. It requires fast and accurate use of keyboard.
Electronic Mail	It is easy to use and cheap.	It requires access to a computer and basic knowledge of computer technology.

Source: (Özkul, 2003: 19)

Distance Education Programs, which allow learners to choose when and where to learn and when and where to access instructional materials, help to, partially or completely, eliminate the restrictions in the delivery of education services with their flexibility and adaptability (Çiçekdağı, Tekin and Tekin, 2014: 83).

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Distance Education offers different education options to people and minimizes the inequality of opportunity. With distance education, mass education becomes easier, education programs are standardized and cost of education is reduced. It helps to increase the quality of education and gives freedom to the student. It offers an enhanced learning environment to the students and does not force them to study in a classroom setting. Distance education allows individual learning as well as independent learning, receiving information from the first source. In addition, more people can benefit from experts through distance education. Distance education, while massifying education, also individualizes it and eliminates the necessity of being in a specific, confined space at a specific time to receive education (Kaya, 2002: 21).

5. Development of Distance Education in the World

The history shows that advances in technology have promoted changes in distance education. It is accepted that the pioneer of distance education was Isaac Pitman who offered shorthand instruction via correspondence in 1840. In the 1850s language education books were published under the title of "Teaching letters for learning the French language" and in 1873 Anna Eliot Ticknor developed a system to encourage the education of women. In 1874, American university level distance education began at Illinois Wesleyan University (Negiz, 2014: 71).

In the 19th century, distance education emerged in Germany and Sweden as well. In Germany, the attempts of distance education that began in 1856 led to today's distance educational institutions of Telekolleg, Schulfernsehen, FernUniversitat and Deutsche Institut für Fernstudien. In 1886, H. S. Hermod, of Sweden, began teaching English by correspondence. Later he founded Hermod's, which would become one of the world's largest and most influential distance education organizations. The "distance education" term, mentioned in the 1892 catalogue of the University of Wisconsin, was used by William Lighty, a professor at University of Wisconsin, for the first time in an essay. Since the use of multimedia tools and presentation systems makes it difficult to define distance education in one, precise statement, different distance education definitions have been made (Uşun, 2006: 6).

It is accepted that there has been three stages in the development of distance education. The first stage was the correspondence study period, which took place between the end of the 19th century and the beginning of the 20th century. During this period, the education was based on a textbook and feedback was received through letters. Starting from the 1970s, in the second stage, radio, television, cassettes and tapes were employed in distance education. The use of the satellite technologies began with the 1980s. And, finally, with the development of computer-based distance education programs, the third stage started (İnan, 2014: 97).

With the use of computer networks and Internet technologies in teaching-learning activities, especially beginning from the late 1990s, the world witnessed an expansion in distance education. With the help of computer networks, major limitations and problems in distance education, such as limited interaction, slow updating, inability to access different resources, not being able to receive service at the requested time and place and inability to focus on personal differences, were largely resolved.

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Today, many educational institutions in the world offer internet-based distance education programs. Higher education institutions offer internet-based distance education associate degree, master's degree and certificate programs. Besides, in some universities some courses are delivered via Internet.

The Open University of the United Kingdom can be shown as the most important distance education institution of our century. It was founded in 1969 by Royal Charter. More than 2 million students have graduated from the Open University since the day it was established. As one of the most important and successful institutions of distance education, the Open University, in collaboration with BBC, broadcasts to the entire country. Today is it one of the top ten universities of the world.

6. Distance Education in Turkey

It was a short time after the declaration of the Republic that distance education was considered as an option as a result of the "Teacher Education Report" presented by John Dewey in 1924. In this report, Dewey suggested the use of distance education in the training of teachers (İşman, 1998: 34).

There have been several other proposals to establish a distance education system. In 1927, "education through correspondence" was considered to teach literacy. In 1933-1934, a proposal was made to start correspondence courses in 1933-1934. In 1950, it was suggested The University of Ankara, Faculty of Law, Bank and Commercial Law Research Institute to use distance education. In 1960, the reason for considering correspondence study as an alternative education method was to train the graduates of secondary vocational schools. Finally, in 1962, The National Education Council recommended the use of correspondence study in order to educate people who cannot attend schools but want to receive education (Alkan, 1996: 20).

The Ministry of National Education used "correspondence courses" in 1958-59 school year for the bankers, particularly living outside of Ankara. In 1960, Ministry of National Education founded Correspondence Education Center Council within the body of Department of Statistics and Publishing. The aim of the Center was to offer distance education (Özdil, 1986: 18).

After the 1960s, some other institutions attempted to establish distance education systems in Turkey; however, they couldn't be very successful due to political reasons and uncertainties. In 1960, in order to deliver vocational and technical training via correspondence courses, Correspondence Education Center was established. In 1974, this center offered courses to train teachers but these efforts didn't last long (Birkök and Vuranok, 2010: 430–431).

Center for Higher Education through Correspondence and Higher Teacher Education Schools were founded in 1974, however, since they fell short of the expectations, these institutions were closed in 1975. Non-formal Higher Education Institution, YAYKUR, was established in the same year as an alternative and began to deliver higher education services through correspondence in the fields of secondary education teaching and primary school teaching. However, since YAYKUR was not successful enough, it was closed in 1979. With Article No 2547 in the 1982 Constitution, the task of distance higher education was given to the universities (İşman, 1998: 43–45).

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Another attempt to establish distance education in higher education was made by Ministry of National Education in 1978. The goal was to establish an Open University, however, it wasn't successful (Gökçe, 2008: 3).

In 1982, Anadolu University Open Education System was established. In 1999, distance education was further developed with the "Distance Education Based on Information and Communication Technologies". After the establishment of Open Education system in Turkey, "distance education system infrastructure" was developed. First it was an activity of documentation, and then it became a "system activity" with the accreditation and system communication and TV broadcasts and was positioned as a non-formal educational activity that aims mass education. Non-formal education is a field of education that targets large masses. It is more planned and programmed compared to formal education and supported by formal education (Çiftçi, 1995: 109).

The use of mass communication tools for distance education purposes began with a radio program in 1941. The name of the program that targeted people living in the countryside was "Agricultural Calendar" and it was produced by TRT Ankara Radio. In 1952, another talk show for the same target audience, this time produced by TRT Istanbul Radio, was broadcasted. In 1954, the radio program "Hour of the Village", which was a collaboration of Radio Department and Ministry of Agriculture, was on air. Based on the legal regulations in the 1961 Constitution, TRT was reorganized in 1964 and as a result of this reorganization; there has been an increase in the educational broadcasts (İşman, 1998: 48). During this period, the medium of radio was used for the distance education. TRT's radio and televisions took an active part in the Literacy campaign held in the 1980s.

In the XV National Education Council gathered in 1996, the ways to meet the educational demands of the society were discussed. In Turkey, web-based distance education began with certificate programs and in-campus courses in 1997. Today, universities offer web-based master's degree, graduate's degree, associate degree and certificate programs (Türkiye Bilişim Derneği, 2004: 368).

7. E-Learning in Distance Education

The technological advances have changed and shaped our ways of communication in the 21st century. They also challenge the traditional approaches to the practice of distance education. The impact of technology on the forms of learning can be classified as follows (Digital Age, 2014:30):

- Extended audience: Today, it can be said that the entire world is the audience as a result of the emergence social media such as blogs, Twitter, Facebook and other online platforms.
- Changing Learning Materials*:* Historical boards and blackboards have already become history. Smart and interactive, multimedia boards are used in education. Learners don't have to carry their files and notes with them. A laptop computer or tablet can store thousands of pages of information. Furthermore, environments such as LiveBinders, which is a Web 2.0 tool, allow to create files in an online environment.
- Interactive Textbooks*:* With the development of the technology, Internet-based websites that contain materials like animations, videos and alike which help learning were created. Students don't have to carry those heavy textbooks with the advances in e-book technology. Thanks to the new communication technologies, student don't have to take notes on notebooks, instead they record their notes on their tablets or cellular phones digitally and share them with their friends.

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- Increase in the use of tablets: Tablet has become a powerful tool in education. The most important feature of tablets is that they make the learning experience of children with special needs (such as autism) easier.
- Extended class environments: Internet-based platforms like Edmodo help to extend the in-class activities of technology. Students and instructors can talk about homeworks and share them with each other using this platform. This helps them to communicate with each other on the projects they are working on.

- Development of Internet-based Libraries**:** Libraries are still in use today. But, the research is conducted via Internet.

The developments in the computer and communication technologies, the emergence and spread of Internet made it easier and faster to access information. Therefore, today, distance education and Internet are inseparable as they are the main elements in creating equality of opportunity in education, which is the fundamental purpose of distance education.

E-learning can be defined in different ways. E-learning is the education and learning activities that allow instructor and students to be located in different locations so that instruction and learning occurs independently of place and time via information – communication technologies

Technology-supported distance education, in other words e-education, is a broad process that involves the collaboration of computer-based learning, web-based learning, virtual classes and digital technologies. E-learning can be defined as a web-based education system presented through a platform on a network (Uşun, 2006: 118). Technology-supported distance education can be defined as a structure with high media technology in which the features and resources of Internet are used in order to create an educational environment that enhances and supports learning (Khan, 1997: 5). In short, e-learning, which is education in electronic environment, accelerates the speed of learning and information transfer by combining the best features of traditional class setting with technology. E-learning allows the delivery of synchronous and asynchronous education via satellite, video (live or recorded) and computer technologies (Internet, intranet, CD-ROM) (Uşun, 2006: 160).

Internet-based Distance Education is an overall approach, which involves all education models that use Internet infrastructure. Teleconference meetings that use Internet, electronic mails that replaced traditional mail, electronic books and periodicals, which present the alternatives for printed sources, are models, which have been used as a part of Internet-based Distance Education. Among all these models, Web-Based Distance Education (WBDE) is the one that is most widely used today (Al and Mardan, 2004: 263).

The systems used to offer distance education services through Internet are called Learning Management Systems. By assigning roles such as student, instructor, course opener, system administrator to users defined on these systems, the student-material-instructor interaction is created via tools like course content, homeworks, assessments, live video, chat rooms and message boards (Akdemir, 2011: 70).

E-learning can be synchronous or asynchronous. Asynchronous learning is self-paced meaning that it allows the student complete freedom in determining his or her own pace for the lecture while in synchronous learning a group of students and the instructor meet in a classroom setting in the computer environment at the same time (İnan, 2014: 98).

Internet-based education, known as e-education, takes place in an electronic environment. Its pedagogical outcomes are still examined. It can be used on its own or it can be a part of formal education or dis-

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tance education (Oral and Kenanoğlu, 2012: 70). Advantages and limitations of Internet-Based Education are as shown on Table 2.

Table 2. Advantages and limitations of Internet-Based Education

	Logistic	**Educational**	**Economic**
Advantages	Free of distance and time Convenience Ease of developing and storing the courses	Enhanced learning environments Student control Efficient Communication Supports formal and informal learning environments	Cost effective usability
Limitations	Solid technical infrastructure Planned preliminary preparation	Free of distance and time Convenience Ease of developing and storing the courses	Financial burden

Source: (Oral and Kenanoğlu, 2012: 70).

Web 2.0 technologies, which were developed especially in the 2000s, took e-learning systems one step further. Theoreticians and programmers continue to create new tools and systems in accordance with the developments in web technologies. These developments focus on e-learning. In traditional education, it is quite important for many educators to have a face-to-face interaction with the student. However, according to the results of the research conducted by Jahng, Krug and Zhang in which online distance education and face-to-face education was compared, there is not any significant difference in terms of the success of the students between these two systems (Soydal, Alır and Ünal, 134).

Today, e-education practices all around the world have a significant share in the market. This market covers many different areas of life from the university education to language learning and to obtaining vocational competence. The value of global e-learning market is about 56.2 billion dollars and 70% of this market is in the countries in the North America and Europe continents. Figure 1 shows the number companies offering e-learning services.

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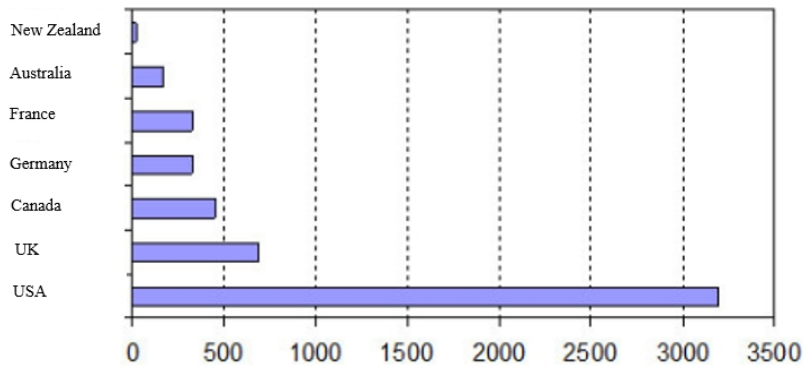


Figure 1. Number of Companies Providing E-Learning Services

Source: E-Öğrenme Pazarı, http://www.enocta.com/enocta/web/kurumportal/Content/e-ogrenme-pazari/1294/, (01.08.2014)

In "E-Learning Market Trends & Forecast 2014 - 2016 Report" published by DOCEBO, it was foreseen that the market will continue to grow all around the world. As it can be seen on the infographic below, the market will grow by 16, 9% in Eastern Europe, 17, 3% in Asia, 14,6% in Latin America and 15,2% in Africa in the next 2 years.

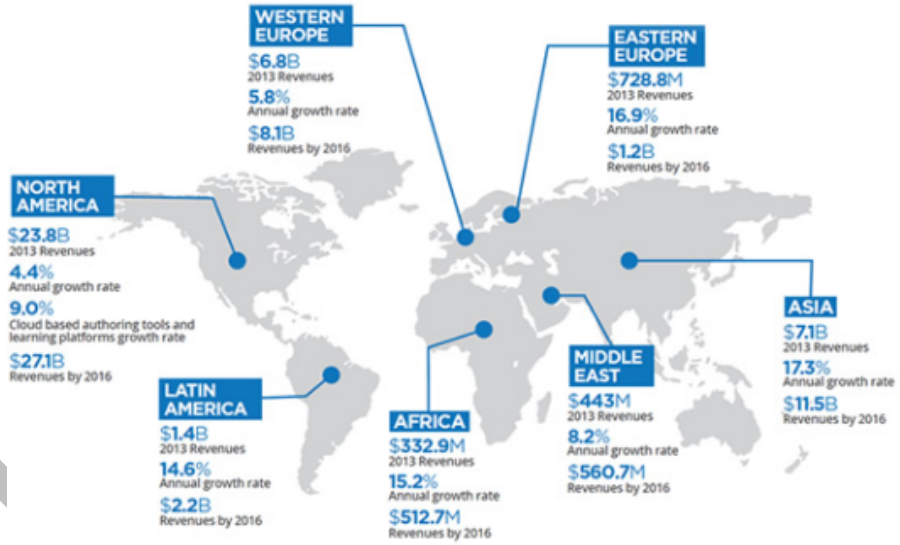


Figure 2. Geographic Distribution of E-Education

8. E-Learning Perception of Students Who Receive Education in Turkey

8.1 Method of the Study

The aim of this paper is to make a determination for the views of Turkish young learners for e-learning. The study made a research with a questioner applied to university and high school students about e-learning. The questioner aims to find out the view of learners for e-learning. In the first part of the questioner there are questions about exploring how the students gather information in their education. In the second part there is a scale of 14 questions exploring the views of e-learning in Turkey. The study conducted to 224 students living in Turkey in İstanbul. The sample was selected randomly from İstanbul high school and university students.

Chapter 4 8.2 Demographic Analysis
Chapter 5 Table 3. The Demographic Specifications of the Participants

Age	(n)	(%)
18 Year and Younger	120	53,57
19-24 Years Old	74	33,03
25 Years and Older	30	13,4
Total	224	100

Education Level	(n)	(%)
High School Students	110	49,1
University Students	114	50,9
Total	224	100

Sex	(n)	(%)
Male	126	56,3
Female	98	43,8
Total	224	100

8. 3 Analysis Regarding the İnformation Source of Students

In the first part of the questioner there are questions exploring the information source of students on their daily life and educational researches. According the answers that were collected students use internet and social media more than other media tools as an information source. The least used media is magazine and newspapers.

Table 4. The Information Source of Students

	(n)	(%)
Internet	108	48,2
Newspaper	19	8,5

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Magazine	5	2,2
Television	20	8,9
Social Media	72	32,1
Total	224	100,0

The 48, 2 % of the participants expressed that they have not gone to a library in the last six months. One interesting point is that there are also students who mentioned that they have never gone to a library for research.

Table 5. Last Time Visited Library

	(n)	(%)
1 Week Before	42	18,8
1-4 Weeks Before	34	15,2
1-3 Months Before	24	10,7
3-6 Months Before	16	7,1
6 Months Before	90	40,1
Never Go	18	8,1
Total	224	100

The students expressed that they use more search engines when they use internet as a research tool. The students expressed that they use Google more than other sources as research tool. They also expressed that Twitter is the most informative social media network in their researches. In that part of the questioner the students allowed to give more than one answer in two questions that's why the total responses are more than the sample size.

Table 6. Internet Use Method as a Research Tool

	(n)	(%)
I look in search engines	174	77,7
Directly I go to the web sites related to topic I search	38	17,0
I look at the social media networks	12	5.3
Total	224	100,0

Table 7. The Most Used Search Engines for Research

	(n)	(%)
Google	218	61,6
Yahoo	18	5,1
Yandex	112	31,6
Mynet	6	1,7

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Total	354	100,0

Table 8. The Best İnformation Social Media Network Source

	(n)	(%)
Facebook	48	17,8
Twitter	152	56,3
YouTube	58	21,5
Instagram	6	2,2
Other	6	2,2
Total	270	100

The 56,3 % of the students declared that they have never read an e-book and the 43,8 % read at least one time an e- book in their life. The 32, 2 of the participants have an experience of e-learning in their life but the 67, 8 % didn't have such an experience.

Table 9. Reading E-Book

	(n)	(%)
Yes I read at least one time in my life	98	43,8
No I Have never Read	126	56,3
Total	224	100,0

Table 10. Have You Ever Had Any E-learning Experience?

	(n)	(%)
Yes	72	32.2
No	152	67,8
Total	224	100,0

In the research it was asked the students the express the advantages of e- learning. They allowed to give free answers and also to say if they think there is no advantage. The answers were coded and compiled in table 11.

Table 11. Advantages of E- Learning

	(%)
Independence from Place	22,6
Cost Save in Finance	15,4
Transportation Advantage	5,3
Continuously Reach	6,6
Easy and Comfortable	11,7

Possibility of Repetition	18,7
Flexibility in Time	16,9
It has no advantage	2,8
Total	100

Chapter 6 8.4 Reliability Analysis

The reliability analysis of the 14 statements shows that this scale is reliable. Since the alpha Cronbach value is more than 0, 70 this scale is enough reliable. The alpha value of this scale is 0,880

Table 12. Reliability Analysis

Cronbach's Alpha	N of Items
,880	14

Chapter 7 8.5 Frequency Analysis

The frequency analysis of the scale is showing that the students confirm the advantages of e-learning and accepts it as future education method. Students accepts the reality that internet is the best source for them to make research with a very big frequency. Student feel free in e- learning and they think that this is also a cost method in education. They accept that transportation, education materials and such cost are lower in e – learning. One other point to be regarded is that students believe that they use time flexible in e – learning and this type of learning is more comfortable.

Table 11. Frequency Analysis

		I absolutely Agree	I Agree	I nor Agree Nei-ther Disagre	I don't Agree	I Absolutely Disagree	Total
A1	I Use internet as an information tool make my researches more easy	73,1	25,1	0	1,2	0	100
A2	The information that I gather from internet helps me to use my time of research better.	57	37,4	2,7	0,9	2	100
A3	I don't have any trust problem on the information I collect from the internet.	3,6	12,5	51,8	28,6	3,6	100
A4	The companies which supply e – learning takes my interests.	19,6	25,9	32,1	10,7	11,6	100
A5	I would like to have e- learning education in the future.	25	20,5	33	13,4	8	100
A6	E-Learning makes me feel more free.	39,1	23,2	16,8	9,4	11,5	100
A7	E- Learning helps me to use my scheduled time better.	28,8	25,2	20,6	17,6	7,8	100
A8	I believe that e – learning is more useful to learn new things and improve myself.	33,3	23,2	21,2	13,4	8,9	100
A9	E- Learning brings me advantage on the cost of my education transportation and educational materials.	46,4	22,3	13,5	10,7	7,1	100

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A10	E- Learning can never take the place of traditional class education.	8	8,9	13,4	31,3	38,4	100
A11	I believe that e-learning will take the place of traditional education in the future	32,1	27,5	12,3	21	6,5	100
A12	I would like to have my university education in a university which use e-learning 100%.	35,7	25,9	27,7	3,6	7,1	100
A13	I believe that a Multimedia based e- learning is more effective than the classroom learning.	25,8	41,1	14,5	10,5	8,1	100
A14	E- Learning give me the information more comfortable.	25,8	29,1	21,5	13,8	9,8	100

9. Conclusion

The changes and advances occurring almost in every part of life challenge the education systems and schools to change. Rapid developments in information and communication technologies led to an increase in the use of technology in the field of education. This requires redefining the concepts of school, teacher and student. Besides, education delivered via Internet has become the most common way of distance education.

Distance Education is, in its broadest definition, a planned and systematic educational activity;

a) that offers individuality, flexibility and freedom in terms of educational age, purposes, time, place, management and etc to the receivers of education,
b) in which the source and the receivers are in separate locations during the most of the teaching-learning process,
c) the interaction and communication between the source and the receivers takes place via interactive/integrated technologies that are based on television and computer.

As its seen in this research conducted to 224 students who live in İstanbul today learners prefer to use internet more for learning new things. Students believe that they can gather information more quickly and more flexible via internet and social media. Their first choice for gathering information is internet and search engines. They mostly use Google in search engines and Twitter in social media for collecting information. The students give more positive feedback to the statements that were prepared in the scale. According to them e-learning give more advantages and this is a future type of education which they would like to use more. According to the students e – learning has four important benefits in their education. These are:

a) gives them freedom and more independency in their education,
b) helps them cost saving in education cost materials, transportation,
c) gives comfortable education,
d) flexibility in time

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Distance Education Applications and E- Learning The Viewpoint of Students for E- Learning in Turkey

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Abstract

Internet has changed all the World. Music industry has been transformed to mp3s from records. Video has gone to streaming on line instead of VHS. The specifications of web 2, 0 did not change only media but also the structure of all industries. One of these industries that had a big effect from internet technologies is education. Internet brought a new outlook to education. The 'new distance' of 'distance education' have killed all the 'distance' between the education institutions and learner. Distance education which had started with letters is now done with networks. These new networks created the steps of E- learning which brought speed, interaction and borderless specifications to education. E- Learning brings new opportunities to education. The learner is now out of the building. Everywhere and every time is possible for education with e – learning. The aim of this paper is to make a determination for the views of Turkish young learners for e-learning. In the first part of the paper there is a conceptual and historical explanation of distance education and the role of e-learning as a new subhead tool of distance education. The paper makes a research with a questioner applied to university and high school students about e-learning. The questioner aims to find out the view of learners for e-learning. In the conclusion of the paper there is a brief underline that internet is changing the demand of education as well as other industries. The learners believes that e-learning brings them freedom and better opportunities for learning in their education life.

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Keyword: New Media, Distance Education, E- Learning

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1. Introduction

The increased importance of knowledge in today's world caused a dramatic increase in the need for education. The inability of traditional educational institutions to meet this increased demand created the education deficit. This need led societies to seek alternatives to traditional education. Distance education has started to fulfill this need. While distance education was delivered through different means of communication such as mail, telegram, telex, radio and television in the past, today, it is usually offered via Internet. Developments in the Internet technologies contributed to the emergence of e-learning concept as a form of distance education. The developments in the Web 2.0 technologies, which made it easier to share audio and videos, gave rise to the multimedia-based e-learning. The developments in the Internet technologies have added a new dimension to education. With e-learning, the need for specific locations disap-

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peared and the limited education format between the student and the educational institution gave its place to an interactive education that continues 24/7.

2. The Concept of Distance Education

Distance education is defined as an economical and interactive form of education in which information technologies are used and which is independent from time and space (Gökçe, 2008: 2). İşman (1998: 18) explained the concept of distant education as a system of education in which students and teachers conduct the activities of learning and teaching through communication technologies and postal services. The U.S. Department of Education's Office of Educational Research and Improvement defines distance education as "the application of telecommunications and electronic devices which enable students and learners to receive instruction that originates from some distant location." (Çakmak, 2013: 264). According to another definition, distance education is a planned educational process in which the teaching is conducted by someone removed in space and/or time from the learner and which is achieved by bridging the physical distance between student and teacher by means of technology in a virtual classroom (Ertuğrul, 1999: 7).

As it can be seen from the definitions above, the fundamental characteristic of distance education is the separation of the teacher and learner. Most often, separation is in geographic terms—teachers are in one location and students are in another. Also the separation of teachers and students is in time. Other components of distance education are that; different communication technologies are used, equivalent learning experiences are provided to each student and it is an education system or model in which learning-teaching activities are conducted.

Distance education is a hypernym referring to different concepts used for any formal approach to learning in which the instruction occurs while the educator and learner are at a distance from each other. Correspondence courses, home study, independent study, external studies, distance teaching and distance learning are classified within the scope of this concept (Kaya, 2002: 9–13).

E-learning is a type of education that is positioned in the system of distance education. In this type of education, Internet networks are used to connect teachers and students who are separated in terms of location and/or time. This education system is supported with video, visuals, audio recordings and graphic design. As the students can access to the educational materials and data anytime from anywhere by using Internet, this education system is independent from physical space (Gökdağ, 1986: 11–13).

Distance education practices started with correspondence courses. In time, along with the developments in the technology, other tools, such as radio, television, telephone and computers were used in the delivery of education. Today, in addition to the media mentioned above, electronic mails, computer conferences and Internet are used to offer distance education (Kaya, 2002: 11). According to Holmberg, distance education methods are grouped as follows (Can, 2004: 2–3):

- Course planning
- Development of course material
- Establishment of education communication
- Student counseling

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- Course development, distribution of course materials, education communication and consultancy management
- Creating an organizational structure for distance education
- Functional evaluation of the system

3. Characteristics and Goals of Distance Education

Although there are some similarities between formal (traditional) education and distance education, there are also several differences among them. The major characteristics of distance education can be summarized as below (Kaya 2002: 13):

- During the course of the education, the learner is physically separate from the teacher.
- Planning and preparing the teaching materials, providing student support services
- Communication tools, computers, audio and visual recordings are used in order to connect students and teachers and to the deliver the content of the course.
- Heavy use of technology
- Teaching is individualized since the learner and the instructor are separated during the course of the education.

As it can be seen in the definitions the main goal of distance education is to allow the individual to receive education in any field that the learner wants, anywhere and anytime. Distance education systems use technology and have efficient systems in accessing and delivering information, therefore the student and the instructor can act free from time and space (Çiçekdağı and Tekin, 2014: 81).

In 2006, the U.S. Department of Education's Office of Postsecondary Education released a report in which the characteristics of a qualified distance education program were stated (Gökçe, 2008: 6):

- The mission statement of the distance education program should identify the purpose of the training;
- Distance education program should be under the supervision of the faculty delivering formal education;
- Faculty delivering formal education should actively take part in the content of the distance education course;
- Technological support should be provided 24/7;
- There should be academic advisers for distance education students and the course and programs of distance education should be assessed continuously

4. Methods of Distance Education

Distance education can be delivered through several different methods. In general, communication environments for distance education are print materials, audio devices, television and television technologies and information technologies. It is necessary to decide which technology to use when designing the distance education program. The compatibility of the technology and the education program and differences between different technologies should be considered carefully. Distance education programs can be efficient if only they are delivered via appropriate technology. Several factors such as; the communication

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technology appropriate for the education program, target audience's ability to access to this technology, the teacher's ability to use this technology in the presentation of the course, corporate technical infrastructure and its usability for the program, cost of the technology and budget of the program should be analyzed. If the technology were selected by considering these factors, it would contribute more to the education program. The advantages and disadvantages of using different technologies can be summarized as in Table 1.

Table 1. Distance Education Methods

Technology	Advantages	Disadvantages
Printed Materials	Mobile, cheap, easy to access, well-organized	There may be delays in the delivery of the materials. Low attention to the courses
Videotapes **(can be transferred to CD-ROM and DVD)**	Mobile, it contains motion video and audio. It allows the learners to easily review the content by using VCR devices.	The tendency for monotonous lecturing and presentation. It can be boring unless the content is interesting or supported with video
Video Conference	Synchronous and two-way communication is established between the instructor and the learners. Sufficient audio and visual quality can be achieved by using advanced technological systems	Expensive. It requires the preparation of a special environment. It allows interaction but this interaction should be supported. The image quality can be low if low-quality systems are used.
Steaming Videos or Presentations	It allows for image transfer or graphic and audio transfer. It can be watched with interest. The material can be viewed again. It can be updated without the duplication of the band. It doesn't take as much time as the video recordings to produce.	The tendency for monotonous lecturing and presentation. It can be boring unless the content is interesting or supported with video. It requires the teacher to plan the presentation. The students have to have a computer and internet connection that meet the requirements
Web	It is possible to access to the computer anytime and anywhere by becoming online. It encourages communication through different course management software (such as chat, bulletin boards)	It requires access to computer and some basic technical skills.
Online discussion tools, bulletin boards, chat sessions	Online connection with the teacher and other students. It could be synchronous (chat) or asynchronous (bulletin board). Discussions can be included.	Talks are limited. It requires fast and accurate use of keyboard.
Electronic Mail	It is easy to use and cheap.	It requires access to a computer and basic knowledge of computer technology.

Source: (Özkul, 2003: 19)

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Distance Education Programs, which allow learners to choose when and where to learn and when and where to access instructional materials, help to, partially or completely, eliminate the restrictions in the delivery of education services with their flexibility and adaptability (Çiçekdağı, Tekin and Tekin, 2014: 83).

Distance Education offers different education options to people and minimizes the inequality of opportunity. With distance education, mass education becomes easier, education programs are standardized and cost of education is reduced. It helps to increase the quality of education and gives freedom to the student. It offers an enhanced learning environment to the students and does not force them to study in a classroom setting. Distance education allows individual learning as well as independent learning, receiving information from the first source. In addition, more people can benefit from experts through distance education. Distance education, while massifying education, also individualizes it and eliminates the necessity of being in a specific, confined space at a specific time to receive education (Kaya, 2002: 21).

5. Development of Distance Education in the World

The history shows that advances in technology have promoted changes in distance education. It is accepted that the pioneer of distance education was Isaac Pitman who offered shorthand instruction via correspondence in 1840. In the 1850s language education books were published under the title of "Teaching letters for learning the French language" and in 1873 Anna Eliot Ticknor developed a system to encourage the education of women. In 1874, American university level distance education began at Illinois Wesleyan University (Negiz, 2014: 71).

In the 19th century, distance education emerged in Germany and Sweden as well. In Germany, the attempts of distance education that began in 1856 led to today's distance educational institutions of Telekolleg, Schulfernsehen, FernUniversitat and Deutsche Institut für Fernstudien. In 1886, H. S. Hermod, of Sweden, began teaching English by correspondence. Later he founded Hermod's, which would become one of the world's largest and most influential distance education organizations. The "distance education" term, mentioned in the 1892 catalogue of the University of Wisconsin, was used by William Lighty, a professor at University of Wisconsin, for the first time in an essay. Since the use of multimedia tools and presentation systems makes it difficult to define distance education in one, precise statement, different distance education definitions have been made (Uşun, 2006: 6).

It is accepted that there has been three stages in the development of distance education. The first stage was the correspondence study period, which took place between the end of the 19th century and the beginning of the 20th century. During this period, the education was based on a textbook and feedback was received through letters. Starting from the 1970s, in the second stage, radio, television, cassettes and tapes were employed in distance education. The use of the satellite technologies began with the 1980s. And, finally, with the development of computer-based distance education programs, the third stage started (İnan, 2014: 97).

With the use of computer networks and Internet technologies in teaching-learning activities, especially beginning from the late 1990s, the world witnessed an expansion in distance education. With the help of computer networks, major limitations and problems in distance education, such as limited interaction, slow updating, inability to access different resources, not being able to receive service at the requested time and place and inability to focus on personal differences, were largely resolved.

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Today, many educational institutions in the world offer internet-based distance education programs. Higher education institutions offer internet-based distance education associate degree, master's degree and certificate programs. Besides, in some universities some courses are delivered via Internet.

The Open University of the United Kingdom can be shown as the most important distance education institution of our century. It was founded in 1969 by Royal Charter. More than 2 million students have graduated from the Open University since the day it was established. As one of the most important and successful institutions of distance education, the Open University, in collaboration with BBC, broadcasts to the entire country. Today is it one of the top ten universities of the world.

6. Distance Education in Turkey

It was a short time after the declaration of the Republic that distance education was considered as an option as a result of the "Teacher Education Report" presented by John Dewey in 1924. In this report, Dewey suggested the use of distance education in the training of teachers (İşman, 1998: 34).

There have been several other proposals to establish a distance education system. In 1927, "education through correspondence" was considered to teach literacy. In 1933-1934, a proposal was made to start correspondence courses in 1933-1934. In 1950, it was suggested The University of Ankara, Faculty of Law, Bank and Commercial Law Research Institute to use distance education. In 1960, the reason for considering correspondence study as an alternative education method was to train the graduates of secondary vocational schools. Finally, in 1962, The National Education Council recommended the use of correspondence study in order to educate people who cannot attend schools but want to receive education (Alkan, 1996: 20).

The Ministry of National Education used "correspondence courses" in 1958-59 school year for the bankers, particularly living outside of Ankara. In 1960, Ministry of National Education founded Correspondence Education Center Council within the body of Department of Statistics and Publishing. The aim of the Center was to offer distance education (Özdil, 1986: 18).

After the 1960s, some other institutions attempted to establish distance education systems in Turkey; however, they couldn't be very successful due to political reasons and uncertainties. In 1960, in order to deliver vocational and technical training via correspondence courses, Correspondence Education Center was established. In 1974, this center offered courses to train teachers but these efforts didn't last long (Birkök and Vuranok, 2010: 430–431).

Center for Higher Education through Correspondence and Higher Teacher Education Schools were founded in 1974, however, since they fell short of the expectations, these institutions were closed in 1975. Non-formal Higher Education Institution, YAYKUR, was established in the same year as an alternative and began to deliver higher education services through correspondence in the fields of secondary education teaching and primary school teaching. However, since YAYKUR was not successful enough, it was closed in 1979. With Article No 2547 in the 1982 Constitution, the task of distance higher education was given to the universities (İşman, 1998: 43–45).

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Another attempt to establish distance education in higher education was made by Ministry of National Education in 1978. The goal was to establish an Open University, however, it wasn't successful (Gökçe, 2008: 3).

In 1982, Anadolu University Open Education System was established. In 1999, distance education was further developed with the "Distance Education Based on Information and Communication Technologies". After the establishment of Open Education system in Turkey, "distance education system infrastructure" was developed. First it was an activity of documentation, and then it became a "system activity" with the accreditation and system communication and TV broadcasts and was positioned as a non-formal educational activity that aims mass education. Non-formal education is a field of education that targets large masses. It is more planned and programmed compared to formal education and supported by formal education (Çiftçi, 1995: 109).

The use of mass communication tools for distance education purposes began with a radio program in 1941. The name of the program that targeted people living in the countryside was "Agricultural Calendar" and it was produced by TRT Ankara Radio. In 1952, another talk show for the same target audience, this time produced by TRT Istanbul Radio, was broadcasted. In 1954, the radio program "Hour of the Village", which was a collaboration of Radio Department and Ministry of Agriculture, was on air. Based on the legal regulations in the 1961 Constitution, TRT was reorganized in 1964 and as a result of this reorganization; there has been an increase in the educational broadcasts (İşman, 1998: 48). During this period, the medium of radio was used for the distance education. TRT's radio and televisions took an active part in the Literacy campaign held in the 1980s.

In the XV National Education Council gathered in 1996, the ways to meet the educational demands of the society were discussed. In Turkey, web-based distance education began with certificate programs and in-campus courses in 1997. Today, universities offer web-based master's degree, graduate's degree, associate degree and certificate programs (Türkiye Bilişim Derneği, 2004: 368).

7. E-Learning in Distance Education

The technological advances have changed and shaped our ways of communication in the 21st century. They also challenge the traditional approaches to the practice of distance education. The impact of technology on the forms of learning can be classified as follows (Digital Age, 2014:30):

- Extended audience: Today, it can be said that the entire world is the audience as a result of the emergence social media such as blogs, Twitter, Facebook and other online platforms.
- Changing Learning Materials*:* Historical boards and blackboards have already become history. Smart and interactive, multimedia boards are used in education. Learners don't have to carry their files and notes with them. A laptop computer or tablet can store thousands of pages of information. Furthermore, environments such as LiveBinders, which is a Web 2.0 tool, allow to create files in an online environment.
- Interactive Textbooks*:* With the development of the technology, Internet-based websites that contain materials like animations, videos and alike which help learning were created. Students don't have to carry those heavy textbooks with the advances in e-book technology. Thanks to the new communication technologies, student don't have to take notes on notebooks, instead they record their notes on their tablets or cellular phones digitally and share them with their friends.

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- Increase in the use of tablets: Tablet has become a powerful tool in education. The most important feature of tablets is that they make the learning experience of children with special needs (such as autism) easier.
- Extended class environments: Internet-based platforms like Edmodo help to extend the in-class activities of technology. Students and instructors can talk about homeworks and share them with each other using this platform. This helps them to communicate with each other on the projects they are working on.

- Development of Internet-based Libraries**:** Libraries are still in use today. But, the research is conducted via Internet.

The developments in the computer and communication technologies, the emergence and spread of Internet made it easier and faster to access information. Therefore, today, distance education and Internet are inseparable as they are the main elements in creating equality of opportunity in education, which is the fundamental purpose of distance education.

E-learning can be defined in different ways. E-learning is the education and learning activities that allow instructor and students to be located in different locations so that instruction and learning occurs independently of place and time via information – communication technologies

Technology-supported distance education, in other words e-education, is a broad process that involves the collaboration of computer-based learning, web-based learning, virtual classes and digital technologies. E-learning can be defined as a web-based education system presented through a platform on a network (Uşun, 2006: 118). Technology-supported distance education can be defined as a structure with high media technology in which the features and resources of Internet are used in order to create an educational environment that enhances and supports learning (Khan, 1997: 5). In short, e-learning, which is education in electronic environment, accelerates the speed of learning and information transfer by combining the best features of traditional class setting with technology. E-learning allows the delivery of synchronous and asynchronous education via satellite, video (live or recorded) and computer technologies (Internet, intranet, CD-ROM) (Uşun, 2006: 160).

Internet-based Distance Education is an overall approach, which involves all education models that use Internet infrastructure. Teleconference meetings that use Internet, electronic mails that replaced traditional mail, electronic books and periodicals, which present the alternatives for printed sources, are models, which have been used as a part of Internet-based Distance Education. Among all these models, Web-Based Distance Education (WBDE) is the one that is most widely used today (Al and Mardan, 2004: 263).

The systems used to offer distance education services through Internet are called Learning Management Systems. By assigning roles such as student, instructor, course opener, system administrator to users defined on these systems, the student-material-instructor interaction is created via tools like course content, homeworks, assessments, live video, chat rooms and message boards (Akdemir, 2011: 70).

E-learning can be synchronous or asynchronous. Asynchronous learning is self-paced meaning that it allows the student complete freedom in determining his or her own pace for the lecture while in synchronous learning a group of students and the instructor meet in a classroom setting in the computer environment at the same time (İnan, 2014: 98).

Internet-based education, known as e-education, takes place in an electronic environment. Its pedagogical outcomes are still examined. It can be used on its own or it can be a part of formal education or dis-

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tance education (Oral and Kenanoğlu, 2012: 70). Advantages and limitations of Internet-Based Education are as shown on Table 2.

Table 2. Advantages and limitations of Internet-Based Education

	Logistic	**Educational**	**Economic**
Advantages	Free of distance and time Convenience Ease of developing and storing the courses	Enhanced learning environments Student control Efficient Communication Supports formal and informal learning environments	Cost effective usability
Limitations	Solid technical infrastructure Planned preliminary preparation	Free of distance and time Convenience Ease of developing and storing the courses	Financial burden

Source: (Oral and Kenanoğlu, 2012: 70).

Web 2.0 technologies, which were developed especially in the 2000s, took e-learning systems one step further. Theoreticians and programmers continue to create new tools and systems in accordance with the developments in web technologies. These developments focus on e-learning. In traditional education, it is quite important for many educators to have a face-to-face interaction with the student. However, according to the results of the research conducted by Jahng, Krug and Zhang in which online distance education and face-to-face education was compared, there is not any significant difference in terms of the success of the students between these two systems (Soydal, Alır and Ünal, 134).

Today, e-education practices all around the world have a significant share in the market. This market covers many different areas of life from the university education to language learning and to obtaining vocational competence. The value of global e-learning market is about 56.2 billion dollars and 70% of this market is in the countries in the North America and Europe continents. Figure 1 shows the number companies offering e-learning services.

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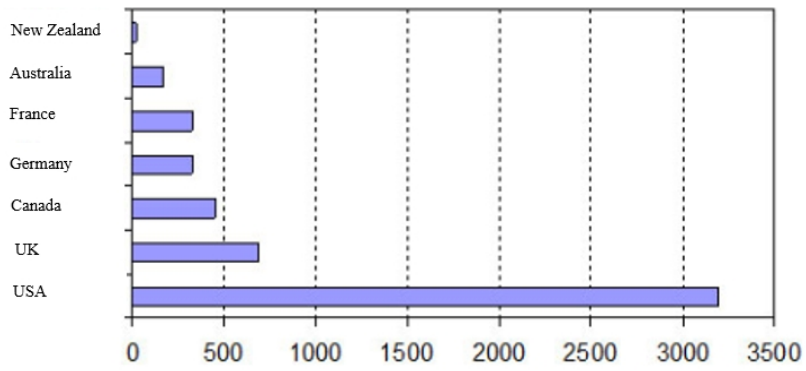


Figure 1. Number of Companies Providing E-Learning Services

Source: E-Öğrenme Pazarı, http://www.enocta.com/enocta/web/kurumportal/Content/e-ogrenme-pazari/1294/, (01.08.2014)

In "E-Learning Market Trends & Forecast 2014 - 2016 Report" published by DOCEBO, it was foreseen that the market will continue to grow all around the world. As it can be seen on the infographic below, the market will grow by 16, 9% in Eastern Europe, 17, 3% in Asia, 14,6% in Latin America and 15,2% in Africa in the next 2 years.

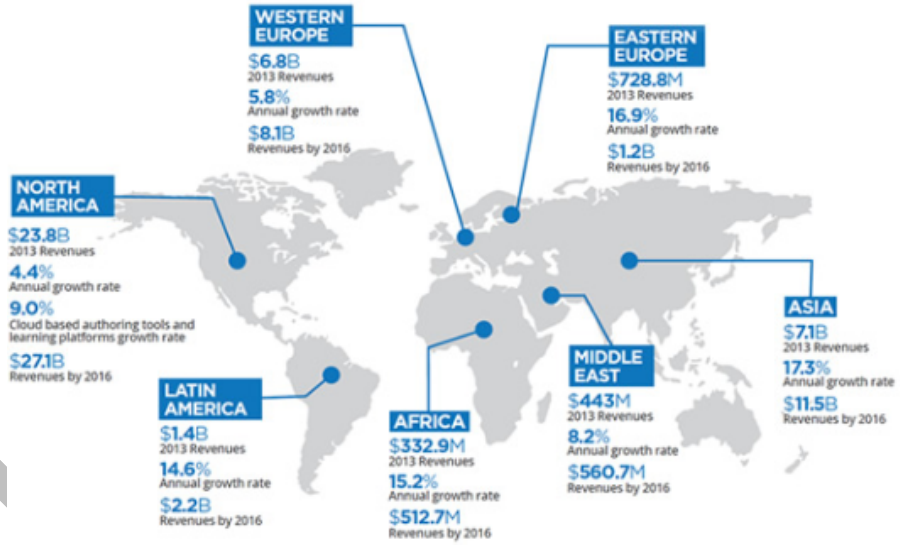


Figure 2. Geographic Distribution of E-Education

8. E-Learning Perception of Students Who Receive Education in Turkey

8.1 Method of the Study

The aim of this paper is to make a determination for the views of Turkish young learners for e-learning. The study made a research with a questioner applied to university and high school students about e-learning. The questioner aims to find out the view of learners for e-learning. In the first part of the questioner there are questions about exploring how the students gather information in their education. In the second part there is a scale of 14 questions exploring the views of e-learning in Turkey. The study conducted to 224 students living in Turkey in İstanbul. The sample was selected randomly from İstanbul high school and university students.

Chapter 8 8.2 Demographic Analysis
Chapter 9 Table 3. The Demographic Specifications of the Participants

Age	(n)	(%)
18 Year and Younger	120	53,57
19-24 Years Old	74	33,03
25 Years and Older	30	13,4
Total	224	100

Education Level	(n)	(%)
High School Students	110	49,1
University Students	114	50,9
Total	224	100

Sex	(n)	(%)
Male	126	56,3
Female	98	43,8
Total	224	100

8. 3 Analysis Regarding the İnformation Source of Students

In the first part of the questioner there are questions exploring the information source of students on their daily life and educational researches. According the answers that were collected students use internet and social media more than other media tools as an information source. The least used media is magazine and newspapers.

Table 4. The Information Source of Students

	(n)	(%)
Internet	108	48,2
Newspaper	19	8,5
Magazine	5	2,2
Television	20	8,9
Social Media	72	32,1
Total	224	100,0

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The 48, 2 % of the participants expressed that they have not gone to a library in the last six months. One interesting point is that there are also students who mentioned that they have never gone to a library for research.

Table 5. Last Time Visited Library

	(n)	(%)
1 Week Before	42	18,8
1-4 Weeks Before	34	15,2
1-3 Months Before	24	10,7
3-6 Months Before	16	7,1
6 Months Before	90	40,1
Never Go	18	8,1
Total	224	100

The students expressed that they use more search engines when they use internet as a research tool. The students expressed that they use Google more than other sources as research tool. They also expressed that Twitter is the most informative social media network in their researches. In that part of the questioner the students allowed to give more than one answer in two questions that's why the total responses are more than the sample size.

Table 6. Internet Use Method as a Research Tool

	(n)	(%)
I look in search engines	174	77,7
Directly I go to the web sites related to topic I search	38	17,0
I look at the social media networks	12	5.3
Total	224	100,0

Table 7. The Most Used Search Engines for Research

	(n)	(%)
Google	218	61,6
Yahoo	18	5,1
Yandex	112	31,6
Mynet	6	1,7
Total	354	100,0

Table 8. The Best İnformation Social Media Network Source

	(n)	(%)

Facebook	48	17,8
Twitter	152	56,3
YouTube	58	21,5
Instagram	6	2,2
Other	6	2,2
Total	270	100

The 56,3 % of the students declared that they have never read an e-book and the 43,8 % read at least one time an e- book in their life. The 32, 2 of the participants have an experience of e-learning in their life but the 67, 8 % didn't have such an experience.

Table 9. Reading E-Book

	(n)	(%)
Yes I read at least one time in my life	98	43,8
No I Have never Read	126	56,3
Total	224	100,0

Table 10. Have You Ever Had Any E-learning Experience?

	(n)	(%)
Yes	72	32.2
No	152	67,8
Total	224	100,0

In the research it was asked the students the express the advantages of e- learning. They allowed to give free answers and also to say if they think there is no advantage. The answers were coded and compiled in table 11.

Table 11. Advantages of E- Learning

	(%)
Independence from Place	22,6
Cost Save in Finance	15,4
Transportation Advantage	5,3
Continuously Reach	6,6
Easy and Comfortable	11,7
Possibility of Repetition	18,7
Flexibility in Time	16,9
It has no advantage	2,8
Total	100

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Chapter 10 8.4 Reliability Analysis

The reliability analysis of the 14 statements shows that this scale is reliable. Since the alpha Cronbach value is more than 0, 70 this scale is enough reliable. The alpha value of this scale is 0,880

Table 12. Reliability Analysis

Cronbach's Alpha	N of Items
,880	14

Chapter 11 8.5 Frequency Analysis

The frequency analysis of the scale is showing that the students confirm the advantages of e-learning and accepts it as future education method. Students accepts the reality that internet is the best source for them to make research with a very big frequency. Student feel free in e- learning and they think that this is also a cost method in education. They accept that transportation, education materials and such cost are lower in e – learning. One other point to be regarded is that students believe that they use time flexible in e – learning and this type of learning is more comfortable.

Table 11. Frequency Analysis

		I absolutely Agree	I Agree	I nor Agree Nei-ther Disagre	I don't Agree	I Absolutely Disagree	Total
A1	I Use internet as an information tool make my researches more easy	73,1	25,1	0	1,2	0	100
A2	The information that I gather from internet helps me to use my time of research better.	57	37,4	2,7	0,9	2	100
A3	I don't have any trust problem on the information I collect from the internet.	3,6	12,5	51,8	28,6	3,6	100
A4	The companies which supply e – learning takes my interests.	19,6	25,9	32,1	10,7	11,6	100
A5	I would like to have e- learning education in the future.	25	20,5	33	13,4	8	100
A6	E-Learning makes me feel more free.	39,1	23,2	16,8	9,4	11,5	100
A7	E- Learning helps me to use my scheduled time better.	28,8	25,2	20,6	17,6	7,8	100
A8	I believe that e – learning is more useful to learn new things and improve myself.	33,3	23,2	21,2	13,4	8,9	100
A9	E- Learning brings me advantage on the cost of my education transportation and educational materials.	46,4	22,3	13,5	10,7	7,1	100
A10	E- Learning can never take the place of traditional class education.	8	8,9	13,4	31,3	38,4	100
A11	I believe that e-learning will take the place of traditional education in the future	32,1	27,5	12,3	21	6,5	100
A12	I would like to have my university education in a university which use e-learning 100%.	35,7	25,9	27,7	3,6	7,1	100
A13	I believe that a Multimedia based e- learning is more effective than the classroom learning.	25,8	41,1	14,5	10,5	8,1	100

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A14	E- Learning give me the information more comfortable.	25,8	29,1	21,5	13,8	9,8	100

9. Conclusion

The changes and advances occurring almost in every part of life challenge the education systems and schools to change. Rapid developments in information and communication technologies led to an increase in the use of technology in the field of education. This requires redefining the concepts of school, teacher and student. Besides, education delivered via Internet has become the most common way of distance education.

Distance Education is, in its broadest definition, a planned and systematic educational activity;

d) that offers individuality, flexibility and freedom in terms of educational age, purposes, time, place, management and etc to the receivers of education,
e) in which the source and the receivers are in separate locations during the most of the teaching-learning process,
f) the interaction and communication between the source and the receivers takes place via interactive/integrated technologies that are based on television and computer.

As its seen in this research conducted to 224 students who live in İstanbul today learners prefer to use internet more for learning new things. Students believe that they can gather information more quickly and more flexible via internet and social media. Their first choice for gathering information is internet and search engines. They mostly use Google in search engines and Twitter in social media for collecting information. The students give more positive feedback to the statements that were prepared in the scale. According to them e-learning give more advantages and this is a future type of education which they would like to use more. According to the students e – learning has four important benefits in their education. These are:

e) gives them freedom and more independency in their education,
f) helps them cost saving in education cost materials, transportation,
g) gives comfortable education,
h) flexibility in time

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Distance-education in foreign language teaching: evaluations from the perspectives of freshman students

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Abstract

This study investigates distance education students' level of satisfaction and evaluations about distance English courses. To this end, a Likert-type questionnaire was applied to 72 students attending a distance education program. In addition, semi-structured interview was employed so as to verify the data gathered from the questionnaire. The results of the study revealed that a great majority of the students were satisfied with the distance education English course stating that the content, format, reading and grammar sections of the course were sufficient, but synchronous courses, listening, speaking, and writing sections were not satisfactory and sufficient both in quality and quantity.

Keywords: Distance Education; Distance Language Learning; Student Satisfaction;Educational Technologies; Synchronous Course

1. Introduction

The power of computers and the internet in the current century enables all learners to study at their home without having to attend a regular face-to-face course or school. In other words, recent developments in Information and Communication Technologies (ICT) have brought about various improvements facilitating people's lives. Learners who are unable to attend classes for one reason or another can study at their own pace independent from time and place. They can take various courses for a diploma, certificate, or a degree via distance education in a more flexible and interactive atmosphere. There is no doubt that these developments in educational technologies have spread to online or distance language learning and teaching field. Opportunities to learn languages through online or distance education are presented each passing day by private courses, colleges, schools, institutions, textbook companies, and universities. Accordingly, some of the universities in Turkey offer distance education programs in associate, undergraduate, and graduate degrees. A great number of students enroll in distance learning programs in all levels, and try to complete the programs successfully. In the process of distance education in different programs, students take various courses depending upon their majors. Actually, students' thoughts and perceptions about these courses and whether these courses meet their needs or not are of great importance for the success and motivation of the students. A number of research (Sampson, 2003; Beare, 1989; Hilgenberg and Tolone, 2000; Jones, 1992; McCleary and Egan, 1989; Garrison, 1990; Holmberg, 1989) highlights satisfaction of students about distance education programs. However, there is rare research (Lambert, 1991; White, 2006; Rashid, Khokhar and Tahir, 2013; Işık, Karakış, and Güler, 2010) on students' satisfaction and needs about language courses through distance education. This study, therefore, investigates students' satisfaction and needs about English course in a distance education program in the associate degree level offered in a state-funded university in Turkey.

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2. Review of literature

2.1 What is distance education?

In a general sense, distance education, some call it open learning, mainly serves learners who cannot attend face-to-face courses or programs for one or another reason. Learners stay at home or office and follow the course, do the assignments, and interact with each other and the teacher via internet. In other words, they take the responsibility of their own learning, which means that learner autonomy is of great importance. Sampson (2003:104) defines distance learning as "... a mode of delivery (independent learning at a distance through the means of self-study texts and non-contiguous communication)". As Holmberg (1989:24) states, people prefer distance education for "the convenience, flexibility and adaptability of this mode of education to suit individual students' needs". Actually, distance education appears in the educational field as a new technique because of the increasing demand for these flexible and convenient aspects. Ohler (1991:22) emphasizes two aspects of distance education: "how it can change our approach to learning and how it can change us". In fact, what Ohler focuses on is related to innovation in education. Distance education mainly rises due to learners' needs for lifelong learning.

The rapid spread of distance education in the world not only offers learners and teachers great opportunities but also brings a lot of challenges. Learners are unsupervised, self-directed, independent, and expected to be more autonomous. This freedom brings many questions together such as Does it lead to low-quality education? Are the materials developed by specialized teachers used effectively as in face-to-face courses in distance education? Who controls the materials? and so on. Besides these negative opinions, some researchers state that students are not alone in the process, but they are in a constant interaction between teachers and their peers. Although there appears opposition to distance education, it seems to continue to catch the attention of educators, teachers, and learners in the future.

2.2. Relevant studies

Research about distance language education courses in general focuses mainly on the effectiveness of teaching language skills, technological aspects in language teaching, and autonomous learning. For instance, Sole and Hopkins (2007) contrast two approaches to distance language learning on the basis of providing practice in four language skills, designing appropriate assessment strategies, and learners' contribution to the educational context. They analyze distance educational philosophies of two universities clarifying some similarities and differences. They conclude that each university provide learners with good quality language courses, however, the writers point out that institutions wishing to carry out distance language courses need to reconsider their medium and long-term consequences about technology. Similarly, Lampert (1991) mentions the lack of innovative development in distance language courses and states that individual language learning needs remain unmet. He maintains that in order to compensate for these disadvantages, upper-level skill instruction should be attached importance, more flexible modules must be produced, and less commonly taught courses must be included in the distance education programs. In another study, White (2006) presents a critical overview of the distance language teaching and learning field. She states that distance language learning is conceptualized as the development of technology-mediated language learning opportunities. She maintains that there is a shift from the delivery of the content to facilitating transactions between, learners, teachers, and native speakers. She emphasizes the importance of independent learner concept, but this is also replaced by collaborative learning community through distance education.

Research on the attitudes of the students towards distance language learning is limited. Glisan, Dudt, and Howe (1998), in their study about two aspects of distance language learning: achievement and attitudes, found that distance programs could have a positive effect on achievement and attitudes. Similarly, Rashid, Khokhar, and Tahir (2013) analyze learners' attitude towards printed word in distance education. They conclude that the distance education makes the learner learn through the medium of the printed word and other technological tools. They maintain that the printed word provides real teaching by itself and it can be used as a substitute for the textbook. Another study which focuses on learners' attitudes towards distance learning is by Işık, Karakış, and Güler (2010). They examine post-graduate students' attitudes towards web-based distance learning. They make use of a questionnaire and a demographic survey to gather the data. The results of their study indicate that there is a general positive attitude towards distance learning. Female students' attitudes are found to be more positive compared to

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males. The researchers maintain that most of the students find feel more comfortable in distance learning although some express boredom during the activities on the web.

3. Method

3.1. Participants

The study was administered to 72 distance learning associate degree program freshman students attending a state-funded university in Turkey. They took all courses through distance education during 2013-2014 academic year. They had asynchronous courses for each lesson every week during the year. They also followed synchronous courses organized by the Distance Education Centre of the university. Synchronous courses were offered each week by the instructors of the lesson. English courses during the academic year were taught by four instructors who were specialized in their field.

3.2. Data collection and analyses

Data were collected through a Likert- type questionnaire including 20 items which would be answered by the students on the base of six quality descriptive words: 1- Excellent, 2- Very Good, 3- Good, 4- Fair, 5- Poor, 6-Very Poor. The questionnaire was inspired, compiled, and redesigned by the researcher from the course evaluation form available on the University of Washington web page. The data gathered through the questionnaire were entered to Microsoft Excell and then transferred to SPSS 20 package program. The reliability coefficient of the questionnaire was found to be ,736 for 20 items. Factor analyses of the questionnaire revealed 5 dimensions explaining 93,504 % of the total variance. In order to verify the quantitative data, semi-structured interview was administered to randomly selected 20 students and the results were quantitized with the help of categorization and coding systems.

4. Results

In this part, findings about the data gathered through the questionnaire and semi-structured interview are presented. Percentage of the students' attitudes towards the distance language learning course is given by employing the tables in the first section. The second section deals with the findings about the semi-structured interview with the help of the related graphs.

4.1 Results of the questionnaire

Students' attitudes towards the English Course are presented in Table 1 below. As it is emphasized below, the first statement was responded positively by almost all of the students. Their overall evaluations about the course range from good to excellent. The course content also was evaluated positively by all of the students. However, It is striking that the organization of the course was evaluated as 'Fair' by half of the students. This evaluation of the students indicates that proportion of the course components, asynchronous and synchronous parts need to be revised. Clarity of the course objectives were also criticized by most of the students as 'Fair' or 'Poor'. Effectiveness and usefulness of writing, listening, and speaking skills in the course were criticised negatively by most of the students. The reading sections were relatively perceived as positive and useful. These results show that the way of presenting language skills in the course should be improved to a great extent.

Table 1. Course Related Attitudes

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Statements	EX	VG	G	F	P	VP
1. The English course offered via distance education as a whole was:		25 %	50%	25%		
2. The course content was:		12,5%	25%	62,5%		
3. The organization of the course was:			12,5%	37,5%	50%	
4. Clarity of the course objectives was:			25%		37,5%	37,5%
5. Usefulness of reading sections in the course was:				37,5%	37,5%	25%
6. Usefulness of writing sections in the course was:				12,5%	12,5%	50% 25%
7. Usefulness of listening sections in the course was:				12,5%	25%	37,5% 25%
8. Usefulness of speaking sections in the course was:				12,5%	25%	37,5% 25%

EX: Excellent **VG:** Very Good **G:** Good **F:** Fair **P:** Poor **VP**: Very Poor

Table 2 deals with the findings about the instructor related attitudes. The contribution of the instructor to the course was evaluated as 'Good' or 'Very Good' by 87,5 % of the students. This result shows the confidence of the students in the instructor, which was verified with the results of item 13 as well. The feedback issue was evaluated as positive by half of the students and as negative by the other half. This finding also indicates the existence of a problem regarding providing feedback. The instructor's abilities and his/her approach to the students having different skill levels were also appreciated by most of the students.

Table 2. Instructor Related Attitudes

Statements	EX	VG	G	F	P	VP
9. The instructor's contribution to the course was:			37,5%	50%	12,5%	

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10. Feedback provided by the instructor was:	12,5%	37,5%	37,5%	12,5%	
11. The instructor's overall abilities of conveying information were:	12,5%	50%	12,5%	12,5%	12,5%
12. Tailoring of instruction to varying student skill levels was:	37,5%	25%	25%	12,5%	
13. Confidence of the students in instructor's knowledge was:	50%	50%			

EX: Excellent **VG:** Very Good **G:** Good **F:** Fair **P:** Poor **VP**: Very Poor

The following table indicates the attitudes towards the synchronous courses. As it is seen in Table 3, overall effectiveness and quality of these courses was appreciated by all students. This may be attributed to the nature of distance education programs since the students have the unique opportunity to meet and interact with the instructor and their peers during synchronous courses. This result was also verified with the percentage of the students' involvement in these courses. Item 16 deals with instructor's help during the synchronous courses. 62,5 % of the students thought that instructor was helpful during the process. The most interesting result of this dimension of the questionnaire is that a great majority of the students found the time allotted for the synchronous courses to be insufficient. This result indicates that the duration and number of the synchronous courses need to be increased.

Table 3. Synchronous Courses Related Attitudes

Statements	**EX**	**VG**	**G**	**F**	**P**	**VP**
14. Effectiveness and quality of the synchronous courses were:		37,5%	37,5%	25%		
15. Time allotted for the synchronous courses was:		12,5%			37,5%	25% 25%
16. Instructor's help during the synchronous courses was:		25%	37,5%	12,5%	12,5%	12,5%

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17. Your involvement in the synchronous courses was:	75%	25%

EX: Excellent **VG:** Very Good **G:** Good **F:** Fair **P:** Poor **VP**: Very Poor

The fourth dimension of the questionnaire was about assignments related attitudes. Half of the students thought that the assignments were not clear enough. 75 % of the students were not aware of their responsibilities. These results indicate that the assignments in this distance language course should be redesigned and revised. Since the learner autonomy in distance education courses is of great importance, students' responsibilities and requirements should be well-defined.

Table 4. Assignments Related Attitudes

Statements	**EX**	**VG**	**G**	**F**	**P**	**VP**
18. Clarity of the assignments was:				50%	37,5%	12,5%
19. Clarity of students' responsibilities and requirements was:				25%	50%	25%

EX: Excellent **VG:** Very Good **G:** Good **F:** Fair **P:** Poor **VP**: Very Poor

The last dimension of the questionnaire was about grading system related attitudes. The findings reveal that 85,5 % of the students were not content with the grading system. This may be attributed to multiple-choice exam type as summative assessment. The course does not allow formative assessment for instructors and this leads to students' displeasure at the grading system.

Table 5. Grading System Related Attitudes

Statements	**EX**	**VG**	**G**	**F**	**P**	**VP**
20. Grading Techniques were:			12,5%	25%	62,5%	

EX: Excellent **VG:** Very Good **G:** Good **F:** Fair **P:** Poor **VP**: Very Poor

4.2. Results of the Semi-structured Interview

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In the semi-structured interview, three main questions were posed to 20 randomly selected students. The findings about the interview are presented in the following figures.

Q-1: Did the course meet your expectations?

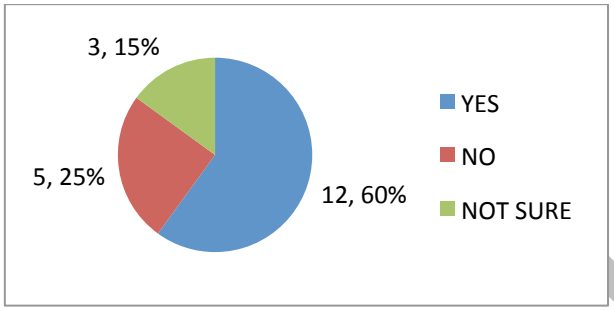


Figure 1. Interview Results about Course Expectations

As it is clear in Figure 1 above, 60% of the students thought that the course met their expectations. This percentage corresponds to 12 students in number. On the other hand, 25% of the students said 'No' stating that the course was not effective enough to meet their expectations. 15% of the students was not sure about whether the course met their expectations or not.

Q-2: What three things did you like most about this course?

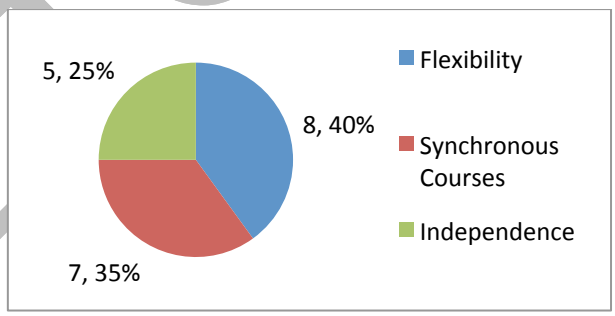


Figure 2. Interview Results about Students' Perceptions of the Course

In the semi-structured interview, students were expected to say three things they liked most about the course. 40% of the students thought that they liked 'flexibility' of the course most. 35% of the students stated that they enjoyed synchronous courses most, while 25% thought that they liked the notion 'inde-

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pendence' the distance course created. These results revealed that removing time and place limitations in the course seemed to please the students. Synchronous courses also had a positive impact on students.

Q-3: What three things did you like least about this course?

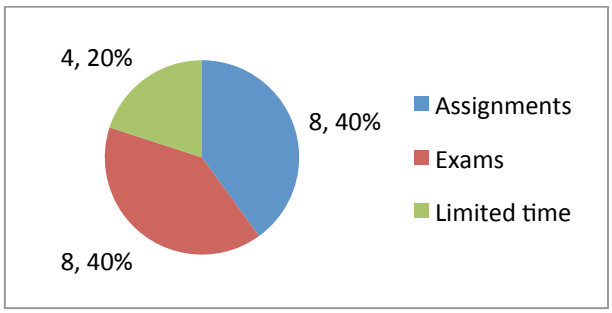


Figure 3. Interview Results about Students' Perceptions of the Course

As for the things the students liked least about the course, the figure above indicates the details. 40% of the students stated that they did not like the assignments in the course. Similarly, the other 40% thought that exams were among the things they liked least. 20% complained about time limitation in the synchronous courses. These results indicate that grading system and assessment techniques in the distance education English course need to be revised.

5. Discussion and conclusion

Both quantitative and qualitative findings gathered through the questionnaire and semi-structured interview indicate that distance English course generally meets students' expectations. However, some skills such as listening, speaking and writing are evaluated as weak parts by most of the students. It is considered that presenting and integrating language skills in face-to-face language courses needs to be planned well beforehand. When it comes to distance language learning courses, it is more challenging. The negative perceptions of students about effective teaching of language skills may be attributed to this challenge. Providing feedback is another issue which is negatively evaluated. This may be because of the time limitation in the synchronous courses as synchronous courses provide students with almost the only opportunity to get feedback from the instructors. Assignments, grading techniques and clarity of students' responsibilities are also criticized by most of the students. Semi-structured interview verifies these results since almost half of the students state that assignments and exams are among the ones they like least about the course. Actually, it seems to be difficult to organize assignments in distance language courses, but when it is planned well, the reactions will be probably better. The study yields not only negative aspects but also some positive findings about the distance English course. For instance, a great majority of the students enjoy distance English course since it enables them to follow the lesson independent from time and place. This flexibility can be regarded as one of the main strongest aspects of the distance course. This study deals with only one distance education program in a one state-funded university. A wider and more comprehensive study can be conducted by comparing two or three programs with more students in the further research. It is hoped that this case study will give some hints about the nature of distance language courses and their improvements for the following programs.

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Dynamic models as change enablers in Educational Mathematics

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Abstract

This paper targets the need to change teaching methods when teaching math. This is important because mathematics is known to have a high failing rate in the university and low understanding in the basic levels. Even with the digital technologies in the classroom, the educational model continues to be *exemplification*. Taking software GeoGebra, as an example, we can see that the attitude of the students goes from being, from a *passive state* to *an active one*. This leads to learning by *Discovery*. The change not only depends on the support of digital technology but, also, on a good instructional model.

Keywords: Digital Technologies; Educational Mathematics; GeoGebra

1. Main text

This paper analyzes the changes in Educational Mathematics since the introduction of digital technologies, as a resource, to the classroom. It further reviews the changes derived from the usage of specialized software that transferred the static classroom models into dynamic models; using GeoGebra as a case of study.

Chapter 12 Nomenclature

A GeoGebra, specialised Software of dynamic Mathematics

Dynamic models as change enablers in Educational Mathematics

Introduction

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UNAM is ruled by the freedom of teaching based on the Mexican constitution. This means that teachers are free to use the resources that they judge best available in order to fulfil the curricula.

Until the last decade, the model to teach science that has been more widespread is the transmission-exemplification. Also known as Traditional Model, it consists on a teacher in front of the class presenting exercises similar to the ones the students can solve with their cognitive level. In the present time a great number of teachers try to use digital technologies in the class room, but even, with the use of lap tops and projectors, the way the teachers give their lessons, still remains the same, transference and exemplification, the difference is the projector instead of the blackboard.

This is not incorrect by itself, the use of digital technology can improve the structure of each session in the class room, but it does not change the teaching paradigm.

However, multiple studies have concluded that a change of paradigm is needed since the current model fails even in well evaluated students.

Method, Study Case: The use of GeoGebra to change Educational Methodology

In January of 2002, Markus Hohenwarter from the Johannes Kepler university in Linz, Austria, launched the first release of the educational software GeoGebra under the license of creative Commons. It was a utility software both to teach and to learn which allowed a dynamic interaction of geometry, algebra, statistics and analytic resources. It is interactive mathematics software for learning and teaching mathematics and science from primary school up to university level. Constructions can be made with points, vectors, segments, lines, polygons, conic sections, inequalities, implicit polynomials and functions. All of them can be changed dynamically afterwards. Elements can be entered and modified directly via mouse and touch, or through the Input Bar. GeoGebra has the ability to use variables for numbers, vectors and points, find derivatives and integrals of functions and has a full complement of commands like Root or Extremum. Teachers and students can use GeoGebra to make conjectures and to understand how to prove geometric theorems. The software is introduced as a friendly model that can be used to exemplify the mathematical concepts ranging from the basic ones to complex applications like angular velocity.

With the application of this software in the classrooms, teachers have a didactical resource that allows them to work in different visualizations of mathematics through a projector. This represents a resource that can be taken to the classrooms at different educational levels. This also spawned several knowledge communities based on the software. Experts in different areas that converge into mathematics, make trans-disciplinary communities that allow information exchange, thus generating new knowledge.

Since the GeoGebra knowledge community grows exponentially in a virtual environment, the limitations that arose were not geographic but ethnographic. In order to overcome this, regional institutions were created to target specific needs of each community. In Mexico, the first institution was recognized in October of 2010. And, as a positive result, in 2014 there were five regional institutions recognized by the international organization.

1.1. Dynamic Mathematics as an educational model

Now that the resource became available, it is appropriate to change the educational model into one that is no longer by transmission. This will be possible by taking the necessary steps for training the people that will apply it.

Since 2011, in Mexico, specialized training has been offered to the teachers so they can achieve the skills needed to facilitate the transition into classrooms and workshops.

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This study documents the work of 23 teachers in a workshop that had the necessary resources (projector, one computer per participant, internet access and a blackboard). The sample had heterogeneous subjects/topics with participants from all six Mathematics disciplines that are taught in the senior high school and in the university: Algebra, physics, differential equations, numeric methods, calculus, etc. Most of them professors at the UNAM faculty of MAC (Bachelors in Mathematics).

In order to verify the results, the participants were requested to present an exercise in the subject they teach. Then analyze the way in which it would affect their class to create a change of paradigm.

1.2. The Implementation

For a period of 15 days, teachers were enabled to use GeoGebra. They started in the most basic levels of the cognitive model, from remembering to creating. This study was completed using Bloom's taxonomy for the digital era (Churches) as a guide to the methodological model to create knowledge.

1.2.1. Step 1 Remember

To start, participants were shown a lecture using the traditional model in order to show them how they usually teach a class. Then, they generated the same knowledge using GeoGebra with a model different from the transmission one.

1.2.2. Step 2 Understand

They were introduced to the tools and instructions that the software comes with, so that they could generate an educative model with that software.

1.2.3. Step 3 Apply

Once they were familiarized with the software, they were introduced to specific mathematical models from basic geometry to calculus maximums and minimums.

1.2.4. Step 4 Analyze

Throughout the study, it became clear that not all the topics could be taught using digital technology. A good instructional model was required to split some topics using digital technologies and others using additional materials, combining them to create significant learning.

1.2.5. Step 5 Evaluate

There was an evaluation of which material should be developed by the teachers using GeoGebra for the lecture and which should be developed by the students, to generate learning by discovery.

1.2.6. Step 6 Create

To conclude, all students had to create an example using GeoGebra of a topic in the curricula. Some of the models were so outstanding that they demonstrated the paradigm change in the teaching of mathematics.

Results

In the end, the participants presented the implementation aspects to use the software in the classroom which included:

a) Use the software to teach basic examples of the subject they teach, in order to get the students familiarized with it.
b) Provide the students with an instruction manual to allow them to start working.
c) Analyze feasible examples to develop with GeoGebra
d) Match the curricula with the examples that the teacher will develop and the ones that he can assign to the students. This way, they will have an active attitude in their learning.

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All these steps were recommended. However, all the teachers agreed that the most important part was to introduce a new strategy to the classroom, one that is based on a good instructional design.

Discussion & Conclusions

The main conclusion was that using a digital model does not change the educative model. There can still be a negative environment, one where the student looks to own the information, resulting in a model of belonging, and not learning.

The transmission model, using digital technologies, has positive factors in itself, such as the subject arrangement and time balancing. But this, itself, does not change the educative paradigm.

In order to prompt a change in the progress on learning, we have to change the methods of teaching using specialize software.

It is known from the constructive point of view, when someone execute an action, significant learning is held.

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Educational multimedia app for dyslexia literacy intervention: a preliminary evaluation

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Abstract

This paper describes the results of a preliminary evaluation of an educational multimedia app containing information and videos of some exemplary techniques in performing reading intervention towards children with dyslexia. The activities encompassed an evaluation with content expert, heuristic evaluation with courseware experts and a pilot study. The evaluation activities revealed some minor errors in the app and were used to make refinement. The pilot study was carried out to evaluate the effects of the app towards learners by employing a pre-test and post-test with a sample of target respondents (*n=30*). They were special education pre-service teachers who were in their fourth semester. Subjects were administered with two instruments about knowledge and self-efficacy belief in dyslexia literacy intervention, before and after using the app. The results revealed mean increase in subjects' knowledge and self-efficacy belief after receiving the treatment.

Keywords: dyslexia reading intervention, evaluation, Android app;

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1. Introduction

A preliminary evaluation of an Android-based educational multimedia app was conducted to evaluate it from experts' perspectives and to test its effect towards the target users. The purpose of the app is to portray some examples of techniques in performing literacy intervention towards children with dyslexia. The app could be used as supplemental material for university course in special education, particularly teaching strategy for children with dyslexia. Therefore, the target users are special education pre-service teachers. The app contains background information about each teaching strategy and exemplary videos that demonstrates the technique as employed by actual teachers who specialises in teaching children with dyslexia in learning to read.

Development of the app was underpinned by two theories namely the Cognitive Theory of Multimedia Learning (Mayer, 2009) and the Social Cognitive Theory (Bandura, 1986). The Cognitive Theory of Multimedia Learning (Mayer, 2009) postulates that the human information-processing system contains channels for processing visual/pictorial and auditory/verbal stimulus, in which each channel has restricted capacity for processing, and active learning requires performing suitable cognitive processing during learning. The theory views multimedia learning as a knowledge construction tool, which supports learner to actively make sense of the presented information, rather than as a passive receiver. The Social Cognitive Theory (Bandura, 1986) suggests that people can learn new information or behaviour by observing others. This process is also known as observational learning. In this view, observers are more likely to learn from a model that they perceived as having similar characteristics or as someone superior. By observation, the learners can acquire knowledge in the demonstrated behaviour without practising it. Therefore, the learners may in the future perform the behaviour when situation permits.

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The development process was implemented according to the model of multimedia design and development (Alessi and Trolip, 2001). The model was chosen because it offers flexibility in designing instructions according to the needs and characteristics of the multimedia learning software. The model encapsulates the necessary steps in executing the planning, design and development phase. It incorporates three attributes which are standards, on-going evaluation and project management in the planning, design and development phases. Evaluation of the app was done at the end of development phase. The following sections contain some literatures pertaining to the study.

1.1. Dyslexia and reading intervention strategies

Dyslexia is a specific language disorder that causes problem in reading, writing and speaking (Richardson, 1992). It has been described as a specific learning disability that is neurobiological in origin and is characterized by poor word recognition, spelling and decoding abilities despite having higher cognitive abilities and receiving effective classroom experience (Reid, Shaywitz, & Shaywitz, 2003). Dyslexia is defined by the World Federation of Neurologist as 'a disorder in children who, despite conventional classroom experience, fail to attain the language skills of reading, writing, and spelling commensurate with their intellectual abilities' (Gomez, 2004). Strong evidence shows that children with dyslexia continue to experience reading problems into adolescence and adulthood (Shaywitz, et al., 1999; Shaywitz, et al., 2003).

Therefore, it is paramount to help dyslexic children to master the reading skills because if left untreated, they will develop low self-esteem and poor confidence (Abdullah, 2004). Furthermore, without effective intervention, a person could develop emotional problem because of inferiority and frustration (Wong, 2009). Spector (1995) in Muter (2004) has suggested early intervention program to include training in phonological awareness, that is by practising the sound of words, segmenting and blending sound in words and training phonics (letter-sound relationships). Echoing this, Thompson (2010) recommended that reading intervention for children with dyslexia should not only be phonologically-based, but incorporates the multisensory technique, involving complete utilisation of the children's visual, auditory and kinaesthetic sensory components to enhance memory and learning..

1.2. Multimedia learning for teacher education

Past research has shown the effectiveness of multimedia learning application in teacher education, for instance Levin and Matthews (1997) revealed multimedia has positively influenced the awareness, knowledge and attitudes of pre-service teachers toward gender-equity issues in elementary classrooms. Meanwhile, multimedia courseware embedded with exemplary videos and animations were able to promote positive attitudes towards learning and enhance motivation perceptions among learners, as compared to learners who learned without exemplars (Moreno & Ortegano-Layne, 2008). Furthermore, Goldman and Torrisi-Steele (2009) described a CD-ROM based courseware about human relationship education, which was designed as a teaching tool to replace lectures and tutorials, and as a revision tool for primary pre-service teachers. It was found that the courseware was able to enhance the pre-service teachers' learning about key concepts of the topic, and learners favoured the courseware since it allowed them to study at own pace. In addition, Fitzgerald, et al. (2011) concluded that multimedia cases helped bridge the gap between theory of teacher education and practice, thus enhancing the pre-service teachers' knowledge and skills in teaching students with emotional/behavioural disorders.

Considering the benefits of multimedia learning application towards learners, it was chosen as the technology to be utilised in developing supplemental material about dyslexia for pre-service teachers. In line with the concept of observational learning and modeling in Social Cognitive Theory, videos was chosen as modeling tool to be embedded into the multimedia learning application since it has the capability to portray real examples of behavior while it is performed in authentic setting. The video would demonstrate some strategies in employing multisensory techniques and phonics when teaching dyslexic children to read.

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2. Application of principles into the user interface design

The Principles of Multimedia Design (Mayer, 2009; Clark and Mayer, 2011) and the Usability Framework for m-Learning (Fetaji and Fetaji, 2011) were used as guidelines in designing the user interface and navigation. The principles of Multimedia Design (Mayer, 2009) were derived from the Cognitive Theory of Multimedia Learning. It supports instructional designers in the design of multimedia instruction that manage the cognitive load of the learners. The purpose of the principles are to ensure the multimedia learning environment is designed in such a way that it will promote deep and meaningful learning by supporting cognitive processes such as reducing extraneous processing, managing essential processing, and fostering generative processing. The extraneous processing involves processing of unrelated material during learning which is caused by poor instructional design. The essential processing is the processing of the essential material in working memory, while the generative processing aims to promote deeper understanding where learners make sense of the presented material.

One of the principles in managing essential processing is the segmenting principle. Mayer (2009) suggested that multimedia message be divided into smaller more manageable chunks that keep pace with the user rather than as a large continuous piece. When an essential material is too complex, it will overload the working memory of the learners, making it impossible to comprehend at once. Mayer (2009) asserted that in this situation, learner might be able to select only a few portions of the lesson, but unable to gain deep understanding. Ideally, with smaller segments that allow user control, learners could learn each at their own pace.

The segmenting principle was applied to the videos embedded in the app, in which a pre-recorded full-length video was divided into smaller but meaningful segments. Each video segment is accompanied with a player that consists of the Play, Pause, Stop and Slider buttons. This could allow freedom for learners to play, pause and stop at any time and watch the videos from any section that they prefer. Besides that, the background information for each intervention technique which mainly contained texts was also divided into smaller segments to support user-paced learning.

The intervention technique demonstrated in the app was made up of three steps, which were identifying letter-shape, identifying letter-sound and pronouncing syllables. For each step, its background information and video segments were presented in three tabbed screens namely Introduction, Preparation and Technique. The background information was described in the Introduction and Preparation tabs, while the video segments can be found under Technique tab. Figure 1 depicts the screen of pronouncing syllables.

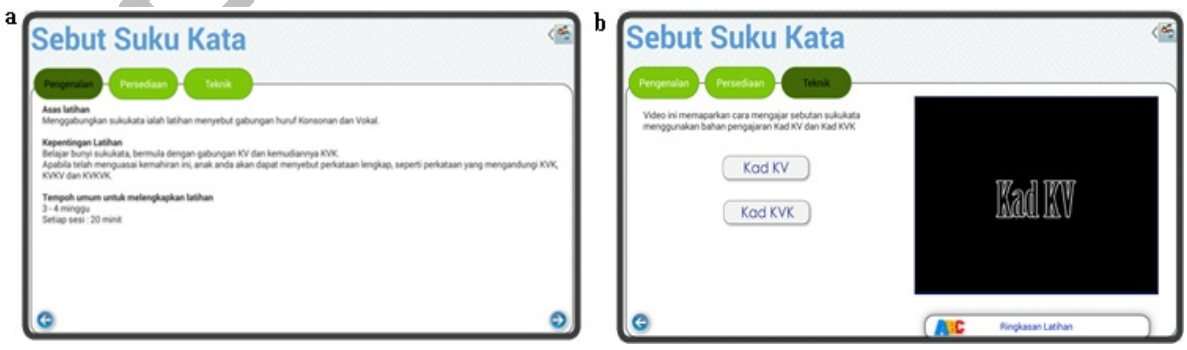


Fig. 1. (a) Pronouncing Syllables - Introduction; (b) Pronouncing Syllables - Technique

3. Evaluation process

The preliminary evaluation consisted of two activities which were evaluation by experts, followed by a pilot study with a small group of subjects. The evaluation by experts was crucial because it could elicit errors in the user interface and contents of the learning app. Thus, refinement could be made before it was used in a pilot study. The following sub-section provides description of the activities.

3.1. Evaluation by experts

The expert evaluation entailed quality review by a subject matter expert and multimedia experts. The subject matter expert was a senior lecturer in special education who has a Ph.D qualification and more than ten years of experience in the field. As such, it was deemed sufficient to perform initial evaluation with only one subject-matter expert. The expert evaluated the app contents using a courseware evaluation form which encompasses dimensions such as instructional design, learning contents, user control and technical issues. Among the items included for evaluation were the suitability of teaching strategy and method employed with the target users, sufficiency of interactivity in navigation, spelling and word structures, and suitability of the interface design with the users. Based on the suggestions made by the expert, minor corrections were made to the instructional design and learning contents to make it more comprehensible by the learners. According to the expert, the details for every intervention technique should be provided in succinct explanations. This is to avoid boredom among learners when they are forced to read long sentences in a small screen such as tablet. Therefore, certain sentences which were considered too long by the expert were reconstructed into concise statements. Additionally, the expert commented there should be a sentence to clearly state that the app portrays only some examples of reading intervention technique. This was a way to inform learners that many other possible techniques exist, which can be employed by teachers. In the area of interactivity and navigation, the expert recommended adding Back button on every screen to return to the previous page of the lesson. This would provide opportunity for learners to revisit preceding lesson and adequately learn basic but necessary knowledge before exploring more advanced lessons.

The multimedia experts evaluated the usability of the application using a heuristic evaluation form which was adapted from Nielsen's Heuristic (Nielsen, 1994). It is a type of inspection that enables the experts to compare the learning application against accepted usability principles. Therefore, usability problems on the user interface could be identified. Two senior lecturers in the field of multimedia, who have approximately eight years of teaching experience in the area were selected to conduct the heuristic evaluation. The experts were required to use the app from the beginning and inspect every screen thoroughly. They listed all usability problems that were detected into the evaluation form and described how the problems violated the heuristics. The recommendations made by the experts were taken into considerations. Thus, few elements on the user interface were modified, such as adding Home button on every screen to make it easier to return to the main screen. This flexibility in navigation could allow users to revisit the beginning of the lesson and jump to any screen afterwards. By performing the simple modification towards the navigation, it would enable complete user control and freedom as recommended in the usability heuristics. Beside that, every link for the videos was also added with label to indicate its duration. It was deemed important because it will enhance the visibility of the system status, which is also outlined by the Usability Guidelines for m-Learning (Fetaji & Fetaji, 2011). Initially, each video segment would be played within its pre-defined area on the screen. The experts commented that it was quite small; hence modification towards the video controller was made so that it could be run in full screen.

3.2. Pilot study

Upon completion of refinement towards the app, a pilot study was carried out with a small group of learners who were administered with the pre-test, treatment and post-test. 30 university students who were undertaking a degree in special education participated in the study. They were in Semester 4 and have undertaken an introductory course about learning difficulties. They will not be participating in the actual data collection. The purpose of the pilot study was to evaluate the effects of the learning app on the knowledge and self-efficacy belief of the subjects toward dyslexia literacy intervention. It also serves other purposes as outlined by Chua (2012), such as to ensure that the research procedures can be run smoothly in actual data collection, to identify any problem that might arise during actual study, and to make

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suggestions for improvement of the actual study. The process enabled the researcher to observe how learners use the application, the problems that they encountered while using the app, the time taken to administer every instrument and the procedure that could be improved as a preparation for the actual study.

The learning app has been pre-installed into each tablet. As such, there is no need for internet connection to download and install it during the pilot study session. Errors and problems with the application, especially the videos were also examined. It was observed that some participants encountered problem in loading certain videos after touching the links. Nevertheless, after performing inspection on the tablets that they were using, this was mainly caused by the processing capability of some tablets. The issue was recorded and resolved by ensuring the cache memory of each tablet be cleared prior to treatment session.

During the pilot study, the subjects were required to answer two instruments pertaining to their knowledge in dyslexia reading intervention, and self-efficacy in implementing reading intervention. They were administered with these instruments during pre-test and post-test. The instruments were developed by the researchers of the study in order to ensure that it measures only topics that have been covered in the learning app. The reliability tests for both instruments were conducted earlier; by employing the internal consistency procedure using Cronbach Alpha. The instrument to measure knowledge, which is Scale of Knowledge in Dyslexia Literacy Intervention, yielded an internal consistency of 0.936. It measures the subjects' knowledge in the learning difficulties and socio-emotional problems usually faced by children with dyslexia, as well as the knowledge in implementing literacy intervention towards children with dyslexia. It contains 30 statements and is divided into three sections, which are Reading Difficulties, Socio-Emotional Problem and Literacy Intervention.

The instrument to measure self-efficacy belief, which is Self-Efficacy Belief in Implementing Dyslexia Literacy Intervention, yielded an internal consistency of 0.935. The instrument contains 12 statements that measure the subjects' self-efficacy belief in implementing literacy intervention towards children with dyslexia. The statements are concerned with identifying the specific reading difficulties, preparing teaching aid and implementing the literacy intervention according to the correct strategies. Both Cronbach Alpha values were considered within excellent range, as described by George and Mallery (2003).

The study was designed by conducting a pre-test, followed by treatment through the app. The subjects were given 60 minutes to use the app. They were also provided with a user manual and were shown a demonstration about using the app. It was observed that the subjects could familiarize themselves with the app fairly quickly and used it smoothly. After the treatment, the subjects were administered with the same instruments again, but with items restructured. The result of the pilot study revealed that there was an increase in the mean score for knowledge and self-efficacy belief among the subjects after receiving the treatment via the learning app. Table 1 and Table 2 describe the results for knowledge and self-efficacy belief during pre-test and post-test.

Table 1. Result of Knowledge test

	Pre-test	Post-test
n	30	30
Mean score	126.57	132.93
Standard deviation	10.71	8.74

Table 2. Result of Self-efficacy Belief test

	Pre-test	Post-test
n	30	30
Mean score	45.13	50.73
Standard deviation	4.62	4.22

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4. Conclusion

The preliminary evaluation which consisted of evaluations by experts in subject-matter and in multimedia has enlightened the researchers about some usability and contents flaws. Among the substantial ones found in the user interface were the navigation and content structures. The recommendations by the experts were used as guidelines in the process of making improvement towards the learning app. It was an essential step before employing the app as a treatment in a pilot study to test its effects towards learners. The outcome of the pilot study indicated that the app has successfully enhanced the knowledge and self-efficacy belief in dyslexia literacy intervention among the subjects. The pilot study provided a window of opportunity to test the research procedures and the effectiveness of the app on a small scale. In order to obtain a more reliable result concerning the effects of the app towards learners, the study will be extended with a larger number of subjects during actual data collection phase.

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Educational technologies for maturing democratic approaches to educational practices in Ukraine

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Abstract

Vinnytsia State Pedagogical University has taken significant steps in policy and practice toward democratization of education. However, many Ukrainian universities have failed to meet European standards required of the Bologna Process, intended to render Ukrainian higher education equal to leading European universities. Superficial changes have not eliminated corruption, poor educational quality, excessive administrative control, or a workload that leaves little room for research or creative work. This paper shares the VSPU experience integrating educational technologies to promote democratization of pedagogy, providing students and faculty with better opportunities for professional growth to become competitive in the educational market of our time.

Keywords: Democratization; Ukraine; Distance Learning; Technology; Web-Blended Learning; International Partnership

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1. Introduction

On May 19 2005 the Ukrainian Ministry of Education (MES) signed a letter of commitment to join the Bologna Process (Educational Portal 2013). At the time, the Bologna Process was viewed as a breath of fresh air, offering a ready-made, time-tested model of serving knowledge without corruption, and with a strong focus on the quality of educational practices to facilitate close cooperation between governments, universities, students, and faculty (Bologna Process, 2010).

Despite nearly 15 years of independence, attempts to modernize and democratize Ukrainian higher education away from the corrupt and highly bureaucratic system inherited from the Soviet Union had reached a stalemate. A university education was no longer free for all students, but educational costs continued to increase and the content of educational practices remained essentially unchanged, with the same pedagogies, governance structures and lack of technology, resulting in poor quality education. Consequently, Ukrainian diplomas were still not valid in any other country except the post-Soviet Union republics.

Joining the Bologna Process represented a serious attempt to break away from the approaches and practices propagated in the Soviet Union, which were rooted deeply in the minds and habits of teachers and

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administrators. Alignment with the goals of the European Higher Education Area promoted mobility and diversity, providing students and faculty from Ukraine with equal opportunities to grow deeper in professionalism through cross-cultural exchange, democratizing and enhancing the quality of education (Bologna Process, 2010).

2. Historical context

2.1. Official support for technology-based education in Ukraine

The Ukrainian government has struggled to integrate the technology necessary to upgrade and democratize education. In 2000, the Ukrainian President endorsed support for Internet access (Alekseychick, 2001) and the Ministry of Education and Science (MES) established the Ukrainian Distance Learning Center (Shunevych, 2002; EdNU, 2010). This initiative was expanded on April 17, 2002, by a Regulation of the President, creating a consortium of six universities to establish "a pedagogical experiment in distance learning." On January 21, 2004, MES Order #40 established official policies and practices for technology-based distance education. When Ukraine joined the Bologna Process in 2005, a five-year plan was developed, "providing all Ukrainian schools and colleges with modern computer equipment … establishing special regional centers of distance education and local internet networks in universities," (Government Portal, 2005). However, there were few new developments in policy or practice as follow-up.

Renewed interest in technology-assisted distance education re-emerged in 2011, as a way to optimize work plans and reduce "obsolete forms of work and themes." Training of teachers for informatics was identified as a priority (Government Portal, 2011), and in 2012 and 2013, there was a significant surge in official government support for distance learning (MES: October 17, 2012; January 18, 2013; April 19, 2013; April 23, 2013; June 12, 2013; June 17, 2013). On April 25, 2013, Order No. 466 "On approval of distance education," updated and superseded the 2004 law with extensive definitional and logistical support.

Official state announcements and practices in the field can be difficult to reconcile. Even the MES acknowledged in a press release on June 17, 2013, "For many years in Ukraine there was not a clear idea of distance learning" and "different approaches to its organization in different schools" resulted in negative and low-grade examples adversely affecting public perception. Many Ukrainian Internet sites claiming research or practice in distance learning are outdated or without substance. Many courses that do exist appear little different from correspondence courses or remote lectures via television or Skype, however there are as many as eight to ten institutions of higher education in Ukraine that are significantly involved in distance education (Powell, Kuzmina,Yamchynska, Shestopalyuk, & Kuzmin, 2013). Critical barriers to technology-based education include lack of funding (especially for smaller districts and institutions), lack of faculty experience designing technology-based courses, psychological unpreparedness for interactions via technology, lack of computer literacy, and lack of computer or Internet access (Shunevych, 2002; Valiliev, Lavrik& Lyubchak, 2007; Klokar, Benderets & Borbit, 2011; MES, January 18, 2013).

2.2. Corruption: The Dark Legacy of Ukrainian higher education

Ukraine has the eighth largest number of university students in the world, with more than 800 institutions of higher education, but none are in the top 1000 worldwide (Abramovich, 2012). According to the World Economic Forum, "the country's most important challenge is the needed overhaul of its institutional framework, which suffers from red tape, a lack of transparency, and favoritism" (2013, p. 31), all of which severely undermine democracy. Ukraine ranks 144th out of 175 countries in perceived corruption (Transparency International, 2014) in the form of bribes, kickbacks, deceptive contracts, patronage, and retroactive tenders (Abramovich, 2012). Fifty-two percent of students surveyed reported that engaging in corrupt practices was "the easiest and most reliable way to solve problems" in higher education (Osipian, 2008, p. 325). Such corruption is by definition a dis-equalizing force, creating hierarchies and favoritism that are inherently undemocratic.

In 2008, university admissions processes converted to independent external assessment to make the process of university qualification more transparent and democratic, but "loopholes" quickly emerged, including advance or bootlegged test copies stolen from poorly monitored testing sites. In 2010, the objectivity

of this new admission process was further undermined when several additional admission criteria were reintroduced, including grade point averages, credit for unsupervised academic awards, secondary school leaving certificates, and false documentation as a member of a minority or socially protected group (Zhuk, 2010; Abramovicy, 2012; USETI Alliance, 2011; Council of Europe, 2011). The net effect was a reversion to "business as usual."

According to Ihor Likarchuk, Director of the Ukrainian Center for Educational Quality Assessment, "teachers fake teaching and students fake learning" (2013, paragraph 5). Professors' wages are chronically so low that additional income is needed just to meet minimal living expenses. Oral end-of-year examinations have little regulation or oversight to monitor the marks received, so instructors accept payments to retake exams, raise grades, or use course books or notes during the examination. "Private lessons," gifts, extra services, or textbook purchases are common in exchange for academic favors (Osipian, 2009; Council of Europe, 2011; USETI Alliance, 2011; Waldie, 2014). There have even been documented "price lists" circulated with specified amounts for a grade of A, B, or C (Osipian, 2009; Council of Europe, 2011).

Education is a crucial leverage point for combating corruption in government services (Mylovanov, 2014). Merit-based grades and reward systems must be instituted to bolster student confidence in the validity of individual effort and trust in public institutions as a means to build personal and social welfare. Higher wages for teachers and administrators and independence from over-regulation and arbitrary supervision (but not from public accountability), impartial monitoring and transparency, and reliable prosecution for abuses would help to reinvigorate integrity and, in turn, bolster the perception and reality of democracy in Ukrainian education.

3. Democratization of education – theory and practice

Michel Foucault asserted that "every educational system is a political means of maintaining or modifying the appropriateness of discourses with the knowledge and power they bring with them" (Ball, 1990, p. 3). Denial of democratic community in the school is an anti-intellectual act which presupposes the inability of students to think on their own and make decisions (Lambert, 2006). To the contrary, education is a transformative democratizing influence that enables a person to have more choices, enhanced personal welfare, and improved productivity (Liqing, Berci, & He, 2011).

However, education as an intellectual act and education as a social and political institution have often been at cross-purposes. Many social educators argue that as schools have developed, they have become increasingly locked into bureaucratic strictures with top-down administrative and instructional paradigms that leave education so homogenized that it has little meaning to the individual (Lambert, 2006). Educational access and equity, including gender and class equity, have become fundamental issues of political and social change in modern culture, especially in regions of the world most affected by pressures of urbanization and growing demands of democracy on government and society (Liqing, Berci, & He, 2011).

Democratic education emphasizes open access and equal opportunity (Liqing, Berci, & He, 2011), "with freedom of choice and a fair chance of success" (Kanwar, 2012). Democratization of education has led to "explosive demands…for open admission to institutions of higher education" (Heydenrich, Higgs, & Van Niekerk, 2004, p. 91). Such democratization has also resulted in new styles of education management and governance, with shifts in ideology and values. As the costs of traditional education increase and open-access alternatives proliferate, there has been a remarkable boom in online provision of programs and resources (ICEF Monitor, 2012; Kanwar, 2012; Kolowich, 2014).

It is not enough to simply make educational opportunities more accessible. Accessibility must be combined with high quality materials, rigorous expectations and accountability for engagement, in order to cultivate autonomous, reflective thinking and decision-making (Liqing, Berci, & He, 2011). However, new technologies "can play a critical role in dramatically improving education quality" and "catalyze economic growth" through the democratization of knowledge (Starr, 2013). However, high-quality incentive-based content, student engagement, and the support of well-trained facilitators are critical to success, as is content personalization to meet individual users' needs and interests (Dorman & Fraser, 2009; Starr, 2013; Acemoglu, Laibson & List, 2014). Over the long term, web-based technologies can further democratize education by making the work of highly skilled lecturers and curriculum developers broadly available,

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improving the quality of courses for instructors who have less skill, experience, or access to resources, increasing the scholarly and economic value of their work.

The use of technology empowers students to direct their own learning, democratizing teacher-student and student-student learning relationships (Mentz, 2014). The teacher becomes a facilitator guiding students to define and solve their own learning challenges more effectively, rather than passively absorb the knowledge of others. Students working individually and in collaboration in a virtual learning environment are able to work without the physical limitations of time and space, teaching themselves and each other as well as seeking the guidance of qualified experts as facilitators.

4. VSPU initiatives in applied democracy

4.1. Alignment with the Bologna Process

Since 2009, VSPU has undertaken many initiatives to establish and foster a commitment to democratize education. Many of these originated in compliance with the national commitment to align higher education with the Bologna Process (VSPU, 2010-2014b). Programs were reorganized with European credit requirements and the addition of Specialist and Master's qualifications, making Ukrainian degrees compatible with those of universities outside the former Soviet sphere. A standardized credit module system was implemented with a redesigned grading and assessment process using a grade designation of A/B/C/D/E/F based on a 100-point scale instead of the subjective and somewhat arbitrary assignment of a 1-5 point course grade. A commitment to merit-based grading with transparent standards and content rigor compatible with the European system has served to not only update Ukrainian higher education, but to also "level the playing field" and reduce opportunities for favoritism.

4.2. Collaboration with international partners

At the same time, VSPU also began to actively pursue international collaboration both as an institutional priority and as a result of significant faculty initiatives (VSPU, 2010-2014a). This has provided a tremendous boost to democratic collaboration between administrators, faculty, and students with international partners around the world. Such collaboration has also opened many doors to enable the inclusion of technological and pedagogical expertise of skilled lecturers and veteran practitioners of distance learning, increasing the quality and range of course content and activities available to VSPU students.

In 2009-2010, a senior instructor from the VSPU Institute of Foreign Languages received a Fulbright grant as Scholar in Residence at Southeast Missouri State University in the United States. This opened the door for a long-term collaboration with annual meetings between senior administrators of VSPU and Southeast to negotiate a formal partnership agreement. A Memorandum of Understanding was signed by the President and Provost of Southeast in 2010, followed by a formal articulation agreement in the fall semester of 2013, approving the transfer of up to 18 credit hours from VSPU toward a Master's qualification in Teaching of English as a Second Language (TESOL) at Southeast. Since 2010, at least three to four VSPU students have been enrolled at Southeast every semester. The first VSPU student to graduate from Southeast received a degree in TESOL in May, 2014. Two graduate students from 2013-2014 are continuing their studies at Southeast with grants as graduate assistants.

The first Fulbright faculty exchange was followed by several exchange experiences involving professors from the Institute of Foreign Languages over the next five years. In fall 2011, VSPU hosted its own visiting Fulbright Scholar in Residence from Bradley University, which is located in the U.S. State of Illinois. In2012 and 2013, four VSPU professors enrolled via distance education as non-editing guest instructors in an online teacher education class at Southeast. In 2013 and 2014, several additional Ukrainian and international partnerships were established by other VSPU departments with universities in Poland, Germany, and Russia. In spring 2013, VSPU hosted another faculty exchange with a teacher education professor from Southeast for a two-week visiting lecture appointment. This visiting lecture tour included presentations and meetings with VSPU administration, faculty, and students, visits to local primary and secondary schools, and a meeting with the Vinnytsia Teachers of English Union.

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In fall 2012, a pilot web-blended course, "Teacher Candidate Preparation in U.S. Universities," was jointly taught asynchronously and in real time with several American professors from Southeast and Bradley University. This represented one of the first experiments with asynchronous learning in virtual space, opening opportunities to interact with faculty and each other outside of scheduled class times. There was even a face-to-face class held in real time with U.S. and Ukrainian teacher education candidates via Skype. Results of research on student evaluations of the web-blended course were then presented at international conferences in Sakarya, Turkey, and St. Louis, Missouri (Powell, Kuzmina, et. al., 2013; Powell, Kuzmina, Yamchynska, Shestopalyuk, & Kuzmin, 2014). This course was offered a second time in spring 2014, with refinements derived from the pilot project, including another joint class via Skype, several new lecturers from Southeast, and a new lecture by the Provost of Nagoya University in Japan.

4.3. Technology for democratic management of data and resources

The success of democracy in higher education depends in large part on a shift to less restrictive management and governance styles (Heydenrich, Higgs, & Van Niekerk, 2004). Accountability, transparency, and appropriate regulation of data management are essential, not only to overcome endemic corruption, but also to re-establish confidence in the fairness and equity of administrative processes (Mylovanov, 2014). VSPU has made a significant commitment toward the use of technology to establish a more transparent and accountable administration, exemplified by several initiatives undertaken in the past two years (Shestopalyuk, 2014).

In September 2012, VSPU began using the "Dean's Office" automated record-keeping system to digitize student records with password protection and electronic security protocols. This not only makes the process of recording and accessing student records much more efficient, it also limits access by unauthorized persons and provides a time-stamped login trail. Increased transparency in management of student records discourages tampering, especially regarding entrance exams for graduate school, and facilitates inspection for accountability audits. During 2013-2014, VSPU increased the scope of this initiative with a series of additional data management and statistical programs ("PC-Student-Web," "PC-Student Transcripts-Web", and "Academic Curriculum") for tracking student progress, ordering certificates, and attesting to student achievement.

The proliferation of data management demands has also led to the organization of a Web Department to set up and secure data management programs and protocols as well as recruit and train operators and programmers. This new administrative unit has been charged with the launch of "PC-Colloquial," which will use electronic monitoring of records to track student progress in real time to enable timely interventions, when appropriate, in order to improve student academic progress. To better manage data security, VSPU has recently adopted the "AC-VSPU-1" protocol to process information of limited access categories.

On May 15, 2014, The Information Processing Centre at VSPU was made a unit of the Office of Education and Methodology for Monitoring and Analysis of the Quality of Education. A pivotal task in implementing this status is the need to acquire software and integrate fragmented and compartmentalized data banks from various departments and institutes into a university-wide data management system.

4.4. Technology for democratic teaching and learning

Technology has also been identified as an important lever to democratize teaching and learning through critical factors such as open access and equal opportunity (Liqing, Berci, & He, 2011), "freedom of choice" (Kanwar, 2012), content personalization (Dorman & Fraser, 2009; Starr, 2013; Acemoglu, Laibson & List, 2014) and empowerment of students to direct their own learning (Mentz, 2014). In the last three years, VSPU faculty members have become increasingly innovative in the use of democratizing learning technologies both in and out of the classroom.

A growing cadre of faculty have committed of their own volition to the use of technology to enrich lectures and incorporate digital audio-visual resources into class activities. Smartboard presentations and activities with live Internet access are regularly integrated into face-to-face classes. Several professors are also experimenting with out-of-class applications such as blogs, communication via social networks such as VKontakte, and web-blended applications organized by the British Council.

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The introduction of computerized tests has streamlined assessment and made the recording of scores more efficient and more secure. Electronic manuals and digital syllabi have simplified communication of expectations and increased student access to course materials. The university administration has also committed this year to initiate the implementation of Ministry of Education recommendations to contract with the Microsoft IT Academy to provide teachers with licensed educational programs and resource materials, and to train the teachers in application of these resources.

Student response to the pilot web-blended class consistently highlighted the democratizing effects of technology use (Powell, Kuzmina, et. al., 2013). By a nearly two-to-one large margin, positive effects outweighed negative perceptions. In particular, students appreciated the ease and flexibility of access to class work (43%). They overwhelmingly cited the benefits of increased interaction (32%) and engagement (28%), especially with American professors and students, but also the increased ability to participate in discussion, to speak up and be heard in class activities. Many students (27%) reported that the course format was especially interesting, with many new and interesting topics that would not have been available in a traditional format. Because this was an English-language class, many appreciated the realistic language practice with native speakers (23%), both in oral conversation in face-to-face Skype sessions and in asynchronous discussion online. Finally, those who adapted well to the online format cited the positive value of independent time management (8%) made available by the flexibility of online access. However, those who did not adapt well found the necessity for independent time management a drawback (12%)

5. Recommendations

Ukraine has many challenges as a country, not the least of which are endemic corruption, lack of funds, lack of infrastructure, and lack of trust in government and administrative systems. Challenges to democratization are many. Higher education has been singled out repeatedly as one of the most corrupt segments of this overloaded and autocratic bureaucracy. Despite prevailing odds, VSPU has made remarkable progress "swimming against the tide." In large part this is due to the commitment of a forward-looking administration that is determined to push VSPU toward technological proficiency, transparency in management, and international partnerships in order to access up-to-date resources and expertise.

Many initiatives in democratization through technology-assisted education have been undertaken, largely piecemeal by innovative individuals. Each success has yielded a greater determination to continue to explore possibilities, building a synergy of positive results that is about to generate a critical mass of commitment and systemic adoption. The integration of data management into a secure university-wide system is critical to establishing and stabilizing the gains made by changes in administrative procedures. The establishment of a dedicated administrative department charged with developing and maintaining technology infrastructure will be essential to support any concerted movement toward systemic adoption of technology-assisted teaching and learning. Broadly available programs of training in technology-assisted pedagogies will be crucial to maximize the gains made by independent experimenters and early adopters. Continuing institutional and political support, especially financial support will, of course, be critical.

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Educational technology for effective service delivery in educational training and research in Nigeria

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Abstract

In Nigeria, there is a need for a paradigm shift from the existing teacher–centred learning environment to a learner-centred instructional environment where learning is enhanced and students acquire the necessary 21st century knowledge and skills. Educational Technology create changes in all aspects of human endeavour especially in training and research as it provide resources for trainers and researchers leading to comprehensive learning as well as extend the learning process. This paper discusses how Educational Technology gadgets could be used effectively in educational training and also the constraints to effective use of the gadgets. The paper proffers recommendations to prospective trainers, researchers and the government on enhancing service delivery in educational settings by integrating Educational Technology.

Keywords: Educational Technology,Effective Training; Educational Research; Teacher-centred; and learner-centred environment.

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1.1 Introduction

Rapid changes in technology have resulted in new approaches in education (Strommen& Lineolin 1992 quoted in karal and Balicekapili, 2010). These changes manifest in all facets of human endeavour. They have brought about new ways of doing old things in both educational and economic life of the society. Nigeria, one of the developing countries in the African continent is striving to measure up with her counterparts in the area of technology. In every educational training, teaching –learning is inevitably involved in information passage; from the teacher or trainer who serves as the sender to the learner or trainee who serves as the receiver. In an average Nigeria classroom, especially in public schools, activities are still dominated with chalkboard and textbooks. Some private schools make efforts to integrate technology into their system to justify the exorbitant fees paid by parents and wards. Given the poverty level, very few people can access this opportunity. In some Schools, the gadgets are purchased and kept for window dressing and exhibition but not used in teaching –learning situations.

The quest for development now in Nigeria makes it imperative for trainers to shift from the existing method of teaching in schools to accommodate use of technologies. Other African countries like Tanzania, Kenya, Uganda and South Africa seems to have gone ahead of Nigeria in this regard. It is disheartening to note that Nigeria, with her abundance of resources - human and non- human cannot boast of being among the countries utilizing technology in teachings, school administration and management.

Technology may be defined as the systematic study of techniques for making and doing things. It can also be defined as the application of the arts, science, processes, ideas, tools and machines to solve human

problems. In essence, it refers to ways people use inventions and discoveries to satisfy needs and desires. Technology includes the use of both sophisticated (highly advanced) and non-sophisticated (simple) tools and methods to work effectively. In the past, service delivery in educational settings has been done through numerous means; from verbal communication to prints and use of instructional materials like pictures and charts. As technology is creating changes in all aspects of our societal life, it is also changing our expectations of what students learn, how they learn it and where they will learn it so as to function in the new world order(Abimbade,2005). According to Kirschner and Davis (2003), school learning and planning oscillates around technology as either core or complementary where they are seen as optional. Resources cannot convey information alone. It is the teacher that will supply the required information in a meaningful way where necessary so that with the aid of the resources, the student's mental horizon will be enlarged thereby allowing them to experience vigorously things they could not otherwise see.

Educational research according to Ogunleye (1999) is a systematic process of collecting information or data on matters concerning education in order to confirm, improve, modify or predict a particular learning environment. Generally, every man, animal or even inanimate (computers) is capable of learning. Since learning is a process of education, therefore all disciplines or fields of study carry out educational research of a particular kind. In Nigeria, Libraries are not many. Even those that exist are not readily accessible to users. Sometimes, available materials are not current and needed to be updated. It is mandatory that users must go to the library, no matter where it is for research instead of the library coming to them at will. Existing Nigeria Libraries tends to have limited access to international journals, current texts, periodicals and audio-visual materials. Teachers/ trainers need to carry out research to equip them for the proposed task.

Educational Technology has been defined variously by many scholars, for instance, the American-based Association for Educational Communications and Technology (AECT) defines it as a complex integrated process involving people, procedures, ideas , devices and organization for analysing problems and devising , implementing , evaluating and managing solutions to those problems involved in human learning.(AECT 1979,Agun and Imogie 1988, and Adeosun 1998).They also defined it as the study of ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources (lever-Duffy McDonald,2011). It can be deduced from these definitions that Educational Technology is the integration of variables in order to find and solve problems and manage solutions to problem involved in all aspects of human learning. It is a far departure from only chart/cardboard teaching-learning situation.

1.2 Educational technology gadgets for effective training and research in Nigeria.

Education is the process of teaching, training and learning especially in schools, colleges or any organized setting to improve knowledge and to develop skills. Educational training takes place in Nigeria at the Nursery, Primary, Secondary and Tertiary levels. It occurs in any organized instructional setting where knowledge is impacted and learning is expected to take place. For more than two decades, Nigeria has experienced a continuing, debilitating crisis in education, including limited access to educational opportunities and resources, large-class size, poor implementation of planned curriculum, inadequate funding, poor management, lack of interest in the endeavour of learning, low number of qualified teachers, and low level of literacy and basic education skills (Onasanya, Ayelaagbe and Laleye 2012). This in turn leads to poor performance of students in examination and malpractices to have better results. Effective service delivery in Educational training depends on the technique or method used by the teacher in teaching the concepts, means of communication or his language of expression, material or media used during the process and nature of the learners in the instructional setting. Needless to say that teachers need to carry out research to gather facts and be current in their subject of specialization in preparation for effective service delivery. Educational Technology resources listed by AECT can be classified into Human and Non- human resources.

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1.3 Human resources

These are the different categories of personnel that provide different services in the teaching –learning process. Example of human resources are the subject teachers, other professionals like doctors, lawyers engineers, pupils, parents, donor agencies like non- governmental agencies or organization (NTI ,2010). The teacher is considered the most important resource person in achieving the goals of any curriculum. He engages in interactive behaviour with the students. His primary concern is to translate educational objectives cognitive, affective or psychomotor to bring about desired change of behaviour in the students. Effective teacher should be ready to learn and adopt different techniques of pedagogy to enhance learning and arouse the interest of learners. He must be able to use effectively, confidently and competently Educational Technology resources to achieve instructional goals and objectives. Presently in Nigeria, especially in public schools, most teachers impact knowledge conventionally. The use of suitable materials and tools in the teaching and learning will undeniably be helpful in making the process more meaningful.

1.4 Non- human resources

Non material resources when used by teachers will facilitate learning and encourage students to become productive members of the society. Educational Technology has yielded several new machines, materials, media men and methods which are interrelated and work together for the fulfilment of specific educational objectives (Aggarwal 2007). These new machines, materials and media have great potential for use in the educational enterprise if they are judiciously used with new functions and roles of educational personnel to bring about more efficient and effective educational training and research. Every sector of the school system ranging from the school administration, school and classroom management to the work of instruction which includes intellectual education, moral education and counselling and every field of specialization can explore educational technology resources for effectiveness.

The collectivises of the newly discovered inventions are referred to as emerging technologies. The major technologies that can be used for effective service delivery according to Aggarwal (2007) are: (1) computer, (2) Artificial intelligence(AI) ,(3) Computer Assisted Instruction, (4) CD-ROM (Computer Disc-Read Only Memory) ,(5) Dial Access , (6) Educational Television ,(7) EDUSAT (Educational Satellite) (8) Email(Electronic Mail ,(9) Teleconferencing (10) Tele-lecture (11) Tele-tutorial (12) Teleseminar (13) Video ,(14) interactive video (15) video-tex ,(16) Video-conferencing (17) Digital Resources (18) Virtual university; and (19) The internet.

The Technologies first emerged in the developed countries, which are primary initiators and producers before they are later sent to the developing countries. With the aid of the new technologies, knowledge could be transmitted to intended audience without their physical presence (Ortese, 2004). The National Policy on Education (2004) has made adequate provision for the adoption of such emerging technologies into the dynamic school setting and the work of the teacher. Section 8B (74) of the national policy on Education (FRN, 2004) noted inter alia: "Teachers Education shall continue to take cognizance of changes in methodology and in curriculum. Teachers shall be regularly exposed to innovations in their profession". However, combining new technologies with effective pedagogy has been a daunting task for teacher training institutions. Successful integration of Educational Technology in the school system depends largely on the attitude of teachers towards the role played by modern technologies in teaching and

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learning. Most of the teachers believe in the old way of the school system and do not see the need for its incorporation in the curriculum. The new Technologies could be used effectively in the following ways:

Computers: The computer is the heart of Technology. They are useful aids in fast word processing of research documents. It is particularly much preferable to a typewriter because one can insert, delete, and copy any part of the previously stored data without having to retype all over again. Writing project reports, book or term paper is expertly processed by the Microsoft Word Disk Operating System (MS-DOS) which is capable of editing, spell checking and formatting texts (Shelly and Roger, 1981). Computers can serve as a database tool such that keep results of research findings and other information that are readily available to the user. Computers are very relevant in electronic libraries with hundreds of thousand users. According to Aggarwal (2008), it could be used by teachers to construct, score and analyse tests; keep record of student's performance and progress through courses; provide guidance to the students and advise them on the choice of next course module.

CD-ROM (Compact Disc Read Only Memory): This is a storing devise, a semi –conductor memory device whose storage is permanent in nature. The electronic books and encyclopaedia made information available to many users simultaneously without demand of the large-space requirements of massive hard copies. Only a single compact disk (CD-ROM or RAM) can house about 25 volumes of an encyclopaedia. It retains the stored data even when the power to the devise is off .It has a variety of applications in digital system such as implementation of combinational logic and sequential logic, character generation, look-up table, microprocessor programme storage (Aggarwal 2008).

Dial Access: Callers can use it to get access to a vast Library audio cassette. Students can use it to dial up lessons from the library. Instead of finding a room for students to meet, students in the tertiary institution can watch videotapes of the lecture individually. Also, instructors call for audio-visual material from a distribution centre.

Electronic-mail (E-mail): It comprises electronic mailboxes that enable communication between two people based at distant locations, and make the transfer of documents from one computer to the other faster, reliable and convenient. It supports person to person messaging and document sharing. It is the most widely used application of computer internetworking. Teachers and trainers can give assignments to their students and ask them to submit to his Email without necessarily seeing the teacher before submission. All they need to do is to know the teacher's Email address.

Artificial Intelligence: It can diagnose the student's learning deficiencies and tailor instruction to them. It is a computational technology that involves the symbolic representation and processing of knowledge. "The Artificial intelligence," an advancement; from robotics revealed that computer robots are capable of learning. That is, they can make intelligent decisions. This is because a previous exposure of the computer to a set of data, aid the recognition of such data in the future. The computers, unlike the human, have an infinitely larger memory capacity and the ability to correlate facts in seconds. These capabilities of computers are useful in 'neutral networking' (i.e. simulating human-neuron network of the brain) and the development of the "expert system" or "knowledge-based system". The neutral network coordinates stimuli more than the human brain and it has very high tolerance to faults. It is still capable of a high degree of accuracy even in the face of several network disconnections. (Howl, 1981).

Computer Assisted Instruction: This is a term given to instruction that is provided by a computer and is closely linked with the concept of mastery learning. It involves drill and practice as well as tutorials for

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effectiveness and efficiency, specific topics and programmes may be packaged for trainees to engage in drills and practice and for remediation.

Internet: This is a complex decentralized communications network .It is the network of computer system that communicates by sending messages to one another. E-mails are exchanged on the internet. Teachers can use the internet to conduct and mark tests .Olusanya and Oloyede (2003) confirmed that the internet is highly beneficial to research institutions and organizations in many ways. The benefits include reduced communication costs, fast access to reference materials and methods, accelerated distribution of knowledge and enhanced coordination and collaboration. It provides access to information and contains huge quantities of data on numerous topics. It removes the limitation of class size, time constraints, and restrictions on the learning pace. It supports schooling, continuing education, re-education and task-specific immediate education.(Aggarwal,2008).Learning process on the internet is interesting and interactive; it encourages creativity in learners.

Educational Television or Instructional Television {ETV): Television is an audio-visual media that an average family in Nigeria has access to and learns from. When television is used for learning purposes or instruction, it is known as Instructional Television. Educational programs are prepared and telecast. It provides functional, formal and non-formal Education. It provides a common experience to learners and viewers no matter their status. Most presentations and teachings on ETV are done by experts. ETV teachers can serve as role models to classroom teachers, stimulate new ideas and dispense more knowledge to them. It directs the attention of the students to the exact details and eliminates distracting surroundings. Different kinds of Educational Television are the Open Circuit Television (OCTV) which is the usual type of telecast by the commercial and non-commercial stations; and the Closed Circuit Television (CCTV).i.e the selective telecast which can be used only by specially equipped receivers and its range is limited to the length of the cable. It increases the range of instruction to one or more locations beyond the classroom of instruction to one or more locations beyond the classroom. It is pertinent to note that teacher's role in planning, preparation, presentation, production utilization and evaluation of the programs cannot be under-estimated (Aggarwal, 2008).

Teleconferencing or interactive television: It is a two-way electronic communication between two or more groups or individuals who are at separate locations; it combines traditional TV viewing with interactivity of the internet and personal computer. In educational training, it can provide professionals or experts instructors to local school, colleges, universities and offices and quality instruction is given over a wide area. Also unlike it learners can interact with the expert and with each other at the locations making learning to be learner- centred. Also, it permits hi-service training to workers without leaving their work place. Its types include Audio conferencing, videoconferencing, audio graphic, and teleconferencing and computer conferencing.

Tele-lecture- It is a one-way information transmission from the teacher to the students with limited opportunity of questions and comments from the students. It is usually followed by pre-telecast, preparation and follow-up. It is exactly like the normal lecture method of teaching but during its packaging in different forms of media, it takes into consideration the constraints of the particular where it will be used.

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Tele-tutorial- Tutorial class is where individual or group of individuals gather together to solve a particular learning difficulty by contacting the teacher at a distance with a request for help. It allow learners to solve problems and for teachers to re-explain or solve problems in areas that are not clear to students without necessarily coming together.

Tele-seminar- It involves small group of students and allows intensive participation of the members which lead to a much focused, in-depth discussion on the topic that has been previously taught.

Video: A video machine is is an audio-visual media that accepts videotape as its software and display the programmes on the screen, usually, television. The programme is recorded with images and sound as electronic signals on the tape using the Video Tape Recorder (VTR). The signals are converted to pictures and sound during playback.

Constraints to effective usage of non- human resources: These are the factors preventing proper integration of Educational Technology for effective teaching –learning and research in Nigeria. Despite the fact that Nigeria is willing to integrate Technology into all facets of the economy including education, the following factors serve as barrier: Inadequate human power; poor Internet accessibility and connectivity; Inadequate software packages for learning; varied Climatic and environmental factors; Shortage. inadequate and inadequate power supply: poor technological know-how of teachers; lack of the interest among the long –serving teachers as they are not ready to learn how to use new technologies talk less of incorporating them into service delivery and research; Inadequate facilities and equipment for conducting research and the Governmental budget which is becoming tighter does not take good care of this especially scientific research. Time factor and rigid time-table as time allocated to each subject and lessons are too short for teachers to integrate technology into classes of 35 minutes per period, Also teachers with little interest in research spend more time doing other things at the expense of academic activity and research.

2.0 Conclusions and recommendations

The computer systems no doubt, had assisted technological pursuits, saved costs, increased productivity but also increased the crime wave. Nigerian Universities are now incorporating use of computers in teaching research, tests and examinations due to its viability. Further improvements in computer usage were made possible through the development of, the optical disk technologies, knowledge-based systems, High Parallel Definition Television (HDTV), Microprocessor - controlled security system that managed the home (e.g. switch off heaters), video conferencing and fax machines. However, over-reliance on computer may demoralize man. Since all men may not have equal access to these educational, technological social amenities, the under privileged group may feel grossly inadequate. This may foster financial and political oppression that may destabilize the human population.

Serving teachers who were once teachers in training should make good use of information and communication technology so as to prepare themselves for the tasks at hand. They need to be more committed and develop interest in improving the quality of their service delivery and be ready to learn as learning itself is continuous and throughout life. This will not only transform the educational system but bring about tremendous changes on the teaching and learning system and this will help them to be firmly rooted professionally. In the National Policy on Education of the Federal Republic of Nigeria (2004), it was

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asserted that no nation can achieve economic, social and technological progress without a good system to sustain its achievements. Teachers' education is given prominence in the Nigerian education system. This states from the fact that "no education system may rise above the quality of its teachers" (FRN, 2004 P.39).

Also, teachers need to be given in-service training to make them relevant to contemporary knowledge age and thus acquire skills in the area of ICTs and for them to be able to husband the potentials of technologies in their teaching tasks. Such training should incorporate the four guiding principles identified by Hughes (2004). These are connecting ICTs learning to professional knowledge, privileging subject matter and pedagogical content connection, using technology to challenge professional knowledge and teaching many technologies. They will be able to model good use of technologies for students who are being prepared for tomorrow's work places, where technology will be indispensable.

Resource centres make readily available necessary technological materials and gadget required for effective teaching, learning and research in scientific and academic environment. Hence, there is a need to set up modern and viable resource centres at the federal, state and local government levels which should be easily accessible to trainers and researchers in the country. Also, each department, faculties and schools should have resource centres which are peculiar to their learning objectives attached to them.

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Effective assessments of integrated animations to explore college students' physics learning performances

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Abstract

This study dealt with effective assessments of physics animations to upgrade college students' learning performance. All participants were taken from engineering departments who joined this physics course. All statistic results demonstrated that the physics animated instruction would be to enrich physics texts, to advance positive learning achievement, and to promote the validity of the revised physics instruction with regard to learning attitudes. Assessments of applied animations in this study contributed much to learning results of students' performance which uplifted students' physics concepts understanding and learning attitudes indicated by different variances of gender and dispositions.

Keywords: physics animations, college students, concepts understanding, learning attitudes

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1. Introduction

Many scholars have pointed out that students rarely build a complete physics knowledge because they underestimate the complexity and relationships between prior knowledge and new knowledge without interactive animations or signaling functions (Feltovich, Coulson & Spiro, 2001). Some physics instruction of promising strategies have already been successfully explored, such as visual animations for communicated environment (Tao, 2004; Su, 2008a, 2008b, 2013; Su & Yeh, 2014), in their advanced concepts of science history (Wang & Marsh, 2002) to help students achieve more effective physics learning. Several constructivists' strategies of integrated animations were included in the overall physics learning process, such as multimedia texts and hands-on inquiry experiences for students to learn fundamental physics conceptual developments.

1.1. Purposee

This research focuses on dynamic applications of physics assessments implemented by 2D animations highlighted with physics conceptions o. Three fundamental prospects of college students' physics learning purposes will be conducted as follows:

(1) Integrated physics animations will enhance students' learning conceptions for physics assessments.
(2) Effective assessments of integrated animations can improve students' physics learning performances.

2. Literature review

Many researches (Becerra-Labra, Gras-Martı & Torregrosa, 2012; Su & Yeh, 2014) reveal that college students' learning towards physics is declining not in their lack of interest, but in lack of integrated animations for instruction environment nowadays. Thus, efforts towards integrated animations are needed for positive physics learning concepts to increase students' interest and motivation. Many contemporary strategies of physics learning are based on constructive integrated animations related to the authentic nature of physics instruction. There are several potential advantages for this study to get effective assessments of rich integrated animations which closely parallel with new technologies of physics instruction. This study also offers physics teaching activities including integrated animations in the learning environment suitable for a constructive assessment of students' learning performances.

2.1. Construct physics learning performances

Constructivism would be an interactive epistemology which defined students' constant competence and demonstrates their understanding of real knowledge. Tenenbaum, Naidu, Jegede, and Austin (2001) presented seven key constructivist factors for students' physics learning environment: (1) dealing with arguments, discussions, debates; (2) meeting conceptual conflicts and dilemmas; (3) sharing ideas with others; (4) measuring targeted materials toward solutions; (5) organizing reflections and conceptual investigations; (6) fitting students' needs; and (7) making meaningful, real-life examples. All seven factors emphasized students' dynamic fulfillment that real knowledge was actively constructed in learners' mind step-by-step. For last few decades, the importance of the constructivist perspective has been stressed by educators for improving students' learning performances. Ausubel (1968) indicated that the fundamental principle of constructivist instruction was to assess what students knew and then to design activities and assessments of their performances accordingly. Constructivist principles had been interpreted in a variety of scientific ways ranging from information processing, interactive and social constructivist to physics instruction (Yore, 2001). Both constructivist principles and students' conceptual changes were influential in physics instruction, and they were inseparable from any physics instruction. This study explored the constructivist-based physics instruction which had been in accordance with the conceptual change models (Posner, Strike, Hewson, and Gertzog, 1982) to help students modify their misconceptions and develop better learning performances.

2.2. Technology enrichment physics learning environment

Students who face rapid changes in the modern world will be in great need of technological instruction with effective animated learning environment. More than one decade, Gilbert (1999) proposed a new strategy of integrated animations to enhance students' science learning environment. He said that much scientific learning was too abstract to interpret, and those complicated ideas would prevent students from constructing mental models and their subsequent learning performances. Several means of physics instruction had been dealt with, such as models, analogies, equations, graphs, diagrams, pictures, mathematical operations, and visual and action images (Lemke, 1998). All these could be functional with integrated animations for different effects of a single representation compared to multiple representations (Yore & Treagust, 2006). Several multiple representations (Spiro & Jehng, 1990; Paivio, 1971 &1991) could be in collation with Ainsworths' (2006) learning frameworks of the ubiquitous DeFT (design, functions, and tasks) for students' physics learning environment. A common justification for using multiple representations responded to the fact that they captured students' interest and, in doing so, played an important role in promoting animated environment for students' learning performances.

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2.3. Learning theory and physics animated environment

Verbal and visual inputs would construct multi-functions of dual-coding theory (Paivio, 1971 & 1991) in students' integrated animations of physics learning environment (Butler & Mautz, 1996). Both verbal and visual systems could be linked and inter-communicated for the cueing combination of one system to the other, which in turn facilitated students' integrated animations of physics instruction. Theoretical principles from this multimedia-orientated environment would offer fundamental presentations as texts and animated sequences which all interacted together to enhance students' learning performances (Mayer, 1997; Moreno & Mayer, 1999). The contiguity principles for computer-based instruction gave students effective impact when words and pictures were presented contiguously in time or space (Mayer & Anderson, 1991; Mayer & Sims, 1994).

3. Methodology

The overall research methodology was comprised of three effective assessments, including pretests, post-tests and questionnaire for non-major college students in the required physics courses.

3.1. Participants

Assessments of statistical samples for group surveys were taken from college students in the present researcher's physics classes. All participants (N = 193) were recruited as tentative samples from both civil engineering and mechanical engineering departments by a stratified procedure to eliminate voids in the sampling frames.

3.2. Tools

There were four major assessment tools in the data collection and analyses stages: namely, (a) pretests, (b) physics instruction of three integrated animation units, (c) posttests, and (d) a follow-up questionnaire. Several pretests and posttests appropriate to three integrated physics units were developed to assess students' learning achievements and learning attitudes. All tests with computer-based analyses were focused on three categories: knowledge, comprehension, and applications (Bloom et al., 1956). Both pretests and posttests for three physics units were administered by local physics professors of the Entrance Examination Center in Taiwan to assess different test validities. The reliability of students' achievement tests was analyzed in Cronbach's alpha coefficients for the pretests and posttests, which were 0.78 and 0.79 respectively. Kline (2005) posited that the α value up 0.70 was considered acceptable. The same test validities were combined together with pretests and posttests to detect students' differential physics learning performances. Effective assessments of students' learning attitudes in the questionnaire were devised by the author (Su, 2008a, 2008b, 2011). The Likert 5-point scale was used to evaluate students' physics learning attitudes. Each test item had five responsive categories, ranged from item 1 (strongly disagree) to item 5 (strongly agree). The questionnaire included six aspects as the following descriptions:

(S1) Learning Attitude towards Integrated Physics Units
(S2) Learning Attitude towards Physics Instructors
(S3) Learning Attitude towards Integrated Physics Learning Environment
(S4) Learning Attitude towards Students' Interactions
(S5) Learning Attitude towards Self-evaluations
(S6) Learning Attitude towards Integrated Physics Learning Results

Effective attitude assessments of the questionnaire were evaluated according to the content, constructive validity and internal consistency reliability. Three specialists were asked to set up the validities of the questionnaire content. Pilot versions of the questionnaire were examined using principle component factor analyses to verify the structure and alignment given the designed constraints. Reliability was explored in

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terms of Cronbach's α coefficient to determine the internal consistency of total subscales. The analyses of six subscales separately yielded different coefficients ranging from 0.92 to 0.96 (S1=0.96, S2=0.92, S3=0.93, S4=0.94, S5=0.94, and S6=0.96). Compared to the previous report of average reliabilities, this questionnaire had a higher reliability than statistical data by most other researchers (Katerina & Tzougraki, 2004).

3.3. Treatments

Three integrated physics units were conducted for effective learning assessments. These integrated physics units normally involved 3 hours of lecture demonstrations and 3 hours of laboratory hand-work each week. The lecture demonstrations programs were redesigned to be enriched with supplemental programs. The supplementary materials (such as animations and slides), lectures, and demonstrations all combined within an integrated learning environment in well-equipped facilities. These component programs were developed by the author drawn from the literature (Ainsworth, 2006; Yore and Treagust, 2006) and constructivist perspectives. Six integrated features of physics courses were covered in the instructional designs and computer animations as the following way:

1. Three integrated animation units were employed for specific visualizations of physics instruction.
2. The recognition of integrated environment determined the important priority of meaningful physics instruction.
3. Concrete creative images and mental assemblages facilitated students' memory and understanding.
4. Integrated interactions of physics learning between teachers and students were reinforced and encouraged in this study.
5. Guided learning with the integrated environment as a catalyst would achieve greater physics instruction goals and overcome students' learning obstacles.
6. Integrated physics presentations and demonstrations proposed opportunities and activities for students' real-life learning.

Three integrated animation units were produced in Flash MX (Macromedia Inc.), static visuals were made with Mathematica 4.2 (Wolfram Research, Inc.), and classroom demonstrations were presented by PowerPoint or e-plus software. The conceptions, ideas and dynamic processes were operated in Adobe Photoshop 7.01. Three integrated animation units were separately indicated from [Figure 1] to [Figure 3].

a) b) c) d)

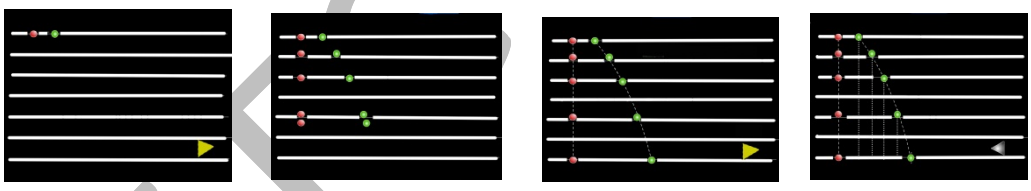


Fig. 1. Selected illustrations and corresponding conceptions from the integrated physics courses with kinematics animations conducted by Photoshop 7.01, as shown in the sequence from slides (a) to (d)

[Figure 2] indicated the passing movements of a ray from one medium V_1 into another medium V_2. The angle of refraction was different from that of incidence. This case would always be the same during reflections when the ray entered a medium at a speed less than the speed of light. Snell's law was the basic requirement of refraction derived from light theory. The sequence presentations of integrated animations, as seen from pictures (a) to (d) in [Figure 2] step by step, provided an effective domination for the conception of the incident wave and the refracted wave. Most students who came from a vocational school background did not have much advanced concepts of abstract physics and dynamic processes; therefore, these animated documents helped students build a sound, basic recognition of refractions and avoid the difficulty and confusion of physics geometric optics as encountered in their daily lives. The principal animations for the conservation of mechanical energy could be seen in [Figure 3] -- as a pendulum swung in a motion system, and the energy was transferred back and forth between kinetic energy K and gravitational potential energy U, as shown from pictures (a) to (f) in [Figure 3], with the sum K+U being constant, as shown in [Figure 3]. The slides indicated a vivid physics illustration of the conservation energy. Any energy that did not serve the intended purpose must be subtracted from the total sum in order to obtain the amount of useful energy. This physics application was very straightforward. This experiment of integrated physic mechanical energy saved students from the misunderstanding of interpreting the abstract conceptions of

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mechanical energy. These animations were available for solving conceptual problems related to the principle of the conservation energy.

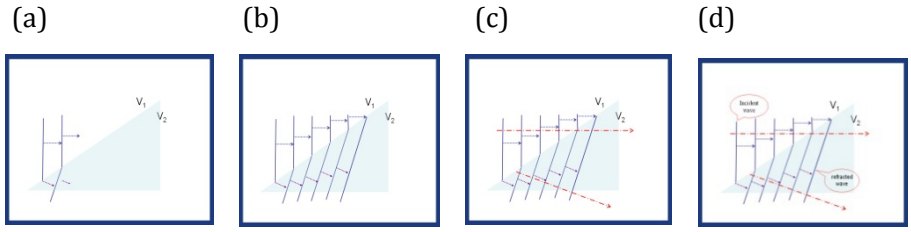


Fig. 2. Selected illustrations and conceptions from the integrated physics courses with corresponding animation arrangements and movements

for the ray passing from medium V_1 into medium V_2, conducted by Photoshop 7.01, as shown in different sequences from slides (a) to (d).

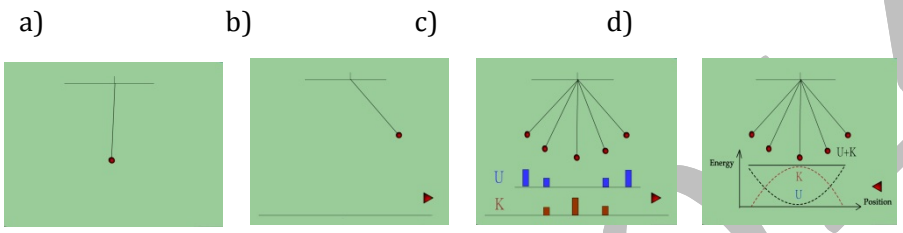


Fig. 3. Selected illustrations and concepts from the integrated physics courses with corresponding animations for the conservation principle of mechanical energy, conducted by Photoshop 7.01, as shown in sequences from slides (a) to (d).

3.4. Data management and analyses

All quantitative data were employed for statistical analyses functioned by the SPSS of Windows 10.0 software. Descriptive statistics (sample sizes, means, and standard deviations) were calculated for two comparative groups, and the significant levels for one-way analyses of covariance (ANCOVA) were set at 0.05 to examine main effects. In cases where *p*-values were less than or equal to 0.05, Scheffe's post hoc comparisons were conducted on different significant effects. Regarding students' changes in achievements and attitudes, the differential effects were explored and identified by the categories of blocking variables for the integrated physics learning.

4.Results

This study focused on three physics units with integrated animations available for Taiwan technical college students. Blocking variables for the data analyses corresponded to differentiated requirements of students' learning performances in implemented conditions and learning attitudes. The design principles and study developments had already been described in the above sections. Next this study examined students' learning performances before and after attending instruction tests in these integrated physics programs. Students' learning performances were documented and analyzed by means of pretests and posttests; the means and standard deviations were calculated by descriptive statistics, and improvements brought about by three physics units. Average performances throughout pretests and posttests for three physics units indicated students' different scores from 10 to 20 points. These scores corresponded to percentage improvements of 35.8% in the kinetic energy and work unit, 30.3% in the optics unit, and 16.5% in the kinematics unit. The total improvement for three physics units was 26.5%, and effect size found by one-way ANCOVA testing was $f = 0.279$, the above medium effect. The effect size was used as the factor or index to differentiate variations in students' learning behaviors. Cohen (1994) pointed out that the effect

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size had more research efficiencies than the *p*-value. The testing results of statistical significance revealed occurrence rates. The effect size put important emphasis on the measurements of the relative magnitude for the experimental results. Although both testing results of statistical significance and effect size showed the size of the experimental effect, effect size became especially influential when comparing the magnitude of experimental treatments to other experimental effects. Cohen noticed that, "the effect size of one-way ANCOVA was represented by $f = [\eta^2 / (1-\eta^2)]^{1/2}$, in which η^2 indicated Eta square to show different efficient, $f = 0.1$ as the smaller effect size, $f = 0.25$ as the medium effect size, and $f = 0.4$ as the higher effect size" (Cohen, 1988). Inspective results of students' attitude survey (with four subscales) indicated reasonable attitudes towards physics learning.

Detailed statistics of variances and covariances were analyzed to examine the differential effects of integrated instructions on civil and mechanical engineering students' physics learning achievements and attitudes. The main effects of the integrated physics courses for students' achievements (for the given variables) were tested by a series of ANCOVAs in which the pretest results were utilized as the covariances. All ANCOVA results revealed that when students' performances of posttests were adjusted by performances of pretests, different significant main effects appeared. The statistical parameters, *F*-ratios, *p*-values and effect sizes (*f)* for each of 12 ANCOVAs for gender, major, dispositions towards computers and orientation attendance (for each of three physics courses and four blocking variables). All ANCOVA results revealed significant main effects between mechanical and civil engineering students in kinematics ($F = 4.209$, $p = 0.044$, $f = 0.259$) and kinetic energy and work content achievements ($F = 22.100$, $p = 0.001$, $f = 0.593$), with above medium or higher effects, but not in the optical units ($F = 1.328$, $p = 0.254$, $f = 0.153$). Non-significant ($p > 0.05$) main effects were found for gender, disposition towards multimedia, and attendance at computer orientation classes for all three integrated physics units. All effect sizes were below the medium effect ($f < 0.25$).

The questionnaire results showed students' differential physics learning attitudes. The four survey subscales indicated positive attitudes toward integrated physics units, with the statistical mean responding > 4.00 for all learning attitudes. The descriptive statistical mean and standard deviations for students' learning attitudes (for six subscales and the total survey) were indicated in [Table 1]. Differential effects of the integrated physics units were explored for taking a variety of students' characteristics into consideration. The main effects of the integrated physics units (with six attitude subscales for the six blocking variables) were tested by a series of ANCOVAs. The final testing was done on the combined samples since each student had to complete the same attitude survey. [Table 2] provided a brief summary of the *F*-ratios, *p*-values and effect sizes (*f*) in 24 ANCOVAs for gender, major, disposition towards integrated physics courses, and students' attendance.

Table 1. Descriptive statistics for the mean scores (M) and standard deviations (SD) for students' integrated physics learning attitudes for six subscales and the total survey.

Scores	Attitude Measurement						
	S_1	S_2	S_3	S_4	S_5	S_6	Total
M	4.22	4.15	4.03	4.08	4.03	4.14	4.11
SD	0.17	0.20	0.07	0.17	0.16	0.24	0.33

The statistic ANCOVAs revealed significant main effects of gender on students' learning attitudes, favoring males over females (S_4) ($F = 3.885$, $p = 0.050$, $f = 0.143$), and self-evaluation (S_5) ($F = 4.621$, $p = 0.033$, $f = 0.157$). The effect sizes ranged between 0.1 and 0.2, indicating small and medium effects. Students demonstrated a non-significant gender effect of attitudes towards integrated physics units (S_1), attitude towards the physics instructors (S_2), attitude towards integrated physics learning environment (S_3), and attitude towards integrated physics learning results (S_6). These effect sizes were all below 0.14, only a small effect. Non-significant ($p > 0.05$) main effects were found for student's major (either mechanical or civil engineering) on all six attitude subscales.

The main effects of ANOVAs significance testing showed that students who attended the learning activities had a favorable attitude towards integrated physics units (S_1) ($F = 8.694$, $p = 0.004$, $f = 0.215$), attitude towards the physics instructors (S_2) ($F = 7.509$, $p = 0.007$, $f = 0.199$), attitude towards students' interactions (S_4) ($F = 4.590$, $p = 0.033$, $f = 0.153$), and attitude towards integrated physics learning results (S_6) (F

= 4.059, p = 0.045, f = 0.146); all effect sizes ranged from small up to medium. Non-significant (p>0.05) main effects were found for two other subscales: learning attitude towards integrated physics learning environment (S_3) and self-evaluation (S_5).

Significant positive main effects were found for dispositions towards integrated physics units for all attitude subscales: attitude towards integrated physics units (S_1) (F = 18.943, p = 0.001, f = 0.446), learning attitude towards the physics instructors (S_2) (F = 21.131, p = 0.001, f = 0.472), attitude towards the integrated physics learning environment (S_3) (F = 10.439, p = 0.001, f = 0.331), attitude towards students' interactions (S_4) (F = 12.067, p = 0.001, f = 0.357), attitude towards self-evaluation (S_5) (F = 14.741, p = 0.001, f = 0.393), and attitude towards integrated physics learning results (S_6) (F = 20.378, p = 0.001, f = 0.464). The effect sizes ranged between 0.331 and 0.472, indicating medium and higher effects. Scheffe's post hoc comparison results revealed that S_1, S_2, and S_5 students' attitudes reporting 'positive' were superior to those reporting 'neutral' and 'negative', and attitudes reporting 'neutral' were superior to those reporting 'negative.' The results of Scheffe's post hoc comparisons revealed the same integrated physics learning results that S_3, S_4, and S_6 students' attitudes reporting 'positive' were superior to those reporting 'negative', and attitudes reporting 'neutral' were superior to those reporting 'negative.'

Table 2. Summary of F-ratios, p-values and effect sizes (f) for each of the ANCOVAs

Blocking Variable	Analyses of Variance	Attitude Measurement					
		S_1	S_2	S_3	S_4	S_5	S_6
Gender (male, female)	F-ratio	2.718	1.642	3.771	3.885	4.621	3.133
	p-value	0.101	0.202	0.054	0.050*	0.033*	0.078
	f	0.119	0.095	0.139	0.143	0.157	0.128
Major (civil, mechanical engineering)	F-ratio	1.004	0.001	0.524	0.727	1.898	2.859
	p-value	0.318	0.977	0.470	0.395	0.170	0.092
	f	0.071	0.071	0.055	0.063	0.101	0.123
Disposition toward multimedia (positive, neutral, negative)	F-ratio	18.943	21.131	10.439	12.067	14.741	20.378
	p-value	0.001*	0.001*	0.001*	0.001*	0.001*	0.001*
	f	0.446	0.472	0.331	0.357	0.393	0.464
Attendance (yes, no)	F-ratio	8.694	7.509	1.652	4.590	3.286	4.059
	p-value	0.004*	0.007*	0.200	0.033*	0.071	0.045*
	f	0.215	0.199	0.095	0.153	0.132	0.146

Note: * $p < 0.05$

5. Conclusions

It would be a favorable strategic teaching for this research to integrate both animations and physics instruction into upgrading students' learning performances. The validity of this study exemplified many characteristics of integrated animations and animated environment in previous research results (Su, 2008a, 2008b, 2011, 2013; Kiboss, 2002; Tao, 2004), which contributed much to students' scientific learning competence and proficiency. As an effective integrated study, all the statistical physics learning results discussed above were consistent with most recent advanced researches (Tenenbaum, et al., 2001; Kiboss, 2002; Tao, 2004). In order to present students' better targeted programs of physics understanding and promote a more positive attitude towards physics learning, all ANCOVAs findings of students' characteristics such as gender, dispositions toward integrated physic courses, and attendance at the integrated physics learning programs had a major significant ($p < 0.05$) influence on their attitudes, with higher effect sizes than other variants considered.

Three major animation principles concerning the properties of physics learning environment such as kinematics, the movement of a ray and the conservation of mechanical energy (indicated in Figure 1, Figure 2 and Figure 3) gave students to organize reflections on the effective learning of physics conceptions. Based on the analyses of statistical responses, students were able to

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identify fundamental concepts between animations environment and physics learning. The integrated texts and physics learning environment helped to develop more unifying principles and meaningful higher-level skills which would enhance students' physics understanding and facilitate their learning performances. The integrated animations environment of physics learning provided a powerful means for fostering physic principles because it could illustrate multi-level physics conceptions (Galili, 1996; Kiboss, 2002). All results of three major animations supported and facilitated students' physics conceptions learning and attitudes.

The integrated statistic results of three animation units in this study were well-organized and helpful for most college students' effective physics learning. It would significantly make a positive contribution to students' physics learning attitudes. The results gave more reliable implications to previous researches (Barton, 2005; Tao, 2004; Kiboss, 2002) in relation to integrated physics materials and demonstrated applications which could encourage students to construct a better physics conceptual understanding. As stated by Ainsworth (2006), the DeFT (Design, Functions, Tasks) learning framework needed to integrate the cognitive representations and constructivist theories of education into multiple research programs. He proposed that the effectiveness of multiple representations could best be understood by considering three fundamental learning aspects: the design parameters that were unique to learning environment; the functions that supported integrated physics learning; and the cognitive tasks that must be undertaken by learners' interactions with multiple representations. All three major animations increased students' learning perspective and cultivated physics conceptions. Through the availability of three principal animation texts, students were capable of more effective performances for developing physics conceptions and learning environment.

Acknowledgements

The author would like to thank the journal editors and the anonymous reviewers of this paper for their kind assistances and helpful suggestions. A short but sincere thank must also be given to the patronage of the National Science Council, R.O.C. in Taiwan (under Grant No. NSC 101-2511-S-237-001 & NSC 102-2511-S-237-001). Without their help, this study could not have been completed in present form. Finally, thanks must also be given to all the instructors and students who participated in this research study.

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E-learning study materials focused on projects from industry

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Abstract

Theoretical knowledge and theoretically oriented study materials are always great advantage of education at universities. However, access to learning materials and know-how used in industrial practice is very limited. With regard to this issue the Faculty of Mechanical Engineering at the University of West Bohemia has launched a project in which example projects from practice are worked on. The outputs of each of the projects are e-learning pdf files. These study materials contain all important information which the designer normally comes into contact with in practice. There are tender dossiers, interactive 3D models, drawings, processes (welding, machining, assembly...). One of these projects is focused on a curing press, which will be used for a closer examination of the developed study materials.

Keywords: e-learning; study materials; machine design; design projects; CAD models; 3D models

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1. Introduction

Industrial companies have high demands on graduates of the Department of Machine Design, Faculty of Mechanical Engineering at the University of West Bohemia. These requirements could be divided into theoretical and practical knowledge. Theoretical knowledge and theoretically oriented study materials are always great privilege of education at universities. However, the accessibility of learning materials and know-how which are used in industrial practice are very limited. Another problem is the lack of practice and the offer of internships from industrial companies for students in technical fields which would balance the lack of these materials to a certain degree.

With regard to this issue Faculty of Mechanical Engineering has launched a project where the example projects from practice are processed. The individual projects are worked out by academics with the support of industrial companies. The output of each project is an e-learning pdf file. These e-learning study materials are comprehensive instructions for designers containing a tender dossier, interactive 3D models, drawings and processes (welding, machining, assembly etc.). One of these projects is focused on a curing press, which is supposed to be used as the example of the developed study materials.

Currently, the interest in studying technical branches is declining in the Czech Republic. According to the demographic distribution as presented in (Koucky and Bartusek, 2011) the number of university students is currently on its local maximum and for the future a decrease in number of students is expected. Although the overall number of university students is at its maximum the number of engineering students is decreasing. This applies not only for the Czech Republic, but also for the whole Europe. Only 15% of students would like to study technical and scientific fields. In Asia the phenomenon is reversed and up to

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60 % of students there are interested in studying technical and scientific fields. By improving the quality of learning materials and applying modern teaching methods the attractiveness of these branches is believed to be increased to attract more students.

Various types of machines (such as hydraulic presses, manipulators of pipes, conveyors, lathes, milling machines, castings, molds, etc.) are processed within the whole developmental project. Each of these "branches" has its own specific features. These characteristics define the method of how the design documentation, technology etc. are carried out. This diversity allows students to recognize the differences between each branch. The overall concept of basic study materials is the same for all the projects. The study materials are different only according to the specifications of a processed branch of production.

2. Introduction to curing presses

Curing presses are machines where the final stage of production of tires takes place. Semi finished tires are inserted into the mold of the curing press and by treatment with a defined pressure and temperature they obtain their final shape and final mechanical properties. Nowadays curing presses are operated by a powerful control system, which ensures continuous operation and control of machine operation. Vulcanization is a chemical reaction taking place under high pressure and temperature while the vulcanizing agent changes the structure of the rubber composition.

Why a curing press? Curing presses have a long tradition of production in the Czech Republic and there are several manufacturers that export their machines all over the world. The tradition of engineering in the Western Bohemia, where the Faculty of Mechanical Engineering is situated, dates back to the beginnings of the development of Skoda factory. Emil Skoda who became the chief engineer at Waldstein Engineering in Pilsen in 1866 was responsible for the development of the Skoda factory. Three years later, he bought the company and soon changed the small factory with 33 employees into a great worldwide known company with 4000 workers and 200 engineers. He built gradually a new foundry, machinery, steel mill, blacksmith shop, railway track and an arms factory (Broz, 2004). Tire curing presses have been producing here since 1960.

Curing presses are classified as moderate weight machines in the range from 40 to 150 tons, depending on their size and design. Mostly they are produced individually or in small batches. One of the reasons why the curing press is used for these study materials is that this machine uses a wide range of components and principles commonly applied in other machines. This offers universality in the use of these study materials.

3. Requirements for the study materials

The developed study materials have to comply with commonly used standards used in the world. These criteria are intended to ensure the quality of the materials. They are also used to support the systematic effort to improve the quality of engineering education. These criteria meet the requirements in dynamic competitive environment of industrial companies.

These requirements are defined according to the Accreditation Board for Engineering and Technology (ABET, 2011). The requirements are similarly defined by the European Network for Accreditation of Engineering Education, which can be identified in (ENAE, 2008).

Requirements according to ABET (ABET, 2011):

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data

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- an ability to design a system, component, or process to meet desired needs within realistic
- constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function on multidisciplinary teams
- an ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- a recognition of the need for, and an ability to engage in life-long learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Leading experts of the Faculty of Mechanical Engineering at the University of West Bohemia, who have sufficient experience in teaching and practice in engineering, have defined additional requirements that complement or concretize the requirements defined for mechanical engineers. These requirements were published in (Hynek et al., 2013) and are as follows:

- an ability to use CAD software
- a knowledge of the mechanical design process
- a knowledge of manufacturing processes
- a knowledge of economic aspects of production
- experience with real applications
- an ability to express their thoughts unequivocally
- an ability to communicate in foreign languages
- technical creativity
- an ability to analyse and formulate technical problems
- a knowledge of total quality management principles

4. Study materials

The entire project of the curing press is divided into several parts. This division is shown in Figure 1. Each of these sections is a separate PDF file which contains the information relevant for the block. These study materials are available in PDF format which allows the use of these study materials at ordinary desktop computers as well as nowadays widespread tablets or smart phones. This eliminates the need for students to purchase student licenses for some of the CAD systems only to view 3D models.

Introductory information - Students get familiar with the basic information in this PDF file and are introduced to the problematic of curing presses. The basic functional principles of conventional curing presses are also clearly illustrated there. Students will also learn how to use all the functions of individual PDF files in this section.

Tender dossier - Tender dossier is a document which specifies customer requirements for the current bought machine. There are all technical specifications and performances. There is also a timetable and procedure for installation. The designer uses this document to create the design of the curing press.

The documentation for welding and system of validation - Welding technology is, along with the machining technology, the most common method of production of individual parts of tire curing presses. Students are introduced to the basic operations of welding in this document. The required documents for the welding process are listed there as well. The information in this PDF file is therefore generally applicable for the welding technology. The specific information about the process of welding of individual assemblies is mentioned in the PDF file which deals with the design of assemblies.

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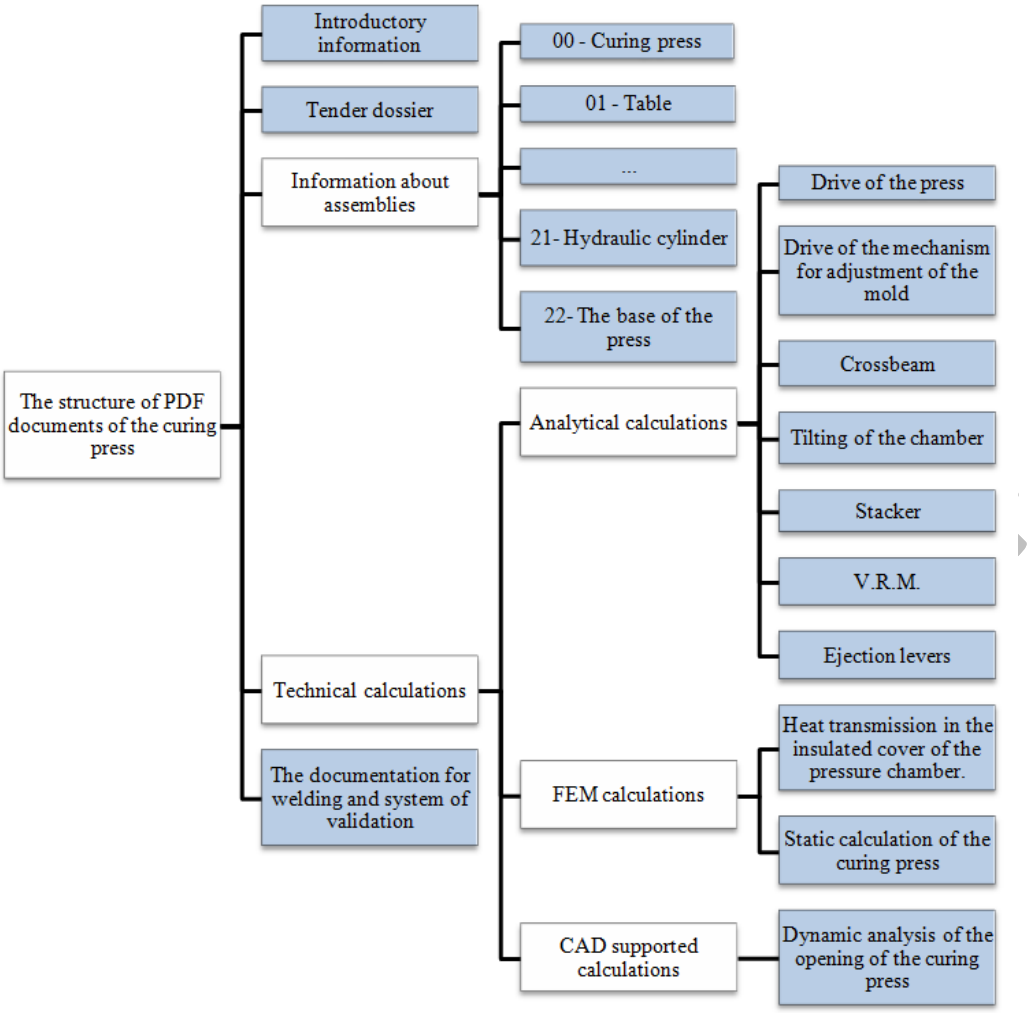


Fig. 1. Structure of PDF files of the curing press

Information about assemblies - This type of document has its fixed structure which is the same in the entire project (For example, in the lathe project, these documents look the same so students who learned to work with these documents can easily orient themselves in another machine or device project). There are all main assemblies of the curing press described in this document. There are explanations of features of specific parts and components and they are also identified and described. For example, see Fig. 2. Thanks to the technology of 3D PDF files there are 3D models which students can manipulate, rotate, hide, etc. For example, see Fig. 3.

Two colourings of components are used for the project of the curing press. The first colouring corresponds to the individual assemblies which allow students to orient themselves in the large number of parts. The second colouring has the technological nature where each part is coloured according to the machining technology. For example, see Fig. 4.

Another important part of the study materials is the complete drawing documentation. The drawing documentation contains all information necessary for the production of components such as dimensions, geometry, tolerances, surface treatment, welding, weight, information about assembling, parts list, etc. For example, see Fig. 5. The creation of drawing documentation is nowadays still the essential activity of designers and because its quality it is necessary to pay significant attention in this field. There are enclosed data sheets of purchased items in the final part of these study materials.

ASSEMBLY OF THE DRIVE OF THE CURING PRESS

- The base of this assembly is the drive shaft.
- Drive shaft is mounted in bearing houses.
- Drive of the shaft is ensured by the electric motor with worm gear.
- Worm gear is used because of the self-locking effect.
- Pin of the torque shoulder prevents the rotation of the gear unit against the press frame.

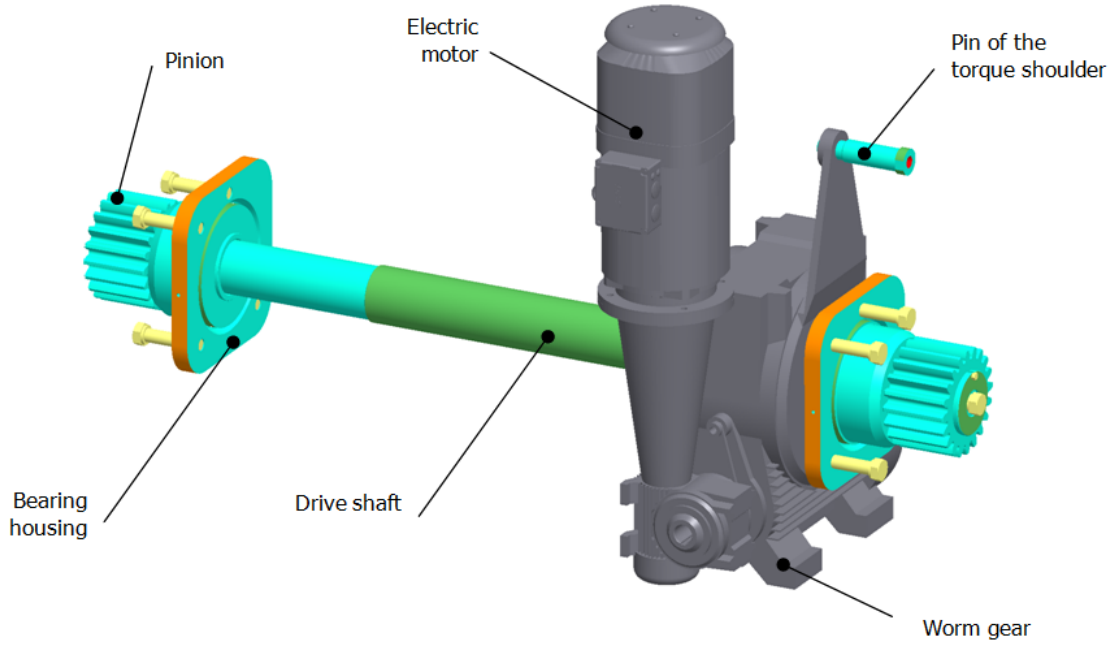


Fig. 2. Structured PDF - Description of the components of assemblies

Analytical calculations - These computational reports describe the design and check calculations of the individual components of the press. Especially there are the calculations of strength, toughness, lifetime, etc. These computational PDFs give students the overview of where and how to apply the theoretical knowledge acquired in subjects such as Mechanics or Mechanics of Deformable Solids.

FEM calculations - Advanced analysis has been done by using computer calculations with the final number of elements. These calculations include the calculation of the components whose analytical expression would be too complicated, inaccurate or impossible. There are two FEM calculations: the first calculation is the static calculation of the entire curing press and the second one is the calculation of the heat transmission in the insulated cover of the pressure chamber. For example, see Fig. 6. The temperature calculation of the insulated cover of the pressure chamber was not solved the same way as the calculations according to (Hynek and Votapek, 2013) which used the boundary layers in the heat transfer to the surrounding environment. This time only one heat transfer coefficient was specified which is more common in practice and it is easier to set the calculation.

CAD supported calculations – The calculation of the reactions in individual components of the curing press during the phase while the curing press was being opened was done by performing dynamic analysis. This analysis has been processed into a comprehensive calculation report.

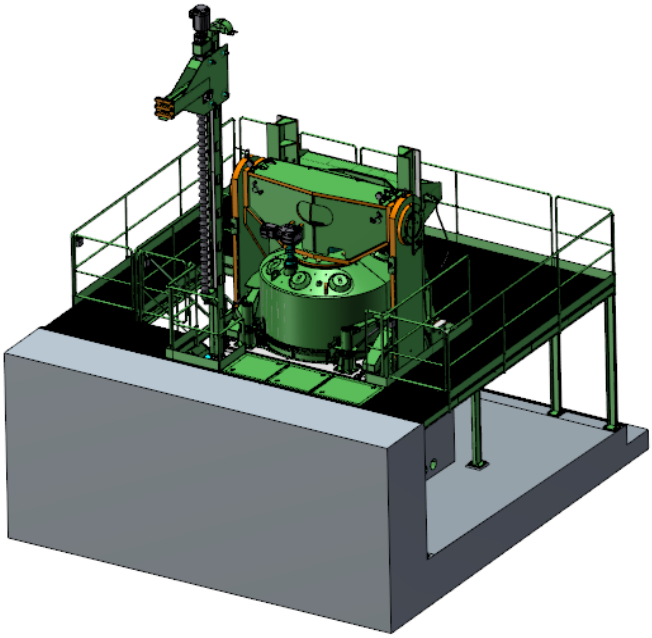


Fig. 3. 3D PDF of the whole curing press

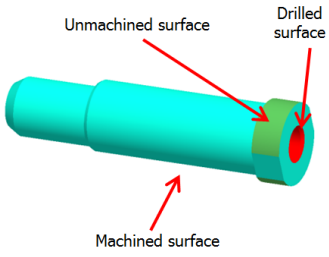
COLOR	RGB	DESCRIPTION	EXAMPLE
GREEN	(90,190,90)	Unmachined surfaces	
AZURE	(10,255,255)	Machined surfaces (lathe, milling machine)	
ORANGE	(250,140,0)	Cut surfaces (water jet, saw, shears…)	
RED	(255,0,0)	Drilled surfaces	
WHITE	(255,255,240)	Grooves	
YELLOW	(255,255,130)	Standard connection parts (screw, nut, pin…)	
GREY	(120,120,130)	Purchased parts	

Fig. 4. Colouring according to machining technology

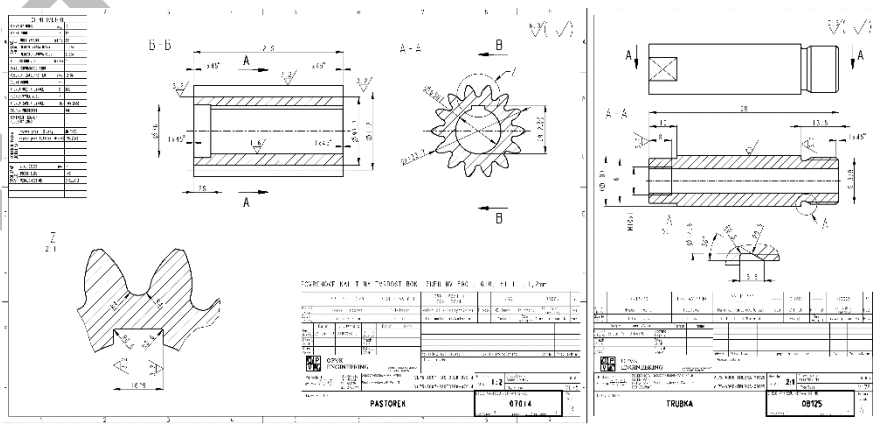


Fig. 5. Sample of the technical drawings

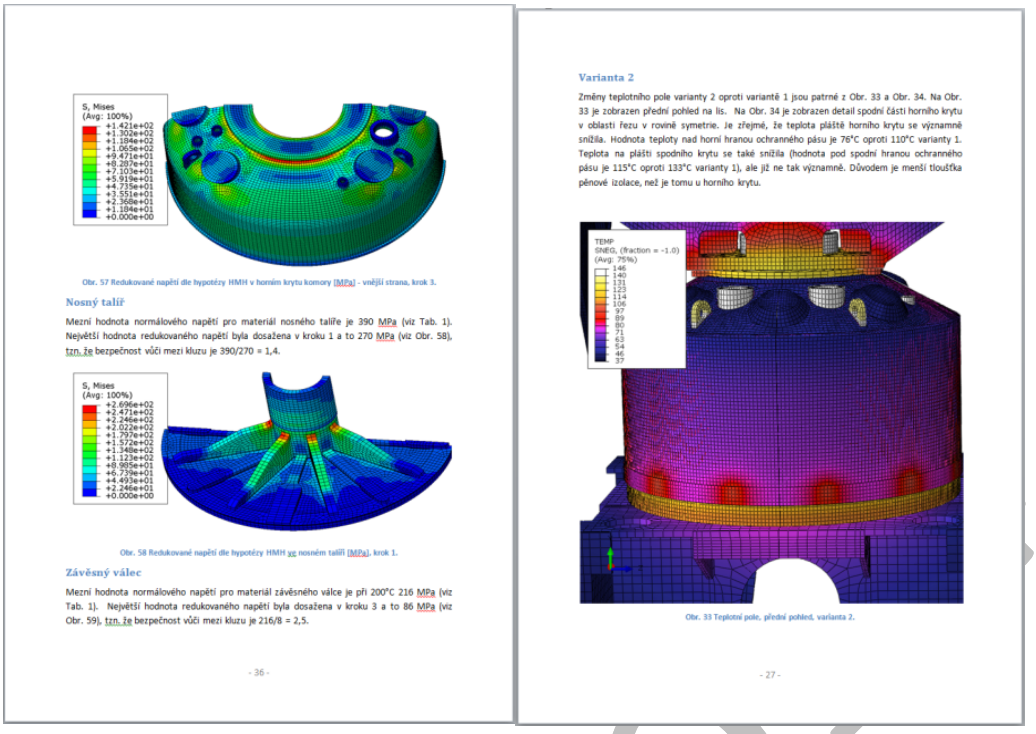


Fig. 6. Sample of FEM calculations

5. Contribution of the developed study materials

- Transfer of knowledge and practical experience from engineering practice into university study materials.
- High complexity of the study materials.
- The study materials have been developed in accordance with the current knowledge in the field of engineering using modern methods.
- Increasing the attractiveness of technical fields to attract more students thanks to high-quality learning materials and modern methods of teaching.
- Possibility to create tasks for the term design projects based on some parts of the machines (e.g. the task could be to modify or enhance the certain part of the machine).

To illustrate the extent of the project of the curing press there are approximate numbers of pages:

- 600 drawings (manufacturing, assembly, parts lists, format A4 - A0)
- 250 pages of analytical calculations
- 77 pages of FEM calculation reports
- 25 interactive 3D PDFs
- 200 pages of descriptive and informative parts

6. Conclusion

The main purpose of this paper is to introduce the form and the structure of the newly developed study materials. These study materials have been designed in accordance with the requirements applicable to

university education in mechanical engineering field. These requirements have been identified in this paper.

The primary reason for creating these study materials was the lack of practice-oriented study materials at mechanical engineering oriented universities in the Czech Republic. Thanks to the cooperation between academics and machinery companies it was possible to transfer practice skills and know-how into the study materials. The advantage of these study materials is their high complexity. They are not only excerpts of context which could be difficult for students to classify. These materials are the complete machine documentation beginning with the tender dossier and ending with the technical drawings.

The further optimization of the study materials will depend on the evaluation performed by students in the system for evaluating the quality of teaching at the University of West Bohemia in Pilsen or on individual responses of students conveyed to the teachers.

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Electronic study materials for design of universal center lathes

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Abstract

This article describes the creation and application of e-learning study material at the University of West Bohemia in Pilsen at the Faculty of Mechanical Engineering in the Department of Machine Design. This project specifically deals with description, design, calculation and construction of a universal centre lathe. The study materials meet standards used in modern engineering practice and they are also appropriately structured for better understanding. All documents are created with the help of experts in this field.

Keywords: e-learning materials; 3DPDF, calculations; CAD models; drawings; lathe; machine design

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Embracing the future: empowering the 21st century educator

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Abstract

The world of education is different and you as an educator have probably been a part of at least some of the educational transformations occurring today. These have not been incremental changes but rather large encompassing changes to education, as we know it. This is a world in which education is moving from the industrial age to the *connected age* brought on by the increasing numbers of Web 2.0 applications. Humans are social beings with a desire to "connect, exchange, share, remix and reinvent" (Prensky, 2005) all of which can be accomplished with a few friends and technology.

Keywords: MOOC's; Mobile Learning; Pedagogy; Augmented Reality; Cloud

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1. Introduction

The world of education is different and you as an educator have probably been a part of at least some of the educational transformations occurring today. These have not been incremental changes but rather large encompassing changes to education, as we know it. Add the massive technological innovations; we now have an educational world that is vastly different from the education of our parents and ourselves (Bonk, 2009).

This is a world in which education is moving from the industrial age to the 'sharing age' brought on by the increasing numbers of Web 2.0 applications. When examined in context of human behaviour and technology, this was inevitable. Humans are social beings with a desire to "connect, exchange, share, remix and reinvent" (Bonk, 2009) all of which can be accomplished with a few friends and technology.

As educators looking to a sustainable future for our higher education institutions, secondary institutions and learners, the answers are not easy. Examining the higher educational issues noted online, within educational *think tanks* and in educational research journals can help educators begin to embrace the future, allowing for thoughtful and strategic planning that empower our educators and learners. The higher education issues to be examined in this paper are:

- Learn, Unlearn and Relearn – Big Ideas
- Going Mobile and the Cloud
- Learning Online – MOOC's for Everyone
- Virtual Learning Environments and Augmented Reality

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Each of these new learning environments brings with it challenges in the pedagogical models educators presently use within higher education institutions. This is not a world for which we as educators were prepared for – we have to rethink how to work with students and in classrooms – no matter where the classroom exists. A decade ago, the faculty member was the sole source of information that a student needed to succeed in a career. Today's students seek information instantaneously through their favourite search engine on a smartphone. The ubiquity of technology has encroached on information acquisition from anywhere at any time, making it essential that we engage students by any means necessary in this new digital learning environment for teaching-and, ultimately, this new way of learning.

2. Learn, Unlearn and Relearn

Teaching must be transformed to better meet the needs of a digital learner (Prensky, 2005). Our fixation with order in our classrooms such that desks are in neat rows facing the instructor who dispenses knowledge must be replaced with a social-cognitive theory of learning for any reform in higher education to succeed in this technological age. The pivotal point of true reform of higher education lies in, "unlearning, old attitudes, acquiring new ones, accepting new responsibilities, trying the new and risking failure, unrealistic time perspectives, and expectations, limited resources, [and] struggles as a consequence of altered power relationships (Seymour, 1990). As educators begin this discussion of educational trends and big ideas, let us be reminded of how we each deal with change. Everett Rogers (Rogers, 2003) for over 30 years studied how communities deal with change by also examining an individual's ability to change. Full disclosure – Rogers began by studying agricultural change and then realized change was about the people in the community not the 'corn products' that he was trying to move the group to plant. He created Rogers' Innovation Adoption Curve to help identify the characteristics of adoption of an innovation (in this case, educational innovation). If we look at the list below, Rogers' (Rogers, 2003) found that most communities including education communities follow this pattern of adoption of innovation when identifying possible innovators and adopters: *Innovators* (2.5 %); *Early Adopters* (13.5 %); *Early Majority* (34 %); *Late Majority* (34 %); and *Laggards* (16 %).

Taking a moment to examine the definition of each of these, the innovators (2.5%) are viewed by their peers as brave people within the organization…pulling the change along. Communication is important to them. *Early Adopters* (13.5%) are respectable people, opinion leaders; try out new ideas in a careful way. The *Early Majority* (34%) are careful people; but accept change more quickly than the average. The *Late Majority* (34%) are skeptics and only change when the majority are using and is required and typically at the risk of loss of a position. The last group, the *Laggards* (16%) are traditional. They expect and want the old ways – will not change – do not waste time on these people when trying to innovate (Rogers, 2003). Each of these groups plays a role within an organization as it tries to innovate. Knowing this information can provide a guide to planning how an organization is going to deal with the members and what professional development, knowledge, skills and dispositions must be achieved for adoption of change.

3. The Need for Big Ideas

*"The illiterate of the twenty-first century will not be those who cannot read and write, but those who cannot **learn**, **unlearn** and **relearn**."…Future Shock*, Alvin Toffler, 1970.

This quote brings the educators to the topic of *Big Ideas*. Higher education classrooms must be the place where thinking occurs. The work of the classroom must be one of co-learning in which lessons are designed such that students *construct meaning and connect* in a networked environment. We have to move to a new model of Bloom's Taxonomy in which we teach conceptually and the students learn the skills as they work through the materials to learn the 'big' idea. The problems of today and tomorrow will need to be solved through big ideas. Ideas matter; big ideas are what excite, engage and motivate learners.

What if students were challenged to work in teams, collaborate with others around the world on math, science and health problems or historic events to analyze an important concept or content? Instead of starting at the bottom of Bloom's Taxonomy, what if the instructor started at the top? Rather than lecture (which includes PowerPoint presentations), use problem-solving teams and case studies in which the students are challenged to dissect the big idea and present the *analysis* process, *synthesize* the information, *evaluate t*he possible outcomes and in the process learn the *knowledge*, *comprehend* the magnitude of the problem, and *apply* a possible solution [(Halstead, 2011) Bloom's Taxonomy reversed!

In classrooms (both face-to-face and online) with the expectation of student-centered learning, students discover their own understanding of content, significant retention and understanding of content occurs with an increased interest in learning. Using open sharing of problem-solving solutions through the use of teams allows not only for in depth discussion by the team of problem solutions but allows for whole group discussion in which the instructor gives students the opportunity to thoroughly explain their thinking about the solution presented. Through probing questions the instructor can help students come to their own understandings and identify and rectify misconceptions in the process (Halstead, 2011).

What Web 2.0 applications might help the student and instructor in their collaboration on big ideas? Mind mapping (also called concept maps) in which students dissect the problem into component issues or concepts might be a place to begin. Popplet® (http://popplet.com/) allows for collaborative development in multiple locations in a multiplayer design within the cloud environment. Inspiration® (http://inspiration.com/) and Mindmeister® (http: //www. mindmeister.com) provide for web-based/cloud distribution of the content to multiple locations. These tools allow teams to build maps of their thinking as they plan for the analysis, synthesis and evaluate content. The mind map can act as a means for the instructor to assess the teams' activities and thought processes as they work through the problem with the mind map acting as a recording of the work of the team. Lastly, the mind map can act as an advance organizer or scaffolding mechanism for relearning material as a student prepares for projects or testing (Kazakoff, 2009). Wikis and blogs act as a foundation for participatory learning and allow students to interact and collaborated beyond the boundaries of the classroom without respect to place, time, and distance (Cunningham, 2009; Leuf & Cunningham, 2001; Warhurst, 2006). Social media software which includes, wikis, blogs, Twitter® and Facebook® to name a few have created a participatory culture and learning environment. In the digital world, traditionally passive learners have become active participants with connectivity and the social rapport sharing their expertise McLoughlin & Lee, 2007). Finally, Web 2.0 applications such as Evernote®, Dropbox®, and Google Drive® allow for student and faculty documents to be shared, again, with no respect to time and place for learning to occur.

Another instructional strategy involves the use of a *flipped* classroom in which instructors construct a new pedagogy to develop skills in critical thinking and problem solving. The flipped classroom as an instructional model reverses the common instructional approach (Tucker, 2012). The instructors do this by changing the definitions of homework and classroom practice. In a flipped classroom, students use non-class time to connect to the content that the instructor would typically teach instead of doing homework. Class time is used to actively engage with other students and the instructor to think critically about real-world problems and to apply the newly learned content knowledge to projects, lab experimentation and collaborative teamwork. The non-class time content is found online in a learning management system (LMS) and students are expected to go to the online site and *study*. As a teaching philosophy, the flipped classroom supports continued learning in which education does not stop when the class ends but there is an expectation that learning continues between class meetings. The flipped classroom model minimizes the time spent on *chalk and talk* and produces more teacher-student and student-student interactions in class. It produces more time for the instructor to organize collaborative activities, interact with students creating a very individualized instruction (Brunsell & Horejsi, 2011). As students learn to work in a flipped classroom environment, they come to realize that with the materials online, they can study at their own pace and schedule and that the responsibility for learning is owned by the student, not the instructor. Web 2.0 technologies are important in a flipped classroom as web-based instruction such as video and podcasting can be watched from multiple devices. As the instructor develops the online materials for the

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student, the instructor becomes a cognitive coach helping each student achieve his/her learning goal (Franklin, Sun, Yinger, Anderson & Geist, 2013).

Changing instruction to embrace big ideas, the use of technology to flip a classroom or connect students in participatory learning requires an educator that is willing to learn, unlearn and relearn new pedagogies for teaching, learning and moving higher education forward.

4. Going Mobile and the Cloud

The cloud technology poses and interesting economic issue for education. With more and more access needed to the Internet (i.e. the cloud), higher education institutions are in constant need of bandwidth. This is being future compounded by students that use multiple devices including smart phones, tablets and laptops, all mobile devices that seek to connect to content, information, games, video, movies and connect to friends 24/7. Add to this the need for apps (small software applications that complete only one task) and software that is delivered by the cloud, the costs to higher education for Internet access continues to climb. At this very moment, Microsoft® and Google® is delivering a new operating systems that will live within the cloud. Cloud connectivity will be used to deliver software and operating systems necessary for your device to work in much the same way your cell phone needs the Wi-Fi or G3 delivery. This cloud access is going to be the new way that businesses make money using the Internet as more and more devices go to a cloud delivery requiring subscriptions to connect you to your productivity software.

We have the development of the netbook to 'blame' for this change. The small, lightweight netbook now called an ultrabook led the way to the present smartphone industry. Once it was identified that lightweight mobile technology was highly sought after by the public, innovation to move to highly mobile devices such as smartphones, cells, flip cameras, and tablets were viable for businesses to produce and sell to the public. The lower price point of these items fueled the cell phone industry as they could now produce smartphones with similar capabilities at the same price or cheaper price. These highly mobile devices are now seen as indispensable to our daily lives (Franklin, 2011).

Always on – always on you is the mantra for today's learner. "With more than 6 billion mobile subscribers worldwide, 85 billion text messages sent per month, mobile texting usage is up 450% over the last two years, it's clear that mobility will overtake the Internet and television as the most ubiquitous form of communication" (Mobile Matters, 2011, para. 1). Here is what it means to be mobile:

- Like your car keys and your wallet, the mobile device is always with you including the ability to communicate in real-time, anywhere, anytime
- There is an every present audience by the use of Twitter™ and Facebook™
- Personalization is the name of the game – 'one size does not fit all'; direct and personal, takes little time to send a message or respond
- User has the option to 'opt out' so it is permission-based
- Messages on your cell phone tend to stay (stick) and can be forwarded to others at the chosen time and place
- Interactive on a 1:1 basis with the user deciding who, when, where and why to communicate (Mobile Matters, 2011, para. 3).

With mobile devices comes pedagogical complexity. Higher education faculty in general are somewhat resistant to the idea of an open system or world in which a student can *reach out and touch him/her*, which is the direction that mobile learning and cell delivery of content takes the learner. Smartphones and other mobile devices create a world in which 24/7 access makes locating experts, in this case faculty, for questions, discussion and collaboration an easy task. Through the use of their mobile device, our students can quickly *fact check* a class lecture, *find people* who may know more about the topic than the faculty member, *find students* who have completed the assignment last year and ask them for help – or *copy* intellectual

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property directly -- and *Facebook*® or *tweet* how bad/boring your class is – all while attending your 55 minute lecture.

Mobile devices increase the opportunity for student/faculty interaction. Text messages, Skype calls and constant email can become a 24/7 event for the faculty member. The expectations of a mobile-based learning will have to be negotiated such that both faculty and student are not invading each other's social and private spaces and time. Cell phone use, laptop use, social networks in the classroom will also have to be negotiated. Mobile devices have the potential of increasing faculty workload. Mobile technology and learning adds a complex layer in which the faculty member has to juggle websites, content, design, implementation and execution of technologies and the cloud. How does my content look on a mobile device? The answer requires repackaging of content, time to prepare and staff support that is often not available (Franklin, 2011).

There is great resistance in the ranks of our higher education faculty as many see these mobile devices as a distraction to learning. Students are often not willing participants either, seeing the use of tablets, laptops and cell phones as a means of making learning 24/7 and their responsibility. Mobile technology may be in the hands of students but it is primarily used to listen to music. Older adults returning to school may have no understanding or expertise with the technology – much less mobile technology (Franklin, 2011).

Going Online – MOOC's for Everyone

The higher education online course development process has become more competitive as more and more universities have created MOOCS. MOOCS is the term for *Massively Open Online Courses* and is the widely seen as an implementation by the universities Harvard, MIT and Stanford as a way to reach out to a worldwide audience of learners. MOOCS are appealing as they allow the learner to choose, when, what, how, where and why he/she wants to learn a subject. MOOCs often attract thousands of participants that are active in the discussions and complete the courses; while at the same time several thousand may *lurk* and read content rather than participate.

Connectivist pedagogy (Siemens, 2005) is the underlying principle behind the development of MOOCs. The Connectivist pedagogy supports a connected learning environment in which knowledge is distributed across a series of networks connections in which the learner must traverse these connections to learn (or in other words – connect to the learning). Knowledge is gained through the connections that from the learners actions or experiences.

Hence, in connectivism, there is no real concept of transferring knowledge, making knowledge, or building knowledge. Rather, the activities we undertake when we conduct practices in order to learn are more like growing or developing ourselves and our society in certain (connected) ways…This implies a pedagogy that (a) seeks to describe 'successful' networks (as identified by their properties, which I have characterized as diversity, autonomy, openness, and connectivity) and (b) seeks to describe the practices that lead to such networks, both in the individual and in society (which I have characterized as modeling and demonstration (on the part of a teacher) and practice and reflection (on the part of a learner)) (Downes, 2007).

MOOCs are built to provide access to the teaching of a world-class professor to thousands of students. The expertise of the professor behind the content isn't cheap and, in many cases, is unique to a particular university as the professor places the lectures, assessments and activities for a course online. A MOOC opens the door to the professor's classroom, often a very expensive classroom from a major Ivy League university.

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Last fall, more than 100,000 people enrolled in a free online version of the renowned Stanford roboticist, Sebastian Thrun's artificial-intelligence course. Many didn't finish. But some did, and among them, some performed just as well on the assignments and exams as the whip-smart students in Palo Alto who took the course in person. For this, the online students received no official academic credits of any kind (*The Chronicle of Higher Education*, September 3, 2012, para 6-7).

Because MOOCs are not bound by semesters or other traditional academic year arrangements, they allow for flexibility but not credentialing. The credentialing aspect of higher education and the role that higher education may or may not take will determine the impact of the MOOC on present pedagogy in higher education. The future of education one of universal access to free, high quality, impeccably branded online courses that their presence can be simply assumed. The interesting questions now revolve around financing, quality assurance, and—most important—credit (*The Chronicle of Higher Education*, September 3, 2012, para 9). The opportunity for a prospective student, alumni or casual student to enter a MOOC and then enroll in the university is a gamble that many US universities are taking in hopes of increasing enrollments and self-determining learners.

Virtual Learning Environments

Teaching and learning styles of yesterday's higher education classroom are no longer applicable in today's digital and technologically based world. Our students have been consumers of information in the past without producing or creating content that is new or relevant to them and their surroundings. The 21st Century requires a philosophical shift in educational practice with the adoption of technology and a more learner centered approach. Augmented reality (AR), also known as virtual reality (VR), is the final innovation to be discussed in this paper. At the core of virtual immersive environments is the changing pedagogy that places the student at the center of learning and as the *driver* of his/her own learning (Oblinger, 2011). Why are virtual learning environments significant?

These virtual environments have the potential to foster constructivist learning in which learners take ownership for their own learning processes. Digital learners are already comfortable with gaming and mobile communications. Virtual worlds bring together learners and challenge them to collaborate in problem-solving activities without explicit learning objectives and assessment. For many learners the avatar-to-avatar experience may seem as real as a face-to-face conversation. Opportunities arise for meaningful engagement in learning across a broad spectrum of students around the world. A virtual world as an educational medium requires reflection on how education has been conducted in the past. The virtual world allows for more interaction and more engagement for some students (Franklin, 2010, p. 196).

Many universities are experimenting with the use of augmented reality environments for teaching and learning and recruiting today's digital learner. From the recruiting aspect, several schools in the US are not using virtual campuses to invite future students to talk to advisors, meet the people in registration, and organize class schedules all within this virtual world (Hughes, 2011). Today's games are complex and require collaboration with others. Sixty-five percent of college students state they play online games on a regular basis. Games are very much a part of their mobile environment with games being played on tablets, laptops and smartphones all the while multitasking by visiting with friends, listening to music or completing assignments (Oblinger, 2006)..

Virtual learning environments are very complex learning constructs. When games come to the classroom, the instructor often views them unfavorably. Instructors in higher education have very little experience in these immersive worlds. Not realizing that these immersive worlds are designed to challenge the

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learner in his/her decision making processes, test problem-solving capabilities, identify goals for success, and work with others to *win*, the higher education faculty determines these are not worth educational time (Franklin, 2010). Gesture-based computing, already in wide use in gaming and mobile devices, has the ability to transcend linguistic and cultural limitations by relying on natural human movements, which transcend culture (Oblinger, 2006).

The gaming aspect to the virtual experience supports the goals of educators by creating a motivation to learn. Learners see themselves in control of the world, in control of decisions and free to explore and experiment. Experiential learning within these virtual environments encourages conscious reflection and critical thinking as learners interact with content and master difficult concepts (Tekaat-Davey, 2006). Learners are often motivated and willing to invest large amounts of time and effort to master video games. Time is spent discussing strategies of the game, the characters in the game, the plot, interactions of players and characters and how to master the game. Motivation to play games has two elements, first the desire to play the game and second the desire to continue to play and persist when challenged by events within the game. This motivation and willingness to invest time in learning is a key element that educators seek to replicate in the classroom (Rieber, Smith & Noah, 1998).

Immersive environments offer the advantage of capturing the attention of the game player who in this instance is the student in the higher education classroom. Having grown up with game devices such as the Sony PlayStation®, the gaming experiences of digital learners may prove to be a motivating factor in learning within virtual worlds designed for higher education as they allow students to say *what if* and explore. Students in virtual worlds are allowed to make mistakes – an important part of learning (Franklin, Chelberg, Liu, 2009). While entrepreneurs and large corporations eagerly examine virtual environments for communication, workforce training and to secure a global presence, higher education has been slow to research the impact of such learning environments. Virtual immersive worlds have the promise of providing collaboration, simulations, and explorations in which learners gain a unique experience with a topic often unrealizable in the classroom. Virtual environments help learners visualize phenomena such as sub-atomic explorations, standing in the eye of a hurricane, experiencing the force of a tsunami or the shaking of the ground in an earthquake which are all virtual experiences that are abstract or impossible to observe in the typical classroom environment (Rieber, 2001).

With virtual learning environments, faculty can present lectures, have students discuss remotely thereby saving transportation fees and commuting time for students and interacting with students inside a virtual classroom as if they are physically gathered in one location. Students can conduct experiments using virtual instruments in virtual labs, which decrease the investment of lab instruments. Virtual worlds also provide places for educational activities such as group thinking and gallery walks to examine research completed and shared by experts.

Virtual environments can provide students with new and unique leaning opportunities that the students would not have access to in the traditional classroom environment. Interacting in virtual worlds allows students to explore a unique and powerful learning environment that model globalization and the way in which these digital natives will work, collaborate, and share information as opposed to today's classroom of demonstrative show, tell, and repeat pattern. This is in direct conflict with the fast paced world students will be engaged in their future work. Globalization of communication, entertainment, and information introduces students to a wider perspective, resources and talent expertise when placed in an ever-changing learning space such as an immersive virtual environment (Oblinger, 2006).

Virtual worlds are set to lead the charge for education into the twenty-first century. A co-mingling of the spheres of learning, work and play is creating a new learning ecology in which the ability to leverage knowledge assets though distributed learning systems to others online is creating virtual environments across the Web.

Conclusion

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Educators may become overwhelmed by the race of the technology and the challenge of the mobile world in which our students are comfortable and knowing, Mobile learning – it seems logical to both faculty and learner, as it allows content that should enhance learning. What educator does not want 24/7 access to content for learners? After all, isn't this the age of the digital learner – the independent learner that has technology at his/her fingertips? We are in a world in which there can be a global educational exchange for exponential change in our educational systems. Educators must prepare their students for unknown new environments upon graduation for P-12 or higher education. Our current educational system is obsolete and we as educators will become obsolete if we do not realize that we must embrace the changes that are upon us in how, where and why students learn.

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Engineering our food: possible risks verses reward

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Abstract

Recently there has been a push to put a ban on genetically Modified foods because many people believe that they are harmful to the health of the public but on the other hand with the world's population continuing to grow and many countries lacking enough food to support their populations. The balancing of possible risk verses benefits is critical because of the great quantities of food that Genetically Engineered Food can provide compared to unmodified foods, but with possible risk factors.

Keywords: Genetically Modified Organism(GMO); Genetically Modified Foods(GMF); Carrying Capacity; Selective Breeding; Genetic Mutation; Food and Drug Administration(FDA); Biotech industry; Lobbyist; Environmental Protection Agency(EPA); United States Department of Agriculture(USDA).

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1. Ethical issue

There has been a lot of debate in recent years about genetically modified foods and their safety. With the advance of technologies there has been great advances on how we grow our food, for example, there was recently a story on national news about a simple hamburger but what is so amazing about the hamburger is that the beef used in it was grown in a laboratory. This laboratory grown beef is an example of the technological advances that in the future could be of great benefit to the world.

These laboratory grown meats in the future could reduce the need for having large herds, which are actually a large source of Methane released in the atmosphere. Methane is one of the most harmful of green house gasses causing climate change with large herds of cows being the source of the Methane. The current cost of the portion of beef that has been created was priced at nearly $330,000 but with the advance of technology this beef will likely become cheaper than natural beef and be produced in greater quantities. The need for cheap foods is becoming more and more important as the worlds population continues to grow exponentially. It is estimated that the earth can support somewhere between two and fifty billion people depending on the average living conditions of the population. The lack of food in regions of the world such as Africa, could be a sign that we are approaching or surpassed the maximum carrying capacity of the planet.



Fig. 1 A picture of the laboratory grown beef.

2. Ethical framework

The main issue when it comes Genetically modified foods comes from Common morality, one must weigh the risks verses rewards, on one hand there is a risk with using Genetically Modified Organisms whether it be by contaminating crops or causing health problems, but on the other had if these Genetically Modified Organisms are not used then the cost and demand for food would rise and some might suffer from starvation because of this increased cost.

2.1 Risks

There is a substantial fear that a genetically modified organism might possibly take over and eradicate the original crop. This fear comes from the fact that some crops such as corn and wheat would be planted in a field an release there pollen into the air, this pollen would then travel to unmodified crops eventually taking over all the crops by breeding the unmodified crops out. As an example the Africanized honey bee was brought to North America because they could produce more honey than the native species, these Africanized bees then began to breed out the native species. Today the Africanized bee has nearly eradicated the native species of honeybee.



Fig. 2 A picture of a Genetically Modified species of corn on top compared to Un-Modified corn.

Possible risks to human health have been called into question in recent years by many independent studies. There have been links made between Genetically Modified Foods and immune problems, accelerated ageing, faulty insulin regulation, changes in major organs and gastrointestinal system and infertility. One study found that when lab rats were fed these Genetically modified foods regularly the fatality rates in the baby rats were over five times the rate of the rats fed un-modified foods, this can be seen in Figure 3.

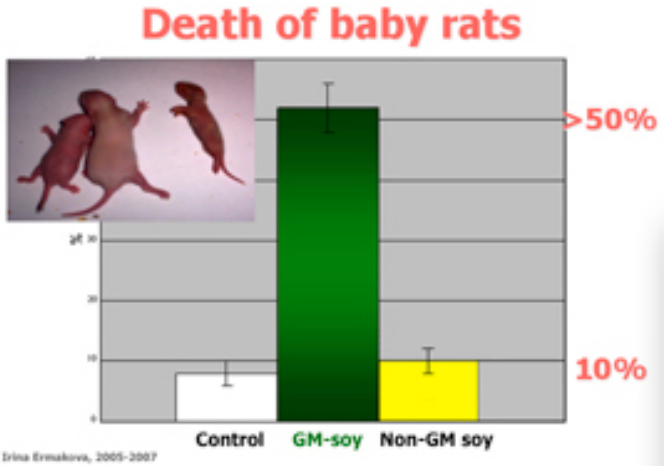


Fig. 3 The image above shows the fatality rates of baby rats that were fed a variety of un-modified and modified foods.

Many critics argue that selective breeding could have the same results as Genetic Modification without the risk of harmful genetic mutations.

Many ask "if genetically modified foods are so dangerous why are they not banned by the Food and Drug Administration(FDA)", some argue that this is be-

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cause political officials were persuaded by lobbyist working for companies to promote these Genetically Modified foods. This theory came about because in the early 1990's the Food and Drug Administration claimed that they had no information showing the Genetically Modified foods were unsafe in any way, however, internal memos were made public showing that department scientists were very concerned about how safe Genetically modified foods really were. Another concerning factor is the lack of regulation when it comes to Genetically modified foods since there are no long-term studies assessing the safety of the crops and these modified food are in many ways an anomaly that the Food and Drug Administration and Environmental Protection Agency(EPA) are not sure how to regulate properly. The unpredictability of modifying foods is concerning because when the DNA of the organism is altered scientist do not have a complete understanding of all the factors that modification could make.

The major rewards of Genetically Modified Foods are the increased yields at lower cost for farmers. This is done because the crops are altered to make them less susceptible to insects and weather conditions while increasing the amount of produce a single organism can produce. This increased yield per plant is very important because as the population grows there is an increasing demand for fertile soil for farmland. These lower prices are passed on to the consumer who is increasingly demand for less costly food, without these altered food crops more of the public would be less able to buy food and could be at risk of starvation especially in underdeveloped and poor countries and households in poverty.

2.2 Common morality

Common Morality dictates that one must help people and work for the greater good of humanity and to not do harm to others, this is hard to balance in this case. It is so hard to balance because Food and Drug Administration studies have found no link between Genetically Modified Foods and any harm to humans but independent studies seem to show differently, but the Genetically Modified crops are helping to feed the less fortunate and those suffering from starvation. By helping feed the impoverished and keeping them from starvation creates a major positive factor and need for Genetically Modified foods but if these foods cause harm for the less fortunate one must weigh if the risk from feeding the modified foods is worth the possibility of a portion of the public starving.

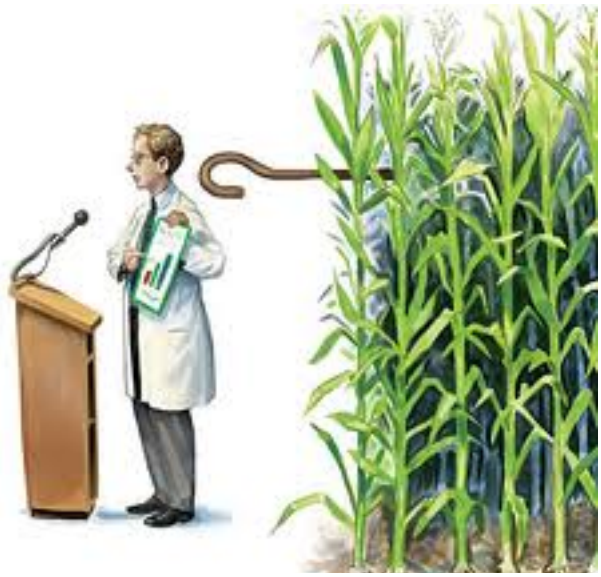


Fig. 4 Shows children in an impoverished region of Africa waiting to get food.

3. Steps for facilitating solutions to ethical issues

3.1 Preventing risk

With so many Independent studies showing the dangers of Genetically Modified foods there needs to be a temporary ban on the sale and large-scale production of the foods. The lack of information of possible harm that may be caused by the foods makes it difficult to assess how safe the foods are. The possibility of these modified crops contaminating the original crops is a big risk because if these crops were found to be harmful and have already begun to take over the original crops the entire crop species would then become inedible and causing the food shortage problem to become worse.



3.2 Research

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There needs to be more independent studies to assess the possible health and ecosystem risks posed by Genetically Modified Crops. The reason they need to be independent is because of the link made between government officials taking special considerations on behalf of the biotech companies. There is also evidence of this from President Barack Obama, the president took a critical stance on Genetically Modified foods in 2007 promising to mandate labeling for all Genetically Modified Products, however, he later signed in to law a bill to protect Genetically modified food and then appointed a biotech lobbyist as a high level official in the Food and Drug Administration. The possible bribery or grease payments by the lobbyist and companies likely influenced governmental decision making which is very troubling and a separate ethical issue in itself. There also needs to be long-term studies to assess the effects of long-term consumption of modified foods.

Fig. 5 Shows a political cartoon of the Biotech companies influencing the decisions of scientists.

3.3 Clarification

The Governmental agencies need to formulate a plan of action to deal with genetically modified foods and how to properly regulate them to insure a consistent safe product. This is an important step because the current policies do not properly deal with the anomaly that these crops are. This is also important because it also will close any loopholes that might be used by Biotech companies to get unsafe or untested products on the market.



Fig. 6 Shows another comparison between an organic tomato and a Genetically Modified tomato.

3.4 Possible outcomes

Depending on what the research concludes there will likely be two outcomes, either they are deemed safe or unsafe. If the modified products are deemed safe for the ecosystem and safe for human consumption they should be allowed to continue production of modified crops under the new clarified governmental polices. If they are deemed unsafe the production, sale, and consumption should be banned, and companies need to invest in new ways to supply the public with large quantities of cheap safe food.

4. Impact of ethical resolution

The Ethical Resolution to this problem rest only with the results of independent research. If the crops are deemed unsafe they should be banned from being produced, sold, and consumed. The Biotech companies should begin researching new possibilities that allow for large, cheap, and safe production of new crops to feed the public. Although there would be a greater need for food, I believe it better to not give the less fortunate harmful foods and knowingly be the cause of long-term harm. I would argue that letting environmental factors that are out of ones control dictate the future of the people is better than unintentionally causing harm from feeding them harmful foods. The better resolution would be that there is no harm found from the consumption of these foods especially since most people have been consuming them in some amount since the 1990's. This also ensures that the supply of food would be stable and the less fortunate would be kept farther from starvation. This also opens the door for further development of crops so the prices of foods will go down and be more plentiful and still being safe.



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Fig. 6 Shows the top ten most common Genetically modified foods.

5. Conclusion

I believe there is enough evidence by independent research to warrant the halting of at least a portion of the Genetically Modified Foods. There is a major lack of proper unbiased research done especially long-term research to definitively prove the safety of the products. I also think that during the period when these crops are banned it will allow for alternative research on other possible ways to increase agricultural productivity.



Fig. 7 Shows President Barack Obama in a speech about passing a mandate for labeling on all Genetically Modified Products.

6. Acknowledgment

The Author of this article would like to thank the entire Engineering Department at the University of West Florida especially Dr. Rashid for there guidance and teaching in the writing of this article.

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8. Author's Short Biography

I Jimmy Kocher was Born on March 7, 1992 in Fort Walton Beach, Florida. From an early age I was always interested in the fields of science and engineering. When I entered high school I began developing an interest in health sciences and I believe that this is why I chose this topic for my report. In my senior year of high school I began struggling to figure out what I wanted to major in because I enjoyed my physics classes which made me strongly consider the fields of physics and engineering, however, my interest in health sciences made me also consider pre-professional biology and exercise science. I eventually made up my mind that year that my combined interest in computers, science, and physics would make Computer Engineering the best choice for me.

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Enhancement of teaching design of CNC milling machines

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Abstract

This paper presents a new approach to teaching which is focused on designing CNC milling machines in the Department of Machine Design at the University of West Bohemia in Pilsen. It is aimed at creating guidelines for students with the following main priorities: find and unify information in one place and in a simple manner for students. For this purpose, 3D models are created in Catia, NX, etc. and converted into a 3D pdf which has lower hardware requirements, no special program and students can still rotate and move the models and make them visible/invisible. The parts are described including their functions.

Keywords: Type your keywords here, separated by semicolons ;

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1. Introduction

The field of Machine Design at the University of West Bohemia in Pilsen is a promising specialization for students who want to apply for a career in construction after graduating. Unfortunately during their studies and after graduation students face several obstacles. One of them is the scope of knowledge required.

Already the definition of the word 'engineering' implies that it is an extensive specialization: 'The creative application of scientific principles to design or develop structures, machines, apparatus, or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design; or to forecast their behavior under specific operating conditions; all as respects an intended function, economics of operation or safety to life and property' (ECPD 1941). Each machine is composed of several elements and creates a complex whole. For this reason, designing a machine often involves several people and therefore the engineers with the experience and skills to lead people also lead a project. For graduates without practice it is very difficult to start in the field of construction. They must face the problem of working on an extensive project and collaborating with other people who are designing their own part of a machine. These study texts were created to show students the issues of designing complex machines and prepare them for working in a team and thus to reduce the time taken to incorporate them into practice.

But every study text will fail without proper presentation and availability to students. Although the University of West Bohemia owns a large library with many specialized texts the students seldom use the library for searching for answers. Rather they obtain information from the internet where some of the information is often wrong or incomplete. According to many studies and technical articles (Šolc 2012 D. Benta 2014) the right way is to educate students by utilizing the benefits of e-learning. Therefore these

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study texts are provided to students through the university "Courseware" portal as a part of e-learning. The students have access to the portal constantly and they can easily and quickly study the issue during the study period.

2. Study materials requirements

According to the Accreditation Board for Engineering and Technology (ABET 2011) and the European Network for Accreditation of Engineering Education (ENAEE) the abilities required by design engineers as the European-stipulated outcomes (ENAEE 2008) were defined as follows:

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function on multidisciplinary teams
- an ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- a recognition of the need for, and an ability to engage in life-long learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Based on these requirements a list of abilities was created from the point of view of Machine Design. These abilities need to be developed in students through study texts. But some of them cannot be obtained only by learning theoretical principles. This problem was solved by consultation with experts in the field and incorporating their experiences into text. The abilities are:

- an ability to use CAD software
- a knowledge of the mechanical design process
- a knowledge of manufacturing processes
- a knowledge of economic aspects of production
- experience with real applications
- an ability to express their thoughts unequivocally
- an ability to communicate in foreign languages
- technical creativity
- an ability to analyse and formulate technical problems
- a knowledge of total quality management principles

3. Study material

Already in 1952 engineers knew too well the benefits of numerically controlled machines (Scientific American Sep, 1952). Since that time there has been great progress in their construction and design. Connections were made between several sectors such as design, electronics, ergonomics, quality, economics, etc. This resulted in creating a multifunctional milling center. Besides performance milling centers must achieve universality, high security, reliability and cost effectiveness. By combining all these properties, it

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is certain that the machine is constructionally very complex. And this is why it is a good example from practice to show students the difficulties with the complexity of construction of milling centers.

3.1. Structure of study materials

The study material is composed of several parts. The first most important parts are CAD models and assembly. After that the models are converted to a 3D-PDF. The models are created with certain rules that facilitate students to understand the assembly and principle of machining parts. In parallel with the creation of 3D models the calculation reports are written for all major machine parts. After modeling of the overall assembly the technical drawings are created again with pre-established rules. The last part is documentation containing a description of the structure of the study materials, the rules and description of controlling 3D models in PDF, description of the important parts of the machine, calculation reports and examples of demands and offers for purchased parts. The overall structure of the learning materials is depicted in Figure 1.

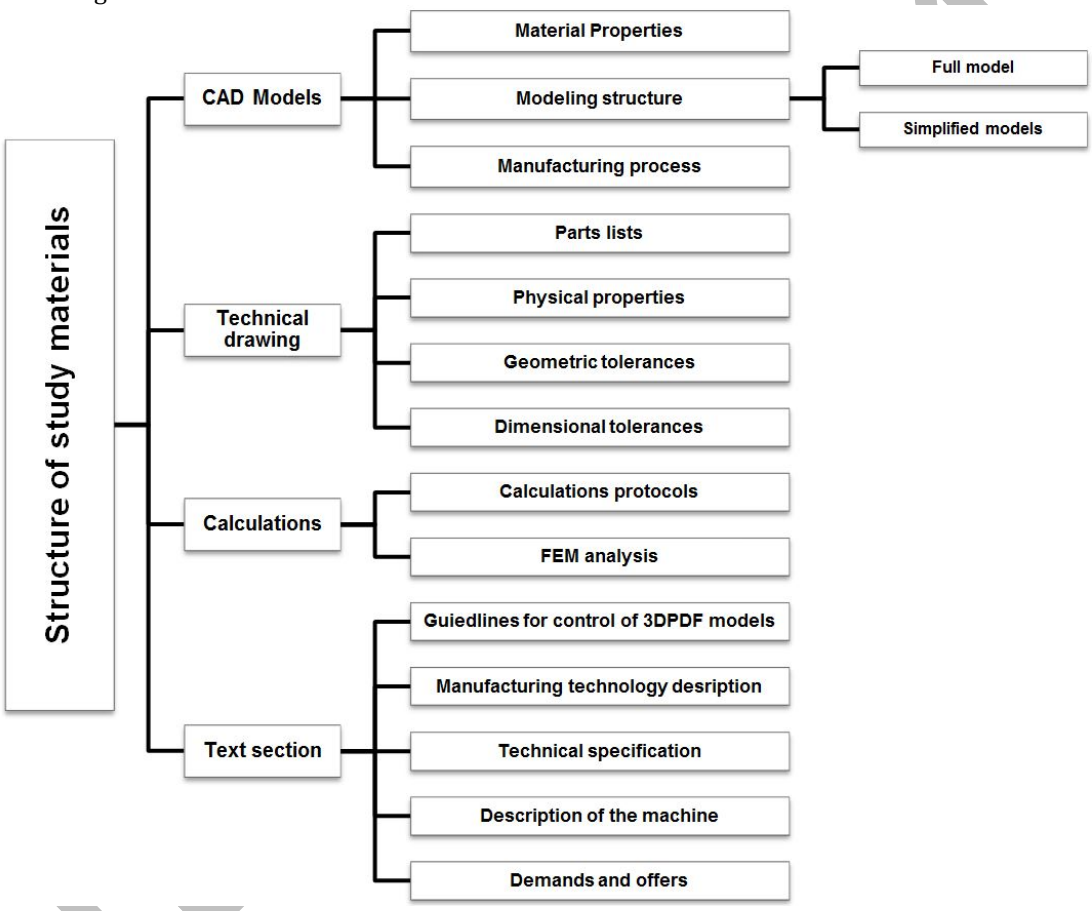


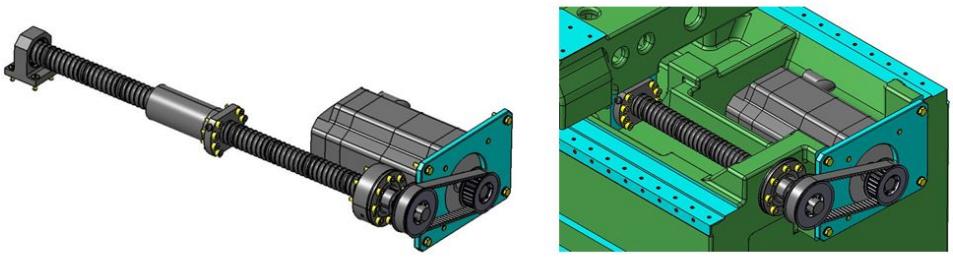
Figure 9 Structure of study materials

3.2. Form and content of study materials

Crucial for good technical study materials is their form. The study materials presented here take the form of a publication. The text is divided into blocks. In the block there are pictures and a description of function, principle of mounting, design process, etc. A sample of the form of the study text is shown in Figure 2.

ASSEMBLY OF BALL SCREW DRIVE

- Electric motor is mounted to plate by four screws. The plate is mounted to main frame by four screws. Using a toothed belt and two driving pulleys is transmitted torque between electric motor and ball screw. Driving pulleys are attached by clamping sleeves.
- On one side of ball screw is a radial-axial bearing housing. On the second side is a simple radial bearing 7205 mounted to bearing housing. Bearing houses are rigidly connected to the main frame. Both bearings are lubricated by long-life grease. Between the bearings is placed double flanged nut DDB. The ball screw nut is lubricated automatically from a central lubrication system.
- Tensioning the toothed belt is made by loosening the plate on which is mounted an electric motor and adjusting the slots. The belt is pretensioned force 252N. Proper belt tension is checked 100N force at which the deflection should be 2.9 mm.



DOUBLE FLANGED NUT DDB

Figure 10 Form of study materials

Figure 2 is an example of the description of an assembly of a ball screw drive. The information helps students to understand the fixing of the assembly to the frame and information about pretension of the tooth belt. After this block you can see the next headline "DOUBLE FLANGED NUT" It is a subheading and under it is a description focusing only on information about a single part (ball nut).

3.3. CAD models

With the advancement of today's technology all technical products are designed by special programs for creating three-dimensional computer-aided design (CAD) models. It is a simple method for designing parts. Models can be easily viewed, rotated and zoomed. In addition the assembly can be shown in cross-section, some parts can be set as transparent, two or more parts can be checked for collision, etc. The next important property is the possibility of adding technical information (part number, assembly number, materials, author name, quantity,...) directly into the models. This information can be found in the drawings and even in the 3D-PDF.

All CAD models are modeled according to strict rules which are described to students in the first few pages of our study materials. One of the rules is the coloring of models. Coloring of models is divided into two methods. The first method is used for coloring of purchased parts. Figure 2 gives an example of coloring of purchased parts. On the left side of the figure is a color palette and on the right side is shown a colored sample of an assembly.

COLORS		RGB	DESCRIPTION
YELLOW		(255,255,0)	Standard parts (screw, nuts, parts according to norms)
GREY		(126,126,126)	Catalog parts (parts purchased under name of the manufacturer)

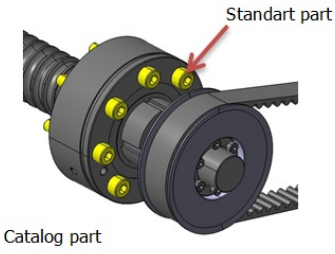


Figure 11 Coloring of purchased parts

The second method of coloring is for manufactured parts. The color palette is based on different manufacturing processes and technologies. Figure 3 gives an example of the second method of coloring. On the

left of the figure is a color palette and on the right is shown a colored sample of the part. All machined surfaces are one color, and there is no difference between turning, milling, etc.

COLORS		RGB	DESCRIPTION
GREEN		(90,190,90)	Non-machined surfaces of manufactured components
ORANGE		(255,128,0)	Material cutting (water jet, resistance wire, cutting, ...)
CYAN		(0,255,255)	Machined surfaces (including 3D dimensional surface)
RED		(255,0,0)	Drilled holes (under Ø50mm)
WHITE		(255,255,255)	Machined grooves
BLUE		(0,128,255)	Moulding surfaces

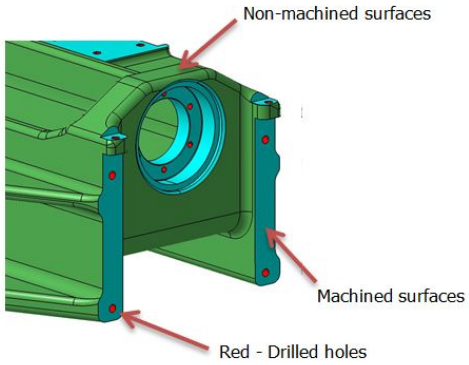


Figure 12 Coloring of manufactured parts

3.4. Technical drawings

As mentioned above, CAD models have many good qualities. But not all parts are transformed into this method. For this reason it is important to show students the rules for creating drawings and teach them to read these drawings.

3.5. 3D PDF

CAD models are a great source of mechanical engineering knowledge for students of Machine Design. Unfortunately programs for creating CAD models are licensed and are not freely available. Of course, these programs are available in the classroom, but students cannot study at home or anywhere else on their laptop. Fortunately, along with the progress of technology to create CAD models, there is the development of converting and viewing models in a universal program in PDF format. In this way, students can take advantage of CAD models (rotation, zooming ...) in the free program. Figure 4 shows how a page of 3D PDF looks. On the right of the figure is the converted model. The left side of the figure is divided into three sections. The upper section represents a structure of the assembly of the CAD model. In the middle are predefined views and at the bottom are shown the parameters obtained from the CAD model.

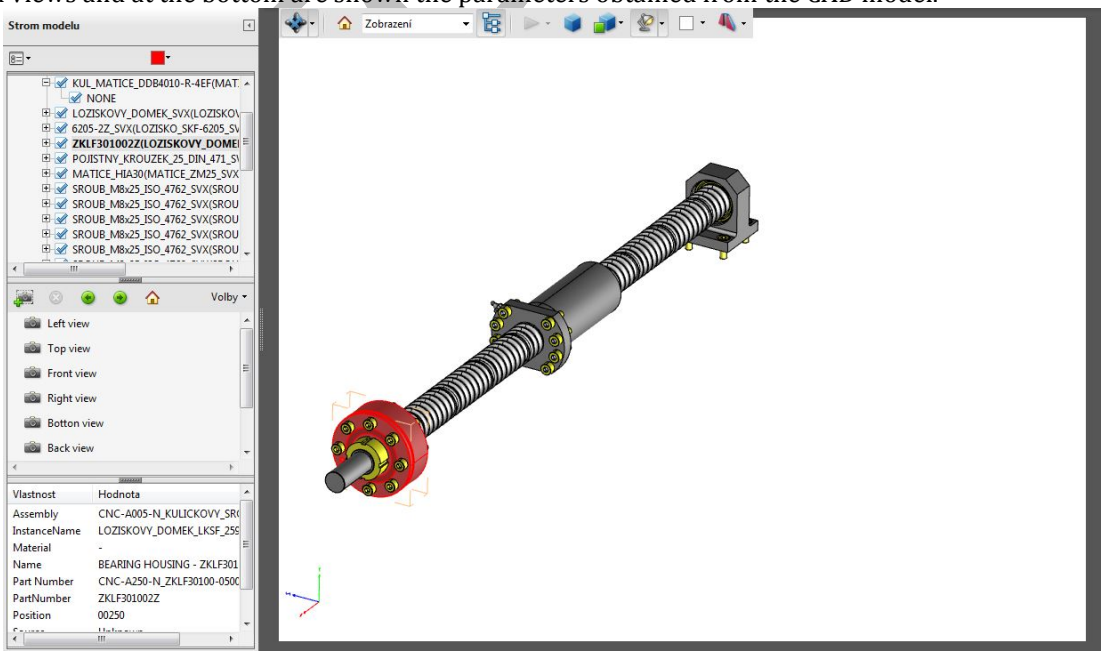


Figure 13 Page of 3D PDF

3.6. Calculation protocol

One part of the study text gives the calculation protocols for components such as the ball screw, linear guiding, parallel keys, screws, etc. The protocols are written based on theoretical calculations, practical experience and the manufacturer's catalog. Figure 6 gives an example of one page of a protocol. The protocol is divided into two columns. In the first column are defined formulas and constants. In the right column is a description of formulas and constants.

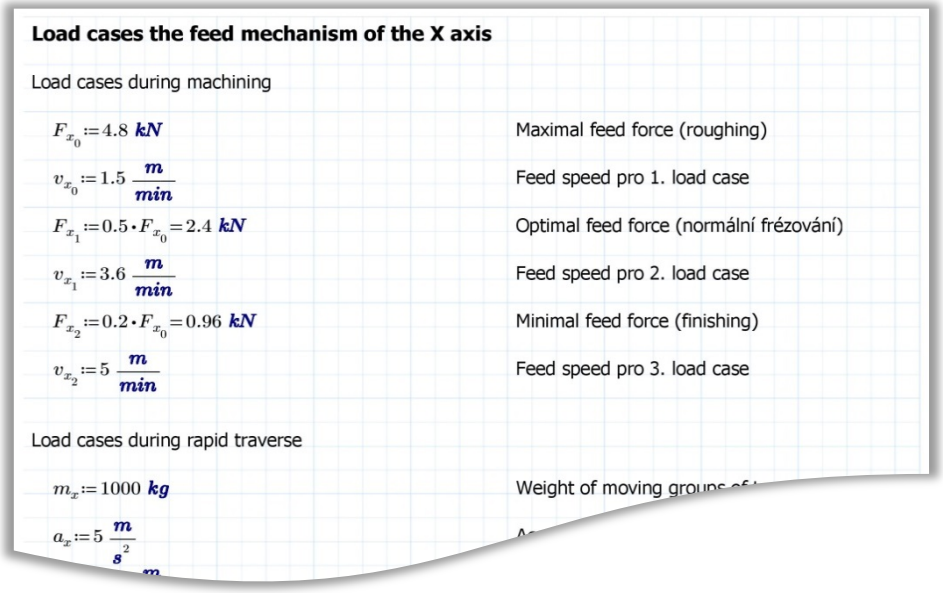


Figure 14 Calculation protocol

4. Conclusion and future work

It is clear that progress cannot be stopped. For this reason it is important to keep step with progress and provide students of Machine Design the latest know-how from industry. Therefore, the Faculty of Mechanical Engineering at the University of West Bohemia is concentrating on enhancing the teaching process and is trying to provide students with demonstrations of real projects. For this reason a new concept of study materials was developed which combines theoretical principles, experience from practice and the advantages of available technology.

The study materials are helping students to understand the obstacles faced when designing a large machine. They use a simple method, the color palette, to recognize purchased parts or machined parts and also to recognize manufacturing processes of machined parts. The next part of the study texts helps students to understand calculation of simple standard parts (parallel keys, screws ...) and also complicated calculations of linear guides, ball screw, etc.

Because all the materials are available to academics, they can modify specifications and provide them to students in the form of a new task. With the original specifications as a pattern, the student can create a new design and understand the obstacles faced when changing specifications and traceability of other changes in the structure.

Of course, a new concept of study materials must be followed up by feedback. For this reason we created questionnaires for students with questions focusing on the advantages and disadvantages. After evaluation, disadvantages will be eliminated and the entire evaluation will be performed again.

Acknowledgements

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Ethical conflicts in stem cell research and education

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Abstract

Stem cells are neither differentiated nor specialized cells, which carry the potential to become any body tissue that one can think of. Differentiation of the cells occurs when a single fertilized egg follows the process of becoming a fully grown human. Stem cells can be stimulated under laboratory conditions to transform into specialized cells with specific functions, such as heart muscle cells, blood cells, or nerve cells when required. Researchers claim that it carries the potential to deliver beneficial treatments to a large portion of diseases where cells have been damaged. The ethical discussion relating to stem cells is closely linked with the way they can be obtained. The aim of this study is to evaluate stem cell research in ethical vision.

Keywords: stem cell; research; health law; moral status of embryo

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1. Introduction

When the medical history is examined, it is evident that human beings have been in a desire to live a long life in a healthy manner and have always been in a constant effort to do so. Amongst these efforts, the thought of means for regaining the functions of a damaged organ as well as the organ regeneration has always been a topic of discussion. It is known that there is a constant formation of new cells to replace the old and dying ones in our body. The first and foremost foundation of all the cells in the living body is called "stem cell" which are cells capable of transforming into other cells with various roles.

Stem cells have the remarkable potential to develop into many diverse cell types in the body during early life and growth. In addition, in many tissues they serve as a sort of internal repair system, dividing essentially without limit to replenish other cells as long as the person or animal is still alive. Stem cells carry the characteristic properties of being plasticity, self-renewal and stems.

Stem cells are neither differentiated nor specialized cells, which carry the potential to become any body tissue that one can think of. Differentiation of the cells occurs when a single fertilized egg follows the process of becoming a fully grown human. In this process, cells divide into becoming hundreds of other cell types with a specific job in the body. In return, they no longer can change their special status yet most lose their ability to divide again (Peter, 2006). Having not lost this capacity, stem cells can be stimulated under laboratory conditions to transform into "specialized cells with specific functions, such as heart muscle cells, blood cells, or nerve cells" when required (Maienschein, Sunderland, Rachel, Ankeny & Robert, 2008). Hence, researchers of stem cells claim that it carries the potential to deliver beneficial treatments to a large portion of diseases where cells have been lost or damaged, namely the Parkinson's disease, Alzheimer's, heart or muscle related injuries and so forth (Peter, 2006).

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1.1 The history of stem cell

Since the 19th century, scientists from all over the world have studied stem cells, from plants, to mice, to patients in search of a cure for their diseases (Ramalho-Santos, Willenbring, 2007).

In 1868 German biologist Ernst Haeckel uses the phrase stem cell to describe the fertilized egg that becomes an organism. William Sedgwick uses the term "stem cells" to describe the parts of a plant that grow and regenerate (Richardson, 1998).

Leroy Stevens performing cancer research in mice, find the tumors, known as teratomas, contained mixtures of differentiated and undifferentiated cells, including hair, bone, intestinal and blood tissue in 1953 (Stevens, Little, 1953).

Ernest McCulloch and James Till perform experiments on the bone marrow of mice and observe that different blood cells come from a special class of cells. This is one of the first pieces of evidence of blood stem cells in 1963 (McCulloch, Till, 2005).

In 1981 Kaufman and Martin Evans at the University of Cambridge in England and Gail R. Martin in America were the first to derive embryonic stem cells (ES cells) from mouse embryos (Evans, Kaufman, 1981) (Martin, 1981).

Dominique Bonnet and John Dick discover that leukemia comes from the same stem cells that make our blood cells in 1997 (Bonnet, Dick, 1997).

A team at the University of Wisconsin, Madison, led by James Thomson and Jeffrey Jones, reports the creation of the first batch of human embryonic stem cells (1998), which they derived from early embryos (Thomson, Itskovitz-Eldor & Shapiro, 1998) .

President George W. Bush signs an order authorizing the use of federal funds for research on a limited number of existing human embryonic stem cell lines in 2001 (The White House, Fact Sheet on Embryonic Stem Cell Research, 2001).

South Korean scientists have used therapeutic cloning to create 11 stem lines that match their donors, one year after reporting the creation of the first human stem cells with this method in 2005 (Hwang, Roh, Lee & et al, 2005).

In 2007, three independent teams in Japan, Wisconsin and Boston, led by Shinya Yamanaka, James Thomson, and George Q. Daley**,** respectively, explained that they have created human Induced Pluripotent Stem (IPS) cells (Yu, Vodyanik, Smuga-Otto & et al, 2007).

Geron Corporation announces the FDA's approval for a limited phase I trial of Geron's new treatment for spinal cord injuries. This was the first FDA approval of a clinical trial for a therapy based on human embryonic stem cells in 2009 (Geron Corporation, 2009).

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President Barack Obama signs Executive Order 13505 to repeal some of the restrictions on human embryonic stem cell research funds placed by the previous administration in 2009. The order requires the "National Institutes of Health" to draft new guidelines for federal funding policies within 120 days (Executive order, 2009).

1.2 Turkey and stem cell: research and legal status

In Turkey, although legal arrangements were made within the recent years in order to ensure compliance with the rest of the world about stem cell research and application, there still exist ethical gaps albeit with problems arising out of the implementation of the legislation.

Our country is a party to the "Convention on Human Rights and Biomedicine - Oviedo Convention" and hence, embryonic stem cell research, including the research aimed at creating embryos, is prohibited in the "Assisted Reproductive Treatment Centers".

Ministry of Health (2005), with the purpose of providing an extensive coverage on matters that are in dispute has prepared and published towards the end of 2005 the "Assisted Reproductive Treatment Centers Regulation". Under the regulation, embryonic stem cell research has been prohibited, although no prevention was brought to the research conducted on adult stem cells. This is due to the fact that adult stem cell treatment was being used in patients with leukemia at the time.

On 04 May 2006, the Ministry has published the "Non-Embryonic Stem Cell Study Guide" for clinical purposes. According to this guide, non-embryonic stem cell research can only be conducted for clinical studies with the permission of "Stem Cell Transplantation Scientific Advisory Board", established by the Ministry of Health, in scientific centers which have been approved by the Ministry. These centers, when applying to the scientific board to conduct stem cell research, need to prove that they possess the necessary ground knowledge, skills and equipment and should be able to provide the evidentiary data when needed (Rep. of Turkey Ministry of Health, 2006) (Türkiye Biyoetik Derneği, 2009).

Published in 2009, "Stem Cell Coordination Center Working Principles and Guidelines" permitted the establishment of cord blood banks and organized the methods of hematopoietic stem cell treatments (Rep. of Turkey Ministry of Health, 2009).

In 2013, the Ministry of Health and the Turkish Red Crescent commenced a study about patients waiting to be treated through stem cell transplantation. It was later decided that "Voluntary Donor Centers" were to be built by the Red Crescent to find donor candidates who are willing to donate either bone marrow or peripheral blood stem cells to "Bone Marrow Bank", the institution established under the body of "Turkey Stem Cell Co-ordination Centre" (TÜRKOK, 2013), for patients in need of hematopoietic stem cell transplantation therapy.

Despite these regulations with regards to stem cells in our country, legal gaps continue to exist. The Assisted Reproductive Treatment Centers Regulation has limited the penal sanction for the violation of any of its regulation articles to the extent in which the wrongdoing center's activities are ceased by the Ministry of Health. On the other hand, the Turkish Penal Code, whilst not having an article on this topic, has not

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been subject to an amendment by a special law to impose a punishment for any violation of the Regulation's provisions.

2. The views about stem cell research

One of the ethical and religious concerns relating to stem cells is closely linked with the way they can be obtained. Although stem cells can be acquired through various sources (including bone marrow or cord flow), it has been claimed by the scientists that much more promising stem cells must be harvested from the embryo itself (Cruzer, 2010). A consequence of this is the fact that embryos cannot survive this procedure and a research in the prevention of these losses from happening has so far been unsuccessful. Hence, how much value then an embryo must have has been on a subject of debate (Maienschein, Sunderland, Rachel, Ankeny & Robert, 2008). Secondly, a controversy exists in the field of cloning which is the technique that carries a potential to provide a "source of tailored" stem cells for the personalized medical treatments. The main question that is positioned in line with this is, through the extent of gene manipulation of human beings, whether the scientists are trying to "play God" and that in return, whether this may have serious risks to our society (Peter, 2006). Lastly, whether the allowance and the increase of stem cell research without proper regulation would lead to the increase of egg donation and the exploitation of women remains a concern to many. Nevertheless, these claims do not come without their opposing sides to them and the balance that must be placed in the ethical ambit of the stem cell research will be explained below.

The initial point of our discussion starts with the fact that Human Stem Cells (hESC) are difficult to isolate and establish a culture. Nevertheless, scientists have been able to obtain these cells from stem cell lines taken from embryos up to 4 or 6 days old – which later cannot survive. These stem cell lines allow cells to be divided without being specializing into any type of adult cell (Maienschein, Sunderland, Rachel, Ankeny & Robert, 2008). Almost all of these aforementioned embryos are created originally to be a part of in-vitro fertilization (IVF) treatment in health clinics to aid patients who cannot have successful pregnancies (Hug, 2006). Despite this, not all of them get implanted and hence, surpluses of unused embryos occur. If legal circumstances permit, couples no longer in need of this treatment can later donate their stored embryos for research purposes (Maienschein, Sunderland, Rachel, Ankeny & Robert, 2008). Although it is not illegal to destroy these embryos, controversy amongst the philosophers and religious clerks exist, since it is not yet clear whether they carry a personhood – whether they are deemed to be human beings with a moral status or not. If so, beliefs as to when this personhood begins to differ. Unfortunately, there exists no arbitrary point or a significant dividing line in "the continuum of physical growth" between an embryo to that of a developed human being (Hug, 2006). What this means in short is that one cannot assess as to when exactly the personhood has begun to exist. Therefore, it might sound logical to state that individuals are deemed to have this moral status both at their embryonic stage as well as after their development stage (Rickard, 2002). Opponents to stem cell research claim that, since each of us have come to life as an embryo and that our lives are worthy of respect and value, so must our lives be in earlier stages. The personhood according to them starts right from the conception (Maienschein, Sunderland, Rachel, Ankeny & Robert, 2008). This view has been favored in a number of religious sects, including Roman Catholic and Conservative Protestant Churches. Under their view, an embryo carries the status of a human being and that any intervention on the embryo would be the violation of that right. Hinduism too rejects animal research as well as the destruction of embryos since injuring sentient beings is prohibited (Sullivan, 2004).

Contrarily, Sandel (2004) rejects this argument and supports his view by challenging it with an analogy. In this, he points out that although every oak tree was an acorn, it cannot make sense to conclude that every acorn is an oak tree. Hence, the loss of an acorn cannot be seen as the loss of a fully grown oak tree. Thus the mere fact that embryos can have the potential to become a developed human being does not make them one by default. In fact, as pointed out in previous paragraph, the research take place on embryos which are less than 6 days old and that at this stage of development, they would not be able to have a

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moral status. They do not have psychological, physical, intellectual or emotional characteristics as one would be able to associate with personhood (Rickard, 2002). Embryos can also be split to form twins up until the 14th day after fertilization. Further, a scientist can divide a five cell embryo into five embryos or can contrarily fuse them into one. After the 14th day, however, twining becomes no longer possible and that the life of one recognizable individual begins to exist (Knoepffler, 2004). The nervous system also begins to form at this period and this might play a role in finding the point in where the life of the embryo becomes solid (Hug, 2006). For these reasons, it can be argued that an embryo used for research purposes at its earliest stage (4-6 days old), since the cells they cannot deem to be individualized enough to have a moral weight of personhood, to be ethical. This view has been favored in a number of religions being; Islam, Judaism, Buddhism and the less conservative Protestant Churches. In Judaism, as long as the embryo is less than 40 days old, research on stem cells can be allowed. This is further illustrated with a view that the God has given us the power to create new technologies and that with the goal of saving lives; the research can be allowed (Peter, 2006). Thinkers in Islam follow a similar approach and they give the reason that the soul is "breathed" into an embryo when it reaches the 40th day, thereby making it sacred. The personhood, thus, is acquired after this period when voluntary movements would appear (Aksoy, 2005). Buddhism and the less conservative Protestant Churches also state that stem cell research before the 14th day of conception can be allowed.

The cloning controversy has begun to exist after the birth of Dolly the sheep in 1997 which was produced wholly by the techniques in cloning (Peter, 2006). Although these techniques have been used in animals models, human embryos can be cloned too via "somatic cell nuclear transfer" (SCNT). With this, eggs can be taken from a woman and then the nucleus of it can be extracted. What is left behind is the cytoplasm (Maienschein, Sunderland, Rachel, Ankeny & Robert, 2008). A nucleus is then obtained from the body cell of a person and then inserted into this cytoplasm. In end, the resulting embryo will have the same genetic material with the donor of the nucleus. The reason why cloning is important comes from the main target of the stem cell research itself. Since the current aim is to allow for the replacement of damaged tissues or organs with the organs grown from stem cells, precautions must be taken to minimize the rejection of this transplantation by the patient's immune system (Curzer, 2004). Cloning aids in preventing this from happening since the stem cells that will be used in the therapeutic medical treatment will share the same characteristics with the DNA of the patient. When a new patient walks in to the clinic, however, all the pre-existing cells from the previous patient would then need to be destroyed.

Nevertheless, reproductive cloning faced high amounts of criticisms from an ethical perspective and was seen as a threat to human "individuality, identity and dignity". Scientists have been seen as trying to play "God" by acting contrary to nature via playing with our genomes. Some scientists state that in pursuit of medical benefits, we risk the value of human life to an extent that the risks outweigh the benefits (Ramalho-Santos, Willenbring, 2007).

Further to this, the UN has adopted a resolution in 2005 to prevent all kinds of human cloning with the reasoning that they are "incompatible with human dignity and the protection of human life" (UN Human Cloning, 2005). This resolution, however, has not been accepted by many (35 states) since it was silent to make a differentiation in between reproductive cloning and non-reproductive cloning. Although as Bowring puts out that the distinction in between is hard to maintain and be difficult to keep an eye on, (Bowring, 2004), a short explanation of this be that: in reproductive cloning, the main aim is to produce a cloned embryo and then implant it into the womb to produce a pregnancy and later a cloned child but in non-reproductive cloning, the clone is constructed solely for research purposes and is destroyed at an early stage (Maienschein, Sunderland, Rachel, Ankeny & Robert, 2008). In the latter version, some countries have even made it legal (New Zealand, Korea), and some have permitted it to be done under a licence (UK, China, etc). From religious perspective, similar to what is mentioned above; the conservative Christians have not moved away from their strong positions towards stem cell research and have prohibited all kinds of cloning. Other beliefs have stood more in line towards the non-reproductive cloning and have not gone against the use of cloned stem cells for both research and also for medical aid purposes (Sullivan, 2004).

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Since the stem cell research has enormous reliance on the donation of fertile eggs from women, concerns exist as to whether potential donors might be subject to both economic and emotional pressures and that exploitation might occur. This would not be of surprise considering the fact that the "infertility industry" in the US alone was $6.5 billion for-profit business even in the year of 2007. Many young women choose the path in becoming donors after seeing the ads in online platforms, college newspapers or the social media and the offer can start from the tempting amount of $5,000 to $100,000 per extraction. If the increase in research cells is not regulated properly, there would be an enormous increase of women donors with low incomes who is not fully aware of this concept nor the health risks that it can bring. For instance, there exists no requirement to check up on the donor after the operation and that they are simply forgotten after they donate their eggs (Schneider, 2008). Other risks of this can be for the donor to loss her fertility or have ovarian torsion, blood clots, kidney disease, premature menopause, ovarian cysts, chronic pelvic pain, stroke, reproductive cancers, and in some cases, death (Giudice, 2007). Due to this many countries do not permit payment exceeding the medical expenses to prevent the concerns highlighted above from happening. However, more protection is required in clinics that do stem cell research and these protections should be governed by law. Thus, the main ethical concern here seems to suggest the need for a legal protection. In line with this, the more liberal views existing i.e. in China, the UK, USA, Belgium, Korea, and Israel is likely to lead the advancement of the law implementation (Giudice, 2007). Hence, the probable exploitation of stem cell research would be legally managed in the future.

3. Conclusion

In conclusion, stem cells carry the potential to bring era opening developments to the medical field. Although scientist can provide the cure for many diseases which exist in today's world, diseases such as Parkinson's disease, Alzheimer's, heart or muscle related injuries still remain to be a problem in which the regenerative medicine cannot provide the sufficient aid to. In line with this, they also remain as being subject to a number of ethical and religious concerns since this area has not yet settled properly with adequate laws or regulations. Once that happens, as highlighted above, most of these concerns would eventually mitigate.

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Table2. The Analysis of subfactors in TAM Scale

	N	Mean	Std. Deviation
Anxiety	510	2,66	1,01
Perceived usefulness	510	3,22	,70
Perceived ease of use	510	3,43	,75
Attitude	510	3,13	,68
Subjective norms	509	3,30	,72
Perceived behaviour control	510	3,40	,67
Satisfaction	510	3,27	,69
Continued intention	510	3,02	,80
Self-efficacy	510	3,51	,81
Facilitative conditions	510	3,82	,76

Analyzing the subfactors, the mean of anxiety level to the e-learning is 2,67 out of 5. It is understood that participants have somewhat anxiety to the system though it is not high. In addition, among the subfactors, facilitative conditions have the highest mean (X= 3,83). Also, it can be stated that the mean of self-efficacy of the participants are the other subfactor which has a high mean (X=3,52). The mean of attitude of the participants to the system is 3,14.

Table3. The Correlation among the variables

	2	3	4	5	6	7	8	9	10	11
1. achievements	-,540*	,188	,696*	,552*	,163	,404*	,133	,184	,539*	,115
2. Anxiety		,123-	,304 -	,162	,047-	,170	,029	,124-	,195	,025
3. Perceived usefulness			,346	,489	,394	,416	,443	,392	,312	,104
4. Perceived ease of use				,302	,226	,251	,277	,250	,473	,111
5. Attitude					,353	,225	,374	,351	,209	,104
6. Subjective norms						,348	,231	,203	,275	,035
7. Perceived behavior control							,243	,341	,228	,118

8. Satisfaction	,306,205	,105
9. Continued intention	,365	,146
10. Self-efficacy		,285
11. Facilitative conditions		1

Table shows the correlation among the variables. According to the table, there is a correlation between variables and course documents.

6. Discussion and Conclusion

This is an empirical study aiming to understand the attitude of Turkish EFL learners towards technology and to determine role of these factors in the academic achievement of the participants. According to the results of the research, most of the participants have a facebook account and a personal computer. In addition, each participant goes online every day and spends at least 1-5 hours online. Moreover, e-language learners spend most of the time studying course documents. The present study also reveals that some of the TAM factors have effects on the academic achievement of the e-learners. It is understood that while anxiety towards e-learning has a negative effect on academic achievement; perceived ease of use, attitude, satisfaction and self-efficacy have a positive effect on the academic achievement of e-learners. These findings indicate that Turkish EFL learners can be considered at the third phase of Rodger (1995) Innovation Decision Process theory. In other words, participants have a positive attitude towards technology and they are at the stage to make a decision to adopt or reject the technology.

The findings of this study were not in line with Saade and Kira's research (2007). The results of their study revealed that anxiety did not play a mediating role on the impact of computer experience and perceived ease of use. In addition, contrary to the findings of the present study, Raaij and Schepers' results (2008) indicated that perceived usefulness had a direct effect on Virtual Learning Environment use. Perceived ease of use and subjective norm had only indirect effects through perceived usefulness.

Ngai et al's findings (2007) were partly in accordance with the results of the present study. They found that perceived ease of use and usefulness were the significant factors influencing the attitude of students using WebCT.

On the other hand, Lee's findings (2010) were partly in line with the results of the present study. His study revealed that satisfaction had the most significant effect on users' continuance intention, followed by perceived usefulness, attitude, concentration, subjective norm. However, perceived behavior control was found as significant but weaker predictors.

The findings of Cheung and Vogel (2013) were not in consistent with the present study. In their study, they found that the subjective norm showed a significant effect on behavioral intention to use technology.

The results of Tzeng's (2011) research were in consistent with the findings of the present study. His study also indicated that attitudes had the strongest significant effect on usage intentions.

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The findings of Sang et al (2010) were in accordance with results of the present study. They also found that computer self-efficacy and more favorable attitudes toward computer were the strongest predictor of prospective computer use.

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Availability and Effective Utilization of Electronic Media in Social Studies Teacher Training Colleges

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Abstract:

Social studies as a discipline in the school curriculum and also being an integration of various disciplines, must use varieties of instructional methods in dispensing it's curricular contents to learners, these methods includes the use of Electronic media in teaching. Teacher education in Nigeria generally, is aimed at producing not only large number of Teachers, but qualitative teachers that are well equipped, well versed and up to date that are able to cope with the challenges of the modern globalized and more challenging society of modern science and technology. Teachers that can compete with peers from all over the world, hence the attention on Social studies teacher training colleges in North Western Nigeria. The region being an educationally disadvantaged state compared to other regions, need pragmatic approach to be able to compete favorably, hence the research to find out the available electronic media devices and how effectively they are employed in the teaching process in the teacher training colleges. The research shall also try to find out sources of the available resources and reasons for the lack of resources. Attempt will also be made to find out why teachers can not apply the resources available effectively, possible solutions and suggestions will be proffered.

Key words: Effective utilization, Electronic Media

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Introduction

The use of Electronic media facilities has become a necessity for improving quality in teaching and learning. This has been emphasized by the Federal Ministry of Education (FME, 2010), as it contributes to meeting the Millennium Development Goals, (MDGs) and Education For All, (EFA) both of which Nigeria is a signatory. While it is a fundamental human right of children, youth and adults to basic education of relevance and quality, Universal Basic Education is an unfulfilled dream in many countries in the world. To achieve Education for All (EFA) goals, 'improved teaching and learning' implies quality education for all learners, and not only the best education for the best few. Towards this EFA goal, improved access and equity can be made the precondition for the first principle of quality education

In recent times the integration of information and communication technology (ICTs) in teacher training programs has been the topic of much debate because educational systems around the world are under increased pressure to use the new Information and Communication Technology (ICTs) to teach students knowledge and skills they need in the 21st century. Teacher education institutions are faced with the challenges of preparing a new generation of teachers to effectively use the new learning tools in their teaching practices (UNESCO, 2002). Thus, teacher education programme have been affected by the penetrating influence of information and communication technology (ICT). The fact that ICT has impacted on the quality and quantity of teaching, learning, in educational institutions around the world cannot be overemphasized.

It is practical that despite efforts by government to establish valuable and effective teacher education programs in Nigeria to help in the preparation of competent teachers, it has a fundamental problem which has incapacitated its development. The basic skill of reading a book has been taken away by the use of electronic media. Today, almost all homes in the world have at least one type of electronic media, whet-

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her it is a radio, video game, computer or television (Gulbahar & Guven, 2008). The school and the family share the responsibility of preparing the young in a world of powerful images, words and sound.

Despite the fact that Electronic Media is accepted globally as a major factor in pedagogical issues, where many western countries have made it compulsory for all Teachers to undergo Information and Communication Technologies (ICT) certification, regardless of their subject area, as reported by Begho (2012). Furthermore the policy is geared towards ensuring the attainment of qualitative education for the enhancement of sustainable socio-economic development, global competitiveness and the individual's ability to survive in the contemporary environment. This can lead to the production of graduates of the education system that can survive in the contemporary society, sustain national development and can compete globally. (FME2010). The interactivity can enable a global out reach for sharing of knowledge, materials and data bases, quickly and cheaply over long geographic distances using online resource. Dewey's word in the previous century has linked this argument thus, "if we teach today as we taught yesterday, we rob our children of tomorrow" (Dewey, 1916).

Chalk and talk had been applied in the teaching process centuries ago; today the emergence of Electronic Media should be used not only to supplement teaching, but to take over as medium of passing out information and the entire pedagogical issues, at least in a phase by phase process. Electronic Media technology serves the diverse learning styles of students and educates them for a wider range of intelligence.

1.1. **Problem of the study**

Advances in technology have brought instructional materials especially the projected and electronic materials to the forefront as the most radical tools of globalization and social development which have affected the classroom teaching/learning situation positively. With them both teaching and learning become very pleasant experiences and less stressful. The teachers should take advantage of the opportunities to procure excellent films and recordings covering a wide range of subject matters in social studies curriculum. While acknowledging that the issue of instructional materials may not be easily resolved, it is important to remark that teachers should not use lack of instructional materials as an excuse not to teach well.

Current obvious reality is that, most teachers depended mostly on textbooks and chalkboards as instructional materials while other relevant instructional materials such as maps and charts, overhead projectors, televisions, improvisation, computers and pictures etc were sparingly used. Okobia (2011) noted other problems associated with the use of instructional materials in most parts of Nigeria, including cost of manufacturing and maintenance of instructional materials. The research is therefore aimed at; identifying the types of Electronic Media that are available in the Colleges of Education in the study area, and assess the extent to which what is available is qualitative and effectively applied in a classroom situation.

1.2. Research questions

i. What are the types of Electronic Media resources available for teaching Social Studies in colleges of education in North-West Geo-political zone of Nigeria?
ii. How qualitative are the Electronic media for teaching Social Studies in the Colleges of education in North-West Geo-political zone of Nigeria?

2. Review of Empirical studies on usage of ICT in Nigeria

Duru and Ozoji (2011) investigated the utilization of ICT and its applications in teaching computer studies in secondary schools in Owerri educational zone. Part of the findings revealed that, computer teachers in secondary schools do not utilize computer hard ware and internet applications in lessons; that teachers lack the required skills to operate these resources; secondary schools lack the necessary infrastructures required for utilization of the resources and applications.

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Chinedu, Nwanna-Nzewunwa and Michael, (2005) researched on electronic media as instructional materials in social and business studies and as instruments of social change: empirical evidence from Nigeria. The study found out that, radio is the most potent instructional material in achieving teaching efficiency and generating desired social change. Computers, projectors, and internet facilities were found to have inherent capabilities of aiding teaching effectiveness that could lead to the attainment of desired social change.

Ebeniza and Oluchi, (2011) in a research titled; Availability of ICT in teaching and learning of English language in secondary schools in Okigwe educational zone, Imo state. The result of the findings shows that, the ICT facilities found in the schools were very few, except for hand-sets. The study also revealed that the available ICT facilities are to a great extent used by the teachers in the schools. The study also confirms that teachers acquire the skills of manipulating the ICT equipments but do not exhibit the skills in classroom pedagogy.

Muideen (2011) also undertook a research titled an Assessment of student's usage and availability of ICT facilities in colleges of education: problems and prospects. The study found out, ICT facilities are widely used in instruction. Students had access to ICT facilities. There were also problems encountered by the students in terms of electricity supply.

Okobia (2011), conducted a research on Availability and Teachers' Use of Instructional Materials and Resources in the Implementation of Social Studies in Junior Secondary Schools in Edo State, Nigeria. The results showed that instructional materials and resources available were grossly inadequate. It was also observed that there was no difference in the use of instructional materials between specialist social studies teachers and non-specialist teachers. It is therefore recommended that instructional materials and resources be made available for the teaching of social studies.

The results of various surveys on College of Education staff on the level of availability, use of and perception of the impact of ICT on teacher education in Nigeria revealed and suggested a low level of usage of ICT gadgets; non availability of ICT equipment and that the respondents were disgruntled with the sluggish use and integration of ICT. Of all the reviewed empirical studies, none was undertaken to cover any part of North Western Nigeria, most of the research summarized actually discussed the availability or nature of utilization, and none combined availability and effectiveness of the resources in teaching and learning of social studies in the teacher training colleges.

3. Methodology

3.1. Population and Sample

The study population consisted of two hundred and thirteen (213) Social studies Lecturers in the Colleges of education within the study area. There are 14 Colleges of Education in North-west Geo-political Zone of Nigeria, located in Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto and Zamfara states Out of the 14 colleges, 4 are Federal, 9 are State owned while 1 is privately owned. Out of a total number of Two hundred and thirteen (213) Lecturers, One hundred and ninety-three (193) representing ninety percent (90%) of the Lecturers' population was the sample of the study.

3.2. Instruments

The research instruments used for the study were checklist, and questionnaires. The questionnaire consists of seven sections A-C harmonized into single questionnaire. Section A focused on the demographic information. Section B, the check list, contains twenty-two (22) items on types of electronic media for teaching. Section C- consists of items that answer research questions utilization and proficiency of electronic media.

4. Results and Discussion

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able 1: Opinions of the respondents on the available electronic media for the teaching and learning of social studies in the colleges

Availability of electronic media	Available / good		Available / not good		Not available		Decision
	Freq.	%	Freq.	%	Freq.	%	
Electronic board	17	15.3	16	14.4	78	70.3	NA
Overhead projector	32	28.8	30	27.0	49	44.1	A
Opaque projector	22	19.8	23	20.7	66	59.5	NA
Slide projector	30	27.0	21	18.9	60	54.1	NA
Filmstrip	26	23.4	20	18.0	65	58.6	NA
Pc projector	24	21.6	26	23.4	61	55.0	NA
Multimedia computer	26	23.4	23	20.7	62	55.9	NA
Computer system	63	56.8	30	27.0	18	16.2	A
Internet/web environment	46	41.4	28	25.2	37	33.3	A
Television	69	62.2	20	18.0	22	19.8	A
Video	60	54.1	20	18.0	31	27.9	A
Radio	54	48.6	27	24.3	30	27.0	NA
Cassette recorder/player	56	50.5	21	18.9	34	30.6	A
Video camera/still camera	42	37.8	18	16.2	51	45.9	NA
Microphone/speaker system	55	49.5	27	24.3	29	26.1	A
Telephone/intercom	32	28.8	17	15.3	62	55.9	NA
Fax machines	23	20.7	10	9.0	78	70.3	NA
Any other	13	11.7	10	9.0	88	79.3	NA

Of all the electronic media devices indicated in the table, Electronic board, Overhead projector, Opaque projector, Slide projector, Filmstrip and PC projector were all not available. This is indicated in the table with high percentage scores by both groups. However, Multimedia computer, Computer system, Internet/web environment, Television, Video were said to be available by the respondents. But electronic media devices like the Microphones and speakers system, Telephone/intercom, Fax machines and other such electronic devices were not available. In all it could be said that most of the electronic media devices required for the teaching and learning of social studies in the Colleges were not available and where they were available, they were not fully functional for effective usage.

Table 2: Opinions of the respondents on the quality of available electronic media for the teaching and learning of social studies in the colleges

Sn	Quality of available electronic media	Very high		High		Low		Very low		Mean
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	
	Organization of information contained in the electronic medial	23	20.7	33	29.7	29	26.1	26	23.4	2.48
	Quality of the sound production of electronic media	15	13.5	42	37.8	30	27.0	24	21.6	2.43
	Acquiring of information contained in the electronic media	12	10.8	44	39.6	34	30.6	21	18.9	2.42
	Appropriateness of the information contained in the electronic media	14	12.6	39	35.1	36	32.4	22	19.8	2.41
	Clarity of projection of the electronic media	17	15.3	31	27.9	41	36.9	22	19.8	2.39
	Accessibility of the information contained in the electronic media	17	15.3	28	25.2	43	38.7	23	20.7	2.35
	Ability of the electronic media to appeal to the interest of the students	14	12.6	29	26.1	43	38.7	25	22.5	2.29
	Durability of the electronic media device	17	15.3	33	29.7	38	34.2	23	20.7	2.40
	Accuracy of the information contained in the electronic media	20	18.0	39	35.1	34	30.6	18	16.2	2.55

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Irretrievability of the information contained in the electronic media	18	16.2	36	32.4	35	31.5	22	19.8	2.45

In terms of the quality of the organization of information contained in the electronic media, both groups were of the view that the quality of the sound production by the electronic media available for teaching and learning of the subject in the colleges was low. These deduced form the frequencies percentage scores for low and very low in the table as well as the mean scores for the first two items of the table. The respondents were of the opinion that the process of acquisition of the information contained in the electronic media was low and that the information contained in the electronic media could not be termed to be very appropriate. Apart from these limitations, the clarity of the projection of the electronic media available in the colleges was not considered well enough for the teaching and learning of the subject.

The quality of access to the information contained in the electronic media was also considered to be very poor and as such the available electronic media are not considered to have much appeal to the interest of the students. The durability of the electronic media devices were considered to be very low by the two groups of respondents and this is translated into their poor rating of the qualities in relatively mean scores. However, the staff were of the view that the accuracy of the information contained in the electronic media were of relatively high quality but the students did not share this opinion as indicated by their mean scores of 2.55 and 2.21 for staff and students respectively for item 9 in the table. But both staff and students were of the view that the information contained in the electronic media for the teaching and learning of the subject in the colleges were not easily retrievable. From the expressed opinions of the respondents, it could not be said that the available electronic media for teaching and learning of social studies were of high quality in the colleges.

5. Summary of Findings

The summary of the major findings are as follows:

1. The study revealed that ICT resources like computers, smart boards, data projectors, digital camera, fax machines, television, radio, etc are fairly available in Federal Colleges of Education in Nigeria.
2. The study revealed that the quality of available electronic media for teaching and learning of social studies in the colleges is poor.

6. Conclusions

The essence of the research is to find out the actual problem that hinders the application of electronic media in teaching and learning process, despite the fact that it is imbibed and recognized despite the importance they placed on computers as tool for enhancing schools related activity. This could be probably due to teachers' inability to relate Electronic Media devices to classroom situation. Most teachers that are interested in applying Electronic Media might be concerned with two major obstacles, either they do not have them, or they lack the skill to handle such in the classroom.

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Availability of online learning tools and the readiness of teachers and students towards it in Adekunle Ajasin University, Akungba-Akoko, Ondo State, Nigeria

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Abstract

This study was carried out in Adekunle Ajasin University, Akungba Akoko Ondo State, Nigeria to verify the level of availability of Online learning tools and to find out the level of readiness of both the teachers and students toward using it. Three research questions and three hypotheses were raised and tested for the study. Descriptive survey research design was adopted for the study. A sample of one hundred and twenty five respondents participated in the study. The research instruments were questionnaires; one designed for the teachers and the other for the students, both were tested for reliability using Cronbach Alpha formula and the reliability co-efficient of each yielded 0.82. The instruments were checked for face, content and construct validity by three experts in computer education and educational technology before administration. Data obtained were analyzed using simple percentage and chi square statistical tools.

Findings from the study revealed that online learning tools are available at Adekunle Ajasin University Akungba-Akoko but the practice has not begun. Students and lecturers are equally ready to use online instructional method whenever it is introduced into the university system. Recommendations were made as follows: The management of Adekunle Ajasin University Akungba-Akoko should introduce On-line instructional method into the school's curriculum also the Nigerian government should ensure that students are taught about the use of Online instruction right from their secondary school.

*Keywords:*Online, Learning, Tools, Availability, Rediness, and Ad ekunle Ajasin University, Nigeria

1. Introduction

To initiate the change to an online system of course delivery, it is important to assess the readiness of the various stakeholders," Kaur, K. & Abas, Z. W. (2004) among whom are students, teachers and administrative staff.

To put ICT to effective use, a country must be "e-ready" in terms of infrastructure and accessibility of ICT to the population at large, and the effect of the legal and regulatory framework on ICT use (CIPESA, 2005).

The trend of using e-learning as learning and teaching tool is now rapidly expanding into education. Many educators and researchers had high hopes for e-learning, believing that it would provide more access to information and communication, and would ultimately lead to a new revolution in education.

Relevant to the success of an e-learning implementation is the assessment of an organization's readiness for e-learning, Aydın and Tasci (2005), an online readiness assessment measures the ability of an

organization to take advantage of online learning tools available in such organization as it is being looked into for Adekunle Ajasin University, Akungba Akoko, Ondo State, Nigeria in this study.

1.1 Statement of the problem: The challenges experienced in Nigeria are not unlike those experienced elsewhere. Despite the current popularity of online instruction, does it have any limitations? Studies have found out that learners are moderately lacking in computer proficiency and, since online learning is centred on computer technologies usage, it is a barrier to those learners without good computer skills.

The following challenges in teaching and learning with technology are considered germane to necessitate this study:

1. Lack of sufficient level of knowledge and skills for the use of multimedia, internet and web technology on the part of its users for online instruction.
2. Non-availability of online environments that promote active teaching and learning process, critical thinking, collaborative learning, and knowledge creation.
3. Non-adoption and innovation of online method into teaching and learning process by faculties.

1.2 Research questions

The following research questions were formulated for the purpose of this study:

1. Are online learning tools available in Adekunle Ajasin University Akungba-Akoko?
2. Are teachers ready to introduce online methods as one of the ways for their course delivery in Adekunle Ajasin University Akungba-Akoko?
3. Are students ready to adapt to the change if online method is introduced and implemented in Adekunle Ajasin University, Akungba-Akoko?

2. Methodology

Descriptive survey research design was adopted for the purpose of this study.

3.Sample and sampling technique

Simple random sampling technique was used for the purpose of this study in which lecturers and students were randomly selected from the five faculties of the university. The samples used for this study includes twenty students from each faculty as well as five lecturers from each faculty. This makes a total of one hundred students as well as twenty five lecturers which makes a grand total of one hundred and twenty five samples. Faculty of Arts, Faculty of Education, Faculty of Science, Faculty of Social and Management Science, and Faculty of Law were the faculties used for this study.

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3.1 Research instrument

Two forms of questionnaires were designed for the purpose of this study; one was designed for the lecturers while the other was used for the students. These questionnaires consist of four sections namely: Section A, B, C and D. Section A sought information on the respondents' personal information, Section B sought information on the availability of internet and online tools within the institution and personal acquisition by lectures and students. Section C sought information on the level of possession of basic Information and Communication Technology (ICT) skills, while section D sought information on the respondents' readiness towards the use of online method of instruction. Both draft questionnaires were given construct, face and content validation by experts, and their reliability index yielded 0.82 each using Cronbach Alpha reliability method.

3.2 Data analysis technique

The information obtained and data collected were processed and analyzed using descriptive statistic of simple percentage and Chi square.

4. Results

The results are presented based on the research questions and the hypotheses.

4.1 Research question 1: Are online learning tools available in Adekunle Ajasin University, Akungba-Akoko?

In answering this research question the researcher collated the responses of the respondents to ten items in Section B of both the lecturers and students' questionnaire and subjected the responses to simple percentages. Majority of the respondents (Lecturer and Students)(74.48%) are of the view that online learning tools are available in Adekunle Ajasin University, Akungba Akoko, Ondo State while 25.52% disagree with the statement.

4.2 Research question 2: Are teachers ready to introduce online methods into their teaching process in Adekunle Ajasin University, Akungba-Akoko?

In answering this research question the researcher collated the responses of respondents to fifteen items in section C and D of the questionnaire for lecturers and subjected the responses to simple percentages.

Majority of the respondents (Lecturers) (85.87%) are of the view that they are ready to introduce e-learning methods into their teaching process in Adekunle Ajasin University, Akungba-Akoko, while others (14.13%) disagreed with the statement

4.3 Research question 3: Are students ready to adapt to the change if online method is been implemented in Adekunle Ajasin University, Akungba Akoko?

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In answering this research question the researcher collated the responses of the respondents to fifteen items in Section C & D of the questionnaire for students and subjected the responses to simple percentage.

Majority of the respondents (Students) (83.07%) are of the view that they are ready to adapt to the change if e-learning is being implemented in Adekunle Ajasin University, Akungba-Akoko, while others (16.93%) disagree with the statement.

4.4 Hypothesis 1

$H_0$1 – Online learning tools are not significantly available in Adekunle Ajasin University Akungba-Akoko.

In testing the hypothesis 1, Chi-Square (X^2) was used and its result presented in Table 1

Table 1: Summary of Chi-square showing if e-learning tools are available in Adekunle Ajasin University, Akungba-Akoko, Ondo State.

RESPONSES	O	E	O-E	$\bar{X}$	Df	X^2	P
Strongly Agree	437	312.5	124.5				
Agree	535	312.5	222.5	1.93	3	60.280	<0.05
Strongly Disagree	214	312.5	-98.5				
Disagree	64	312.5	-248.5				
Total	1250	1250	0				

The hypotheses were tested with the use of Chi-square (X^2) statistics at 0.05 level of significance. The result obtained was significant. [X^2 = 60.280; and $p<0.05$]. The null hypothesis **($H_0$1)** is hereby rejected. This implies that e-learning tools are available in Adekunle Ajasin University Akungba Akoko.

4.5 Hypothesis 2

**$H_0$2 –** There is no significant indication in the readiness of teachers at the introduction of Online learning method into teaching process in Adekunle Ajasin University Akungba-Akoko. In testing the hypothesis 2, Chi-Square (X^2) was used and it presented in Table 2

Table 2: Summary of Chi-square showing the teachers ready to introduce e-learning methods into their teaching process in in Adekunle Ajasin University

RESPONSES	O	E	O-E	$\bar{X}$	Df	X^2	P
Strongly Agree	125	93.75	31.25				
Agree	197	93.75	103.25	1.88	1.73	7.89	<0.05
Strongly Disagree	53	93.75	-40.75				
Disagree	-	93.75	-93.75				

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Total	375	375	0

This hypothesis was tested with the use of chi-square (X^2) statistics at 0.05 level of significance. The result obtained showed significantly that the teachers are ready to introduce e-learning into teaching process in Adekunle Ajasin University. [$X^2 = 7.89$; $p<0.05$]. The null hypothesis **($H_0$2)** is hereby rejected.

4.6 Hypothesis 3

**$H_0$3 –** There is no significant indication in the readiness of students at the introduction of Online learning method in Adekunle Ajasin University Akungba-Akoko. Chi-Square (X^2) was used in testing the hypothesis 3 and it presented in Table 3

Table 3: Summary of Chi-square showing that students are ready to adapt to the change if e-learning is been implemented in Adekunle Ajasin University

RESPONSES	**O**	**E**	**O-E**	$\bar{X}$	**Df**	**X^2**	**P**
Strongly Agree	644	375	269				
Agree	602	375	227	1.93	2.6	47.4	<0.05
Strongly Disagree	199	375	-176				
Disagree	55	375	-320				
Total	1500	1500	0				

This hypothesis was tested with the use of Chi-square (X^2) statistics at 0.05 level of significance. The result obtained showed significantly that students are ready to adapt to the change if Online learning method is been implemented in Adekunle Ajasin University. [$X^2 = 47.4$; $p<0.05$]. The null hypothesis **($H_0$3)** is hereby rejected.

4.7 Discussion of the findings:

(a) *Availability of Online learning Tools*: Findings from this study revealed that, online learning tools are available at Adekunle Ajasin University, Akungba-Akoko, Ondo State. This is in accordance with the research done by Wole and Opesade (2008) on the e-readiness assessment of University of Ibadan. Also this finding is in concordance with the research of Liverpool, Marut, Ndam and Oti (2009) on University of Jos ICT Maths Initiative.

(b) *Access to internet connectivity*: Findings of this study revealed that the level of access to the university's internet connection is very low. This is in concordance with the research of Renu, B. & Sameer, S. (2002) on Evaluating E-learning Readiness in Higher Education Institutions.

A critical look at this finding revealed that online learning tools are available in Adekunle Ajasin University, Akungba-Akoko, Ondo State, and both the Teachers and students are well skilled to participate in online instructional method when introduced. This mirrors the research of Krishnakumar and Rajesh as cited by S. Boondao, S. Komlayut and W. Punnakan (2010) on the Attitude of Teacher's of Higher Education towards e-learning.

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As touching the readiness of students to adapt if online learning method is been introduced, Majority of the participants of this study know what online learning is, though some agreed that they have not been a part of any online course before, however, most of them agreed that they have made personal enquiry on how to use online learning tools. Majority of the respondent also agreed that they would be comfortable using a computer several times a week to participate in an online course: and that they should be able to take notes when watching a video on the computer, and that they will understand calculation and equation related course when such are presented in video format.

5.0 Conclusion

From the finding of this study, the following conclusions were made;

1. Online learning tools are available in Adekunle Ajasin University, Akungba-Akoko,
2. Both the Teachers and students have required basic ICT skills to implement online instruction.
3. Both the Teachers and students are ready if online learning method is introduced into the schools' curriculum by the school management.

5.1 Recommendation:

Based on the findings of this research and the conclusion drawn, the following recommendations are made;

1. The management of Adekunle Ajasin University, Akungba-Akoko should introduce online learning method into the school's curriculum.
2. The management of Adekunle Ajasin University, Akungba-Akoko should make the school's internet connection accessible to both the lecturers and students.

For easy implementation of online learning in tertiary institutions, Nigerian government should ensure that students are been taught about online instruction and how it is being used from their secondary school level.

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Bir iletişim dili olarak fotoğraf

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Abstract

Fotoğrafın icadı, gelişim süreci ve ilk dönem ressamların fotoğraftan faydalanmaları ile fotoğraf sanat olarak kabul edilmiştir. Fotoğraf modern sanat akımlarının grafik tasarımla birleşmesinde önemli bir yere sahiptir. Fotoğrafın gelişimi geleneksel süreçten sayısal sürece geçişte hızlı bir ivme göstermiştir. Bilim ve teknolojinin birbirine parelel olarak gelişmesi ile ortaya çıkan yeni iletişim ortamları fotoğrafı bir iletişim dili haline getirmektedir. Kitle iletişim araçlarının etkin kullanıldığı günümüzde iletişim dünyasının en önemli öğelerinden biri haline gelen fotoğraf ile tüm bilgi ve belgeler kayıt altına alınmakta ve arşivlenebilmektedir. İletişim dilinin gelişmesinde en fazla katkıyı sağlayan fotoğrafın teknoloji ile birleşmesi ile manipülasyon teknikleri ile sayısal fotoğrafın önemi ortaya çıkmıştır. Bu araştırmada fotoğrafın gelişimi fotoğraf ve toplumsal algı, İletişim nedir, fotoğrafın iletişimde bir grafik tasarım ifade aracı olarak kullanılması, İletişim dili olarak fotoğraf irdelenerek fotoğrafın evrensel bir dil olduğu irdelenmiştir. Bu araştırmanın alan yazında araştırmacıların fotoğrafı tanımalarına yardımcı olacağı düşünülmektedir.

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Keywords: Fotoğraf, İletişim, Tasarım.

1. Introduction

Fotoğrafın tarihsel gelişimi, fotoğraf ışığa duyarlı emülsiyonlar ile kaplı bir kağıt üzerine pozlanan şekillerin bazı kimyasallar kullanılarak görünür hale getirilmesidir. Bu işlemler için insanlar 19. yy. boyunca rastlantısal bazı işlemler sürdürmüşlerdir. İsa'dan sonra 965 ve 1038 yılları arasında yaşayan İslam bilgini Basralı Ebu Ali El Hasan İbn-i Heysem ilk fotoğraf makinesi olarak bilinen Obscura'yı kullanan kişi olarak bilinmektedir(Arı, 2013: 5).

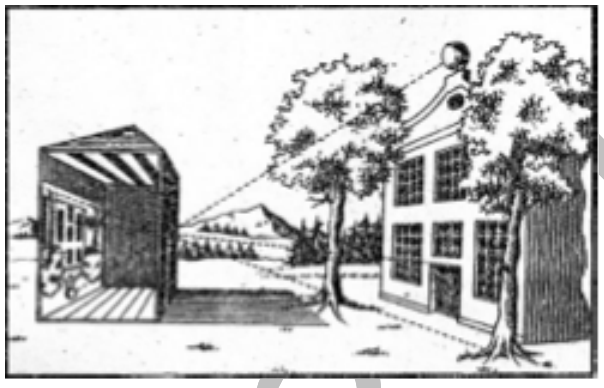
1452-1519 tarihleri arasında Leonarda Da Vinci'nin bir eserinde siyah beyaz oda tanımı geçerken çağdaşı olan Albert Dürer'de karanlık oda tabirini nesnelerin perspektifini doğru çizebilecekleri bir aygıt icat olduğundan söz ediyordu. Jerome Cardan 1550 yılında karanlık oda deliği üzerine yerleştirdiği mercek ile kadraja denk gelen mevcut görüntünün küçük kağıtlar üzerine yansımasını gördü. 1697-74 yılları arasında Almanya'da Altdorf Üniversitesinde Profesör olan Schulse bir şişe içerisine koyduğu tebeşir, gümüş ve nitrik asit karışımının sallanıp yere bırakıldıktan sonra ışığa bakan tarafının karardığını keşfederek, bu karışıma karanlıklara getiren manasındaki "scotophore" ismini vermişti(Ergin, 1989; 7-9).

Fotoğraf yaygınlaşmadan önce gazeteler önemli olaylarını ressamlardan çalışmalarını beklerdi. Harpers Weekly 1863 yılında Gettybury savaşının fotoğraflarını çizmesi için Alfred Maud isimli ressam ile çalışmıştır (Arı, 2013:10).

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Fotoğrafın icadından sonra gazete ressamlarına ihtiyaç kalmamıştır. Fotoğrafın tarihsel gelişiminde karanlık bir odanın duvarına bir iğne deliği açılmış dışardaki cisimlerin görüntüsü duvara ters olarak düşmüştür. bu fiziksel olaya "camera obscura" denilmektedir(Demirkol, 2007:8).

Daguerre Niepce'nin başlattığı denemeleri geliştirerek fotoğrafçılıkta belli bir yol kat etmiştir. Fotoğraf makineleri uzun sürede belli şekilde yol değiştirmiştir. Karanlık oda kalkmasa da neredeyse yok denecek kadar az kullanılmaya başlanmış, ışığa duyarlı film yerini yeni bir teknoloji ile değiştirmiştir. Pozlama ve ışık ölçüm sistemlerinde değişiklikler görülse de film üzerinde görüntü sabitleme mantığı aynı şekilde devam etmiştir. Filmlerin yapısal olarak ışığa duyalılıklarının artması, görüntü kalitesinin yükselmesi, görüntünün duyarlı yüzeye aktarılması, film öncesi dönemde bakır plakalar ile sağlanmaktadırlar. Sonrasında filmin yüzeyine aktarılması günümüze kadar devam eden uzun bir süreçtir (Kılıç, 2005:195).



Şekil 1- Kamera obscuranın çalışma biçimi

1.1. Fotoğraf ve toplumsal algı

Toplumsal ve kültürel hayatta fotoğraf yaygınlaşması ile birlikte temel algılarda bazı değişikliklere sebep olmuştur. Bütünlük oluşturduğu düşünülen görüntülerin bozulabildiği bunun yanında yeni oluşan formlardan yeni görüntü biçimleri oluştuğu görülmeye başlanmıştır. Fotoğrafın icadı ile kent yaşamındaki olgular birer şok olarak algılanmaya başlanmıştır. Her olay kendi içinde değerlendirilerek diğer olaylardan bağımsız algılanmakta ve yorumlanmaktadır (Göknar; 2010:22).

İnsanlığın var olması ve gelişmesi ile birlikte duyularında gelişmesi ve algılama biçimi değişir ve gelişir. Bu sebeple algılamayı sağlayan duyular doğal koşullarla birlikte tarihsel gelişime de bağlıdır(Benjamin, 2002, s. 56).

19 yy. Dan itibaren resim, heykel ve edebiyatın gelişimi ile birlikte imgelerin gücüde artmıştır. Bu dönemde edebiyat yeni bir kimlik olarak "sanat" kimliğini edinir. Diğer sanat dalları ile etkileşim içine girer. 19 yydan itibaren sanat gözleme ve izleme etkinliği ile birlikte güzelin, iyinin ve doğruyu sanatçının belirlemesini sağlar. Aynı zamanda sanatçının dışında olan ve ilerleyen klasizm ve milimetrik ilkeler terk edilmeye başlar(Baudelaire, 2009, s.41).

1.2. İletişim nedir

İletişim insanın anlam arama çabasıdır. İnsanın kendisinin başlattığı iletişim süreci kişilerin değişen gereksinimleri karşılayacak şekilde ayırt etmesini sağlayan bir edim olarak düşünülebilir. İletişim genel olarak bilgi, fikir, duygu ve becerilerin simgeler aracılığıyla da iletişimidir denilebilir. İletişimin esası olan simgeler bir kişi, yada gruptan diğerine fikir, tutum yada duygu olarak iletilir. İletişim sözlü olarak varlıkla, iletişim sözsüz olarak eylemle, yazılı olarak da belge ile ilgili olan bir süreçtir(Yalçın, 2005: 54).

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1.3. Fotoğrafın iletişimde bir grafik tasarım ifade aracı olarak kullanılması

Artan ideolojik isteklerin yanı sıra, sosyal politik olaylar 20. yy ile birlikte artarak çoğalmıştır. 1910'dan sonra üretim ve tüketim toplumunun gereği olan sanayileşme sürecinin geliştiği de görülmektedir. Bu sebeple görsel iletişime verilen önem teknolojinin de gelişmesi ile kitlesel iletişimde önemli rol almıştır. Dönemin tasarımcıları modernleşme ve sanatsal akımların etkisini fotoğrafta ve grafik iletişim unsurlarında görmekte, uygulamakta ve geliştirmektedirler. Tasarım sürecinde yenilik tipografi, renklerin simgesel kullanımı, sloganlar olarak sayılabilir. Etkili bir tasarım elemanı olarak fotoğrafı ele alırsak; fotoğraf hazır görüntüdür, renksel müdahele ve kadraj değişikliklerine uygundur. Değişik ölçülerde büyütülüp küçültülebilir. Çeşitli şekillerde karanlık oda da yeni görsel biçimler elde edilir. Ayrıca fotoğraf istenilen tasarım alanlarına uygulanabilir(Yigin, 2011 s:67-68).

1.4. İletişim dili olarak fotoğraf

Fotoğraf kişinin kendi dışında gelişen olaylar ile ilişkisini bir müdahale olmadığı sürece olduğu gibi yansıtır. Fotoğraf yazı ya göre daha betimleyici bir anlatım şekli olup; fotoğraf içindeki nesneler de ışık gölge ve farklı malzemeler aynı andalığı yaşamaktadır. Bu sebeple fotoğraf evrensel kodları içerisinde barındırmaktadır(karaca;2011: 51). Fotoğrafın icadında gerçeği belgeleme fikri bulunmaktadır. Bu sebeple fotoğraf anı belgelese yada kurgulansada var olanı gösteren niteliğindedir. Bu sebeple fotoğraf illüstrasyonların(savaş belgeleme) yerini almıştır(Yigin: 2011;11).

Fotoğraf dünyada diğer ülkeler ve kültürler arasında ilişki kurar. Tek bir dil olarak insanların arasında iletişim kurar. Fotoğraf için herhangi bir dil bilmek gerekmez çünkü fotoğrafın kendi dili bulunmaktadır. Fotoğraf toplumsal koşullar hakkında bilgi verir. Aynı zamanda teknolojiyi de iyi kullanılarak fotoğrafla birlikte gelen düşüncenin de hızla yayılması sağlanır. Tüm bu yapılanmalardan ötürü fotoğraf yüzyılımızın et etkili aracı olarak düşünülür Sanat bir dil konuşurken, fotoğraf hem hayal gücünü besler ve bir kaç dil konuşur(Karadağ, 2004; 50).

Fotoğraf makinesinin denklanşörüne basıldığı andan itibaren an durur. Ronalt Bartes fotoğraf için "o fotoğrafın görüntüsü ölümdür" demektedir(Yigin: 2011;11). Fotoğraf bulundukları yerlerden kesilerek kolaj çalışmalarında da kullanılmıştır. Bu sebeple hazır görüntüdür.

Fotoğraf doğanın bir tekrarı ve anı olarak düşünülse de fotoğrafta farklı anlatım dilleri bulunmaktadır. Fotoğrafla sanatçı görünenin güzel olanın ve estetiğin kaygısını ön plana çıkarır. Fotoğrafın dolaylı ve direkt olarak anlatım dilleri bulunmaktadır. Fotoğrafın dili çekilen kadrajda nesnelerin görüntüsünün boyut değiştirmesidir. Fotoğrafta görünen ve yorumlanan birleşerek yön değiştirir. Bu şekilde imgeler biçimler ile ifade edilmiş olur(karadağ, 2004: 127).

Fotoğrafın etkili bir iletişim dili olması için bir fikre dayalı olması gerekir. Kadraj içine dahil edilen öğeler anlamı belirlemektedir. Fotoğrafta iletişimin temeli algıdır. Algı hedef fikre atıf yapsa da, algıda bireysel farklılıklar olabilir. Barbara Krugerin fotoğrafta anlam inşaası konusundaki yorumu şöyledir:

"Ne zaman bir eserin ne anlam geldiğini sorsalar, anlamın inşaasının kişiden kişiye değiştiğini söylüyorum"

(Karaca; 2011: 54/58).

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Fotoğraf gerçeğin bir yorumudur. Gerçekten yola çıkan bir iz, anı yakalamadır. Fotoğrafın biçimle örtüşmesi ile ortaya çıkan iletişim fotoğraf çekimi sırasında fotoğrafçının maruz kaldığı psikolojik durumu da yansıtır(Karaca; 2011: 54/58).

2. Reseaech Methods

It has been a research in the survey model and has been prepared with documentary survey method, the research is the total of scanned documents, paintings, pictures, voice records, plaques, equipment , sculpture belonging to the past and in addition to these it also includes every kind of reports, encylopedias, books, statistics and minutes.(Karasar, 1999: 183).

3. Conclusion

Fotoğrafın icadı ile birlikte gelişen tasarım süreci ile sanatçılar ve tasarımcılar sayısız çalışmalarında fotoğraftan faydalanmışlardır. Bilim ve teknolojinin birbirine paralelle gitmesi, ile gelişen fotoğraf ile belgeleme işlemi ivme kazanmıştır. Fotoğrafın evrensel bir iletişim dili olmasını yanı sıra toplumda da fotoğraf ve fotoğrafçılık algısı oluşmaya başlamıştır. Bir iletişim dili olarak fotoğraf kadrajdan çıkmasına rağmen renkli bir algı sağlamaya sebep olmaktadır. Bu sebeple pek çok tasarım alanında kullanılmaktadır. Fotoğraf aracılığı ile bazen kişisel ve bazen de toplumsal konular görsel iletişim olarak sunulmaktadır. Bu sebeple fotoğraf etkili bir görsel sanatlar dalı olarak, aracı olduğu sanat eserleri ayrı olmak üzere, kişisel ve kitlesel mesaj verebilme yeteneğinden ötürü en etkili iletişim araçlarındandır. Bu araştırmada fotoğrafı anlamak ve etkili kullanımını sağlamak amacı güdülmüştür. Bu araştırmanın alan yazında araştırmacıların fotoğrafı tanımalarına yardımcı olacağı düşünülmektedir.

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Bring cs2013 recommendations into c programming course

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Abstract

Computer Science Curriculum 2013 has become the guidance of computing education since it was released in 2013by the ACM/IEEE-Computer Society. This paper analyzes the CS curriculum development trend, trying to dig the programming-related core from CS2013 with respect to the knowledge areas, topics, organization of teaching, and the building of students' capability. Considering the characteristic of our local institution and undergraduates, we present an updated teaching curriculum and lab curriculum for C Programming Language course in relation to CS2013 recommendations, which highlight the development of the students' abilities on programming, problem-solving, self-regulated learning, and computational thinking. Finally, we present and assess the implementation of the resulting curriculum.

Keywords: CS2013, C programming course, CS curriculum planning, CS major;

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1. Introduction

The ACM and IEEE Computer Society jointly sponsored the development of Computer Science Curriculum 2013 (CS2013) (http://ai.stanford.edu/users/sahami/CS2013, 2012). Since released, it has become the guidance of computer science major and received the widespread attention. With the sequential publication of the strawman, the ironman and the final version, researchers, educators and teachers have made a wide range of discussion on its guiding ideology and content (Mehran Sahami, Steve Roach, Ernesto Cuadros-Vargas, Richard LeBlanc, 2013). To follow this advanced education principle and bring it into C programming course for Chinese undergraduate CS majors, we design a lab syllabus for C programming course to meet the requirement of undergraduates.

As an important part of CS major, programming course is always being concerned about how it trains students to solve problems using a programming language in practice. This is again emphasized in CS 2013, but it's still lack of concrete and practical guidance for practice stage. Therefore, how to make the practice and the knowledge units in the CS2013 match is a key challenge. This paper discusses the problem and gives some recommendations and examples for other instructors to use as references in developing and teaching similar courses in the CS curriculum.

2. Program design courses in cs2013

In CS2013, the body of knowledge in computer science has been updated and divided into 18 Knowledge areas (http://ai.stanford.edu/users/sahami/CS2013, 2012), including：

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- Algorithms and Complexity (AL)
- Architecture and Organization (AR)
- Computational Science (CN)
- Discrete Structures (DS)
- Graphics and Visual Computing (GV)
- Human-Computer Interaction (HC)
- Information Assurance and Security (IAS)
- Information Management (IM), Intelligent Systems (IS)
- Networking and Communications (NC)
- Operating Systems (OS)
- Platform-Based Development (PBD)
- Parallel and Distributed Computing (PD)
- Programming Languages (PL)
- Software Development Fundamentals (SDF)
- Software Engineering (SE)
- System Fundamentals (SF)
- Social and Professional Issues (SP)

From the perspective of knowledge units, programming Language and Software Development Fundamentals are related to the programming courses. The detailed knowledge units composing these two knowledge areas are listed in table 1.

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Table1. Knowledge areas and their knowledge units related to programming design course

Knowledge area	Knowledge unit	hours
Software Development Fundamentals	Algorithms and Design	Core(11,0)
	Fundamental Programming Concepts	Core(10,0)
	Fundamental Data Structures	Core(12,0)
	Development Methods	Core(9,0)
Programming Languages	Object-Oriented Programming	Core(4,6)
	Functional Programming	Core(3,4)
	Event-Driven and Reactive Programming	Core(0,2)

3. Objective and requirement of "c programming" lab syllabus

By being familiar with the basic syntax and programming practice in a type of programming language (such as C or C++), help students to understand the process of software design and development, master the basic methods of constructional and object-oriented programming, and in-depth understand the computational thinking on how to describe and solve specific problems by computers, as well as the foundational methodologies of software system design and implementation.

Students are required to be familiar with some types of integrated development environment (IDE) as well as the common algorithms when solving problems by computers. Furthermore, it is necessary for students to utilize constructional and object-oriented programming methods to solve some practical problems, which cultivates their program analysis, design, coding and debugging abilities and helps them to get into a habit of good programming style.

4. Organizations of labs

In our syllabus, we provide 5 required labs and 2 elective labs as well as 2 projects. For required labs, we put emphasis on the training of students' fundamental programming skills, such as debugging, common algorithms and problem-solving strategies. For elective labs, higher requirements are brought in so that students need to flexibly apply their knowledge to solve some complex problems, additionally, they will face some new methods in software development such as incremental testing, which enhances their programming skills as well as computational thinking (Jeannette M. Wing, 2006). Here we list the main content of labs and projects designed for undergraduates.

4.1. Labs

Lab 1: Basic control structures (required)

Design and implement a number-guessing game step by step to master how to program by sequence, selection and loop structures.

(1)A user guesses an integer between 1 to 100 which is randomly chosen by a computer, if the user gives the right answer, the computer outputs "Right!" , otherwise, it outputs "Wrong!" and reports that the hidden number is higher or lower than the number that was guessed, then the game is over; (2) Based on task(1), modify the program to allow the user to continue to guess until he/she offers a correct number; (3) Based on task(2), limit the times that the user can repeat(for instance, the user can guess 10 numbers at most). Furthermore, if the user hasn't provided the correct number within the given times, the game is over; (4) Based on task(3), modify the program to enable it to offer multiple numbers at one running, and the game continues until the user inputs 'Y' or 'y'; if the user hasn't guessed the correct number in the given times, then skip the current number and make the user continue to guess the next number.

Lab 2: Functions (required)

Calculate the greatest common divisor (GCD) of two integers by exhaustion, iteration and recursion respectively to master how to define and call functions and how to pass parameters into and return values from functions. Comprehend the process of function invocation, especially the recursive function invocation. Master problem-solving strategies and the defensive programming methodology.

Lab 3: Arrays and pointers (Required)

Design and implement a menu-driven student score management system to master how to use one-dimension arrays, two-dimension arrays or pointers as function parameters and some common algorithms related to arrays, such as sorting and searching algorithm. Furthermore, comprehend the role of algorithms in the problem-solving process, apply the module programming methodology and debug programs using a modern IDE.

Assume there are m students who take n examinations(the value of m and n are from user's keyboard input), write a program to realize the following functions: (1)Record student ID, name and all courses' scores for each student;(2)Calculate total scores and average score of each course and each student;

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(3)Sort by total scores of all students in descending order and ascending order respectively; (4) Sort by student ID in ascending order and by name in lexicographic order respectively; (5) Search a student's ranking and scores by student ID and name.

Lab 4: Structs and files (Required)

Based on Lab 3, employ structure arrays or singly linked list to rewrite the code of Lab 3 and introduce the file processing (write each student's score table into a file; or read and print each student's score table from the file). Through this lab, master how to use the structure arrays or structure pointers as function parameters, and observe the advantages of structure arrays and linked lists in the field of database management instead of arraysof primitive types. At the same time, grasp the basic file operations, master in-depth module programming methodology, unit testing and incremental testing methodology.

Lab 5: Object-oriented programming

Rewrite the code of Lab 3 or 4 in the way of object-oriented programming. In this lab, understand the essential differences between object-oriented programming and structured programming, meanwhile observe the advantages of object-oriented programming. Further master the fundamental concepts of object-oriented programming, such as the definition and implementation of classes, and the creation as well as the application of objects. Be familiar with some modern IDEs.

Lab 6: Grand prix grading system (Elective)

Design and implement a grading system for Grand Prix to master in depth the application of some common sort and search algorithms and how to choose the appropriate data structure to solve practical problems by programming.Assume that there are n athletes participating in the grand prix and m (m>2) judges grading all athletes. The grading rules include: delete the highest and the lowest score from every athlete's m scores graded by judges, take the average score of the rest scores as the final grade of the athlete. Sort the final grades of all athletes in descending order to determine the awards list and assess the accuracy of each judger's grading.

Lab 7 A survey system for quality of food and beverage service (Elective)

Design and implement a survey system for quality of food and beverage service to master in depth the application of some common sort and search algorithms and how to choose the appropriate data structure in order to solve practical problems by coding.

Assume that one university invites some students to assess the food and service quality offered by campus restaurant; the range for access marking includesome levels; meanwhile they can propose their comments and suggestions. Implement the following functions: (1) Show the survey result in the form of histogram with respect to each marking level; (2) Given a specific marking level, find and output the number of students grading this marking level; (3) Calculate the average mean, median and mode of the total marking levels; (4) Keep records of the comments and suggestions in a file for future use.

4.2. Projects

Project 1: Contacts system

Implement a menu-driven contacts system by programming to master the top-down and stepwise refinement modularity programming methodology. In this project students should be able to utilize multiple knowledge units including functions, arrays, pointers, structs, files, and some common sorting and searching algorithms. Furthermore, this project trains students to improve their abilities of system analysis, design, programming and debugging.

Project 2: Gluttonous snake game

Utilize the basic knowledge on object-oriented programming and realize an extended gluttonous snake game which could help users to learn English and recite words. This project contributes to help students

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to master the methods of object-oriented programming, and enhance their abilities of system analysis, design, coding and debugging.

(1)User's account management
(2)Game management
(3) Word-reciting management

Table 2. Knowledge coverage

Knowledge area	Knowledge unit	Topics covered	Lab/Project
SDF	Algorithms and Design	The concept and properties of algorithms (Informal comparison of algorithm efficiency, e.g., operation counts); The role of algorithms in the problem-solving process; Problem- solving strategies(Iterative and recursive mathematical functions, iterative and recursive traversal of data structures, divide-and-conquer strategies); Fundamental design concepts and principles (abstraction,program decomposition , encapsulation and information hiding, separation of behavior and implementation)	Lab 2, Lab 3, Lab 4, Lab 5, Lab 6, Lab 7, Project1, Project 2
SDF	Development Methods	Program correctness; Debugging strategies; Documentation and program style	Lab1, Lab 2, Lab 3, Lab 4, Lab 5, Lab 6, Lab 7, Project1, Project 2
SDF	Fundamental Programming Concepts Development Methods	Basic syntax and semantics of a higher-level language; Variables and primitive data types; Expressions and assignments; Conditional and iterative control structures; Simple I/O. Testing fundamentals.	Lab1
SDF	Fundamental Programming Concepts; Development Methods	Functions and parameter passing; The concept of recursion. Defensive programming.	Lab 2
SDF	Fundamental Data Structures; Development Methods	Arrays; Strings and string processing; Pointers (References and aliasing). Debugging strategies.	Lab 3, Lab 6, Lab 7, Project 1
SDF	Fundamental Data Structures; Development Methods	Records/structs; Linked list;Strategies for choosing the appropriate data structure; file I/O. Unit testing.	Lab 4, Lab 6, Lab 7, Project 1
PL SDF	Object-Oriented Programming; Development Methods	Object-oriented design; Definition of classes: fields, methods, and constructors. Unit testing; Debugging strategies;Modern programming environments.	Lab 5, Lab 6, Lab 7, Project 2

5. Conclusion

Based on the analysis of the CS curriculum development trend, we firstly extract the programming-related core of CS2013 with respect to the knowledge areas, topics, organization of teaching, and the building of students' capability. Considering the characteristic of our local institution and undergraduates, we reorganized and redesigned the lab curriculum for Program design course, which highlights the development of the students' abilities on programming, problem-solving, and computational thinking.

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E-tutors' teaching readiness in distance learning companion project in Taiwan

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Abstract

E-tutors play an important role in after-school distance learning project. This study focused on developing the readiness instrument for evaluation of the e-tutors, and hoped to assist the mentor to understand the teaching e-tutors well. Teaching readiness index scale was used as research instruments. Besides, qualitative data was also collected for analysis in the study. Distance Learning companion project started from October 22, 2013 to January 9, 2014. Forty four e-tutors participated for one hour and a half a course, twice per week. The results indicated that at the beginning of distance learning companion project, forty-two e-tutors showed high job readiness and high psychological readiness (R4), and two e-tutors showed low job readiness and high psychological readiness (R2). After a semester of teaching and training, 44 were high job readiness and high psychological (R4). According to the results of the study, job readiness was improved and the psychological readiness was maintained. In the study, it was found that the content of the training workshop mainly focused on job readiness, but neglected psychological readiness. In the future, more content about psychological readiness should be designed in the training workshop to support the e-tutors.

Keywords: Distance learning companion; readiness; situational leadership theory; e-totur

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1. Introduction

Due to the development of technology and Internet, it brings new opportunities for education. Through online learning platform, students can learn and acquire knowledge regardless of the limitation of the time and space. For educator, providing equal education opportunity is always important. Students in rural area usually didn't receive as much educational resource as students in the cities (Huang, Liu, Lin, & Chang, 2011). Fortunately, online tutoring provides a channel to deliver the educational resource to the students in need (Huang, Liu, Sung, 2011). Ministry of Education in Taiwan initiated the distance learning companion project in 2006 to apply the platform, Joinnet, to deliver online tutoring to the students in rural area. In 2013, the project served more than 1000 students in rural area. More and more e-tutors participated in this project, and ensuring the e-tutors teaching readiness and providing them suitable support is important (Yang, Liu, Lin, Hu, Cheng, Wu, Cheng, & Chang, 2010).

Hersey and Blanchard (1993) proposed the idea of readiness in situational leadership theory, and readiness indicated the degree to which the individuals' ability and willingness to take on the task. The purposed of this study is to investigate the e-tutors' teaching readiness in the distance learning companion project.

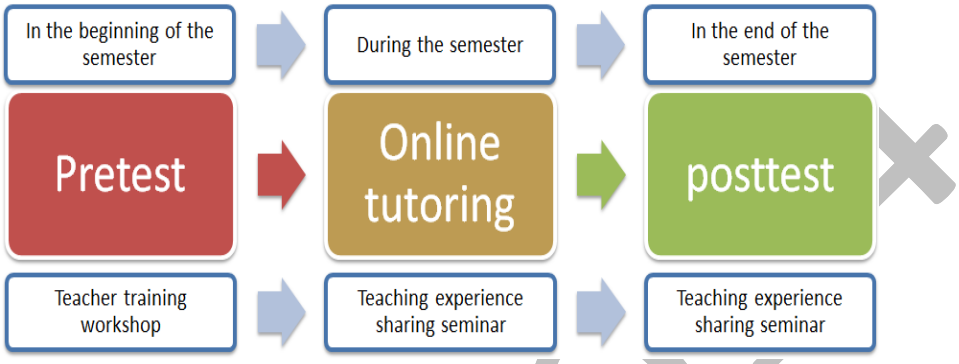
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2. Methodology

2.1. Experimental design

A single group pretest-posttest design was applied in this study. In the beginning of the semester, the e-tutors filed the questionnaire for the pretest. After the online tutoring last for a semester, the e-tutors filed the questionnaire in the end of the semester (Fig. 1).

Figure 1. The study design of this study



2.2. Participants

44 undergraduate students participated in this study, and all the participants joined the distant education program, and take the role as e-tutors. 23 e-tutors were male, and 21 e-tutors were female. Among the e-tutors, 5 were freshman, 12 were sophomore, 11 were junior, 7 were senior, and 9 were graduate students.

2.3. Instrument

Teaching Readiness Index Scale(TRIS) was designed based on the readiness concept in situational leadership theory proposed by Hersey and Blanchard (1993). Two dimensions were included in TRIS: Work readiness (7 items), Psychological readiness (3 items). The scale was designed in 8 point Likert scale style. According to the score in the two dimensions, we could divided the tutors into four categories: Low readiness (R1): Work readiness and psychological readiness scored from 1 to 4; Mid-low readiness (R2): Work readiness scored 1 to 4 and psychological readiness scored from 5 to 8; Mid-high readiness (R3): Work readiness scored 5 to 8 and psychological readiness scored from 1 to 4; High readiness (R4): Work readiness and psychological readiness scored from 5 to 8. The result of reliability analysis indicated that the Cronbach's alpha of working readiness was 0.85 and the Cronbach's alpha of psychological readiness was 0.82. The Cronbach's alpha of total scale was 0.90. The result indicated that the Teaching Readiness Index Scale have suitable reliability.

3. Results

3.1. Teaching readiness of e-tutors in the beginning and the end of the semester

Moreover, it was found that in the beginning of the semester, 42 e-tutors were high readiness and 2 were mid-low readiness, and all the 44 e-tutors were high readiness (Fig. 2). The result indicated that the e-tutors' teaching readiness were significantly improved during the online tutoring.

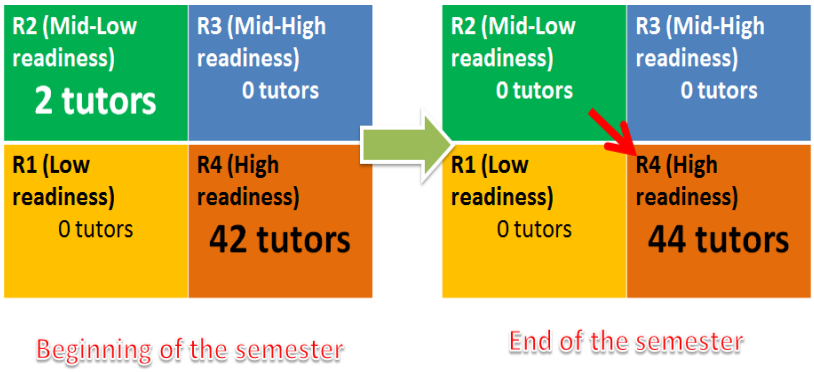


Figure 2. The e-tutors' teaching readiness in the beginning and the end of the semester

Moreover, the result indicated that the e-tutors' working readiness were significant improved in the end of the semester (t=6.25, p<.001), however, their psychological readiness did not significant in the end of the semester (Table 1).

Table 1. The t test of e-tutors' teaching readiness

Dimensions	pretest		posttest		T
	M	SD	M	SD	
Working readiness	5.27	.97	7.30	.70	6.25***
psychological readiness	6.80	.69	7.03	.88	1.64

p<.001

4. Conclusion

In this study, we develop a Teaching Readiness Index Scale (TRIS). It was found that most of the tutors have high teaching readiness when they join the distance education program. Providing teacher training courses and experience sharing seminars for the tutors is important. However, in this study, we found that e-tutors' psychological readiness did not significant improved in the end of the semester, and it may be the lack of the related training course in the training workshop during the semester. In the future, more training course to enhance e-tutors' psychological readiness and examine the effect of the training course on e-tutors' teaching readiness.

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Evaluation of a digital story pedagogical module for the indigenous learners using the stake countenance model

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Abstract

This study involved the development of a literacy pedagogy for the indigenous people in Malaysia. The Developmental Research Approach was used where insights about the indigenous people and their lifestyle were gathered and analysed for content in developing a literacy pedagogical module. Several principles emerged from the data collected and these principles formed the basis for the module. The module encompassing a digital story was implemented in two schools for indigenous students situated in Peninsular Malaysia. The Stake Countenance model was used to analyse and conclude the evaluation of the module. Both teachers and students who participated in the module implementation were directly involved in the evaluation process. Findings showed that there was strong engagement between the Indigenous students and the lessons in the module. The teachers found that the module was able to respond to the needs of the indigenous students. This paper will discuss the evaluation process in detail and present the findings with reference to educational needs of the indigenous students in the country as a whole.

Key words: Responsive Pedagogy; Indigenous Learners; Literacy pedagogy; Developmental Research Approach.

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1. Introduction

Literacy practices among children today are embedded in textual environments which are complex (Healy, 2002). This is due to the dynamic development of multi-literacies and multimodalities which have a profound impact in the lives of young children today. Text is no longer associated with written messages and symbols alone. Transformation in digital technologies has expanded the definition of text to include various other multi modal features (Larson, 2009). Research in the area of literacy and technology indicates that there is significant difference in the way readers approach digital texts as compared to printed texts (Bailey, 2006, in McVee, Bailey, & Shanahan 2008; Healy, 2002; Tseng, 2008). This is attributed to several reasons; first, the textual artefacts and accompaniments of digital technology make a difference to the ways in which text is read (Healy, 2002). Healy explains that electronic texts are composed of info-graphic structure with the integration of image, sign, and audio. This makes the text rich and non-linear in structure which also requires the reader to use multiple strategies when reading. Next,

meanings in multimedia text are not fixed and additive (the word meaning plus the picture meaning) but multiplicative (word meaning modified by image context, image meaning modified by textual context), making the whole far greater than the simple sum of its parts (Bailey, 2006, in McVee et al., 2008).

Given this development in literacy, there is a great implication on literacy pedagogy. ELT methodology has to embrace this development or face the risk of being irrelevant to a society made up of different layers of communities whose cultures and life experiences differ from one another. In Malaysia, the indigenous group is a particular community that is of concern for the government. It has been noted that the literacy level and learning achievement among the Indigenous children is low in Malaysia (UNICEF Malaysia, 2008). The illiteracy rate among the Indigenous children is also alarming. Redzuan and Gill (2008) reported that the illiteracy rate among this group is 49.2% compared to 6.4% at the national level. Another serious problem of the Indigenous people is the high dropout rate. About 62% of Indigenous children drop out of school every year and 94.4% do not complete secondary school (Kamarulzaman Kamarudin & Osman Jusoh, 2008). The percentage of passes among the Indigenous children in Year 6 is between 43% to 59% compared to 78% at the national level. This calls for serious attention and the government of Malaysia has taken several initiatives in addressing the issue.

The National Education Blueprint 2013-2025 has specified various efforts to provide equal facilities and education to both rural and urban schools. It is crucial that steps are taken to improve the standard of education among the Indigenous students. One such effort is to look at ways to increase their literacy by making reading materials effective and relevant to their context. This paper discusses an initiative to design a literacy pedagogy to facilitate literacy among indigenous learners. This paper will present findings from a research carried out with a group of indigenous people in Malaysia. The Developmental Research Approach was used where insights about the indigenous people and their lifestyle were gathered and analysed for content in developing a literacy pedagogical module. Several principles emerged from the data collected and these principles formed the basis for the module. The module encompassing a digital story was implemented in two schools for indigenous students situated in Peninsular Malaysia. The Stake Countenance model was used to analyse and conclude evaluation of the module. Both teachers and students who participated in the module implementation were directly involved in the evaluation process. Findings showed that there was strong engagement between the Indigenous students and the lessons in the module. The teachers found that the module was able to respond to the needs of the indigenous students. This paper will discuss the evaluation process in detail and present the findings with reference to educational needs of the indigenous students in the country as a whole.

2. Theoretical framework

The present study was guided by the schema theory. The schema theory describes comprehension as a process of interaction between the text and the reader's background knowledge (Carrel & Eisterhold, 1983). Carrel and Eisterhold (1983) argued that text by itself does not bring meaning but it is the reader who relates the text to the existing acquired knowledge to construct meaning.

Text comprehension as a process is based on the principle that every input is mapped against some existing schema which should be compatible with the input. The schema or schemata is organized from the most general at the top to the most specific at the bottom. This organization helps to explain the two modes of information processing: bottom-up and top-down processing. Bottom-up processing involves the bottom level schemata and the incoming data. This stage is called data-driven. The top-down processing involves higher level general schemata where the system makes general predictions and searches for more detailed information from the specific schema to fit in the general idea. This stage of processing is called conceptually driven. Both the bottom-up and top-down should be occurring at the same time, one facilitating the other.

Brown (2001) describes two types of schema; content schema and formal schema. Content schema includes knowledge about people, the world, culture and the universe. Formal schema is knowledge about the discourse structure. Content schema refers to understanding of the text and the cultural elements

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needed to interpret it. This cultural element is a major aspect that influences the understanding of a text (Carrell, 1983, in Ahmad, 2006). Carrell suggests that reading teachers should ascertain that the reading text matches the student's culture.

In view of the schema theory, Coady (1979) in Carell et al. (1996) described reading as an interpretive process. Coady explained how the reader's background knowledge interacted with their conceptual abilities and process strategies in comprehending the text. Readers are able to understand better because they can take the text beyond its graphic representation and assign the task to the knowledge and concepts already stored in the memory. This is further supported with the attitude and beliefs the readers bring to the text. Therefore, Coady suggested that the linguistic ability together with the knowledge of the world enables the reader to comprehend the text. This interaction can be seen in Figure 1.

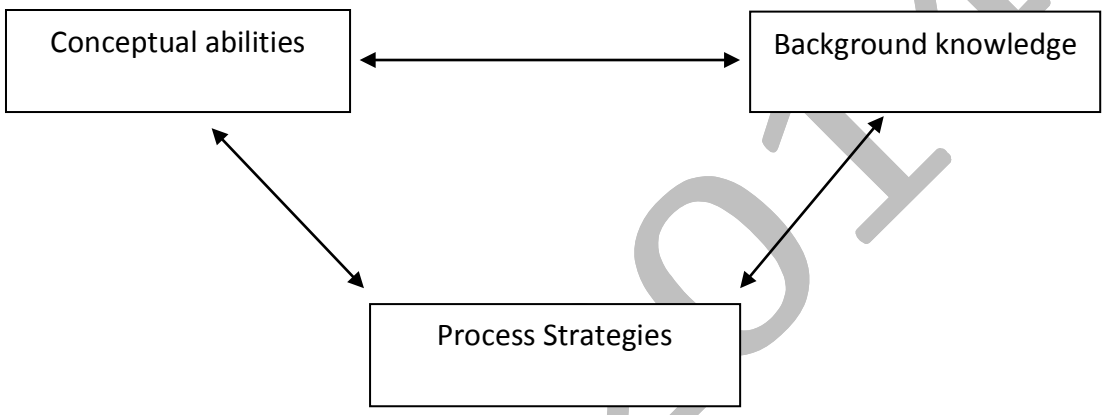


Figure 1. Coady's (1979) model of the ESL Reader.

Content knowledge of a second language learner is often culture-specific (Carrell & Eisterhold, 1983). Thus, it is important to provide text familiar to the learner and to which the learner can relate. One method of maximizing learners' cultural schema is by using the students' own ideas and words in the reading text as proposed by the Language Experience Approach (Rigg, 1981, in Carrell & Eisterhold, 1983). The other method is by developing reading material with the local settings and specialized low frequency vocabulary. This method is important for learners with low proficiency who need facilitation in vocabulary. Finally, previewing is another activity that helps to activate the prior knowledge (Carrell & Eisterhold, 1983). Showing familiar pictures and vocabulary, for instance, helps the reader in understanding the text.

McVee, Dunsmore, and Gavalek (2005) reviewed the influence of cultural perspectives on learners' schema. Reviewing the work by Bartlet (1925), McVee et al. pointed out that one's schema or understanding of the world is formed through transactions with the outside world. This transaction includes the cultural practice of the learners. In fact, schema is defined as formed within individuals, in the head (McVee et al., 2005, p. 556). In explaining the origin of schema, McVee et al. stressed that schemas or cognitive structures emerge or transform as a result of transactions with the world through material and ideational means.

3. Methodology

The study adopted the Developmental Research design which has a clear outline of design strategies, systematically divided into several phases. Van Den Akker (1999) has outlined three major stages in the developmental research approach. In the present study, phase 1 involved inquiry into the needs of the Orang Asli students in relation to reading comprehension in the English language. The participants in the needs analysis phase were ten English language teachers from Orang Asli schools. Classroom observations were carried out to gain information on the current pedagogy in reading comprehension as well as to identify the needs of the Orang Asli students with regard to reading comprehension. Phase 2 was the design and the development phase where the DS pedagogical module was designed and developed. This involved interviews with experts from various related fields such as from the Orang Asli context, the teaching of English language and the use of technology in education. Observation of everyday events in the context of the Orang Asli community were also were integrated in the module. Upon completion of the module development, a team of experts reviewed the module. Finally phase 3 was the module implementation and evaluation. The module was implemented in two contexts with the same population of Orang Asli, the Temuan community. The Stake Countenance model was used to evaluate the module.

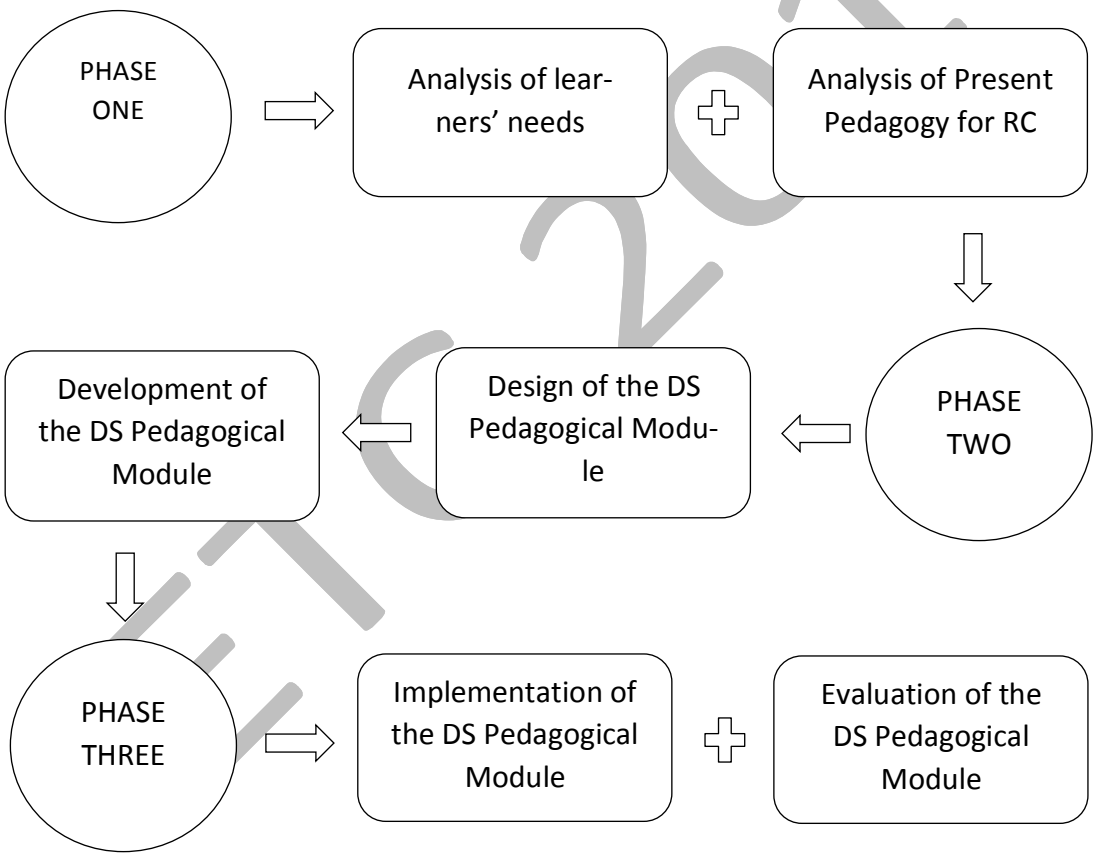


Figure 2 Summary of phases in the present study.

4. Research questions

The research questions which guided the third phase of the study were:

1. What is teachers' evaluation of the DS pedagogical module according to the Stake Countenance model?

a) What are teachers' expectations of the DS pedagogical module before its implementation?

b) What are teachers' opinions of the DS pedagogical module after its implementation?

c) What is the congruence between teachers' expectations before the implementation of the module and teachers' opinions after implementation?

5. Description of the stake countenance model

The Stake Countenance model is often used as a framework for evaluation. This model involves two major operations or countenances which is complete description and judgement of the program. The Stake model provides a framework for evaluators in collecting, organizing and interpreting data. The framework has three components which are antecedent, transaction and outcome. Antecedent is the condition existing prior to instruction. Transactions refer to successive engagements in the process of instruction and outcomes are the effects of instruction. The present study was evaluated based on this model where two teachers were interviewed before and after the module was implemented. An analysis of congruence between the two phases of interviews was carried out to obtain judgement regarding the use of the module in facilitating reading comprehension. Description of the lessons through observations as well as student response was done and this explained the transaction process as depicted in the model. Figure 3 is a description of the Stake Countenance Model used in the present study

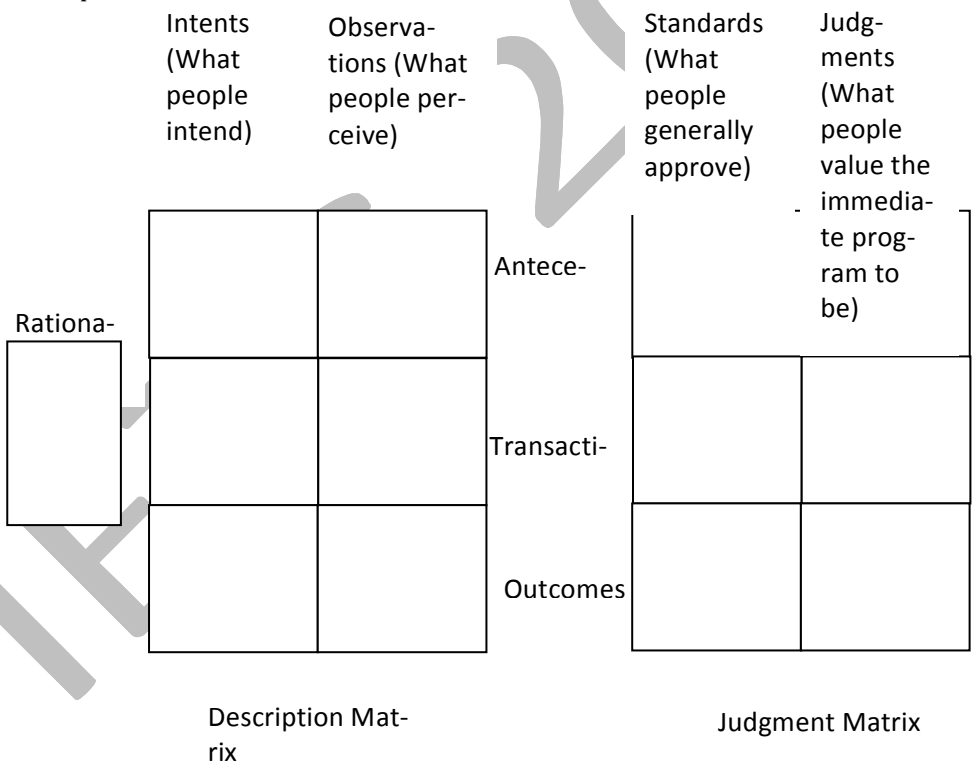


Figure 1.2. Stake Model for Collecting Data to be used in evaluating an Educational Program.

The Stake Countenance Model is appropriate for the present study because the model provides space for description that reflects the fullness, the complexity and the importance of a program (Stufflebeam & Shinkfield, 1985). This description is necessary to evaluate the usability of the DS pedagogical module.

6. Findings from the evaluation phase using the stake countenance model

The evaluation phase consisted of interview sessions which were categorized into six aspects: reading text, content, language, comprehension strategy, comprehension task and teaching as well as learning instruction. There were two rounds of interviews: the first round was conducted as antecedent data while the second round was after the transaction where the module was implemented. This section discusses the analysis of congruence between teachers' expectations before and after the module implementation.

Teachers' expectations before and after implementation of the DS pedagogical module

Interview sessions were carried out with both teachers from context A and B to seek information on their expectations and views of the DS pedagogical module. The teachers' expectations were analyzed according to five **c**ategories found in the DS pedagogical module

The following Table 1 describes the findings before and after the module implementation.

Table 1: Teachers' Views Before and After Module Implementation

Categories	**Teachers' expectation of the module before the implementation of the module.**	**Teachers' views after the implementation of the module.**
Type of text	In the form of a story In the electronic medium Should have a lot of colorful pictures. The story should have illustrations to aid comprehension. Should have digital effects such as sound effects, 3D effects and authentic material.	text of the digital story was interesting and relevant to the students in the context of the study. text had been presented in an interesting manner.
Content	The themes should be related to the Orang Asli life. Should include some cultural elements which reflected the context of the Orang Asli community. The setting should be like their home. Should include songs and music.	suitable and relevant to the students the story as realistic and within their context. the content was context specific and the students were able to make connection with the text. cultural element in the digital story which was related to the Orang Asli way of life the culture of staying in the jungle for a period of time to find things. This culture could be seen in the digital story. subject about their culture helped the students in understanding
Language	Should be simple and relevant to the context of the Orang Asli students. The vocabulary should be at lower level. The dialogue should be a mix of English	The language was simple and the students were able to understand the story The meanings had been translated into their language. This facilitated the

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	language, Bahasa Melayu and the Temuan language. The sentences should be in the simple form and not too complicated.	understanding. Language was simple. The students could understand the story.
Reading Comprehension Task	The task should be interesting and relevant to their needs. The task should also emphasize a lot of repetition. The text should have reading task in the form of games and activities. Interactive activities using the computer will be good.	The activities were relevant and useful in helping the students in comprehending the text. The students could respond very well on the task A lot of activities, interactive and related to the text and students were able respond well. Instructions for the teaching and learning activities were clear. The bamboo task was connected to their lifestyle. There was a difference in the way the students responded to the lesson…they were active and interested.

An analysis of the congruence between the expectations before the implementation and teachers' opinion after the DS pedagogical module was implemented in the two schools was done. Analysis was focused on the same five areas: type of text, content, language, comprehension strategy and comprehension task.

7. Implications of the study

1) Material production for Orang Asli primary school students.

Indigenous students learn better with indigenous material. Rushton (2007) proposed this notion after working with several cases of indigenous students in New Zealand. The reading text was based on the cultural context of the indigenous students and this improved students' learning. Rushton concluded that familiarity of a text is important as it gives the learners opportunity to participate and understand better.

'Familiarity' is a concept related to the schema of the learners and research has proven the positive role of learners' schema or background knowledge in reading comprehension (Ahmad 2006; Brown, 2001; Carrell et al. 1983 & Holliday,1997). The content schema of a learner includes knowledge of the learners' context and experience. In reading comprehension, this knowledge must be activated and the reading text has to allow this to happen. Therefore, content of the text should be related to the learners' background knowledge. In the present study, the reading text was designed based on the Temuan students' context which included their environment, experiences and issues. The digital story has the forest and their environment as the bigger theme as well as how they lived close with nature. When they were given a reading task based on the use of bamboo, the students were able to relate so much of information as bamboo hunting was part of their cultural experience. This experience is part of their schema and it facilitated their response.

Apart from the content, the language was carefully used to facilitate their understanding of the text. Simple sentences and vocabulary from the context are used in the story. Furthermore, the Temuan language at word level was also included to aid meaning. All these elements of language as suggested by the experts were integrated in the DS pedagogical module to facilitate comprehension of the digital story. Findings from the evaluation of the module do show that the students were able to comprehend the digital

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story. As such, it is important that reading text for the indigenous students should be designed based on their context.

2) The need for a culturally responsive pedagogy.

A culturally responsive pedagogy recognizes cultural knowledge, prior experiences and values of the community concerned (Jazadi, 2003 &Johnson, 2011). It has the learner's context and experience playing a central role in the learning process. Research in this area has proven that instruction through responsive pedagogical model has positive impact on students' knowledge and skill (Allen et al., 2002& Janzen, 2009). The present study has involved not only the context of the Temuan students in the digital story, the students themselves have played the role of some of the characters in the story. This participation has created excitement and motivation among the students during the reading lessons. As noted by the teacher, the students were able to understand the reading text because they were part of the story and the context was familiar to them.

3) Digital text to facilitate comprehension.

Meaning making in a multi modal text involves more than words; a variety of semiotic structures such as the visual, auditory and kinesthetic is needed (Eisner, 1985 in Sithamparam, 2005). Sithamparam, 2005 also suggested that alternative forms of representation should be used to aid the meaning making process in a text. A digital text has positive impact on learners' involvement in the reading process (Gordon,2009; Grabe,1996 & Grabinger,1996).

In this study, a digital text was designed to teach reading and the findings show that the Temuan students enjoyed reading the text as well as were able to comprehend the story. The students mentioned that they liked reading the story as they could see the character climbing trees, swimming, playing and so forth. The story was presented as a movie with narration and music as well as sound effects. This caught the students' attention. They were able to recapture the story with the details in the reading task. Thus, as this study has proven, more digital text should be designed to teach reading. Effort should be taken to include multiple forms of structures in ways that can facilitate comprehension.

8. Conclusion

This research has proven that a culturally responsive pedagogy recognizes cultural knowledge, prior experiences and values of the community concerned. The learner's context and experience play a central role in the learning process. The present study involved the indigenous learners and community as a major part of the content creation. This participation created excitement and motivation among the learners. The use of the Stake Countenance Model to evaluate the DS module was most appropriate and accurate in capturing teachers' needs and expectations. The evaluation process was conducted systematically and analysis of findings was managed appropriately. It is highly recommended that other impact study specifically in the education field utilizes the Stake Countenance model.

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Evaluation of e-learning courses using communicative and cooperative tools

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Abstract

In the contribution are presented the results of research directed at evaluation of e-learning course with help of specific tools, particularly for communication and cooperation are presented in this study. The research was drafted as pedagogical experiment and for data collection the knowledge test and nonstandard questionnaire aimed at the subjective course evaluation were used. We extended the e-learning courses for the experimental group about discussion forum, chat, and wiki. We followed evaluation of course in dependence on application of the introduced tools and further even on frequency of the approach to courses in both groups. In closing of the project discussions with students were realized and we obtained immediate subjective reaction on possibilities of implemented tools in the frame of the experiment.

Keywords: ICT in education; communication tools ; pcooperatinsupils with special needs

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1. Introduction

Among frequently discussed disadvantages of e-learning belongs insufficient motivation of students disability of independent work and its organization or even independent learning. Individual study is a common practice in e-learning. The student could feel in cyberspace isolated, lonely. The teacher could not be always at his disposal, when the student needs him, it could make deeper student´s loneliness and helplessness (Zounek, 2012), communication „face to face" is absent, etc. Individual study lacks elements of cooperation, which is considered as an important part not only of education, but even of successful „function in teams" (working and private).

We found out during informative preparation of the project, in process of problem study that existed researches in this area of e-learning bring especially quantitative approaches and are mainly directed on perception of the course as a whole without specific directing on the tools of communication and cooperation. The tools exploited in the frame of e-learning course and quality of communication from student´s view was investigated by David Bremer and Rueben Bryant (2004), Michael Machado and Eric Tao (2007). Clayton R. Wrighta compiled evaluation criteria of e-learning courses, Kearsley (2000), Benigno., and Guglielmo Trentin (2000) and Barbera (2004) were also engaged in this problem.

2. The project

We came out, in the frame of monitoring the condition of LMS Moodle, from the analysis of the tools used in the courses formed in the given environment. We directed our attention to a fact, if the course contains this tool and at the same time is actively used by student and teacher. The courses of Institute of primary and preprimary education Faculty of Education of University Hradec Králové were selected for the analysis of e- learning courses. In total 132 courses from Institute of primary and preprimary education Faculty of Education of University Hradec Králové were analyzed.

It follows from the analysis that:

- the most common part of e-learning courses are teaching materials determined for self-learning – the tool set (100 %), task aimed at independent work of students – tool task (60 % on the average), parallel respective completing tests (73 % on the average) and URL references (48 % on the average).
- Communication tool chat is used on an average from 4 %
- Communication tool Forum is used on the average from 48 %
- The tool for cooperation WIKI is used on the average in 1 %
- The tool of research is used on the average from 2 %

In the frame of separate courses were not used the tools as dictionary, public inquiry, questionnaire, lecture, workshop, book, unit and page.

According to our opinion e-learning courses drafted this way (i.e. courses, which contain tools, sets, tasks, tests, URL references) do not consider the important aspect of learning as communication, cooperation and mutual interaction of the participants of learning in the virtual space and do not exploit the potential, which is offered by the systems for conducting of learning.

2.1. Aim and methodology

Main aim of the research was to find out, if application of the tools for communication and cooperation in LMS Moodle influenced subjective evaluation of e-learning course from the standpoint of the teachers of the 1st level of primary school. The following partial aims ensued from the main of the research:

- to compare subjective evaluation of e-learning course of classic type, i.e. without application of specific instruments and e-learning course with exploitation of specific tools namely in the frame of the students of each faculty and then mutually

- to find out the application of specific Moodle tools by means of internet statistics of Moodle especially in the frame of students of each faculty and then mutually

- we determined, on the base of research aim formulation, research problem and research questions, following hypotheses:

H 1: We suppose that the students, who will work in e-learning course with the tools for communication and cooperation will have better results in knowledge test than the students, who worked in the course without application of these tools

H 2: We suppose that e-learning course with the tools for communication and cooperation will have positive evaluation than e-learning course without application of the tools

H 3: We suppose that the students, who use e-learning course with the tools for communication and cooperation would attend more frequently the course than the students, who have for disposal the course without application of the tools

As a design of research we selected mixed designs, where the fundamental quantitative research method was determined by pedagogical experiment, which was subsequently completed with discussion (qualitative method). Total number of 97 students of teaching for the 1st level of primary school took part in the research. The students were divided by toss up in the control and experimental group. They subsequently passed teaching one whole semester in the selected groups. Teaching was conceived as a blended learning (Poulová, Šimonová, xxx).

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2.2. Research results

To fulfill the basic requirements of the pedagogical experiment to from the same entering parameters in the control and experimental group, the students passed the pretest. For satisfying of entering parameters of pedagogical experiment, hypothesis on the results of pretests was tested.

We came out in hypothesis formulation from zero hypothesis:

H 0 There is no statistically significant difference between the average number of points in the entering test of the control and experimental group.

The results of tests are introduced in the table 1. It was confirmed that there is not statistically significant difference between the results of entering tests at the control and experimental group of the students of Faculty of Education of University Hradec Králové.

Table 1. Comparison of the entry

	Mean	T-Value	Z-Value	H_0
C control group (Cj_vs_K)	50,4	-0,4623	-0,5342	Accept
C experimental group (Cj_vs_E)	51,1			

In conclusion of the course the students of all groups passed the output test – posttest aimed at the knowledge. On the basis of obtained data we could tested the first designated hypothesis"

H 1: *We suppose that the students who will work in e-learning course with specific tools (communication and cooperation) would have better results in the knowledge test that the students, who worked in the course without application of these tools*.

For testing we came out from zero hypothesis:

H10: *We do not suppose statistically significant difference between the resulting score of tests of the experimental and control group*.

The test results (T-test and nonparametric Mann-Whitney tests) are given in table 2.

Table 2. Comparison of the output

	Mean	T-Value	Z-Value	H_0
C control group (Cj_vys_K)	79,7	-3,4568	-2,4519	Reject
C experimental group (Cj_vys_E)	95,6			

It follows from the results that zero hypothesis was not confirmed and thus we are inclined to a fact that there was statistically significant difference between the results of tests at control and experimental group.

We were further interested in the subjective course evaluation on basis of non-standardized questionnaire. We started out from generally formulated hypothesis H2:

H 2: *We expect that e-learning course, in which specific tools will be used (communication and cooperation) will have more positive evaluation that e-learning course without application of these tools*.

Table 3. Questionaire T-tests

		Mean	T-Value	Z-Value	H_0
General information	C control group	118,8	0,4489	-0,8812	Accept
	C experimental group	119,9			
Communication	C control group	41,8	-1,9984	2,5323	Reject

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	C experimental group	46,2			
Cooperation	C control group	14,3	0,3567	-0,5208	Accept
	C experimental group	14,7			

How we can observe in table 3, statistically significant difference was not proved in total evaluation of control and experimental group. Only at evaluation of the course from view of communication, zero hypothesis was rejected and we can conclude that there is statistically significant difference between subjective evaluation of possibilities of communication and cooperation in the frame of e-learning course.

The object of our interest was comparison of approach frequency to courses. We came out of the hypothesis:

H 3: *We suppose that students using e-learning course with specific tools, spend in this course more time than students, who use course without application of these tools*

We formulated zero hypothesis for our own testing of the number of approaches:

H30: *There will not be statistically significant difference between the number of approaches to e-learning courses at experimental and control groups*.

Control and experimental groups were tested. The fundamental characteristics of tested variables are introduced in table 4. The results of testing are summarized in table 5.

Table 4. Described characteristics

	Mean	Standard Deviation	Minimum	Maximum	Median	Modus
C control group	144,5	63,72	35	262	162	-
C experimental group	177,2	44,73	80	266	179	-

Table 5. Results of T-test and Mann-Whitney test for H30

	Mean	T-Value	Z-Value	H_0
C control group	143,5	-2,2156	2,0836	Reject
C experimental group	178,1			

It is obvious from the results that zero hypothesis was not confirmed between control and experimental group. We can conclude that the students of the experimental e-learning courses entered the e-learning courses more often on the average. We were also interested in spreading of the approaches, if the students used the courses continuously during the semester or in certain periods. In graph 1 spreading of approaches to all courses is visible, which were applied for the purpose of pedagogical experiment.

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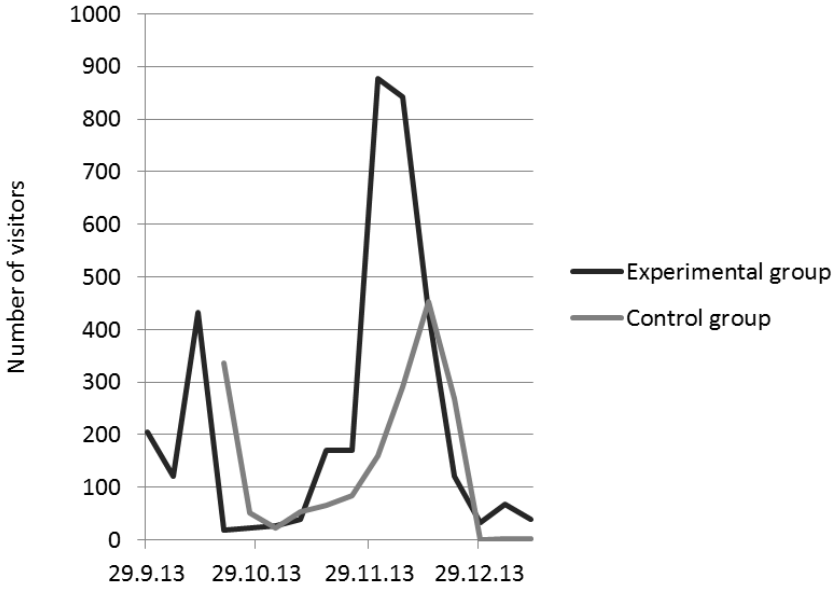


Fig. 1. Spreading of approaches at control and experimental groups during semester

Discussion in the focus group was used as an quantitative research method. Our aim was to obtain student´s reflection to newly introduced tools. E-learning courses usually include basic learning materials supplemented by references, self-tests, tests and tasks (see course analysis). Students are used to work regularly with these materials and evaluate them positively: "we have materials in hand, we need not to search anything for a long time".." we can print the material and insert in our notes, draw off the needed texts from reference." The self-tests are less exploited, mostly before credit test:" Sometimes I do the self-test, - I go through self-test before paper, it is before credit test – It is super – I try to tap the test on computer, then I feel more experienced in the credit test. If the lector uses tests regularly, the reactions are more inconsistent: "Test every week is a little bit stressing „if we must write the test regularly, it pushes us to stand attention all the time...I got used to tests during semester, it presses us to learn regularly... in the course of the semester one must think on it, not to forget it, but at the credit it is about one test less.

Commitment of the tasks – seminary works does not make any trouble – I loaded up the set without any problem, but at the beginning I lack certainty if I loaded it correctly, – but now it keeps me calm."

Forum as a tool for discussion is rather well-tried at Faculty of Education UHK. Students use it for practice reflection from the first year of study, then especially in the fourth year. Students are used to evaluate openly their practice even the approach of the faculty teachers, they work regularly with Forum, sometimes they enclose photo documentation from the practice – interesting situation in the class or photography of pupil´s work. Opinions on the use of the tool Forum were positive: "I quite enjoy to discuss on Forum, I got used to that even the teachers answer".. "it is not so informal as facebook, but I like to read the viewpoints of my classmates and their experience"....." I think that it is important to get used to discuss and express ones meaning. "

Chat was applied as a tool, which has not been used at any faculty. Students are accustomed to usage of facebook and to other social nets. For chat in Moodle they took up rather critical standpoint: "Chat in Moodle is seen by teacher, chat on facebook nobody could see, therefore we prefer facebook, where we arranged special group. I do not like to go to Moodle as I know that it is connected with school, when I click I know that only work is waiting for me, but on facebook it is combination of duties, work with entertainment "on social nets we have our friends and environment, which is close to us, it is the reason that combination of work, e.g. on facebook together with informal chat is pleasant"

Wiki – the tool for cooperative teaching has not been yet used in Moodle at Faculty of Education UHK. Generally cooperative teaching is not common. We tried to introduce this type of teaching in the frame of experiment by means of e-learning environment. It is true that students fulfilled the task, worked out wiki pages, but their reaction was confused ".we met and settled that one of us would fulfill the task"...."Maybe

that we did not comprehend that it should have made our work easier", ".I think that we should learn to work with it, try it on some informal topic", ."I know from practice that children enjoy cooperative teaching, but somehow we did not catch the strategy".

We were also interested in the student´s recommendation for learning improvement supported with e-learning course. We partially awaited their opinions and it was instructive for us when it was heard:

- "education as long life trend should not be differentiate – now I better myself for school and now I better myself for life.", "LMS should take it in consideration and be more tempting and enable combination of private and school life"
- "as Moodle is exploited at school now, the teacher should show it already from the 1st year, how we could use it for communication and cooperation – not only "here you have materials and tests and it is all ", "we should be shown how to work with Moodle in each subject – now, after long time in the fifth year we have to retain the log-in for Moodle, which we input long time ago"
- "In the same way we had schooling about information system in the 1st year, we should have schooling about Moodle, i.e. as a part of entry. Moodle should be more utilized by teachers not to lost the continuity and not forget log-in, improve the style of work."

Our aim was to catch opinions and relation of the respondents in the focal group to e-learning course, especially specific tools used in the subject Didactics of information and communication technologies. In a short resume we mentioned that all questioned teachers had positive attitude to e-learning course as a support of teaching and consider it already as an inseparable part of teaching. They also take into consideration the conditions, which should be fulfilled to make work effective in their course. It follows from their opinion that the specific tools must be introduced from the 1st year already, as a inseparable part of the course, students must only „touch them" get used to apply them.

3. Conclusion

The level of output knowledge of control and experimental group was tested and statistically significant difference was confirmed (experimental group reached better results). We could presume that application of the tools for communication and cooperation could evoke greater interest about subject in the students and they developed greater study effort. From the viewpoint of the course evaluation influence of used tools for communication and cooperation was not proved. It followed from the discussion with students that application of the specific tools except Forum was novelty for them, they did not meet with this tool in any course till now and it was the main reason for subjective evaluation of the course as a whole and its part. Chat is used by students in different style, its application in the course could be influenced by teacher´s presence. Students in discussion mentioned that the tool could be more satisfying for them, if chat, in some cases, could be opened only for students. Further phenomenon occurs from the results – students from experimental group joined the course significantly more frequently. This finding corresponds with that they were involved in discussion forum. Applied chat and formed seminary work in the frame of wiki. Frequency of approaches was similarly spread in both groups, students most often entered the course at the beginning of the semester and the highest frequency of course attending was in closing of the course.

In spite the fact that we did not prove effect of the tools for communication and cooperation on e-learning course evaluation, we considered their implementation as beneficial for pedagogical practice in general.

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Exploring Students' Learning Style at a Gulf University: A Contributing Factor to Effective Instruction

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Abstract

Analyzing learners' characteristics is an important preliminary step in learning and teaching design. Specifically it aids in the selection and adoption of suitable teaching method/s and developing appropriate learning materials. Learner background, learning preferences and learning styles are examples of these characteristics.
Because each learner has individual characteristics, adjusting instruction (learning and teaching) to meet these characteristics would help each learner excel in his/her study. In other words, recognizing a learner's learning style would enhance the quality of education, making it more appropriate for that individual learner. Learning style can be defined as the way in which a learner perceives and processes information.
Academic literature identifies several learning styles. Visual, Auditory and Kinesthetic (VAK) styles are commonly used to classified learners as Visual learners, Auditory learners or Kinesthetic learners.
At Sohar University (SU), one of leading private universities in Sultanate of Oman, little consideration has been paid as regards to the importance of learning style as a factor to improve the educational experience of learners. Most lecturers use traditional passive approaches to course delivery. Nowadays, however, the university is in the process of encouraging a shift to active learning. This requires more individualization of instruction.
The purpose of this study is to explore SU students' learning styles, and determine what types of learners they are, Visual learners, Auditory learners or/and Kinesthetic learners. This study will also determine related factors (hand use, gender, and study streams) and their impact, as well as make recommendations to improve teaching and learning at the University.

Keywords: Visual, Audio, Tactile Learning; Dale Cone; Active Learning

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1. Introduction:

Analyzing learners' characteristics is an important preliminary step in learning and teaching design. Specifically it aids in the selection and adoption of suitable teaching method/s and developing appropriate learning materials. Learner background, learning preferences and learning styles are examples of these characteristics.

Because each learner has individual characteristics, adjusting instruction (learning and teaching) to meet these characteristics would help each learner excel in his/her study. In other words, recognizing a learner's learning style would enhance the quality of education, making it more appropriate for that individual learner. Learning style can be defined as the way in which a learner perceives and processes information.

Academic literature identifies several learning styles. Visual, Auditory and Kinesthetic (VAK) styles are commonly used to classified learners as Visual learners, Auditory learners or Kinesthetic learners.

The aim of the study is to explore students' learning styles and factors influencing these for a purpose of suggesting effective instruction model.

2. The Country and the University Context

Oman, with a population of only two million people is a small but nonetheless progressive and developing nation in the Middle East. With fossil fuel reserves dwindling in the foreseeable future the government has decided to strive to attain a knowledge-based economy to reduce dependence on the current resource based economy. By far the biggest factor currently holding us back is the lack of a well-grounded educational system in the country. The public school system in the country has only been in existence for the past forty years. Before that Oman only had three primary schools.

At Sohar University (SU), one of leading private universities in Sultanate of Oman, little consideration has been paid as regards to the importance of learning style as a factor to improve the educational experience of learners. Most lecturers use traditional passive approaches to course delivery. Nowadays, however, the university is in the process of encouraging a shift to active learning. This requires more individualization of instruction.

3. Study Design and instrumentation

The study aims to explore SU students' learning styles (visual learning style, auditory learning style and kinesthetic/tactile learning style) using the VAK learning styles inventory. 287 SU students participated in the study, 75% female and 25% male selected at the convenience (incidental or accidental sample). The participants were asked to read 24 short scenarios and make their appropriate responses from three selections on each scenario.

The study addressed two main questions:

1. What is the dominant learning style (Visual, Auditory OR Kinesthetic) is favored by Sohar University students?
2. Do personal characteristics such as gender, hand-use and study streams have an impact on learning styles?
3. Is there any correlation three types of learning styles and students' academic performance?

4. Findings

4.1. Dominant Learning Styles

The table (1) shows that the students' responses: 36% Visual, 35% Auditory and 29% kinesthetic/ tactile.

Table 1. Students Dominant Styles

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Type of Learning Style	Students' Responses
Visual Learning Style	36%
Auditory Learning Style	35%
kinesthetic/ tactile Learning Style	29%

4.2. Factors Influencing Learning Styles:

4.2.1 Gender influence

Table (2) shows that means for (male and female) responses to the three types of learning are very close. Table (3) illustrates no significant differences of gender impact on the learning styles with a p-value greater than 0.05.

Table 2. Students Styles and Gender

Learning Style	Gender	N	Mean	SD
Visual	Male	74	8.55	3.3
	Female	213	8.76	2.95
Auditory	Male	74	8.42	3.05
	Female	213	8.19	2.6
kinesthetic/ tactile	Male	74	6.66	2.75
	Female	213	6.87	2.71

Table 3. T Test Students Styles and Gender

T Test	T	df	Sig (2-tailed)
Visual Learning Style	-0.503	285	0.61
Auditory Learning Style	0.616	285	0.57
kinesthetic/ tactile Learning Style	.0616	285	0.53

4.2.2. Hand-use impact

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There is no significant difference in responses of left hand students and right hand students with a p-value greater than 0.05 (See table 4). However, it seems that left hand students are more visual learners as can be seen from table (5).

Table 4. T Test Students Styles and Hand-use

T Test	T	df	Sig (2-tailed)
Visual Learning Style	-.888	285	0.375
Auditory Learning Style	018	285	0.986
kinesthetic/ tactile Learning Style	.399	285	0.690

Table 5. Students Styles and Gender

Learning Style	Use hand	N	Mean	SD
Visual	Right	246	8.64	2.99
	Left	41	9.10	3.33
Auditory	Right	246	8.25	2.66
	Left	41	8.24	3.08
kinesthetic/ tactile	Right	246	6.84	2.73
	Left	41	8.24	3.08

4.2.3. Study streams

In table and table 6, it is interesting to note that science students are visual students with a p-value less than 0.05 and Art students are tactile with a p-value less than 0.05. However, there is no significant difference with regards Auditory style to study stream with a value is greater than 0.05. (See table7)

Table 6. Students Styles and Study streams

Learning Style	Study streams	N	Mean	SD
Visual	Science	163	9.07	3.0
	Arts	124	8.23	2.9
Auditory	Science	163	8.09	2.7
	Arts	124	8.46	2.6
kinesthetic/ tactile	Science	163	6.54	2.6
	Arts	124	7.18	2.7

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Table 7. T Test Students Styles and Study streams

T Test	T	Df	Sig (2-tailed)
Visual Learning Style	2.360	285	.019
Auditory Learning Style	-1.134	285	.26
kinesthetic/ tactile Learning Style	-1.982	285	.048

4.3. Learning styles and student s' performance

Table 8 shows there is not significance correlation between students' GPA and their learning styles with a p-value greater than 0.05.

Table 8. Students Styles and GPA

	Pearson Correlation	Sig. (2-tailed)
Visual Learning Style	-.053	.573
Auditory Learning Style	.091	.335
kinesthetic/ tactile Learning Style	.010	.913

5. Learning Style Models

A number of learning style models have been proposed to improve learners' understanding and retention in a better way for the learners reflecting on preference learning styles , such models as Klob (1984), Honey and Mumford (1986) and Vermunt (1994). Although each model has a different perspective on how learner processes information, i.e., how better learns, the models agree learners have individual preferable way/s to learn things. Therefore, learners need to be provided with learning situation/s that can accommodate their different learning styles.

Visual, Auditory and Kinesthetic (VAK) learning styles model is a widely used in the education history to reflect on importance of identifying learner's characteristics to enable effective education. The model is based on Howard Gardner' multiple intelligences theory which proposes that people actually display intelligence in eight ways: visual-spatial, bodily-kinesthetic, musical, interpersonal ,intrapersonal, logical-mathematical, verbal-linguistic, and naturalistic (Jeral 2010). VAK model identifies three types of learners based on how learner learns more effectively: (1) visual learners are those who learn things best through seeing them, (2) auditory learners are those who learn things best through hearing them and (3) Kinesthetic/ tactile learners those who best when physically involved with the environment, such as by playing games or performing demonstrations (Sousa, 2006).

Research on VAK model shows discrepancies on the dominance of each learning style and learner's individual preference. For example, in the study carried out by Nouryia in Saudi Arabia shows that the dominant learning style is visual followed by Kinesthetic and Auditory. While Jeral (2010) study concludes that a few students who had a strong preference for learning in one specific modality, 43% of the students

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were a mix of two or three learning. In their study, Deeb and Hassan (2011) show that the learning style preference is a blend of all three or even two styles.

Effective instructional activities mean involving learners actively in learning practices whereby they use their higher-order thinking skills (in Bloom's Taxonomy: analysis, synthesis, evaluation and creating). This means learning is a process of actively constructing knowledge by integrating experiences into the learners' prior knowledge; the learner plays an active role in building his/her knowledge. Learners also need learning experiences which promote higher-order thinking skills (HOTS). Dale's Cone of experience can provide a model of types of experiences supporting different thinking skills.

In addition, there is also a need to assess learners' learning preferences in order to excel in their learning. According to Junko (1998) learners having different learning style preferences would perceive, interact, and respond to the learning environments differently. One approach of assessing learners' learning preference is Visual, Auditory and Kinesthetic (VAK) model.

This study shows there is no influences of learning styles over students' performance and also there is no a preference to a single learning style, but a combination of the three types of learning styles. According to the VAK theorists, there is a need to present information using all three styles. This allows all learners the opportunity to become involved, no matter what their preferred style may be" (Clark, 2000).



Fig. 1. Model for Effective instruction

Based on Dales' Cone, Bloom's taxonomy and VAK model, the suggested model (fig. 1) presents wide range instructional activities. Active instructional activities can be described as hand-on, real experience, collaborative. Such activities as hands-on task, field trip, team project

6. Conclusion

The study sheds light on learning styles and factors might influence these styles. The study show three different learning styles are presented in sample of the study, and there is no dominant learning style. The study shows catering for students' learning styles would improve their learning and understanding and

based on the results of the study, a model of effective instruction is suggested. The model is designed to promote active learning and enhance students' learning regardless to their discrepancies.

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Factors influencing administrators' empowerment and financial management effectiveness

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Abstract

This study determined the relationship between the identified factors of Administrators' Empowerment based on the Integrated Clarity (IC) framework of Miyashiro and Rosenberg (2007) on Identity, Life Affirming Purpose, Direction, Structure, Energy and Expression and Financial Management effectiveness on Planning, Budgeting, Monitoring and Evaluation.

The identified factors on Administrators' empowerment and the functions of financial management effectiveness are significantly reinforced by Integrated Planning, Budgeting and Monitoring System (IPBMS) principles and to some extent in relation to the Length of service and financial management training and preparation under the Administrators' characteristics. The findings served as bases for a proposed empowerment and financial sustainable development plan.

Keywords: Financial Management effectiveness, Integrated Clarity (IC), Integrated Planning, Budgeting and Monitoring System (IPBMS)

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1. Introduction

The focus on value maximization emerges as a non-negotiable element in the beginning of the 21st century. Learning the art of managing the finances of any organization is a vital discipline for creating and maintaining financial sustainability. This study attempts to explore and affirm that Integrated Clarity (IC) and Integrated Planning-Budgeting-Monitoring (IPBMS) frameworks work best if all key players who have been entrusted with power to influence the strategic plans and financial decision making, are convinced that stewardship, active participation, accountability and commitment to the goals and aims of an educational organization are the necessary conditions in order that effective organizational interventions and changes can be introduced with greater results at least cost and wastage. The purpose of this study is to identify the factors that may influence administrator's empowerment and financial management effectiveness and in the process determine how these two factors are correlated with each other in order to propose an Empowerment and Financial Sustainable Development Plan.

2. Theoretical and conceptual framework

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The research of Amalia Ifanti (2011) on schools' empowerment issues over the last three decades, School Empowerment: Discourse and the politics of the Federation of Secondary School Teachers in Greece, affirmed greatly the importance of school empowerment. While empowerment is not new, framing it using the Integrated Clarity (IC) as suggested by Marie Miyashiro and Marshall Rosenberg spells out the difference since IC Framework helps organization to discover and articulate its needs critical to its sustainability in a way that benefits the whole system and the people by subscribing to six (6) universal organizational needs essential to the institution's existence. These are (1) Identity refers to the vision statement, (2) Life-Affirming Purpose refers to the mission statement, (3) Direction refers to the strategic plans, means, thrusts and priorities of the organization; (4) Structure refers to the articulation of the organizational structure, policies and functions, (5) Energy focuses on the effectiveness of operational management, control and financial sustainability, and (6) Expression refers to the growth as a natural by-product of reaching and serving people or it conveys a specific contribution of the organization on the industry or society (Holman, Devane, et al, 2007). In this study, the aforementioned six (6) universal organizational needs are assumed as the factors influencing school administrators' empowerment and are considered as the **independent variables** (x).

Achieving institutional financial sustainability for Catholic schools in the Philippines is both a goal and a challenge for its economic survival. The Sacred Congregation for Catholic Schools (#81) cited that many Catholic schools has considerably improved their financial condition while initially receiving various public or private grants but later began to enter into agreements, conventions, contracts, etc. which guarantee both the preservation of the special status of the Catholic school and its ability to perform its function adequately. The Pastoral Letter of Archbishop Jose Palma, President of Catholic Bishops Conference of the Philippines on the occasion of the 400 Years of Catholic Education in the Philippines (2012) affirmed the same point: The Catholic schools assist the government in providing education to the rest of the citizens who opt for Catholic education as well as those who cannot be accommodated in public schools. Brigham and Houston (2012) mentioned: All important organizational decisions have financial implications. According to Patricia León (2001) financial sustainability is its capacity to generate resources in response to a demand, in order to maintain productive processes at a steady or growing rate in order to produce results and obtain some savings. In the day to day operations of the school, administrators are entrusted the task to plan, direct and control operations of an organization (Ballada and Ballada, 2012). In order to succeed effectively and efficiently in this regard must require adherence to the four (4) financial management functions specifically, (1) planning refers to the formulation plan of actions or programs in order to attain the objectives or goals; (2) budgeting which completes the program planning because financial resources are committed to achieve the planned activity or program; (3) controlling ensures that actions conform to the plan and efforts are made to monitor its progress; and finally, (4) evaluating that becomes a tool to measure the success of the plan. If these functions are performed optimally and strategically, decision makers will help maximize the values of their organization and contribute to the welfare of clients and employees (Brigham and Houston, 2012). In this study, these four (4) financial management functions are regarded as the **dependent variables** (y).

As cited earlier, the role of the school administrator is crucial and he must be prepared to adapt to the changing environment. In this study, there are **supporting variables** (z) that may enhance his/her efficiency and effectiveness grouped as (a) administrator's characteristics such as: (1) length of service as administrator; (2) financial management training and preparation; and (3) administrative experiences and (b) the principles of Integrated Planning-Budgeting and Monitoring System (IPBMS) such as: (4) participatory, involvement of all levels of management in the processes of planning, decision making and execution based on their competencies and authority; (5) stewardship, the wise use of resources entrusted to the administrators' care and to manage it responsibly; (6) accountability, the obligation of an administrator to account for its activities, accept responsibility for money or other entrusted property, and to disclose the results in a transparent manner; (7) transparency, the full, accurate and timely disclosure of information which enables people to support each other in accomplishing the work to be done; (8) autonomy and solidarity, shown through the exercise of independence at the same time interdependence in relation to the common objective and thrust of the organization; (9) systemic, the implementation of each phase affects the whole system; and (10) Management by Objective (MBO) requires that all the unit plans must have specific results; target dates to accomplish, and has identified persons who are responsible and ac-

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countable for each activity. Finally, through the interplay of the above variables and structures of interrelationships together with a built in control mechanism, the application of funds and its corresponding performance is ensure to be consistent to the strategic plan (Schermerhorn, 2008). The use of Integrated Clarity as a tool offers new elements in enhancing the school's financial management effectiveness and cultivating new ways of empowering the school administrators. Figure 1.1 showed the interrelationships among independent variables (x), dependent variables (y) and supporting variables (z).

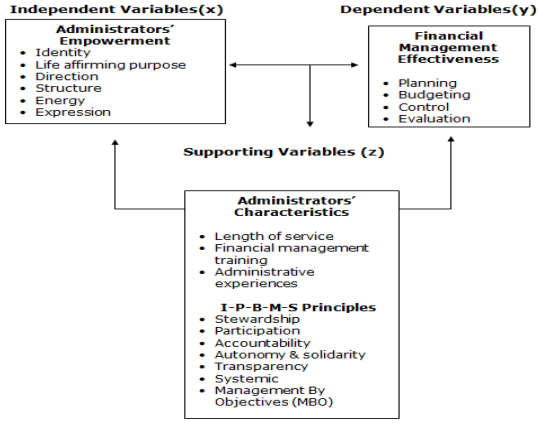


Figure 1.1 Conceptual Framework

3. Research questions

This study determined the relationship between the identified variables of administrators' empowerment and financial management effectiveness among the selected nine (9) participating Catholic Schools in Davao city (6), Digos city (1), Iloilo city (1) and of Quezon city (1). The findings served as bases for a proposed empowerment and financial sustainable development plan. Specifically, this study answered the following questions:

1. What is the level of influence of the identified factors on administrators' empowerment as perceived by the research subjects?

2. What is the level of influence on the identified functions of financial management as perceived by the research subjects?

3. What is the level of influence of the identified supporting variables on administrators' empowerment and financial management effectiveness as perceived by the research subjects?

4. Is there a significant relationship between the

4.1 supporting variables and factors influencing administrators' empowerment and financial management effectiveness; and

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factors influencing administrators' empowerment and financial management effectiveness?

5. Is there a significant difference in the perceptions of the research subjects on the factors influencing administrators' empowerment and financial management effectiveness when grouped according to schools?

6. What are the perceived factors that may influence the administrators' empowerment and financial management effectiveness?

7. What empowerment and sustainable financial development plan can be proposed based on the findings of this study?

5. Methodology

This study employed quantitative, non-experimental research design using descriptive correlation. It utilized statistical analytical tools such as: mean chi-square, Pearson-r correlation and One-way Anova. A customized survey questionnaire was designed and supported by Focused Group Discussions in order to verify the results and findings draw insights and reinforce especially the qualitative aspects of this study. This research was conducted in nine (9) selected participating Catholic schools located in Mindanao, Davao City (6) and Digos City (1), Visayas in Iloilo City (1) and in Luzon, Quezon City (1). Figure 1.1 shows the geographical locations of the research subjects and number of participants in each school.

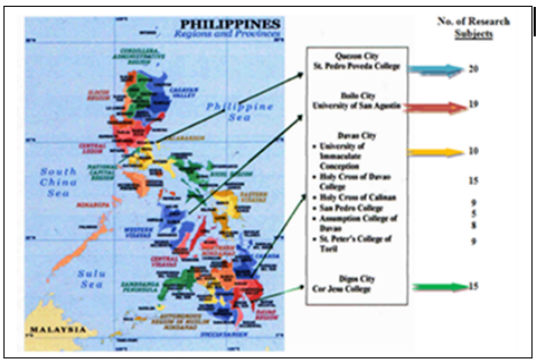


Figure 1.1 Geographical Locations and Number of Research Subjects

6. Summary of findings, conclusions and recommendations

6.1 Profile of the research subjects

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The total 110 research subjects were composed of academe (68) and non-academe (42). With respect to Gender and Civil status, majority were female (69%) and married (59%) while the rest were male. In terms of Age, majority fell from ages 30 to 49 years old (66%). On the educational attainment, majority had master's degree (65%) while 25% of them finished their doctoral degree. Further, the length of service in school, 51% of the administrators served the school from 10 to 19 years while in terms of the length of years in position held, 68% had been in the position for less than 5 years. Further, 101 out of 120 had assumed various administrative tasks but unfortunately, 84of them had not undertaken any formal training on financial management.

6.2 Levels of influence on the identified factors on administrators' empowerment, functions of financial management and supporting variables as perceived by research subjects

Figure 1.2.A presented an over-all level of influence of "very high" on six (6) identified factors, of which 3.78 was rated by administrators from the academe and 3.76 by the non-academe. Examining the details, the factor on Direction got the highest score whereas Expression was rated the lowest. Further, Figure 1.2.B earmarked an overall descriptive rating of 'very high' on the four (4) identified functions of financial management effectiveness. The average means were 3.79 and 3.81 from the academic and non-academic research subjects, respectively. Planning got the highest mean responses while Control was rated the lowest. Finally, Figure 1.2.C indicated a descriptive rating of 'very high' on the identified Supporting variables of which an equal rating of 3.61 came from both the academe and non-academe administrators. Moreover, Transparency got the highest mean responses and administrative experiences was rated the lowest. Finally, as perceived by both academic and non-academic research subjects, the most rated administrative characteristics was Financial management training and preparations while Accountability was marked as the most important Supporting variable under the IPBMS principles.



A B C

Fig. 1.2 Levels of Influence of the identified factors of administrators' empowerment (A), functions of financial management effectiveness (B) and Supporting variables (C) as perceived by the research subjects

6.3 Relationship among supporting variables, administrators' empowerment and financial management effectiveness

Table 5.1: Significant Relationship between Identified Factors on Administrators' Empowerment and Supporting Variables

Factors	Computed r-values	Critical p-value	Decision on Ho	Interpretation
Identity or Vision Statement				
Participatory	0.243	0.010*	Reject Ho	Significant
Autonomy and Solidarity	0.282	0.003*	Reject Ho	Significant
Accountability	0.254	0.007*	Reject Ho	Significant
Stewardship	0.249	0.009*	Reject Ho	Significant
Transparency	0.502	0.000*	Reject Ho	Significant
Systemic	0.328	0.000*	Reject Ho	Significant
Management by Objectives	0.409	0.000*	Reject Ho	Significant
Life-Affirming Purpose or Mission statement				
Accountability	0.284	0.003*	Reject Ho	Significant
Transparency	0.318	0.001*	Reject Ho	Significant
Stewardship	0.348	0.000*	Reject Ho	Significant
Management by Objectives	0.403	0.000*	Reject Ho	Significant
Direction or Strategic plans, goals, priorities, thrusts and objectives				
Participatory	0.261	0.006*	Reject Ho	Significant
Structure or Organizational structure				
Participatory	0.211	0.027*	Reject Ho	Significant
Autonomy and Solidarity	0.275	0.004*	Reject Ho	Significant
Accountability	0.313	0.001*	Reject Ho	Significant
Transparency	0.352	0.000*	Reject Ho	Significant
Systemic	0.468	0.000*	Reject Ho	Significant
Energy or Operational management, control and financial sustainability				
Stewardship	0.215	0.024*	Reject Ho	Significant
Accountability	0.219	0.021*	Reject Ho	Significant
Transparency	0.350	0.000*	Reject Ho	Significant
Systemic	0.397	0.000*	Reject Ho	Significant
Management by Objectives	0.302	0.001*	Reject Ho	Significant
Expression or Organization's unique contribution and place in the market environment				
Participatory	0.224	0.018*	Reject Ho	Significant
Accountability	0.246	0.010*	Reject Ho	Significant
Autonomy and Solidarity	0.309	0.001*	Reject Ho	Significant
Management by Objectives	0.273	0.004*	Reject Ho	Significant
Systemic	0.402	0.000*	Reject Ho	Significant

Table 5.2: Significant Relationship between Functions of Financial Management Effectiveness and Supporting Variables

Functions	Computed r-values	Critical p-values	Decision on Ho	Interpretation
Planning				
Financial management training and preparation	0.199	0.037*	Reject Ho	Significant
Transparency	0.190	0.046*	Reject Ho	Significant
Management by Objectives	0.195	0.041*	Reject Ho	Significant
Participatory	0.277	0.003*	Reject Ho	Significant
Accountability	0.260	0.006*	Reject Ho	Significant
Stewardship	0.251	0.008*	Reject Ho	Significant
Budgeting				
Participatory	0.225	0.018*	Reject Ho	Significant
Autonomy and Solidarity	0.230	0.016*	Reject Ho	Significant
Management by Objectives	0.218	0.022*	Reject Ho	Significant
Control				
Length of service	0.213	0.026*	Reject Ho	Significant
Management by Objectives	0.218	0.022*	Reject Ho	Significant
Accountability	0.296	0.002*	Reject Ho	Significant
Participatory	0.341	0.000*	Reject Ho	Significant
Autonomy and Solidarity	0.335	0.000*	Reject Ho	Significant
Systemic	0.170	0.000*	Reject Ho	Significant
Evaluation				
Management by Objectives	0.053	0.016*	Reject Ho	Significant
Systemic	0.243	0.010*	Reject Ho	Significant
Accountability	0.283	0.003*	Reject Ho	Significant
Transparency	0.283	0.003*	Reject Ho	Significant
Participatory	0.416	0.000*	Reject Ho	Significant

Table 5.3: Relationship between the Identified Factors on Administrators' Empowerment and the Functions on Financial Management Effectiveness

Factors (x)	Computed r-values	Critical p-values	Decision on Ho	Interpretation
Identity or Vision Statement				
Planning	0.116	0.226	Do not Reject Ho	Not Significant
Budgeting	0.427	0.000*	Reject Ho	Significant
Control	0.313	0.001*	Reject Ho	Significant
Evaluation	0.400	0.000*	Reject Ho	Significant
Life Affirming Purpose or Mission Statement				
Planning	0.208	0.030*	Reject Ho	Significant
Budgeting	0.327	0.000*	Reject Ho	Significant
Control	0.188	0.050*	Reject Ho	Significant
Evaluation	0.318	0.001*	Reject Ho	Significant
Direction or Strategic Plans, Goals, Priorities, Thrusts and Objectives				
Planning	0.310	0.001*	Reject Ho	Significant
Budgeting	0.271	0.004*	Reject Ho	Significant
Control	0.264	0.005*	Reject Ho	Significant
Evaluation	0.076	0.432	Do not Reject Ho	Not Significant
Structure or Organizational Structure				
Planning	0.063	0.513	Do not Reject Ho	Not Significant
Budgeting	0.343	0.000*	Reject Ho	Significant
Control	0.343	0.000*	Reject Ho	Significant
Evaluation	0.486	0.000*	Reject Ho	Significant
Energy or Operational Management, Control and Financial Sustainability				
Planning	0.177	0.065	Do not Reject Ho	Not Significant
Budgeting	0.340	0.000*	Reject Ho	Significant
Control	0.368	0.000*	Reject Ho	Significant
Evaluation	0.480	0.000*	Reject Ho	Significant
Expression or Unique Contribution and Place in the market environment				
Planning	0.076	0.432	Do not Reject Ho	Not Significant
Budgeting	0.520	0.000*	Reject Ho	Significant
Control	0.405	0.000*	Reject Ho	Significant
Evaluation	0.525	0.000*	Reject Ho	Significant

Positive significant correlations at varying p values existed between the identified factors on Empowerment (x) and Supporting variables (z) as shown in Table 5.1. To wit: between Identity or vision statement with all the principles of Integrated Planning, Budgeting and Monitoring System (IPBMS) on Participatory, Autonomy and solidarity, Accountability, Stewardship, Transparency, Systemic and Management by Objectives (MBO); between Life affirming purpose or mission statement with Accountability, Transparency, Stewardship and MBO; between Direction or Strategic plans, goals, priorities, thrusts and objectives with Participatory; between Structure with Participatory, Autonomy and solidarity, Accountability, Transparency and Systemic; between Energy or operational management, control and financial sustainability with Stewardship, Accountability, Transparency, Systemic and MBO; lastly, between Expression or unique contribution and place in the market environment with all IPBMS principles except Stewardship. Moreover, a no significant correlations existed among the identified factors on Administrators' Empowerment(x) with Supporting variables (z). To wit: between Identity or vision statement with all the three (3) Administrators characteristics on Length of service, financial management training and preparation and administrative experiences; between Life affirming purpose or mission statement with all the three (3) Administrators characteristics and IPBMS principles on Participatory, Systemic and Autonomy and solidarity; between Direction or strategic plans, goals, etc. with all the three (3) Administrators characteristics and IPBMS principles except Participatory; between Structure with all the three (3) Administrators characteristics and IPBMS principles on Stewardship and MBO; between Energy or operational management, control and financial sustainability with all the three (3) Administrators characteristics and IPBMS principle of Autonomy and solidarity; and between Energy or unique contribution and place in the market with all the three (3) Administrators characteristics and IPBMS principle of Stewardship.

Moreover, Table 5.2 showed positive significant correlations among the identified functions on Financial Management Effectiveness (y) and Supporting variables (z) as shown in Table 5.2 on the following: Participatory and Management by objectives. Further, varying positive correlations exist with Supporting variables with Planning such as: Financial management training and operation; Transparency; Accountability and Stewardship; with Budgeting the variable of Autonomy and Solidarity; with Control were Length of service, Accountability and Systemic; and finally, with Evaluation were variables of Systemic, Accountability and Transparency.

Table 5.3 summarized the significant correlations at varying p values which existed between the four (4) functions of Financial management effectiveness (y) of Planning, Budgeting, Control and Evaluation and Supporting variables (z) of Administrators characteristics and IPBMS principles specifically between Planning with Financial management training and preparation and IPBMS principles except Autonomy and solidarity and Systemic; between Budgeting with IPBMS principles on Participatory, Autonomy and solidarity and MBO; between Control with Length of service and IPMS principles except Stewardship and Transparency; and between Evaluation with IPBMS principles except Stewardship and Autonomy and solidarity.

In addition, a no significant correlation existed between Planning with Length of service, Administrative experiences and IPBMS principles on Autonomy and solidarity and systemic; between Budgeting with all the three (3) Administrator's characteristics and IPMS principles on Systemic, Accountability, Transparency and Stewardship; between Control with Financial management training and preparation, Administrative experiences and IPBMS principle on Transparency; and finally between Evaluation with all the three (3) Administrator's characteristics and IPBMS principles on Stewardship and Autonomy and solidarity.

Finally, a significant correlation existed between the identified factors on Administrators' Empowerment(x) and functions on financial management effectiveness (y) on the following: between Life affirming purpose with all the four (4) functions of Financial management effectiveness; between Identity, Structure, Energy and Expression with Budgeting, Control and Evaluation; and finally, between Direction with Planning, Budgeting and Control.

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6.4 Difference in the Perceptions of the Research Subjects on the Identified Factors on Administrators' Empowerment and Functions on Financial Management Effectiveness when Grouped According to Schools

Table 6.1: Difference in the Perceptions of the Research Subjects on the Identified Factors on Administrators' Empowerment and Functions of Financial Management when Grouped According to Schools

Factors	Means	Critical Value	Decision on Ho	Interpretation
Identity	3.72	0.42	Do not reject Ho	No Significant Difference
Life-affirming purpose	3.84	0.14	Do not reject Ho	No Significant Difference
Direction	3.94	0.66	Do not reject Ho	No Significant Difference
Structure	3.70	0.57	Do not reject Ho	No Significant Difference
Energy	3.70	0.37	Do not reject Ho	No Significant Difference
Expression	3.60	0.20	Do not reject Ho	No Significant Difference
Planning	3.96	0.84	Do not reject Ho	No Significant Difference
Budgeting	3.79	0.59	Do not reject Ho	No Significant Difference
Control	3.63	0.18	Do not reject Ho	No Significant Difference
Evaluation	3.74	0.11	Do not reject Ho	No Significant Difference

A 'very high' descriptive rating on the perceptions of the research subjects on identified factors on Administrators' Empowerment when grouped based on the nine (9) selected schools was rated. But when testing the difference in the perceptions, a no significant difference existed on Direction, Energy, Expression, Identity, Life-affirming purpose and Structure as the identified factors on Administrators' empowerment (x).

6.5 Perceived Factors that may Influence Administrators' Empowerment and Financial Management Effectiveness

The common themes on other perceived factors mentioned during the Focused Group Discussions (FGDs) were categorized as follows: (a) core values, charism or directives and corporate Identity of the school; (b) leadership style that adheres the processes of consultation, participation and shared decision-making; (c) mutual trust that the person delegated does the task effectively and efficiently; (d) transparency as mutual sharing of expectations and desires; (e) coordination and team-working referring to the harmonious interactions among academic and non-academic administrators and personnel; and (f) honing the administrator's skills through constant training and updating.

Whereas, the common themes the on other perceived factors on Financial management effectiveness were (a) Planning-Budgeting-feedbacking; (b) participatory Budgeting; (c) enhancement in the Evaluation; and (d) tracking and inventory of assets.

6.6 Conclusions

Based on the findings of the study, the following conclusions are drawn:

The profile on Gender connects with Life affirming purpose. In this study, the female research subjects outnumbered the male administrators. This data may have influenced the result.

Further, Organizational structure correlates with Planning as a function of financial management effectiveness which means that the clearer the structural design specifically on the lines of authorities and accountabilities, distribution of roles and responsibilities, and flow of communications, the better equipped are the research subjects or administrators to engage in institutional strategic visioning and planning.

Administrators' empowerment is enhanced when identified factors such as Identity, Life affirming purpose, Direction, Structure, Energy and Expression are complemented with Supporting variables under the principles of Integrated Planning, Budgeting and Monitoring System (IPBMS) arranged according to

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frequency of importance from Accountability, Transparency, Participatory, MBO, Systemic, Stewardship, Autonomy and solidarity.

Effectiveness and efficiency in financial management are heightened as the identified functions of Planning, Budgeting, Control and Evaluation are complemented by IPBMS principles arranged according to frequency of importance from Participatory, MBO, Accountability, Systemic, Transparency, Autonomy and solidarity and lastly, Stewardship. Based on the outcome, as institutional Planning and Budgeting advanced, administrators' Length of service and Financial experiences and preparations are factors that reinforced financial management effectiveness.

The Life affirming purpose or mission statement of the Catholic institution is significantly enhanced as the processes and dynamics of Planning, Budgeting, Control and Evaluation are developed and improved. Direction which signifies strategic plans, goals, priorities, thrusts and objectives of the institution are better pursued when Planning, Budgeting and Control mechanisms and systems are installed and supported by well-articulated measures of standards of performance leads to clearer institutional identity and better contribution to society at large. It can be concluded from the study that financial management effectiveness on Budgeting and Control are considered important in all the identified factors of Administrators' empowerment, this further means that the schools understudied tend towards the aspects of operational management, control and financial sustainability rather than on long term strategic planning.

In order to harness the strengths that are intrinsically present in each of the identified factors of Administrators' empowerment and the functions of Financial management effectiveness, the administrator is challenged to make a paradigm shift from the traditional way of managing the school's finances to an integrated and systemic manner of doing things backed up by the basic IPBMS principles as its foundation. He/she is further confronted to make a major decision inherent to his/her function to consider Integrated Clarity (IC) framework and IPBMS as priority thrust and program in setting the new direction of the school. Active participation of the members of the school community is necessary since the strength of the IC framework and so with IPBMS lies on its people. While, monitoring, review and impact assessment are essential mechanisms and tools in order to measure the attainment of the institutional strategic plans, goals, programs and objectives in an efficient and effective manner. Moreover, a well-defined set of standards and policies must be timely communicated and harmoniously coordinated leading to better results.

The perceptions on the identified factors on Administrators' empowerment and Financial management effectiveness of the research subjects when grouped by schools point to the same direction, unified expectations, shared understanding and common convictions in relation to the interactions of these two variables understudy, as strategic pillars of any educational system.

On the whole, the research subjects highlight other perceived factors that may influence Administrators' empowerment such as the institutional core values and identity, mutual trust among those delegated with authority to govern and lead, transparency, shared responsibilities, coordination, consultation and delegation as a style of leadership to name a few. Whereas, aside from the four (4) functions of Financial management effectiveness, an effective and efficient exercise of plan-budget-feedback mechanisms, evaluation and review techniques, capital expenditures (CAPEX) inventory system just to name a few are the added elements.

6.7 Recommendations

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Based on the findings and conclusions of the study, the following are recommended:

1. Implement the Proposed Empowerment and Sustainability Development Plan in the two (2) major areas of concern: Administrators' Empowerment and Financial Management effectiveness, in order to improve the financial net-worth of the Catholic school.

2. Conduct regular financial management operation's evaluation as a built-in mechanisms complemented by benchmarking strategies.

3. Conduct similar studies in other Catholic schools and non-sectarian schools using the identified significant predictors.

4. Specifically, for St. Pedro Poveda College and University of San Agustin conduct an interim financial management operation's audit and impact implementation of Integrated Planning, Budgeting and Monitoring system (IPBMS) and draw best financial management practices to be shared to other Catholic educational institutions or other non-sectarian schools as one of their unique contribution in the field of educational administration and management.

6.7 Proposed empowerment and financial sustainability development plan

Table 6.2 Proposed Empowerment and Financial Sustainability Development Plan

Areas of Concern	Objectives	Strategies	Person Involved	Evaluation Criteria
1. An increased administrators' empowerment is perceived to exist when identified factors under the Integrated Clarity Framework.	To conduct an organizational needs assessment using the Integrated Clarity Framework To re-visit and review the strategic development plan.	Organizational needs assessment conducted. Set up unified organizational needs as spring board for empowerment. Strategic plan re-visited and reviewed.	School Administrators Academic Non-academic Consultants	90-100% increase organizational needs assessment and planning improvement.
2. As institutional planning & budgeting advanced, administrators need updating and training in financial management	To train and hone skills in financial management.	IPBMS training modules implemented.	School Administrators Academic Non-academic Consultants	100% participated in all the sessions
3. Effectiveness and efficiency in financial management through planning, budgeting, control and evaluation.	To institutionalize the Integrated Strategic Planning, Budgeting and monitoring system (IPBMS) as a tool.	IPBMS orientation conducted. Customized a Computer-based IPBMS program	School Administrators Academic Non-academic Consultants	90-100% willingness to participate in all the sessions
4. Significant correlation between Over-all financial status and Energy which refers to management operations, control and financial sustainability.	To initiate and engage in income generation and fund sourcing activities. To establish systems for inventory and maintenance of capital expenditures	Creation of endowment and trust funds. Diversification of funding through local and foreign fund sources. Promotion of income/revenue generating initiatives and activities, joint ventures, re: business activities Establishment of systems for CAPEX and inventory /maintenance.	School Administrators Academic Non-academic Consultants	70-80% increase fund sourcing and economic activities

The findings of the study revealed that effectiveness and efficiency in financial management increases as the functions of planning, budgeting, control and evaluation are complemented by factors influencing administrators' empowerment taken from the Integrated Clarity (IC) framework such as: direction, energy and life affirming purpose and supported by financial management training and preparation on the Integrated Planning, Budgeting and Monitoring System (IPBMS) and its underlying principles of management by objectives, transparency, participatory, accountability, autonomy and solidarity, stewardship and systemic processes.

The Life affirming purpose articulated clearly in the mission statements of these nine (9) participating Catholic schools is significantly enhanced as the processes and dynamics of planning, control and

evaluation are advanced. While Direction which signifies the strategic plan, thrusts, priorities and goals of these schools are better pursued when systems and processes of planning, budgeting and control mechanisms are installed. Moreover, an increased awareness on the need to enhance its institutional identity and rediscover its unique contribution in society would require reviewing the measures and standards of performance set and to do benchmarking as an aid for enhancing institutional relevance. As institutional planning and budgeting advanced, there is a need for administrators to be trained in multi-faceted areas of school management including managing change, of financial management, organizational development, stewardship and leadership and other aspects that may increase and enhance best administrative practices.

Achieving institutional financial sustainability for Catholic schools in the Philippines is both a goal and a challenge for its economic survival. According to Patricia León (2001) financial sustainability is its capacity to generate resources in response to a demand, in order to sustain productive processes at a steady or growing rate in order to produce results and to obtain a savings.

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Faculty's perceived integration of emerging technologies and pedagogical knowledge in the instructional setting

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Abstract

This study was designed to examine faculty's perceived integration of emerging technologies and pedagogical knowledge in the instructional setting. Understanding the relationship between learning theory and technology was considered important because educational practices are rationalized based on proven learning principles and processes. Participants were 313 full- and part-time nursing teachers in a nursing institute during the 2012-2013 academic year in southern Taiwan. The results of the study revealed that many of the faculty members who took part in this study believed in using learning theories as a foundation for selection technology for instruction. However, a great number of teachers felt they did not sufficiently matched learning theories with their selection of instructional technology. In addition, a proportion of the respondents acknowledged that they did not consider pedagogical principles such as learner's pace, design of activities, evaluations, etc. when planning for instruction using emerging technologies. Teaching professionals need to recognize that the heart of good technology integration lie with the recognition of the relationship between technology and pedagogy. The findings of the study aims to provide data to technology trainers and specialists to help them develop appropriate professional training materials and address teachers' needs during technology profession training in a way that connects pedagogical knowledge and the use of emerging technologies in instruction.

Keywords: Emerging Technologies, Pedagogical Knowledge, Nursing Education

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1. Introduction

Schools and scholars readily agree that infusing technology in both educational contents and methods of delivery is highly necessary in order to prepare students for industrial and business workplace skills. Therefore, it has become imperative to train and equip teachers with technological skills and methods including techniques to use technology to deliver instruction. The recognition of the importance of technology infusion has led to the demand to provide teachers with current technological skills have given rise to the acquisition of various hardware and software technologies. However, sometimes the knowledge of pedagogy upon which technology integration is rationalized is not properly addressed. This is critical because emphases on technology integration in teachers' training programs might not have received adequate attention among some of the segments of teachers, especially the older teachers. While teachers may receive faculty development training periodically, such training may not adequately address the theoretical framework that guides the selection of instructional strategies and methods upon which technology integration is based.

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Pedagogical and technological knowledge mainly refers to the understanding of the processes and methods including practices through which teaching and learning are conducted, managed and assessed (Shulman, 1986). Koehler & Mishra (2008) have attained that effective technology integration practice was to understand content pedagogy which describes the subject discipline to be learned; pedagogical knowledge which deals with the strategies, principles and processes of learning. It also refers to technological knowledge which addresses teachers' ability to select and apply suitable technologies for specific instruction taking into consideration the need of the learner and lesson objectives of the lesson; including the understanding of how the learning contents and technology interact and influence each other. Technology is a fluid infrastructure which transforms with constant rapidity and complexity. The rapid transformation and changes in educational technology tend to put teachers at a disadvantage, particularly teachers who were trained before technology became a buzz word in educational establishments. Koechler and Mishra (2009) observed that:

Many teachers earned degrees at a time when educational technology was at a very different stage of development than today. It is, thus, not surprising that they do not consider themselves sufficiently prepared to use technology in the classroom and often do not appreciate its value or relevance to teaching and learning. Furthermore, teachers have often been provided with inadequate training for this task (p. 62).

The argument is that the understanding of the relationship between technology infusion and pedagogical knowledge represents the foundation and a road map through which technology integration can be successfully implementation. According to Honey & Moeller (1990), the vital aspect of technology integration is teachers' understanding of the pedagogical principles to address technology integration. Also, Hasselbring, Barron & Risko (2000) remarked that teachers may desire to use computers for instruction and may gain sufficient computer literacy but remain deficient in the acquisition of the pedagogical knowledge required to effectively use technology to facilitate instruction. Whestone & Carr-Chellman (2001) maintained that teachers acknowledged that computers are important in supporting teaching and learning, however, they fail to realize the necessity of implementing technology integration using pedagogy as foundation knowledge. Also, Pierson (2001) echoed the idea that technology integration involves the utilization of technological skill and pedagogical knowledge to support and facilitate instruction.

The focus of this study is on how emerging technologies, such as mobile technologies, cloud technologies, etc. chosen by the teachers, to play a role in today's class and make technology integration a proven reality. Two fundamental questions under study were: Have teachers mastered and consolidated the skills in these emerging technologies in a manner that creates confident in a manner that helps them to use in the instructional setting? Are teachers able to integrate emerging technologies into teaching and learning using pedagogical principles as a base for making appropriate and suitable selection of technology based on the instructional objectives?

Piaget's definition of effective learning is incremental, from the simple to the complex. While it is neat to make effort to embrace emerging technologies which just cannot exclude social and interactive media, it is vital that teachers master basic technologies that are used for personal and for business. Yet, teachers seem to be less confident in using them and teaching students how to use them. As succulently stated by Gunter & Baumbach (2004), technology integration "requires a good foundation in computer literacy, information literacy and integration literacy…" (p.194). Koc & Bakir (2010) maintained that the availability of technology in the classroom does not ultimately suggest that technology integration is being implemented; the authors believed that teachers need training. It appears that teachers need training not only on more sophisticated type of technology but also on the basic literacy skills because teachers need a thorough understanding of the processes of pedagogy to guide technology integration.

1.1 Pedagogy & emerging technologies

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Emerging technologies such as mobile and cloud technologies, or Internet technology in an conglomerate term have become a great tool for teaching and learning. But are teachers able to use these resources to truly enrich their teaching materials or to use different technologies to transform their classroom into virtual authentic classroom? Proper use of the emerging technologies will allow teachers to explore the world as a learning community and to create awareness of current issues in a global scale. A good teacher is required to keep abreast of news and information as they emerge to educate his/her students on the new developments on the disciplines of interest, including emerging research knowledge. Part of the effort to integrate technology into instruction is to be able consolidate the technology skills that have been acquired and being able to infuse it into teaching and learning using pedagogy as well as the ability to enrich classroom instruction using the internet. While there is an increase in the use of computer and the World Wide Web (WWW) for assignment, record keeping and assignments; "less than 10 percent of teachers reported using computers or the internet to access model lesson plans or to access research and best practices (US Department of Education, Office of educational Research and Improvement, 2000, p.1). The findings of a study carried out by Limayem & Hirt (2000) revealed that teachers in their study tend to introduce technology to learners and leave "students to their own devices," the authors claim that this "will not be sufficient" (p. 7). This further illustrates that some teachers may not have the ability to use digital resources readily at hands to enrich teaching and learning in a way that is profitable to be teachers and students. Although, technology has been introduced into education for decades now, yet as Koc (2005) pointed out that " majority of teachers do not feel well prepared to integrate technology into their teaching" (p. 3). The observation of Vannatta & Beyerbach (2000) in Koc (2005) delineated the problematic nature of technology integration among teachers by stating "that technology integration must be connected to course content, objectives and assignments, and addressed much earlier in the teacher education programs" (p. 12). Unfortunately, most technology professional development programs do not adequately address the importance of pedagogical principles in technology integration training. Therefore, the problem of this study is that teachers' understanding of the importance of using pedagogical knowledge as foundation for using emerging technologies to support instruction remains unclear; such uncertainty does not inspire confidence among teachers. Internet resources can improve teaching and expand learning materials, nevertheless, teachers have shown less enthusiasm to use internet resources properly to enrich instruction as well as provide opportunity to engage in exploratory learning with their student. The following research questions were developed to guide this study:

1. What percentage of teachers believes that they consider the use of pedagogical theories as a foundation for selecting technologies to support instruction?

2. Are there any differences among teachers based on years of teaching experience in their perceived ability to use pedagogical knowledge as a base for using emerging technologies to support instruction?

2. The study

The purpose of this study was to investigate teachers' perceptions toward the relationships between pedagogical use of emerging technologies and classroom technology infusion. Understanding the relationship between learning theory and technology was considered important because educational practices are rationalized based on proven learning principles and processes. The goal is to provide data to technology trainers and specialists to help them develop appropriate professional training materials and address teachers' needs during technology profession training in a way that connects pedagogical knowledge and technology. The idea was to identify participants' weaknesses and address those weaknesses during professional development training. Quite often, most technology professional training is carried out without addressing specific needs of the trainees.

2.1. Methodology

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In this study, a self-reported questionnaire was used to gather data from the accessible population for the study was approximately 313 full- and part-time nursing teachers in a Taiwanese Nursing Institute during the 2012-2013 academic year. The faculty taught primarily undergraduate classes and possessed necessary knowledge and skills in seven (7) specialized areas in nursing practices: Fundamental Nursing, Clinical Medicine, Internal Medicine/Surgery, Intensive Care, Public Health/Palliative Care, Psychiatrics, and Obstetrics, Gynecology & Pediatrics. The researchers used a convenient sampling technique to select the subjects for the study. In the end, 313 teachers participated in this study. As seen in Table 1, the participants varied in their age, gender, positions, as well as their experience of using computers for instruction. The questionnaire was validated by professors with expertise in pedagogy and technology integration. The internal consistency of the instrument was established using Cronbach's alpha and it stood r = 85, p. ≤ .05. The primary purpose of the 5-point Likert scale questionnaire administered to the participants was to assess participants' understanding of the use of pedagogical principles as a base to implement technology integration including assessing teachers' use of the emerging technologies to expand instructional materials. Data for research questionnaire was collected using a 5-point Likert scale namely, "SA" for strongly agree (5-point), "A" for agree (4-point), "N" for neutral (3-point), " D" for disagree (2-point) and "SD" for strongly disagree (1-point). Percentages, means and standard deviation were employed to analyze teachers' responses. Correlational statistics were used to seek if relationship existed among teachers in their responses to questionnaire items based on their demographic, independent variables of gender, age, years of teaching experience salary and type of school where teachers taught.

3. Findings

Table 1: Distribution of Teachers by Demographic Variables and Percentages

Demographic Variables	Frequencies	Percentages
Gender		
Male	92	29%
Female	221	71%
Age		
20-25 years	36	12%
26-30 years	6	2%
31-35 years	40	13%
36-40 years	53	17%
40-45 years	33	11%
46-50 years	38	12%
51-55 years	52	17%
56 and above	55	18%
Experience		
5 years or less	109	35%
6-10 years	52	17%
11-15 years	44	14%
16-20 years	29	9%

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21-26 years	35	11%
27 years and above	44	14%

Research Question #1: What percentages of teachers believe that they consider the use of pedagogical theories as a foundation for selecting technologies to support instruction?

Frequencies and percentages for each scale were calculated to determine the distribution of teachers for each Likert rating scale as shown in Table 2 below. In questionnaire item #1, 56 or 18% of the participants strongly agreed that they use learning theories as a foundation for selecting technology for instruction; 133 or 42% agreed with this statement. However, the results showed that 83 or 27% were not sure (undecided) regarding whether or not they consider learning theories as they make instructional decision for their students. Also, 31 or 10% teachers disagreed and 10 or 3% strongly disagreed with the statement in research questionnaire #1. In questionnaire item #10, only 88 or 28% of the respondents strongly agreed, whereas 155 or 50% agreed that they use technology for teaching in a manner that could be used to solve real problem; 49 or 16% remained undecided, 15 or 5% disagreed with the statement contained in questionnaire #10. Moreover, 87 or 28% of the participants strongly agreed with the statement #11 in the questionnaire, while 136 or 46% of the faulty members agreed, 55 or 18% undecided, 27 or 9% disagreed and 8 or 3% strongly disagreed.

Table 2: Frequencies & percentages of teachers' perceptions of the use of pedagogical theories as a foundation for selecting technologies to support instruction

Questionnaire Items	**SA**		**A**		**N**		**D**		**SD**	
	f	***%***	***f***	***%***	***f***	***%***	***f***	***%***	***f***	***%***
Q1: I use learning theories as a base for applying technology into instruction.	56	18	133	42	83	27	31	10	10	3
Q2: I consider lesson objectives when I select technologies for instruction.	107	34	159	51	23	7	18	6	6	2
Q3: I do not consider instructional methods as I select technology to support instruction.	4	1	18	6	36	12	143	46	112	36
Q4: I do not consider learning styles when I choose technology for instruction.	2	1	18	6	26	8	141	45	126	40
Q5: I consider students' pace of learning when I select technology to support instruction	99	32	165	53	30	10	12	4	7	2
Q6: I consider methods of evaluation when I choose technology to support instruction.	98	31	148	47	41	13	18	6	8	3
Q7: When I select follow-up activities, I do not consider the type of technology to match the follow-up activities.	10	3	17	5	48	15	150	48	88	28
Q8: I consider students' developmental stage when I select technology for instruction	105	34	11	4	32	10	11	4	154	49
Q9: When I choose software for instruction, I do not consider if it is user friendly	10	3	19	6	41	13	120	38	123	39
Q10: As I plan for instruction, I consider how the technological skills taught will be used to solve real life problems.	88	28	155	50	49	16	15	5	6	2
Q11: As I teacher, I use technology as a tool for teaching problem-solving skills.	87	28	136	43	55	18	27	9	8	3

F= frequencies

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Research Question #2: Do differences exist among teachers based on years of teaching experience in their perceived ability to use pedagogical knowledge as a base for using emerging technologies to support instruction?

Out of the 11 questionnaire items, statistical significant differences were found to exist among the respondents in four of the questionnaire items based on the teachers' years of teaching experience. In questionnaire item #1, *I use learning theories as a base for applying technology into instruction* (Table 3), significant differences were found among teachers, $F(10, 303) = 3.119$, $p < .01$. Further tests were conducted using Tukey HSD and the results showed that teachers who had between five years or less years of experience (M = 4.22), including those teachers who had between six and10 years (M = 4.25) and those teachers with 11-15 years of teaching experience (M = 4.30) as well as those with 21-26 years *agreed* with statement contained in questionnaire item #1. However, teachers with 27 years teaching experience and above were undecided (M = 3.70) regarding questionnaire item #1. In questionnaire item #4, the result of the ANOVA tests revealed that significant differences existed among teachers with different years of experience, $F(10, 303) = 4.650$ $p < .01$. Post Hoc tests were used to locate where the differences were found and the findings indicated that teachers who had five years or less experience, six to 10 years of experience and 21 to 26 years of experience were *undecided* (M = 3.67) with the statement: *I do not consider learning styles when I choose technology for instruction.* But teachers with 27 years and above *agreed* (mean score 4.65).

In questionnaire #6, the result of ANOVA showed a significant differences among those participants involved in this study, $F(10, 303) = 3.615$, $p < .01$. Teachers with five years of teaching experience or less (M = 4.17); teachers who had experience 6-10 years of experience (M = 4.20); teacher with 11-5 years of teaching experience (M = 4.14) *agreed* with the statement recorded in questionnaire #6 but teachers with 21-26 of experience and 27 and above were *undecided* concerning the statement in questionnaire item #6.

There were statistical significant differences in teachers responses to research questionnaire item #10 (Table 6), $F(10, 303) = 4.151$, $p. < .001$. The result of the Tukey HSD tests indicated that teachers who had worked for five years or less including those teachers with 6-10 years of experience, 11-15 years of experience and those teachers with16-20 were *agreed* (M = 4.13) that as they *plan for instruction, they consider how the technological skills taught will be used to solve real life problems.* But teachers with 27 years of experience and above were undecided (M = 3.75) regarding questionnaire item #10.

Table 3: ANOVA results of teachers' pedagogical knowledge as a base for using emerging technologies to support instruction based on teachers' years of teaching experience

Questionnaire Items (Dependent Variables)	**Groups**	**Sum of Squares**	**df**	**Mean Squares**	**F**	**Sig.**
Questionnaire Item #1: I use learning theories as a base for applying technology into instruction.	Between Groups	13.101	10	2.620	3.119	.009
	Within Groups	250.343	303	.840		
	Total	263.444	313			
Questionnaire Item #4: I do not consider learning styles when I choose technology for instruction	Between Groups	11.461	10	2.292	4.650	.001
	Within Groups	166.736	303	.560		
	Total	178.197	313			

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Questionnaire Item #6 I consider methods of evaluation when I choose technology to support instruction.	Between Groups	13.427	10	2.685	3.615	.003
	Within Groups	222.101	303	.743		
	Total	235.528	313			
Questionnaire Item #10 As I plan for instruction, I consider how the technological skills taught will be used to solve real life problems.	Between Groups	13.716	10	2.743	4.151	001
	Within Groups	198.271	303	.662		
	Total	211.987	313			

4. Discussion

The results of the study revealed that many of the teachers who took part in this study believed in using learning theories as a foundation for selection technology for instruction as demonstrated in Table 2. Nevertheless, a substantial number of teachers were not sure that they used learning theories to inform their selection of basic software technology for instruction. Also a reasonable proportion of teachers acknowledged that they did not consider learning principles as the based for applying software applications into instruction. The findings revealed that the use of basic software applications to support instruction still remains problematic. In research questionnaire item #1, only 18% recorded strongly agree response while 28% agreed with the statement in questionnaire item #1. Twenty-seven percent of the participants were unsure; 31 or 10% of the teachers disagreed. When the number of teachers who were not sure about their practice in using learning theories as a base for selecting emerging technologies to facilitate instruction and those teachers who acknowledged that they did not consider learning theories, it became apparent that teachers in the school system needed help in implementing basic technology integration. This could represent one of the problems with technology integration because some teachers do not consider learning theories which could provide them with the rationality for choosing and using technology to support teaching and learning. Selecting technology for instruction arbitrarily or in a vacuum would definitely hinder technology integration. This finding mirrors the result of a study carried out by Mouza (2011) who argued that teachers did not possess pedagogical content knowledge to implement technology integration. Littrell, Zagumny, and Zagumny (2005) pointed out that teachers still lacked the skill to use technology to promote teaching and learning in a meaningful way. Koehler & Mishra (2009) maintained that the heart of good technology integration lie with the recognition of the relationship between technology and pedagogy. Unfortunately, a sizeable proportion of the teachers who were involved in the resent research did not seem to recognize such relationship.

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Formative research in higher education: some reflections

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Abstract

Research is considered fundamental in the formation process of students in higher education institutions (HEI). It has been positioning pedagogic strategies to promote its development such as formative research. It represents an effective alternative that allows the stimulation of students' skills improving the quality and structure of the research and professional profile of the student training. In this paper is presented the role and importance of formative research in professional training qualification. It considers how it is understood the concept of formative research, mentioning some techniques or strategies that have enabled in its development as a pedagogic activity in School or HEI.

Keywords: formative research; virtuality; hotbed of research; teaching; higher education.

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1. What is formative research?

Formative research is understood as the learning process in the development of a research culture in the student beyond obtaining concrete scientific results (Facundo et al., 2007). Its aim is to stimulate the student's abilities and interests in relation to the research, in order to strengthen their professional abilities. It is achieved by a series of activities that do not necessarily involve a specific research project, but other measures to potentiate the analytical and critical skills of students (Tejada, Tejada, and Villabona, 2008).

The developed processes in the formative research seek to familiarize the students with the scientific and research culture. It is accomplished when process, methodologies and techniques useful in the training process are recognized and applied in different contexts of the subject's life students (Tejada et al., 2008). The concept of formative research is understood as a pedagogical strategy in professional training. The developed where the aim is to stimulate their research abilities so that may be applicable in their context, such as problem solving, analysis of a situation, the application of methodologies to recognize deficiencies or situations and implement improvements from various perspectives that allow to understand the phenomena of their field of knowledge (Lemos and Sánchez, 2009).

It is necessary to recognize what is the difference between formative research and research training, to establish clarity in their use. As noted above, formative research can be understood as a pedagogical strategy to form students in research abilities, oriented to their professional training. On the other hand, research training is properly understood as the research exercise in strict sense of the term. It is put into practice the knowledge acquired to conduct research project (Parra, 2009). Nevertheless, it is important to note that both concepts are not far from each other. The combination of these two elements is necessary for the consolidation of the research function, composed by the research teaching and pedagogical

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training from research (Parra, 2009). The integration of them with others gives value and recognition of Higher Education Institutions (HEIs). It is also important to recognize that research is the core idea of all this dynamic interaction and it should be understood as a social process where the collective construction of knowledge is its basis. The research must be set out through dialogue and discussion in groups and scientific communities. The diversity of ideas and points of view provides a complete training that encouraging formative research (Restrepo, 2002).

Interaction, dialogue and practice of research in a social context are necessary in formative research, but the student is who consolidates his intellectual and professional profile. Then, formative research is recognized as a process that occurs in the student's autonomy (Macea, 2008). In this regard, it is important to understand the formative research as a knowledge network that is nourished by the collaborative work and dialogue (Ramírez and Morales, 2011). Techniques and strategies should be developed in the classroom or academic groups by different actors in order to promote and facilitate access to knowledge, developing skills, habits and attitudes, but the most important, to felt the research spirit, that quality that combines the senses towards finding answers and solutions to the situations of the context in which the professional or student in training is located (Landazabal y Ortiz, 2010). Understanding the formative research as a pedagogical strategy helps to the learner in his research path due to the research is assumed as a transverse hub at training process of student, helping to manage the expertise of his area in practice and theory.

To some extent, hotbeds of research in Colombian universities have become a strategy to contribute to the training of professional research elements. In business and work environment, it has taken a great value and has become a plus that unlike other students who do not have the opportunity to belong to a group, and to develop or stimulate applied research capabilities to their field. Thus, there are many universities that include in their academic curriculum aspects oriented to formative research, with strategies as hotbed of research, motivations as an alternative extracurricular that manage, encourage and promote the research spirit in its students. To help to the dynamics of these exercises, the use of guidelines and methodological tools are really exploited, and generate additional value to the student's professional education (Macea, 2008).

Furthermore, the formative research contributes to the purpose of teaching. It helps training students to acquire a set of attitudes, abilities and competencies that enable the appropriation of theoretical, practical and technical knowledge necessary to the professional or academic exercise. In this sense, formative research is necessary in the teaching profession to develop and stimulate the complex and basic mental processes. First one related to analytical, critical, proactive and relational thinking and second one with observation, description and comparison (Parra, 2009).

One of the values generated by formative research is the ability to achieve the interaction between teacher disciplinary knowledge and experimental background of the students. According to Macea (2008), this allows for a combination of knowledge, given from the experience and training acquired, allowing to explain a circulating reality or answering to the interests of the area or the particular profession, helping in some way to understand certain situation, analyze it, being critical, and besides, being proactive (González, 2009). All this happens in a classroom with interactions between students and the teacher, enabling a complete education, dialogue of knowledge that is nourished by motivations, interests, thoughts, attitudes, beliefs, values, and rational and emotional intelligence expressions.

Thus, formative research has been positioned in the academic and training activities of universities. It has greatly impacted the teaching processes, and as beforehand indicated, contributing to the generation of added value in the acquisition of competences by undergraduate students from the qualification of acquired knowledge (Ramirez, 2009). Also, formative research is considered as an alternative to facilitate the appropriation of research as a matter of passion, and make this a first step to have an appropriation and continuity in research exercise that occurs in universities or specialized centers (Macea, 2008).

Then, a series of actions and techniques are presented to manage the processes of research training developed in universities and HEIs. For example, theoretical essay with research scheme in order to generate ideas and arguments regarding specific topic, being the basis for the initiation of an academic and thorough discussion. Other is the magazine club that consists of follow a trail of information, categorizing and getting an overview of a specific area of knowledge. There are also seminars as a way to facilitate the

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meeting and reasoned discussion on certain issues. They are usually recommended to be approached from different perspectives and are supported by documentary studies (Parra, 2009).

Other exercises recommended by Parra (2009) are those employing PBL (Problem Based Learning) method. This method is used primarily in the health sciences, but it can be applied in other areas too The intention is to follow the methodology that set out for research, where a problem is delimited, a hypothesis is generated, data are seeking to support the hypothesis and the information found in function to respond or validate the hypothesis analyzed. Finally, another mechanism suggested is the formulation of preliminary research projects on specific topics of a subject. Its aim is to help students to acquire the ability to develop theoretical and practical problems in a particular discipline or profession. It is important to clarify that the use of this technique is not intended to accomplish the preliminary research projects, but it sets out a research process to familiarize students with the logical, systematic and methodological requirements involving the research process.

Diversity of methods are then observed to stimulate the student from the formative research, the required competencies within his professional environment or area of knowledge, being universities responsible for this process of formative research seeking to be nourished by competencies, knowledge and experience of his teachers, which ultimately generate a proper environment to encourage his professional training in research spirit (Hernández, 2003). Therefore, thinking in formative research as a teaching process requires the active participation of institutions. They facilitate spaces and tools for the student to develop a critical, analytical, and reflective thinking that allow him to be independent and proactive in his field work or professional practice (Benjumea and Sánchez, 2011). However, one of the great challenges facing HEIs is the deficiency in its formative research processes (Jaimes, 2007). They have no clear indicators to recognize the achievement of the proposed objectives in areas such as information processing, contrasting, induction, deduction and other required topics in the research process. It has made the rigor of the process is lost, besides the loss of institutional commitment to the issue of formative research.

Contemporary research trends are aimed to promote the collaborative work and teamwork. The individuality of the student is fundamental to recognize his interests, experiences and work dynamic that can vary from individual to individual, but that individuality and differentiation must take shape from teamwork, dialogue of knowledge and research discussion (Jaén, 2006). Moreover, articulated and collaborative work facilitates a more comprehensive view of reality to have a broader perspective of several variables that are analyzed from different or complementary visions. All this becomes in a process of mediation and collective interpretation, encouraging student capabilities such as: teamwork, consensus and dissent, the possibility to debate and defend a thesis, or facing a problem and manage it from his field of knowledge (Ramirez and Morales, 2008).

Finally, the formative research is understood as a pedagogical strategy that instructs necessary actions and attitudes for the training student, which are essential to make him a comprehensive professional (Macea, 2008) prepared to respond to dynamics of his environment, being critical, reflective, propositional and proactive.

2. Role of research hotbeds in higher education

One strategy that has been developed as a hub of formative research in HEIs is the research hotbeds. They are meeting spaces for training in research methodologies involving in the professional field of student. Research cannot be considered a matter of teachers or certain fields of knowledge (Hernández, 2003). Research today is a key in professional dynamic. Therefore, implementation of formative research is needed within the educational models in order to form a comprehensive professional, and it can be supported by the development and consolidation of research hotbeds in Higher Education Institutions.

First, it is necessary to define hotbed. It means etymologically "a place where planting and breeding, where is saved and preserved, origin and principle of" (Facundo et al., 2007). If hotbed is applied to the

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research, it is the space for cultivating student and professional talent through research. Its objectives are to facilitate generational change, improve the quality of teaching, research and social work. In that sense, the hotbeds have been considered as spaces to guide and go in depth in knowledge related to the field of knowledge which belongs from research (Guerrero, 2007).

Structurally, the hotbeds are generally composed by students and teachers who are interested in learning: how to learn in a voluntary, autonomous and extracurricular way. In most cases they are coordinated or directed by teachers, who play the role of tutors and counselors in the process of formative research (Parra, 2009). As indicated in the previous section, these spaces are enriched not only by the knowledge and wisdom of teachers, but the dialogue between teachers and students, where the experience of both contributing to the consolidation of the hotbed as a private space for formative research and also as a pedagogical strategy.

It is fundamental be clear about the role of research hotbeds. The hotbeds are part of that educational strategy which responds formative research, and in that sense it is proper to think that most of the graduates of these spaces won't make the research as a part of their professional life, because these areas respond more to a space of training that reinforces their own knowledge of professional training, which is important to denote that student should have abilities in research if the application of this knowledge in their work is necessary (Miyahira, 2009).

The research hotbeds are framed within a context of formative research. It is established as a space to strengthen the student learning, where in most cases he is there by his own decision and interests, in order to go in depth in knowledge to know different perspectives, approaches and methodologies of their field of knowledge (Macea, 2008). In this sense, the hotbeds encourage scientific research activity within HEIs and contribute to the consolidation of a scientific culture in the academic community (Benjumea and Sánchez, 2011).

Usually, the hotbeds develop their research activities through seminars, workshops, forums, roundtables, lectures and discussion sessions and group activities that encourage collaborative work, argumentation, debate, reflection and proposition, which today are necessary competences in professional training. Methodological research processes are formed by developing works such as document review, reading, writing generation, schema design, prototyping and development of research projects, activities that are consolidated from the presence and work sessions group (Miyahira, 2009).

Research hotbeds have been established as one of the first stages of the research. The hotbeds have become in many HEIs in the first spaces for discussion, reflection and construction of social issues or research problems in response to the interests that each student has. Autonomy is the key in these spaces, because the student must to have the freedom to pursue topics that address their own professional brand or interests with respect to his knowledge field. Thus, many universities have included in their academic curriculum the research as a key issue for quality construction and autonomy, seeking the avant-garde in new research methodologies such as the plurality, interdisciplinary, and the training and practice (Macea, 2008)

Therefore, the networking of hotbeds is important in the formation process of the student, because it encourages interdisciplinary work, the meeting of knowledge and explaining work. Then, it is possible to affirm that since the hotbeds through networking, the learning communities and collective formative research are established (Correa, 2011). Also, it is acquired the strengthening of abilities as a professional training, where spaces like hotbeds are themselves the place to implement the knowledge, manage and encourage them, in order to contribute to the formation of a comprehensive professional.

In turn, the hotbeds have become a filter for many academic units of universities, as the beginning of young researchers. They nourish groups and research centers and contribute to ensure a renewal in these spaces with the generation of new ideas and reflections and giving sustainability at the same time, from the generational change that was discussed in previous sections (Rojas, 2010). Besides the abovementioned, students who are in research hotbeds, unlike those who are not, are formed in abilities for learning to learn, reference, search information, key elements to generate knowledge and the train students in the workplace (Benjumea and Sánchez, 2011).

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The research hotbeds have contributed to the consolidation of a scientific culture and formative research that occurs in universities. Although, this is not guarantee to the institutional support which in turn generates in some students feels of motivation to participate in these spaces. Additionally, maybe there are problems in the field of teaching and learning, and the work that the same tutors make, who from the subjects of the research area can generate dislike, disinterest and lack of motivation in students by their participation in these training spaces (Benjumea and Sánchez, 2011).

Consequently, it is important that HEIs from the same administration begin to mediate processes that enable the creation of a true research culture, and not a half formative research, which might cause aversion or disinterest in students. In that sense, ICTs are currently a key tool in this process of formative research because many young people are involved with these technological scenarios that can promote interactivity, intercommunication and collaborative network from virtually, promoting time and space (Ramírez, 2011).

3. Conclusions

Formative research, as indicated by (Arakaki, 2009) is essential for the professional formation with critical, reflective and proactive thinking, since it stimulates the ability to ask and respond to environmental problems or situations that no have been resolved. Formative research is constituted as a pedagogical strategy by the teacher in the classroom or in student. This strategy stimulates and goes in depth the knowledge acquired in the training field of student.

The role of teachers in the processes of research training should be to guide, advice, and provide the basic abilities to encourage the student's investigative skills in his field of knowledge. In these formative research processes, the teacher must to be a strategist to encourage young to participate in the research stages and appropriates of these spaces, it also enable the consolidation of scientific culture and the relationship between the institution and students in spaces such as research hotbeds.

The hotbeds of research have become a meeting place for socializing, discussion, reasoning and collaborative work, which in most cases is mediated by teachers or institutional representative. Then, they are a teaching strategy that allows the strengthening of research as a mechanism to promote generational change in research groups or as it has been indicated, provide to professional training of student attitudes and skills of their field of knowledge, because today the ideal is to make research a transversal issue in the curricula offered by universities.

Finally, the importance of mediating formative research processes through virtually, since ICT currently occupies an important place in social processes. Virtualize many of the formative research process allows for example, greater process efficiency, autonomy and flexibility in the proposed activities, being important to monitor the maintenance of content and education quality, and making possible the reasoning, discussion and knowledge construction in a collectively way.

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From the diffusion of innovation to tech parks, business incubators as a model of economic development: the case of "Sardegna Ricerche".

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Abstract

Considering the long lasting phase of low economic growth in which the Italian economy has been trapped, the subject of innovative start-ups and how to support their development is a crucial one. The so-called "business incubators" are one of the possible solutions considered in the economic literature and are in fact implemented in several countries, in order to develop new businesses with strong innovative components. The research will focus on the development of "business incubators", namely the "incubator" "Sardegna Ricerche". A further aim of the study is to apply Everett Rogers' theory on the "diffusion of innovation" on the data collected by "Sardegna Ricerche".

Keywords: incubator; innovation; diffusion;

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1. Foreword

The diffusion of the technology is an articulate and complex subject. There are several social processes that influence the way in which it becomes part of the individuals' daily life. The everyday life is the fundamental context in which the relationship between technology and society can be analyzed in its various nuances, requiring a deep analytical skills, capable of embrace both the *micro* and *macro* dimension of the social experience.

If it's true that technology is spread in the social world thanks to economic processes that are controlled by market dynamics, then it is also true that the design, the diffusion, the inclusion in the people's lifestyle and the success (or the failure) of a given technology are subject to complex trends that refer to deep social and cultural frameworks.

Today as never before, we are realizing that innovation and the capability to overcome problems with non-traditional solutions are the most efficient tools to survive this critical phase the global economy is facing.

Innovation diffusion is a very large and multidisciplinary field of study. It varies from the study of new consumption goods to the analysis of new productive processes, from the new organizational structures to scientific and cultural novelties in their wider meaning.

According to Schumpeter (1942), an economy is capable to survive only if the entrepreneurs keep on innovating, thus contributing to the global competitiveness; in this way the processes of diffusion of tech-

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nologic innovations (Rogers 1962[50]) can influence in a relevant way on the enterprises and on the whole economic system.

This is where the importance of business incubators comes from; an organization that speeds-up and systematizes the enterprise creation and start-up process, providing them with a large choice of integrated services i.e. physical space (offices, meeting rooms, labs etc), business support services and integration and networking possibilities (European Commission Enterprise Directorate General, Benchmarking of Business Incubators, Centre for strategy and evaluation services, February 2002).

In this field, business incubators are proposed by the economic literature as one of the solutions and are implemented in most advanced and emerging countries, although in different ways. In Italy this matter came back to the public attention thanks to the recent legislation passed by the government (Decree n. 179/2012 converted into Law n. 221 of 17 December 2012), which recognize to innovative start-up companies their important role for the economic development and the increase of employment, especially of young workers, and support the business incubators.

Within this study we will see how, on one side, the adoption and the diffusion of speficic innovation trajectories tend to become dominant with time, and, on the other side, how the scientific research, the institutions and the innovation supply tend to coagulate around the development of an entrepreneurial environment through business incubators.

The study, after examining the diffusion theory, will aim to study the different types of incubators active in Italy and their respective institutional goals, the services they offer to enterprises, their level of involvement in the different phases of the SME development. Furthermore, the study will carry out a specific analysis of the incubator's activities implemented by the Sardegna Ricerche Tech park for the development of new enterprises.

2. Theory of diffusion

The diffusion processes of technologic innovation can influence in a very strong way the organizations and the economic system.

Since 1940 the American researchers started studying the way in which the innovative ideas and practices were diffused within the agricultural communities.

One study on the diffusion of hybrid corn among Iowan farmers became a milestone of this kind of research. Since then, the foundations for innovation diffusion studies were laid and numerous studies from all around the world started to be published.

Sociologist Everett Rogers (1962), summed up those studies in a collection of generalizations that shaped the model of diffusion currently used worldwide in both industrialized and developing countries. He illustrated the process of diffusion through the familiar "bell-shaped" curve.

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[50] Rogers E.M.(1962), *Diffusion of Innovations*, (3rd ed. 1985)New York: Free Press;

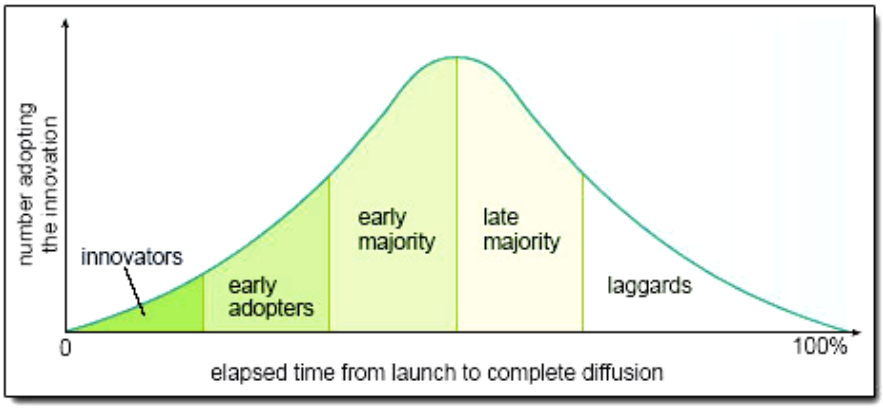


Fig. 1. Rogers Curve, theory of diffusion. Source: Rogers, Diffusion of Innovations, 1985

The curve is divided in five segments which represent five distinct groups of people: the first one is the group of *innovators*, highly educated and risk oriented people, control over funding sources, specific skills that enable them to understand and apply technical knowledge and exposed to several information sources; the second group will include the *early adopters*, with high levels of education and reputation in their communities, the capability to achieve social leadership and with successful experiences in their personal history; the third group is called the *early majority*, made by people that have strong interactions with their peers; they often occupy leadership positions and have the tendency to follow a deliberative process before adopting a new idea; the fourth group is the so-called *late majority*, a group that includes usually skeptical and traditionalist subjects with a low status. The components of this group are usually very careful and suffer the social "pressure" that the other group members put onto them; the *laggards* are the last group. Its made by usually isolated and suspicious subjects with none or little external social interaction (only neighbors and close relatives), a very slow decision making process and little resources.

Rogers (1983) states that the diffusion is the process by which an innovation is passed through time among the members of a social system through certain channels. In fact, following the theories of Tarde[51] and Ryan & Gross[52], he demonstrated empirically how the early adopters[53] and those that were part of the early majority were more introduced in the local communication mechanisms and had a higher capability to take over the role of opinion leader. Rogers pushed this demonstration further to identify the process of diffusion as a fundamentally communicative [54], where personal characteristics and tendencies come into play.

In Roger's vision, diffusion is essentially a communication process, heavily influenced by personal information and the media.

By reprising the theories of Lazarsfeld[55] (1963), Rogers observes how the personal influence is much more relevant than the one exerted by the media. The latter have, in fact, the power to inform, but their power to persuade is much more weaker than the one exerted by personal communication. However, the communication channels through which the innovation is transmitted cannot be separated the social system in which they are embedded.

When determining the level of diffusion both the prevailing social rules (for instance, the ones upheld in an organized system), and the presence of opinion leaders that influence the decisions are important.

[51] Tarde G., Parsons E.W.C. (1903) The laws of imitation, New York: Holt

[52] Ryan and Gross typology indicates empirical studies carried out during the forties by B, Ryan and N. Gross (1943) on the diffusion of hybrid seed corn in Iowa which confirmed Tarde's thesis. Ryan B., Gross N. (1943), The diffusion of hybrid seed corn in two Iowa communities, in *Rural Sociology*, 8(1)

[53] Early adopters are considered by the companies and the service providers as an essential resource for their product's fine tuning and their qualitative evaluation. The definition was used the first time by Everett M. Rogers in Diffusion of Innovations (1962)

[54] Communication is described as a linear process composed by six main elements: (1) a broadcaster, which intends to communicate, (2) a message, (3) a channel through which the message is conveyed (4) and a receiver. The impact generated on the receiver is called (5) effect or audience response, whether it's translated into an improved knowledge or a change in the behavior or in the decision-making skills or not. The effects is, finally, verified by the(6) feed-back

[55] Lazarsfeld P.F., Menzel H. (1963), Mass media and personal influence, in Schramm W., *The Science of Human Communications*, Basic Books, New York, 1963

The presence of "change agents" and "change aides" is also important. Those are subjects that take on the burden of pushing forward the innovation within the social system by carrying out different functions as supporting the need for change, favoring the circulation of information, identifying the problems that may be solved through innovation and supporting a stabilization of the adoption process.

Rogers' thesis had and still have a predominant role in the field of innovation diffusion.

The diffusion model is a product of the western industrialized world, it reflects the social, cultural, economic and communicational conditions of the early 20th century, where agriculture is the object of the studies for the implementation of economic policies. Farmers had a modest level of education and their chances to access information on new agricultural technologies were limited. Farming technology originated by empirical experiments on the field and by science was relatively simple and, in most cases, did not require high capitals for investments. Finally, the large majority of farmers shared the same mixed models of production.

In present days the situation is different. Firstly the agricultural production is not the only sector where it's required to proceed with innovation diffusion; research, as well as the life conditions and social interactions, has changed.

The Universities and other research institution produce, nowadays an increasingly wider and more sophisticated knowledge. The technology that arises from the research and experimental activities becomes every day more complex and requires higher investments. Production, in general, is becoming more and more specialized. Shared production schemes are rarely found; on the contrary, it varies noticeably from company to company.

If the 1960s model of diffusion was developed as a function of a consultancy service that found its reason in the technology transfer to farmers. Nowadays, such function can be described in a wider and punctual way, embracing all sector of economic activity.

The different social, economic, historic, cultural and territorial dimensions have changed with time and so did the models of diffusion of technologic innovation for the development of the relevant sectors.

In the beginning the agricultural production was the only sector in which the innovation diffusion was required. At a later stage, the change in the needs of society gave to the Universities and other institution the power to increasingly influence on the technology diffusion processes within the SMEs, giving birth to customized research and experimental activities, designed on the single company's requirements.

3. From the tech park to the business incubators

In order to diffuse innovation, the first Scientific Technologic Park (STP) "Stanford Research Park" is created in 1951 in California. In the park, for the first time, university professors, researchers and alumni could translate their research results into industrial products. It's a spontaneous process stimulated by the research carried out in the universities. The Stanford Research Park initial objective was not to create new businesses but to research on innovation.

Today, the goals that push the STP promoters towards its realization are found in this model's recognized capability to optimize the strategic assets' organization in order to consolidate the development of an advanced economy area, restart industrial areas struck by crisis or stimulate lagging areas.

In this way, STP that aim to offer services for innovation and technology transfer to SMEs are born in certain developing areas.

The incubators differ from STPs because they are created to support companies in their start-up phase. Most of the research centers and STPs do not offer to SMEs technical assistance services, that are the trademark of a business incubator programme. Nevertheless several research centers and STPs host incubators.

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Companies introduced in the incubators can be newly created companies or pre-existing companies in a transformation phase. The goal is to promote entrepreneurship and economic development in disadvantaged areas of the country. In particular, the "Società per la Promozione e Sviluppo Imprenditoriale[56] (SPI)", a state-owned company has played a fundamental role in the creation of the first business incubators in the shape of the Business and Innovation Center (BIC), following the recommendations of the European Commission (1984) and focused primarily on the manufacturing and hi-tech sectors.

From the end of the eighties STPs started to promote incubation programmes[57] in order to support the development and the creation of new innovative enterprises. This kind of incubators was created and it's currently funded by public resources.

In the late nineties university incubators, offering similar services were developed, although with a stronger aim to transfer technology from the academic world to the business environment.

Table 1.Business incubator activities in Europe. Source: Authors' Elaboration, 2014

1970s	**1980s**	**1990s**	**From 2000 until now**
Transition phase that marked the evolution from a traditional industrial economy to an economy increasingly based on ICT.	Incubators are considered as an instrument of economic policy to withstand the macroeconomic changes and to stimulate entrepreneurship and the creation of jobs after the recession phase. This is possibly the most dynamic and relevant phase of the evolution of incubators with an increase not only in the number of initiatives but also in the amount of money invested by a variety of agents as governments, academic institutions and businesses	The development of the biomedical sector and ICT have stimulated the growth of the so-called "sector incubators", focused on the emerging technologies in these fields. A quick diffusion of scientific parks, that gave a relevant impulse towards the creation of new business incubators, is noted during these years.	In recent times a quick increase years of a new type of privately-owned incubator , was recorded. It can be considered as an hybrid between a sector incubator and a venture capital fund.

A new kind of incubator, developed in the first years of 2000 is privately-owned. It acts as an incubator but adds the role of the venture capital fund; these incubators are mostly specialized in web related activities.

In the early phases the aim of the incubators was to create a fertile micro-environment for new companies by offering physical spaces and supporting services capable to guide the enterprise through the start-up phase. Subsequently the focus of these incubators was moved towards intangible services with higher value added, such as tutoring, mentoring, and networking activites or fundraising initiatives, in order to promote the economic development and the creation of new jobs through talent integration, diffusion of technology, know-how and capital within a network that supports the new companies' development.

These services, the shared costs and the scale economies increase the survival chances of the companies hosted in the incubator.

Through the years some methodologies that characterize the different stages of incubation have been devised. Three different categories of incubators can be identified: there are "generic" incubators that host any type of enterprise, "specialized" that discriminate according to the sector and "high-tech" if the hosted companies belong only to this family of activities.

[56] SPI - Società per la Promozione e Sviluppo Imprenditoriale S.p.A (Society for the promotion and entrepreneurial development) was an Italian publicly owned company that was created to implement programmes and policies of promotion and industrial development, and in particular the creation and internationalization of SMEs. It was founded on April 20th, 1954 with the name of *Isap - Istituto per lo sviluppo delle attività produttive S.p.A (*Institute for the productive activities development) with the aim to develop the southern Italian economy. In May 1970 becomes *Spi - Promozione e sviluppo industriale S.p.A* and in 2000 is merged into Sviluppo Italia.

[57] Stone, Mancuso, 2008, Minventor of business incubator, dies in *Rochester Business Journal*

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New enterprises can be hosted in the incubator's structures for a time span of two to five years. Within the structure several common services are available (hardware, training, secretaries) in exchange for a rent fee.

The incubator makes possible the realization of scale economies, a tight cooperation among the enterprise workgroup and the interaction with the other hosted entrepreneurs.

When the businesses have reached a proper level of development they leave the incubator and they access more appropriate premises capable to assist the development of the production activities. This environment can be provided by the tech park.

Table 2. Business incubator activities in Italy. Source: Authors' Elaboration, 2014

1980s	**1990s**	**From 2000 until now**
The Technologic and Scientific Parks (STP) started to implement incubators in order to support the start-up phase of innovative enterprises.	The university incubators start to spread: those entities offer similar services as the ones provided by STPs and BICs but they are oriented towards technology and knowledge transfer from the academic world	Private incubator are born. They are specialized in the new economy and web based enterprises. They also take part in venture capital operations.
Since the eighties the development of the different kinds of incubators is associated to a certain evolution of their functioning models. While the initial scope of the incubators was to provide logistic and physical assistance to the start-up companies, they increasingly evolved towards intangible and high value –added services as tutoring, mentoring e networking and fundraising.		

The Bank of Italy conducted a study in 2012 on the Italian business incubators. Fifty-three active incubators were found, the elder established in 1984; over half of the Italian incubators were created between 2003 and 2009.

The first notable element of the research is a certain geographical fragmentation of the incubators: 10 are established in the north west of the country, 18 in the north east, 17 in central Italy and 13 in southern and insular Italy.

Table 3. Incubators that took part in the survey, by region (absolute value and percentages). Source: Authors' elaboration, 2014

Region	**Incubators**	**Privately owned (quota %)**	**Public (quota %)**
Piedmont	3	0	100
Lombardy	7	71	29
Trentino	2	0	100
Veneto	4	50	50
Friuli Venezia Giulia	3	33	67
Emilia Romagna	9	50	50
Tuscany	10	30	70
Umbria	1	0	100
Marche	2	50	50
Latium	4	75	25
Abruzzo	3	0	100
Molise	1	0	100
Campania	3	50	50
Apulia	2	0	100
Sicily	2	0	100

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Sardinia	2	0	100
Italia	**58**	**36**	**64**

Over two thirds of the incubators are publicly owned. This puts Italy within the European average. Over three quarters of the incubators are not for profit.

Table 4. Geographic distribution of private and public incubators in Italy (percentage values) Source: Authors' elaboration, 2014

Area	**Public**	**Private**	**Total**
North West	50	50	100
North East	59	41	100
Center	59	41	100
South and Islands	91	9	100
Italy	**64**	**36**	**100**

The no profit condition coincides almost constantly with the public incubators while the private incubators are equally split between profit and no profit institutions..

Table 4. Geographic distribution of profit and not-for-profit incubators in Italy (percentage values) Source: Authors' elaboration, 2014

Area	**No Profit**	**Profit**	**Totale**
North West	71	29	100
North East	67	33	100
Center	73	27	100
South and Islands	100	0	100
Italy	**74**	**26**	**100**

The Italian incubators are mostly public in the south, mainly private in the north west. The north eastern incubators are mostly oriented to profit while center based incubators are mostly not for profit.

Almost three quarters of the Italian incubators are linked with universities or research centers, the rest have no relationship whatsoever with such entities; from this it can be inferred that the incubator's activity can be carried out with no direct links with the academic world.

It is interesting to note how the absence of links with the universities is mostly found in the profit-oriented incubators.

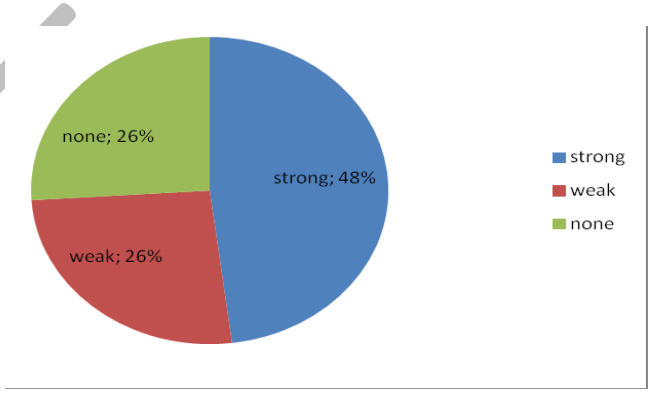


Fig. 2. Incubators and intensity of their relationship with universities and research institutes. Source: authors' elaboration, 2014

The incubators analyzed in this research have an average of 16 people in staff, mostly employed as a direct support to the hosted enterprises. Only a few of them are actually in staff to the incubator itself.

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Moreover, the private and the profit-oriented incubators tend to have a slightly higher number of personnel in staff. The employees of smaller or average size incubators are usually assigned to the different tasks in an homogeneous way.

The services offered to companies are mostly of logistic nature, while the other services are less frequent. On a territorial level the north western incubators tend to offer more high added-value services than their southern homologues, in which the logistic services are prevalent.

The selection of the startup companies to include in the incubator is usually a continuous process: 82,5% of the incubators state that they tend to select the hosted companies on the basis of their business idea as soon as they are submitted to them.

The sectors more frequently hosted are the services/professional activities, internet and energy. The companies that have started their incubation period are usually active in sectors that do not require a high level of startup investment (i.e. services and internet based companies) or those sectors where a lean business plan with low risk can be implemented in the startup phase. Such companies have normally limited growth perspectives because they usually provide a relatively simplified service mix. This fact showcases the general dynamics of creation of technologic companies in Italy. These companies suffer some basic weaknesses of the economic and financial structure of Italy, as the ones related to the scarcity of venture capital funds and low average innovation propension of the businesses.

The research also shows how the services sector, the computer science and the bio sciences sectors are mostly represented in the public incubators while internet services, nanotechnologies and aerospace are mostly hosted by private incubators. The profit oriented incubators tend to host more enterprises from the internet, ICT, electronics, services and aerospace sectors, while computer science, nanotechnologies and the bio sciences sectors are more often found in the not for profit incubators.

The Italian incubators are mostly involved in the preliminary phase of the business idea. After the company makes its debut on the market their level of involvement diminishes. This is usually confirmed by the same companies in the field enquiry, from which we also understand that the most frequently used services are the logistic ones, coherently with the incubators' offer. The field enquiry, while showing some limits regarding the size and representativeness of the population, indicates also that the role of the incubators is deemed useful but not fundamental for the success of the startup company by most of the enterprises.

The entrepreneurial team of the incubated companies is usually made by engineers and experts of scientific disciplines, while business management and legal competences are less frequently found; this could indicate possible weaknesses in the management skills of the startup entrepreneurs. At the same time, it appears thatlittle attention is given to the management aspects of the enterprise.

Most obstacles to the incubated businesses growth can be found in the overall difficulty to "create business" in Italy, because of the high taxation and the bureaucracy. The financial restrictions are also relevant for a large (but not the majority) of the companies. This shows that these limitation do not appear to be the higher obstacle for the creation and development of new companies in Italy; the part played by specialized intermediaries (business angel, private equity and others) regarding the acquisition of venture capital is relatively small but not irrelevant.

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4. Sardegna Ricerche

The technology and scientific park of Sardinia was established in 2003 and it comprises a wide range of advanced infrastructures, innovation and development services and services for the industrialization of research. It is managed by Sardegna Ricerche, a regional agency, and has two branches (Pula in the south of the island, and Alghero, in the north). It hosts over 60 companies and it's one of the largest STPs in Italy, the first one for the number of incubated biotech companies (Assobiotec- Ernst & Young report "Biotechnologies in Italy 2010").

The tech park is specialized in: ICT, biotechnology and bio computer science, renewable energies. It also has technology platforms. It promotes the regional economic development through technologic innovation and knowledge. Its activities are mostly dedicated to enterprise, research centers and other entities that wish to introduce research and experimental activities in their fields. In particular, it's open to entrepreneurs and researcher that wish to create new enterprise or to carry out innovative projects starting from their research results. In order to do so, it provides multifunctional spaces, labs, reception and logistic services and services for technologic development. Within the park there are two operational incubators. The bio-incubator of Pula (province of Cagliari) dedicated to initiatives in the field of life science and the incubator based in Alghero (province of Sassari) dedicated to food technology and biotechnologies for health and environment.

Both incubators aim to support new technologies, software and industrial applications by supporting newly established companies and young entrepreneurs and helping to translate into economic value the results of research and knowledge.

The incubators generate a dynamic system where the good ideas become business, thus overcoming the traditional deficit of the entrepreneurial system (gap between research and SMEs, scarcity of innovation services, low technology transfer, difficulties in fundraising in the startup phase, inadequateness of the traditional finance system to answer quickly and properly to new business ideas).

Since 2004 several initiatives were implemented which helped, through different start up development programmes, to increase the number of Sardinian-based innovative businesses.

Table 5. Innovative Start up programmes (2005-2011) source: Authors' elaboration from Sardegna Ricerche data, 2014

Sector	Period	Number of Companies	Development plan costs	Public contribution	Private contribution
Biofarm 2004/2005: start-up and HR for bio computing and personalized medicine– APQ	2004/2005	11	475.000,00	475.000,00	0
Start up programme: Digital content	2007	1	88.900,00	80.000,00	8.900,00
Start up programme: Medical devices	2007	2	133.000,00	119.700,00	13.300,00
Research spin off companies creation – Regional Operational Plan(EU structural funds) 16 Development plans and 3 R&D projects)	2007/2008	16	2.276.734,00	1.886.435,00	390.299,00
New businesses for young graduates – Regional Operational Plan	2007/2008	16	1.603.820,00	1.443.438,00	160.382,00
Spin off companies creation POLARIS	2007	2	200.000,00	180.000,00	20.000,00
Start Up Incentive POLARIS	2010	3	449.000,00	338.000,00	111.000,00
Total		**49**	**4.777.454,00**	**4.184.573,00**	**592.881,00**

The final goal of these programmes is to support the creation of new enterprises and to make possible their success on the markets.

Out of the 49 companies created thanks to the initiatives of Sardegna Ricerche, some have achieved very important results and acknowledgements. Bioecopest srl, a Start up developed in the Alghero incubator won the National Prize for innovation in 2009 and the regional "start Cup". Prossima Isola srl, a start up company established thanks to the 2008 innovative businesses programme was a finalist in the 2010 edition of the Mind the Bridge competition; Karalit srl and Elianto srl, two Spin-off companies of the CRS4 incubator (Pula) were funded by the innovative start up programme 2007/2008, got their first round of funding on the market; Xorovo srl another spin-off company of Cagliari University was acquired in 2011 by the international group Applix.

Based on our research, if we apply the Rogers Curve to these companies, we can state that they can be included in the early majority group.

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5. Conclusions

The Everett Rogers theory implies that some individuals are more open to innovation and adaptation towards new technologies than others. This has some consequences that impact on the chances of success of the new scientific innovations.

If we observe the theory of diffusion bell curve (see paragraph 2), we will note that, a part of the classical product life cycle, there is also a segmentation of the curve. This segments represents the different types of subjects widely described earlier: innovators, early adopters, early majority, late majority, laggards.

There's nothing particularly interesting until we understand that there is a great gap to be filled in order to shift from the early adopters sector to the early majority. The gap is an ideological and social one, and it discriminates the different approaches towards innovation adopted by a very small and a very large market share, the latter being very relevant in terms of size and capable to determine the success of a new product.

Many companies have introduced new and performing technologies on the market without being capable to win over the market. Furthermore, sometimes it has occurred that the same technology was reprised later in time by other companies that managed to achieve good results with a different approach.

It is a widespread opinion that the time to market is one of the most important drivers of success. Nevertheless, the first mover is not automatically sure to be successful. Unfortunately, it happens quite often that the innovator isn't able to enjoy the benefits of his ideas. Sometimes he has the function of a mere tester while the market approach problems will be analyzed and solved by other companies that will take the new technology to success.

Some other times the failure to introduce a new technology is linked to an immature market. This is why we analyzed the diffusion of innovation and technologies by focusing on the role of the incubators and STPs.

The diffusion of innovation is crucial for economic development and competitiveness. STPs, Incubators and private-public partnerships are the most important "actors of innovation". The channels through which the innovative processes and technologies are conveyed are multiple and have different characteristics according to the territorial needs, traditions and situation.

The diffusion model of the sixties was developed, as we explained, as a function of a consultancy service that identified itself as an agent of technology transfer to farmers, while nowadays this function can be extended to all the economic sectors.

The diffusion of innovation is not anymore a matter for farmers-entrepreneurs, as this function is now embraced by tech parks and business incubators.

The positive conclusion of a business incubator programme increase noticeably the chances that the start up company stays in business in the long run of the economic scenario, placint itself in the most profitable segment of the Rogers Curve: the early majority.

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IMPLEMENTATION OF PROFESSIONAL LEARNING COMMUNITY IN MALAYSIAN SCHOOLS

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ABSTRACT

In recent years, many schools in Malaysia attach importance to teachers' professional learning community (PLC) to improve both teachers' development and students' achievement. This research has been designed to investigate the implementation of teachers' professional learning communities in primary schools and secondary schools in Johor Bahru, Malaysia. A questionnaire was administered to 224 participants in six schools. The study investigated how gender and school type influenced teachers' perceptions of the five dimensions of professional learning communities. This study found that gender and type of school were not significant in influencing teachers' perceptions of professional learning communities. The PLCs were found to be effective in enhancing teaching and collaboration.

Keywords: Professional Learning Community, Teachers, Primary and Secondary Schools, Success Factors, Implementation, Classroom

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Background of the Study

In recent years, the topic of professional learning community has become important and significant in educational research. Although previous researches related to this topic have achieved great progress, the continuous study is encouraged to contribute more information in this field.

Professional learning communities emphasize the process of learning together with the questions of what to learn, how to learn and where to learn for improving schools. Huffman and Jacobson (2003) mentioned that professional learning community is a way for school members to devise solutions to help students progress. According to DuFour (2004), educators should have clear dialectical awareness of professional learning communities to build up the model that can arouse creativity of professionals in the learning community which is significant for educational development.

Huffman and Jacobson (2003) deemed that professional learning community plays a key role in professional development and is an important strategy for instituting change in education. This is the big problem, and all the educators should face it. They should understand this is the requirement of school reform and the goals are to develop teaching but most important to help achieve great progress in the whole school and students' learning.

In the professional learning community, as the participants, teachers have positive impacts on student learning. Vescio, Ross, and Adams (2008) in their study indicated that when teachers belonged to the professional learning community, their students' would achieve better learning outcomes. In conclusion, the teacher members of professional learning communities have close relationship with students' learning improvement. As mentioned by Richardson (2003), two main elements influence teachers' learning and teaching: their conceptions, and past experiences (Opfer & Pedder, 2011). Many researchers (DuFour, 2002; Senge, 1997) considered that Professional Learning Community is the foundation for teachers to pay attention to student learning together as the main part of the educational process. Newmann (1994) posited that teachers who worked in PLCs promoted their students' learning. Professional learning communities make teachers improve in collecting ideas and perceptions of teaching and learning which make students attain sufficient clear information; these continual clear information develop school's quality and capacity to shape high competitiveness to win students' interests; by sharing visions and ideas teachers are guided to solve the problems of specialized subject knowledge and physical changes in the process of teaching which are useful for helping students successfully overcome difficulties in their learning (Scribner, Hager, & Warne, 2002). Besides that, technology also plays a key role in the success of professional learning communities.

The PLC concept is relatively new, having grown out of the work in the mid-1990s to reculture schools. Since then, schools have shown much enthusiasm for the potential of PLCs for increasing teacher professional knowledge and enhancing student learning. Although research is just starting to emerge, much has been written about PLCs. In education circles, the term learning community has become commonplace. It is being used to mean any number of things, such as extending classroom practice into the community; bringing community personnel into the school to enhance the curriculum and learning tasks for students; or engaging students, teachers, and administrators simultaneously in learning -- to suggest just a few.

Professional learning communities pay attention to teachers' perceptions of themselves in the roles of both teachers and learners. As learners, based on teachers' conceptions of sharing understanding with students, the main common ways are interviews and observations. Through these ways, teachers build up the conception of student learning, academic success and social development. Teachers understand they need sustained learning of both teaching skills and their students' background of family and living environment. These can help teachers learn about students' needs including the areas of academic, social development and emotion. In addition, teachers also need improve their skills of dealing with problems at work. Teachers also should learn how to share the moral commitment with their students in the deep level. The appearance is shown by students to have motivations to teachers' behaviors to meet the requirements of students to express strength and resilience. In the professional learning community, teachers build up the close relationship for sharing knowledge, discussing their universal goals and learning teaching skills from each other through others' classes.

As learners, teachers have their own perceptions of learning which not only support the individual's learning but the whole organizational learning. Teachers should understand how to maintain the balance between their personal learning aims and organizational aims. If one teacher does not care about an individual's demands, he or she will do not understand the academic and professional needs of the college or school. In the context of school improvement, Professional Learning Communities (PLCs) shift the focus of school reform from restructuring to reculturing. The PLC concept is misused or implied to describe a committee or any weekly meeting in which the participants undertake data-based decision making often. However, a PLC is much more than that. It is an ongoing process used to establish a school-wide culture

based on a fundamental belief in building teacher leadership in school improvement efforts. Through participation in PLCs, teachers enhance their leadership capacity as they work as members of ongoing, high-performing, collaborative teams that focus on improving student learning.

Background of the Problem

As we know, the independence of Malaysia brought about transformation in Malaysian education. The old system and model of education changed to meet the requirements of national issues and economic development and Malaysia attained great progress in these years by continued attention and educational reform (Phaik-Lah, 1997).

With the sustained improvements of education in Malaysia, more and more schools are paying attention to the new topic of professional learning community in recent years. Professional learning communities have already become the subject of international studies on academic issues.

The PLCs emphasize the role of teachers in professional learning community of school; professional learning communities can promote the relationships between teachers' professional learning and teachers' immediate demands. More important, teacher professional learning communities have the direct positive influence on student achievements. The teacher professional learning communities support developing teachers' teaching and school performance improvement.

Teachers attain advantages by learning from each other and learning together. These actions of teachers help schools improve to become learning organizations. The professional learning community make teachers get together to collect their conceptions, ideas, perceptions, and suggestions in every area of school life that can reflect most of teachers' interests, demands, and enthusiasms in different levels.

With the depth of exploring the professional learning community in school, teacher's role is in new perceptions. As the entity of professional learning community, schools should make teachers have the responsibilities to learn the community's visions and carry out the actions in their classrooms (Cormier & Olivier, 2009; DuFour, 2004).

DuFour and Eaker (1998) emphasized teachers' basic responsibilities of changing their roles in professional learning communities: considering learning more important than teaching; paying more attention to student engagement; using instructions to guide the results; applying feedback to assess students' performance; doing the actions which help form the professional learning community. Teachers should have clear awareness of changing their roles from instructors to agents for helping students to learn.

Statement of the Problem

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This research has being designed and applied to investigate and measure the situation and implementation of teachers' professional learning communities in primary schools and secondary schools in Johor Bahru, Malaysia. In the whole process of professional learning community of school, the main participants are teachers.

Objectives of the Study

The objectives of this research are:

1. To determine whether professional learning communities has been implemented in primary and secondary schools in Johor Bahru?
2. To determine the differences from teachers 'perceptions based on their gender and type of schools in Johor Bahru.
3. To determine the most and least of professional learning communities facets the implantation based on teachers' perceptions in primary and secondary schools in Johor Bahru.
4. To determine what are the factors that can maintain the stability of teachers' professional learning communities in primary and secondary schools in Johor Bahru.
5. To determine what are the important factors have the negative influences on professional learning communities in primary and secondary schools in Johor Bahru.

Significance of the Study

The factors which facilitate and hinder the professional learning communities development in Malaysia will be investigated. The results of this study will contribute to those wishing to establish professional learning communities, namely the teachers and school leaders.

Research Design

This survey has close relations with some important studies that have significant guiding meanings in the area of professional learning community. DuFour and Eaker argued that the PLC model indicated the general perceptive system on school changes but did not describe the stylized rules (Stuewe, 2012). The PLC model required that teachers and school leaders begin to search for new ways to solve the key problems in teaching and learning (Stuewe, 2012).

Stuewe (2012) completed the deductive research of professional learning community which has the influence on students 'achievements in middle school mathematics. Stuewe (2012) emphasized students' achievements or results which are the criterion to test the professional learning community's positive influences in the middle school that applied the PLC department in one year.

The location of this study is within primary schools and secondary schools in Johor Bahru, Malaysia. The towns selected in Johor Bahru are Skudai and Kulai. Those towns were selected due to their location

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which is near to Singapore, the educational philosophy has a positive impact and they are in the progress of developing. Therefore, there are numerous schools in the above named cities with well-established teachers.

Generally, this research has utilized quantitative research strategy. Through the utilization of this strategy, research questions and objectives would be better understood. The technique used to collect data was through distribution of the questionnaires. The questionnaires have been sent to teachers of primary schools and secondary schools.

INSTRUMENTS

Some 224 questionnaires have been sent out to all the teachers in Johor Bahru of Malaysia. In order to collect the data, a questionnaire was developed, which consisted of 42 items, and had been designed to seek information and opinions about the perception of the teachers in Johor, Malaysia regarding professional learning community. The questionnaire was distributed to the teachers and collected from them after 30 days. The responses were analyzed and interpreted on percentage basis. Data were collected from the teachers and administrators of primary and secondary schools of Johor, which was made up of a total 224 respondents with 93 male and 131 female respondents.

The questionnaire is divided into two major sections as shown in the next sub section. This questionnaire assesses teachers' perceptions about the principal, staff, and stakeholders based on the five dimensions of a professional learning community (PLC) and related attributes. The questionnaire contains a number of statements about practices that occur in some schools. Respondents read each statement and then use the scale to select the scale point that best reflects their personal degree of agreement with the statement.

Section A of the questionnaire elicited demographic information of the respondent such as: name, age, sex, position in the school, working experiences, school location, and others.

Section B determined the factors which facilitate the professional learning communities function in Malaysia. In section B, problems relating to the application of determining the factors which facilitate the professional learning communities function in Malaysia have been listed and respondents were required to rate them . Besides that, the importance of determining the factors which facilitate the professional learning communities function also have been asked in this part.

Research Interview

In this research, the research instrument that is suitable to be used to collect the primary data is questionnaire and interview.

Firstly, a discussion with the supervisor has been conducted to ensure the questionnaire is focused on the research objective. During the design state of questionnaire, some open ended questions were set up to allow input of respondents' answer which differs from predefined answers.

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Secondly, the appropriate qualitative interview was conducted. A total of 20 teachers who registered in the schools including different age, different sex, different race, different education background, different working experience and different major.

The quantitative research questions, as well as the corresponding data analysis approaches are listed in the following tables.

FINDINGS

Hypothesis: Ho 1

There is no significant difference in teachers' perception regarding Professional learning community on the basis of gender.

Table 1: Group statistics

Gender	N	Mean	Std. Deviation
Male	93	3.0077	.37969
Female	131	2.9291	.35924

Table 2: Independent sample *t*- test

		Levene's test for equality of variance		T-test for equality of means	
		F	Sig.	df	Sig. (2-tailed)
PLC assessment	Equal variances assumed	.958	.329	222	.117
	Equal variances not assumed			191.389	.120

A *t*-test was used to assess the perception of teachers about Professional Learning Community based on gender. The participants in this study comprised of 93 male and 131 female. The group statistics reveal that the magnitude of the difference between two mean and standard deviation is minimum (Table 1).

In Table 2 independent sample test, according to Levene's test for equality of variances the significant value is .329 which is greater than .05. Since we know that a value greater than .05 means that the variability between the two conditions is about the same. It means that the variability in two conditions (male or female) is not significantly different. In the independent sample test result the significance value also refer that the focal row for the decision making is the top row. From the top row it is also evident that the sig (2 tailed) value, which is also called *p* value, is .117. Hence the *p* value is greater than .05 and we can conclude that there is no significant difference between teachers' perception based on gender regarding professional learning community assessment.

Hypothesis: Ho 2

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There is no significant difference between teachers' perception toward PLC on the basis of types of schools.

Table 3: Group statistics

Type of school	N	Mean	Std. Deviation
Primary schools	122	3.0265	.36276
Secondary schools	102	2.8842	.36326

Table 4: Independent sample *t*-test

		Levene's test for equality of variance		*t*-test for equality of means	
		F	Sig.	df	Sig. (2-tailed)
PLC assessment	Equal variances assumed	.029	.866	222	.004
	Equal variances not assumed			214.922	.004

The number of participants from the primary and secondary school is 122 and 102 respectively. The mean for primary and secondary school is 3.03 and 2.89 (after rounding) respectively. However the standard deviation is almost same in both the cases (Table 3).

In Table 4, from the Levene's test for equality of variance it is revealed that the Sig. value is greater than .05. The *p* value (0.004) is less than .05 reflecting the existence of a significant difference in teachers' perception regarding professional learning community assessment on the basis of type of school. It can be concluded that teachers' perception regarding professional learning community assessment varies according to the type of school.

Hypothesis: Ho 3

There is no significant difference between gender and teachers perception of PLC towards the aspect of supportive and shared leadership; shared values and vision; collective learning and application; shared personal practice and supportive conditions. The independent sample test was used to determine the teachers' Perception by gender towards five dimensions of PLC. The findings are displayed in Table 5.

Table 5: Teacher perceptions of the Five Dimensions of PLC by gender

Aspect of perception	*F*	Sig.	df	Sig. (2-tailed)
supportive and shared leadership	.952	.330	222	.055
shared values and vision	3.975	.047	222	.182
collective learning and application	.107	.744	222	.067
shared personal practice	.328	.567	222	.509
supportive conditions	.284	.594	222	.376

Table 5 indicates the result of teachers' perception regarding five dimensions of PLC based on gender. Results show that there is no significant difference between the teachers' gender towards supportive and shared leadership dimension (*F* = .952; Sig. = .330; df = 222; sig (2-tailed) = .055). There is also no significant difference between the teacher's gender towards dimension of shared value and vision (*F* = 3.975; Sig. = .047; df = 222; sig (2-tailed) = .182). Outcomes also indicate that there is no significant difference between the teachers' gender towards collective learning and application (F = .107; Sig. = .744; df = 222; sig (2-tailed) = .067). Likewise the result also reveals that there is no significant difference between the

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teachers' gender towards shared personal practice dimension (*F* =.328; Sig. = .567; df = 222; sig (2-tailed) = .509). The result also demonstrates that there is no significant difference between the teachers' gender towards dimension of supportive conditions (*F*=.284; Sig. = .594; df = 222; sig (2-tailed) = .376). These findings show that there is no significant difference between teachers' gender towards the five dimensions of PLC.

Hypothesis: Ho 4

There is no significant difference between types of school and teachers' perception of PLC towards the aspect of supportive and shared leadership; shared values and vision; collective learning and application; shared personal practice and supportive conditions. The results of independent sample *t*-test are illustrated in Table 6:

Table 6: The independent sample test was used to determine the teachers'Perception by types of schools towards five dimensions of PLC

Aspect of perception	*F*	Sig.	df	Sig. (2-tailed)
supportive and shared leadership	1.780	.183	222	.002
shared values and vision	.600	.439	222	.033
collective learning and application	1.526	.218	222	.007
shared personal practice	.190	.664	222	.112
supportive conditions	.127	.722	222	.010

Table 6 indicates the result of teachers' perception regarding five dimensions of PLC based on types of schools (primary and secondary schools). Result shows that there is significant difference in teachers' perception based on type of school towards supportive and shared leadership dimension (*F* = 1.780; Sig. = .183; df = 222; sig (2-tailed) = .002). There is also significant difference in teachers' perception based on type of school towards dimension of shared value and vision (*F* =.600; Sig.=.439; df = 222; sig (2-tailed) = .033). Outcomes also indicate that there is also significant difference in teachers' perception based on type of school towards collective learning and application (*F* = 1.526; Sig.=.218; df = 222; sig (2-tailed) = .007). Likewise the results also reveal there is no significant difference in teachers' perception based on type of school towards shared personal practice dimension (*F* = .190; Sig. = .664; df = 222; sig (2-tailed) = .112). The results also demonstrate that there is a significant difference in teachers' perception based on types of school towards dimension of supportive conditions (*F* =.127; Sig. = .722; df = 222; sig (2-tailed) = .010). These findings show that there is significant difference in teachers' perception based on types of school towards the dimensions of supportive and shared leadership, shared values and vision, collective learning and application, and supportive conditions. Only one exception is that there is no significant difference in teachers' perception based on type of school for the dimension of shared personal practice.

DISCUSSION AND CONCLUSION

This research investigated teachers' perception towards the five dimensions of professional learning community namely: supportive and shared leadership, shared value and vision, collective learning and application, shared personal practice and supportive conditions. This study also explores the challenges

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and complexities teachers face in developing a PLC. The research also tends to report the benefits teachers experienced and anticipated they would experience in such a learning community.

A survey method was utilized. The study was carried out using questionnaire administered to randomly selected teachers of primary and secondary schools. Some 350 questionnaires had been distributed, but 224 questionnaires were returned.

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 16.0. The reliability test on the items had shown a Cronbach's alpha value of .949. In order to determine the means of teachers' perception regarding five dimensions of PLC descriptive analysis was used. To determine teachers' perception based on gender and types of schools, independent sample *t*-test was used.

The researcher analyzed the collaborative behaviors provided by the data in relation to the collaborative behaviors identified in the PLC.

- Supportive and shared leadership: The supportive and shared leadership dimension addresses information regarding sharing and decision making, authority and responsibility, and commitment and accountability of a PLC. The teachers had continuous accessibility to key information of the school. Respondents confirmed that teachers faced no obstacle in accessing information. Some participants in the survey perceived teacher involvement and commitment to student learning as problematic. Multiple survey participants indicated strong disagreement with only one statement.
- Shared values and vision: The collected data indicated the presence of a collaboratively developed vision and shared values that support teaching and learning behavior norms. The respondents' answers to the survey do reflect minimally the perception that pressure to perform on standardized tests negatively influences the focus on student learning. The data collected supports the identified characteristics of this dimension in the PLC at implementing or sustaining phases.
- Collective learning and application: The dimension of collective learning and application reflects collaboration, planning and problem solving as well as knowledge, skills and strategies. The research reveals that the PLC team used collaboration to solve problems, demonstrating their focus on the vision during this process. The collected data supported the identified characteristics of this dimension in the PLC at implementing or sustaining phases.
- Shared personal practice: The shared personal practice dimension addresses observation, review and feedback, sharing outcomes of practice, and mentoring and coaching. The respondents shared data describing a commitment to change and willingness to share. The schools demand reflective practice and focuses on team improvement rather than individual blame. The survey data identifies teachers' perception of their PLC's to be least aligned with the PLC in this dimension.
- Supportive conditions: The supportive conditions (relationship) dimension reflects trust and respect, behavioral norms, and caring school relationships. The supportive conditions (structures) address resources and systems in place to monitor and adjust practices for improved student learning. The data reveal the introduction of norms or standards focused on the vision and accountability measures to ensure their use. Process implementation ensures opportunities for developing trust and skills leading to empowerment. Developing collaborative skills largely depends on team trust.

DISCUSSION

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PLCs develop over time. The primary and secondary schools recognized this fact and focused on building a collective capacity of collaboration through continuous skill development process. The researcher found the interdependency of processes, trust and accountability and teacher empowerment as influential factors for developing collaboration in the PLC. The processes helps teachers to develop their skills; teachers also contribute to improve processes as they systematically learned to collaborate effectively for student learning. Introducing accountability practices allowed the team members to develop trust on each other and understand their collective capacity.

The PLCs helped teachers in leadership development and thus all teams developed and introduced standards for meetings. The processes helped them in conflict resolution and thus contributed to empowering them and willingness to correct practices as needed. The data also revealed that teachers should have access to key information to make decisions and resolve possible conflicts.

Teachers' perception regarding benefits from PLC

The teachers reported a number of benefits of initiating a Professional Learning Community (PLC). They perceived that time saving through integration of subjects is a major benefit. Sharing ideas and techniques was also perceived as beneficial as the meetings provided teachers with alternative ideas to choose from while dealing with issues in the classroom. Other teachers can know about new ways of handling situations as teachers tend to share their personal experiences.

Professional development was a big benefit in the view of the teachers as the schools cannot always provide them many opportunities for professional development. According to them, the PLC provides them with opportunities for a personalized form of professional development.

The PLC also helped the teachers to map out further development of their teaching and professional activities.

Through participating in PLC, teachers got to know each other better. Some of the teachers met each other first through participating PLC. The PLC enhanced socialization among the teachers and reduces isolation. The respondents reported that they became more socialized after joining the PLC through sharing and expressing their thoughts. Respondents were able to exchange their views regarding teaching and learning as they came to know others perspectives regarding teaching and learning. The respondents shared their personal class room experiences and thus learned more about their colleagues experiences about particular class room situations.

Most of the teachers replied that they experienced change in their attitudes after participating in PLC. They became more open minded towards new practices of teaching and more student-centered. PLC meetings and group discussions made the teachers more conscious about their teaching practices and methods.

Challenges faced by the professional learning community

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The study considers both the benefits and challenges of participating in PLC. One of the challenges was teacher unwillingness to provide peer feedback related to instructional practices. This finding supports that of Bolam et al. (2005). When we asked about sharing thoughts regarding institutional practices, a good number of the respondents were reluctant to provide feedback. Challenges also include the level of collaboration in the schools as a result of the PLC initiative. The teachers in schools were not accustomed to collaboration. Although some teachers do seek advice from their colleagues, it was not the norm of the schools.

The school culture was found to be a challenge for teachers participating in PLC. Poor school culture and lack of trust and collaboration are all barriers to creating a PLC. The schools' culture described by the participants indicated that outstanding achievements are not recognized by the institutions, no time was provided for collaborative work and the institutions did not promote collective learning and shared practice.

Changing the school's culture would require a major effort by the teachers and administrators.

Another challenge is that most of the institutions focus mainly on test scores and grades of the students rather than student learning. Such practice may bring good result for the institution but is not sufficient to develop the students as good human being and asset for the society. It has been said that the schools culture reflects the society's culture, which means that there need to bring changes in attitudes form people outside of the school as well.

Practical Implications of the Study

The findings of the study have implications for practitioners, including both teachers and administrators.

Implications for teachers

The respondents reported that they benefitted by participating in the PLC through building trust within the group and sharing their successful practices. Teachers saved time by reducing repetitive teaching of topics that had already been taught in different subject areas. It was also found that teachers can save time by sharing worksheets and splitting up their planning tasks.

Teachers need leadership to enjoy these benefits. This leadership may emerge from the group, but if not, then they have to get a facilitator outside of the school to attain these benefits.

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Implications for Administrators

Administrators will also be benefitted from PLC through developing level of trust in sharing practices among them and increasing and enhancing their teaching practice to benefit the student of the school which will in turn increase the possibilities of improving students learning and grades in exams. The presence of administrators in the PLC may limit the open discussions among the teachers, but they may be able to provide external facilitators to initiate the PLC.

Including administrators in the PLC will contribute in bringing changes to reduce challenges and problems faced by the teachers as they have the authority in doing so. Moreover, by sharing leadership in the school, the administrators will be able to delegate more responsibilities to other senior teachers which can eventually make the teachers more self-directed in their professional learning.

Implications for Schools

The institution will also be benefit from PLC through improvement in both teaching and learning at the schools. Students will be aided by the various teaching techniques learned by the teachers from their colleagues and from the fact that teachers work together for the students' development.

Theoretical Implications

Many studies on professional learning communities have been conducted in recent years and most of the studies aimed at better understanding the characteristics of PLCs. This study adds to the research by looking at the teachers' perception regarding the dimensions of PLC and thus identifying the benefits and challenges from the teachers' viewpoint. This study also provides research in a culture different from the USA, Canada and the United Kingdom and the other more familiar contexts. The study is unique in that it shows the teachers perception regarding PLC and their significant development in teaching and attitudes after participating in PLC. It is not the static representation of a PLC that appears in many other studies.

Suggestions for Future Research

Two of the limitations of the study were the use of teachers' perception data in measuring teachers' improvements and absence of student development data. Conducting a similar study incorporating additional measures of teacher development and student development data would reinforce the claims regarding PLC effectiveness. Student achievement data will help to investigate whether PLC structure contributes to improving student learning and teaching practices, which would provide a more concrete support for implementing or not implementing the PLC model. The process of implementing PLC begins with a need

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to change to improve student quality. The teachers and administrators accepted the task and focused on their vision and utilized processes to collaborate. They established empowerment and ensured growth through the process. As teams continue to develop trust and empowerment, more complications are easy to resolve. A question for future research: can variable goals contribute teachers to collaborate beyond teams and school to ensure PLC sustainability and improved student learning?

It is evident that administrators have a role to play in developing, implementing and sustaining the PLC by influencing different leadership styles as the PLC develops. The PLC needs a structural process that can be relatively inflexible at the beginning, but it needs more autonomy as it develops. As the PLC develops over time, the teams increase in skills and confidence and they demonstrate their ability to lead themselves. Future research could consider how leadership styles affect PLC sustainability.

Although the teachers experienced benefits from this professional learning community, they also faced challenges. Many of the challenges were problems they faced in the school that could hinder the proper functioning of a professional learning community. Despite the challenges, these teachers are in favor of PLC.

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Appendix

PROFESSIONAL LEARNING COMMUNITY IN SCHOOL BASED SETTING

SECTION A

Demography

All information given in this questionnaire will be kept confidential. Please give brief information or indicate with a tick (√) in the box that describes you.

Age: _____ years old

Gender: Male ☐ Female ☐

Types of School : Primary schools ☐ Secondary schools ☐

Race: ☐ Malay ☐ Indian

☐ nese Oth ☐ _____

Years of services in school: _____ years

PROFESSIONAL LEARNING COMMUNITY ASSESSMENT

Directions:

This questionnaire assesses your perceptions based on the five characteristics of a professional learning community (PLC) and related attributes. Read each statement and then use the scale below to select the scale point that best reflects your personal degree of agreement with the statement. Be certain to select only one response for each statement.

Scale: 1 = Strongly Disagree (SD)
2 = Disagree (D)
3 = Agree (A)
4 = Strongly Agree (SA)

STATEMENTS		SCALE			
Supportive and shared leadership		**SD**	**D**	**A**	**SA**
1.	Teachers are consistently involved in discussing and making decisions about most institution issues	1	2	3	4
2.	School leader incorporates advice from teachers to make decisions.	1	2	3	4
3.	Teachers have accessibility to key information	1	2	3	4
4.	School leader is proactive and addresses areas where support is needed.	1	2	3	4
5.	Opportunities are provided for teachers to initiate change.	1	2	3	4
6.	School leader shares responsibility and rewards for innovative actions.	1	2	3	4
7.	School leader participates democratically with staff sharing power and authority.	1	2	3	4
8.	Leadership is promoted and nurtured among teachers.	1	2	3	4
9.	Decision making takes place through committees and communication across grade and subject areas.	1	2	3	4
Shared values and vision		**SD**	**D**	**A**	**SA**
10.	A collaborative process exists for developing a shared sense of values among teachers.	1	2	3	4
11.	Shared values support norms of behavior that guide decisions about teaching and learning.	1	2	3	4
12.	Teachers shares visions for institution improvement that have an undeviating focus on student learning.	1	2	3	4
13.	Decisions are made in alignment with the school's values and vision.	1	2	3	4
14.	A collaborative process exists for developing a shared vision among teachers.	1	2	3	4

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15.	Institution goals focus on student learning beyond test scores and grades.	1	2	3	4
16.	Policies and programs are aligned to the school's vision.	1	2	3	4
Collective learning and application		**SD**	**D**	**A**	**SA**
17.	Teachers work together to seek knowledge, skills and strategies and apply this new learning to their work.	1	2	3	4
18.	Collegial relationships exist among teachers that reflect commitment to institution improvement efforts.	1	2	3	4
19.	Teachers plan and work together to search for solutions to address diverse student needs.	1	2	3	4
20.	A variety opportunities and structures exist for collective learning through open dialogue.	1	2	3	4
21.	Teachers engage in dialogue that reflects a respect for diverse ideas that lead to continued inquiry.	1	2	3	4
22.	Professional development focuses on teaching and learning.	1	2	3	4
23.	Teachers learn together and apply new knowledge to solve problems.	1	2	3	4
24.	Teachers are committed to programs that enhance learning.	1	2	3	4
Shared personal practice		**SD**	**D**	**A**	**SA**
25.	Opportunities exist for teachers to observe peers and offer encouragement.	1	2	3	4
26.	Teachers provide feedback to peers related to instructional practices.	1	2	3	4
27.	Teachers informally share ideas and suggestions for improving student learning.	1	2	3	4
28.	Teachers collaboratively review student work to share and improve instructional practices.	1	2	3	4
29.	Opportunities exist for coaching and mentoring.	1	2	3	4
30.	Individuals and teams have the opportunity to apply learning and share the results of their practices.	1	2	3	4
Supportive conditions		**SD**	**D**	**A**	**SA**
31.	Caring relationships exist among teachers and students that are built on trust and respect.	1	2	3	4
32.	A culture of trust and respect exists for taking risks.	1	2	3	4
33.	Outstanding achievement is recognized and celebrated regularly in your institution.	1	2	3	4
34.	Time is provided to facilitate collaborative work.	1	2	3	4
35.	The institution schedule promotes collective learning and shared practice.	1	2	3	4

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36.	Fiscal resources are available for professional development.	1	2	3	4
37.	Appropriate technology and instructional materials are available to staff.	1	2	3	4
38.	Resource people provide expertise and support for continuous learning.	1	2	3	4
39.	The institution is clean, attractive and inviting.	1	2	3	4
40.	The proximity of grade level and department personnel allows for ease in collaborating with colleagues.	1	2	3	4
41.	Communication systems promote a flow of information among teachers.	1	2	3	4
42.	Communication systems promote a flow of information across the entire school community including: central office personnel, parents, and community members.	1	2	3	4

Source. Adapted from Huffman, j b. & Kipp, K.K. (2003). *Reculturing schools as Professional Learning Communities*. Lanham, MD: Scarecrow Education.

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Improving the speaking skill using reading contextual internet-based instructional materials in an EFL class in Indonesia

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Abstract

The aim of the study is to solve speaking problems of students in an EFL class using contextual internet-based instructional materials. The study employed Classroom Action Research design in a speaking class at an English Education Department at a university in Indonesia. The study consisted of two cycles. Each cycle consisted of planning, implementation, observation and reflection. The criterion of success was that ≥ 80% of the students must gain speaking score of ≥75. The results of cycle 1 revealed that less than 80% of the students achieved the criterion; consequently the revised plan for cycle 2 was implemented. The results of cycle 2 revealed that more than 80% of the students gained score ≥75 and therefore the cycle was stopped. The design and development process of the instructional materials are discussed and the steps in implementing teaching integrated reading and speaking in EFL teaching and learning (TIRS) are proposed.

Keywords: speaking skill; contextual internet-based instructional materials; integrated teaching

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1. Introduction

Speaking as one of the language skills becomes important topics to discuss in language teaching. The discussion topics can be related to the instructional techniques, the instructional materials, the instructional media, the language teachers, the language learners, and even the speaking components. The instructional techniques hold an important role to motivate and activate learners, the instructional materials play the role to contextualize the language usage and to meet language learners' needs, instructional media bring the teaching into real life situation, the teachers facilitate and ease the learning process, the learners manifest and produce meaningful and appropriate utterances as an indicator of the instructional success, and the speaking components relates to which components of the speaking to be the emphasis in a speaking class activities. In addition, success in studying a language is often measured by learners' ability to speak in the language being learned. More importantly, Harmer (2007) argues that language learners use all language they know when they speak. Therefore, research is always needed and recommended to improve the teaching and learning techniques to improve the speaking skills that enable learners to communicate.

The ability to use the language as a means of communication often judges one's successfulness in speaking class in language learning. This success is detected when a language learner can use the language to express his ideas, feeling, and thought in the form of monologue or dialogue or the success can be simply seen when language learners are able to express their purposes or when language learners are able to make a conversation with others. Nunan (1995) argues that speaking is an important aspect of language learning whether it is as a second or a foreign language and the success is measured by the ability of lan-

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guage learners to carry out conversation in the language being learnt. This is in line with Richard's (2008) viewpoint that speaking is an important skill in language learning that enable language learners to communicate not only in expressing view point but also in giving responses. It is also agreed that speaking as a productive skill is related to the ability of language learners to process information during the conversation (Harmer, 1991; Burns and Joyce, 1997; Brown, 2001). It implies that speaking deals with the ability to process messages so that utterances produced are appropriate with the context of the conversation and hence the produced utterances meet the purpose of the conversation.

Improving the speaking skill of students in English as a foreign language (EFL) or English as a second language (ESL) becomes an issue. Quite a few EFL teachers expect their students to be able to speak accurately after the teaching learning process. On the other hand, most learners find it difficult to express grammatically correct sentences due to the significant differences in the grammar of the native language of the students and that of the EFL and consequently they prefer to put emphasis in fluency rather than on accuracy during the speaking activities. Cultural difference is also considered to contribute to the difficulties of EFL learners to use English in their daily conversation (Richards and Rodgers, 1986; Ho, 2009) and in appropriate social interaction (Schumin, 2001; Efrizal, 2012). Despite the faced problems in the teaching and learning of speaking, Heaton (1988) proposed that in the teaching of speaking learners must master the three components of speaking; fluency, accuracy, and comprehensibility or apropriacy. It means that there must be efforts to choose effective techniques in teaching speaking and willingness to create and design interesting instructional materials that facilitate the achievement of the three speaking components.

Techniques in teaching speaking holds important role to improve the speaking skill. The teaching of speaking must open up wide opportunities for learners to practice. Harmer (1991) suggests that the importance of presentation, practice, and communication/production during the teaching of speaking in order to meet the real purpose of the teaching cannot be neglected. Widiati and Cahyono (2006) highlight the importance of techniques in selecting classroom activities in a speaking class. More importantly, Jones (2007) suggests that language teachers as well as the instructional materials guide students, manage students activities, and direct learning during the language teaching and learning process. Therefore, the role of the EFL or ESL teachers are not only limited to the choice of effective techniques but also on creativity and innovation to design and develop instructional materials.

Well developed instructional materials help language learners improve language mastery. The choice of speaking instructional materials is influenced by the techniques employed in teaching and learning process. Widiati and Cahyono (2006) reveal the importance of materials for communicative activities to make students ready to speak. They analyze and report the results of studies in speaking in relation to the choice of the teaching materials in Indonesia. Their conclusion is that the teaching materials can be either prepared by language learners or language teachers. Manurung (2012) also highlights that effective instructional materials contain task and activities that promote not only cognitive skills but also psychomotor skills. However, the teaching materials prepared by the language learners bring about memorization of utterances, while the teaching materials prepared by the teachers underpin spontaneous utterances. This is in line with Richards (2001), Richards and Renandya (2002), and Moore (2005) viewpoints that instructional materials should be based on the needs, interest, or even the problems experienced by the language learners to allow fluent and appropriate speech. This supports what have been believed in language teaching that language teachers and instructional materials create efficient and joyful learning (Lewis and Hill, 1985). This has been the main concern of this study where contextual internet-based instructional materials are used to improve the speaking skill of university students in Indonesia.

The speaking skill of the students at English Education Department at the Faculty of Teacher Training and Education at Tadulako University needs to be improved. It is observed that the achievement of the students in the speaking classes has not been satisfying. Many of them still find it difficult to begin monologue and dialogue, to keep a conversation going on continuously, and to sum up and conclude monologue and dialogue. It is also noted that the students are not active in the speaking class, and more importantly the students are reluctant to ask questions during discussion sessions. This research intends to overcome those problems and therefore the question to be answered is *how does the implementation of contextual internet-based instructional materials improve the speaking skill of the students?* The findings of this research will contribute to the improvement of the techniques in the teaching of speaking and the development of the instructional materials in speaking classes.

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2. Method of the research

This research employed classroom action research (CAR). The steps of the CAR; planning, implementation, observation and reflection were implemented. The research was conducted in two cycles where each cycles consisted of four meetings. The setting of the research was at the English Department Faculty of Teacher Training and Education, Tadulako University in Indonesia. The subjects were 29 students who enrolled in the *Speaking IV class* 2013/2014 academic year. The data were collected by scoring individual oral presentation and participation in each cycle. Field notes and observation were also conducted. The field notes were based on the classroom situation and interaction and the observation was based on the way individual students speak and respond during the class.

3. Results and discussion

3.1. Results

3.1.1. Cycle 1

Cycle 1 consisted of four meetings. In the planning phase, the lesson plan was prepared based on the syllabus and the previously identified problems. The identified problems are; difficulty to begin monologue and dialogue, difficulty to maintain a conversation or dialogue, difficulty to sum up and conclude monologue and dialogue, hesitation to be active in the speaking class, and reluctant to ask questions during the discussion session. The instructional objectives were used as the basic of the selection of the possible instructional material topics. The topics were planned and chosen based on the student's real experiences in learning the language skills and the language components. Each group was assigned to discuss either their problems in one of the language skills or one of the language components during their English study period. The assigned topics also related to the same case faced by other EFL learners reported in journal articles or any other popular writings posted in the internet. It was decided that the scoring system was based on the individual active participation during the speaking class. In the implementation phase, the three phase technique, pre-activities, while activities, and the post activities, was implemented. During the pre-activities, the purpose of the study and the instructional objectives were introduced. The students were divided into group of four to five so there were seven groups. The placement of the students into group was done based on their attendance list. It was decided that group one discussed their problems in listening, group two in speaking, group three in reading, group four in writing, group five in grammar, group six in vocabulary, and group seven in pronunciation. In the observation phase, individual active participation was check-listed in the column that has been previously prepared and notes were jotted down based on the classroom situation during the four meetings implementation phase. Two groups did the topic presentation in each meeting. The presentation lasted for twenty minutes and it was followed by thirty minutes question and answer session among the groups. Around five to ten minutes were planned to conclude or to sum up the presentation. In the post-activities phase, it was time for students to express their point of view of the presentation and to summarize what they have got after the discussion. The class was ended up by highlighting how to begin, to keep a conversation goes on continuously, and to conclude or sum-up a monologue or a dialogue. The achievement of the set criterion in cycle 1 is graphed in figure 1.

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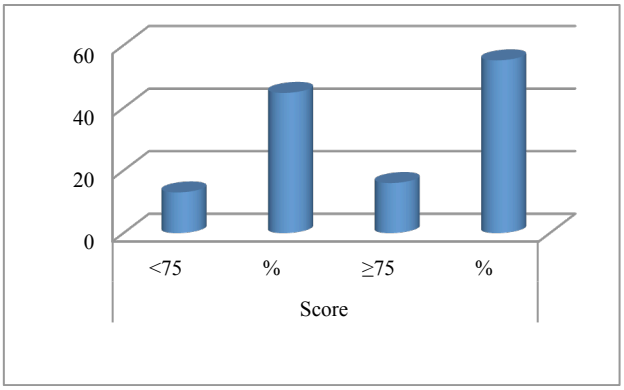


Figure 1. The results of cycle 1

The figure indicates that there are still quite a few students who have not passed the set criteria. The results are also presented in the percentage table as can be described in Table 1.

Table 1. Results of cycle 1

	Score			
	<75	%	≥75	%
Cycle 1	13	44,8	16	55,2

The data indicate that there are still 13 or 44.8% of the subjects who have not passed the set criteria. Since the criteria of success was planned based on the individual active participation and presentation, the results of the observation on the students active participation are graphedin figure 2.

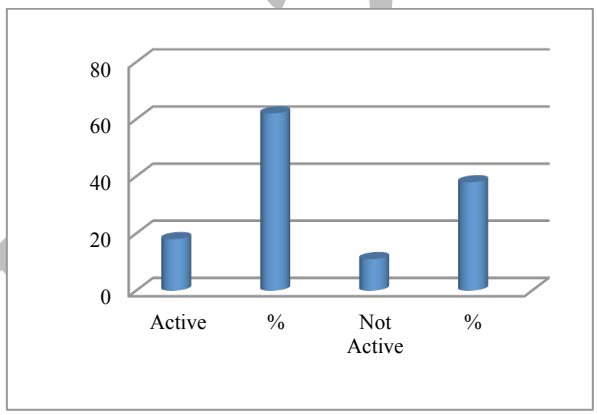


Figure 2. The results of the observation in cycle 1

The figure indicates that there are many students who are not active during the discussion and meetings in cycle 1. The number and the percentage of the students who are not active are presented in table 2.

Table 2. The results of the observation

	Active	%	Not Active	%
Cycle 1	18	62,01	11	37,9

In the reflection phase, it is concluded that the criterion of success has not been achieved and that the revised plan must be prepared. Consequently the research has to continue to cycle 2. The results of the reflection indicate that there must be improvement in the choice of the discussion or presentation topic, in

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the pre, while, post activities during the implementation, role of the group member, and the conclusion or the sum-up session.

3.1.2. Cycle 2

Cycle 2 consisted of four meetings. The member of the group in cycle 2 was the same students as the member of group in cycle 1. In the planning phase, the revised plan, the discussion or presentation topic for each group was revised. Each group freely chose and decided a contextual internet-based topic or issue based on the interest of the group. The topics or issues were downloaded and printed out from any website. Before the classroom meeting and discussion, every member of the group was assigned to read the chosen topic individually and then discuss the topic or issue in their small group discussion. The group discussed the topic or issue and decided the role of each member for the classroom meeting; a member of the group who introduced and began the presentation, who explained or described the chosen issue, and who concluded the presentation. The member of the group was only allowed to bring clues or keywords during the classroom presentation. The implementation phase in cycle 2 was the same as the one in cycle 1; pre-while-post activities. However, the pre-and post-activities were revised. In the pre-and post activities, it was reminded the importance of using beginning and closing expressions in speaking both in monologue and dialogue. The results of cycle 2 are graphed in figure 3.

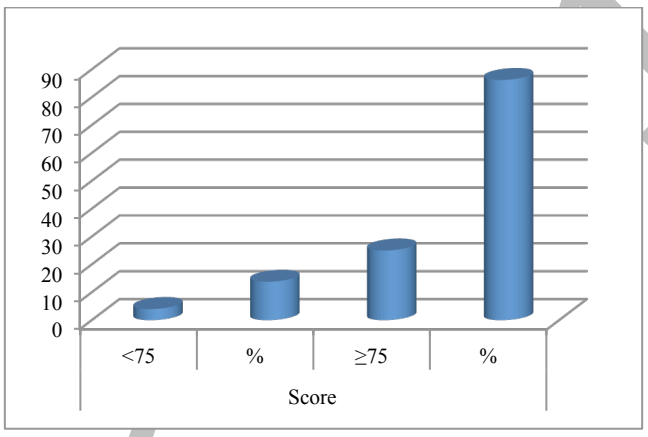


Figure 2. The results of cycle 2

The data in figure 3 indicate that only few students who get lower than the set criterion and the ones who achieved the set criterion increased. The number and the percentage of the students who have achieved the set criterion are presented in table 3.

Table 3. Results of cycle 2

	Score			
	<75	%	≥75	%
Cycle 2	4	13,8	25	86,2

The data in table 3 indicate that 25 out of 29 or 86.2% have achieved the criteria of success and only 4 out of 29 or 13.8% who have not passed the set criterion. The active participation of the students in cycle two was also observed. The data of the active participation are graphed in figure 4.

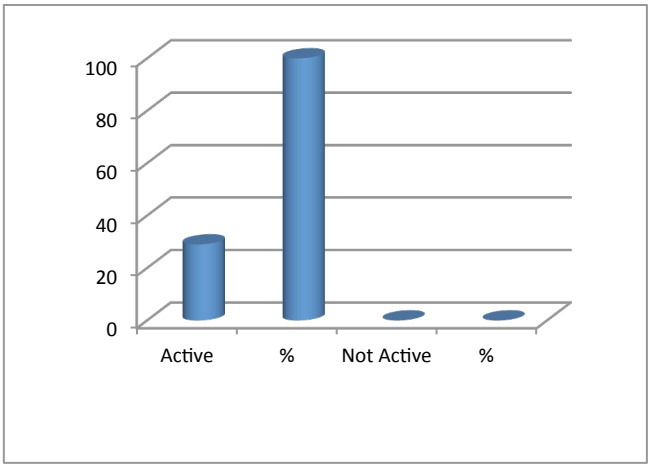


Figure 4. Participation of the students in cycle 2

The data in figure 4 indicate that all of the students are active. It can be seen also in Table 4 that 29 or 100% of the students are active.

Table 4. Active participation

	Active	%	Not Active	%
Cycle 2	29	100	0	0

The data in table 3 indicate that all of the students participate actively during the classroom meetings and presentation in cycle 2. Since the criteria of success has been achieved and that all of the students have been active during the classroom meeting and presentation, the cycle was stopped.

In the reflection of cycle 2, it is noted that the students' achievement increase from cycle 1 to cycle 2. The improvement is graphed in figure 5.

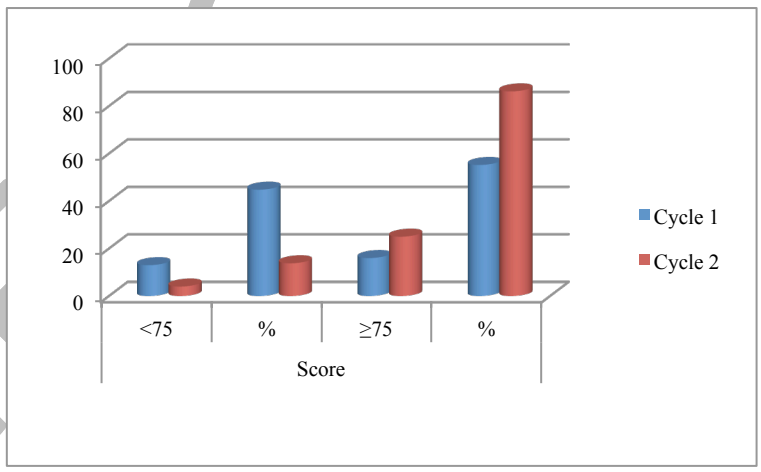


Figure 5. The comparison of the achievement of cycle 1 and 2

The data in figure 5 indicate that the students who passed the criteria increase significantly from cycle 1 to cycle 2. The same case applies to the improvement in the student's active participation during the class meeting and presentation. The improvement in the student's active participation between cycle 1 and cycle 2 is graphed in figure 6.

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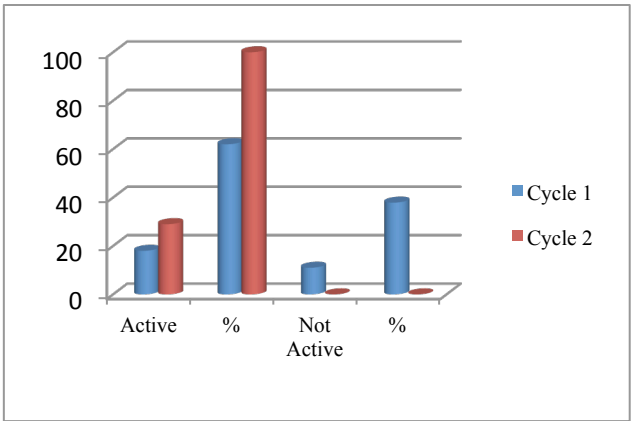


Figure 6. The comparison of the active participation in cycle 1 and cycle 2

The data in figure 6 indicate that all of the students who are not active in cycle 1 become active in the classroom meeting and the presentation in cycle 2. The improvement of the students' speaking skill achievement and the improvement in the active participation during the classroom meeting and presentation are believed to be affected by the implementation of the revised plan.

3.2. Discussion

The research question has been answered during the implementation of cycle 1 and cycle 2. The speaking skills of the students get improved by using contextual internet-based instructional materials in the speaking class in two cycles. There are at least two potential factors that have been implemented during the cycles to overcome those problems, the first is the way to choose instructional materials for the group discussion topic and the second is the integration of the reading and speaking activities in the instructional procedure.

3.2.1. The discussion topic selection

Referring back to the previous identified problems in the speaking class; difficulty to begin monologue and dialogue, difficulty to maintain a conversation or dialogue, difficulty to sum up and conclude monologue and dialogue, hesitation to be active in the speaking class, and reluctance to ask questions during the discussion session, it is noted that the way to select instructional materials particularly the discussion topics in cycle 1 holds important role. The change of the way to assign the discussion topic in cycle1 and in cycle 2 provides the students with opportunities to choose topic in which they are interested in. The opportunity to freely choose topics from any website in internet opens up wide possibility for the students to choose topic which is contextual and based on their interest. This technique seems potential to create efficient and joyful learning to overcome the problems of the students in speaking and to improve their speaking skills in the following ways; Firstly, the topic that the students is interested in motivates them to read and discuss with others; Secondly, the students should have got previous knowledge and experiences related to the topics and consequently there have been at least stock of vocabularies related to the topics; Thirdly, when the topic is contextual the students get opportunities to hear or even to listen to the topics in their daily encounter and hence help them broaden their understanding of the topics; and finally, since the topics is internet-based, it can be read and downloaded from different websites or sources that can enrich their data and ideas of the topics. Since the students are assigned to download and print out the discussion materials they have more opportunities to read and reread the topics in their own spare time and on their own phase.

3.2.2. The instructional procedure

The second potential factor that has contributed to the way to solve the problems in speaking and the improvement of the speaking skill is the instructional procedure. The instructional procedure helps solve the speaking problems of the students in the following ways; firstly, the pre-activities process. The introduction and presentation of the way to begin, to keep and maintain monologue and dialogue or conversation, and to sum up speaking activities prior to classroom discussion and presentation build self-confidence of the students. The students are also guided to work on the chosen topics particularly to as-

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sign each member of the group to play a role in the real classroom presentation. The assignment of the individual students to download and read the chosen topic prior to attending small group discussion in the pre-activities encourages each group member to prepare for the discussion. Secondly, the integration of reading and speaking helps students make notes by writing down clues or keywords that help them build up self-confidence in the classroom meeting and presentation. These techniques also help students to maintain their explanation or description of topics and lengthen the period of the discussion and presentation. More importantly, this techniques allow the students to implement scanning and skimming techniques in reading by making notes on personal names, place, time, and location while reading which are used as a guide during the classroom discussion and presentation. Third, the assignment of the group member to play role motivate them to get active during the classroom meeting and presentation. Finally, the scoring system which is based on the active participation during the classroom discussion and group presentation encourages students to take part; describing or explaining the topics, arguing, commenting, answering or responding, or even asking for clarification. In short, the implemented teaching and learning procedure in this CAR proposes the introduction and implementation of TIRS (Teaching Integrated Reading and Speaking). The steps can be briefly proposed as follows; 1) Freely choose a topic for a small group; 2) Read the topic individually before small group discussion; 3) Make individual clues or keywords; 4) Bring the individual clues and keywords to small group discussion; 5) Revise the clues or keywords in the small group discussion; 6) Decide role of each group member before classroom meeting and presentation.

4. Conclusion

The implementation of contextual internet-based instructional materials improves the speaking skill of the students. The improvement in the speaking skill is seen in the individual student active participation in explaining or describing the chosen topic, the ability to play the assigned role in the classroom meeting and presentation, the ability to ask questions, the ability to answer or respond questions, and the ability to comment and argue during the discussion. There are two ways on how the improvement is achieved using the contextual internet-based instructional materials; The first is the procedure in the selection of the discussion topic which is contextual and based on the interest of the students found in website in the internet motivates students to actively participate in the classroom meeting and presentation; The second is the instructional procedure which allows the students to actively participate in the classroom meeting and presentation. The implementation of the three phase techniques in the instructional process allows the students to read the chosen topic individually and then in the small group prior to classroom meeting and presentation. The findings imply that TIRS potentially improve the speaking skill of the students in the Speaking class in EFL teaching at the university level.

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Acknowledgment

I would like to thank the students enrolled in speaking IV class in 2013/2014 academic year at English Department of Teacher Training and Education Faculty Tadulako University Palu Indonesia who have participated in the study.

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Increasing efficiency of the learning process by an active cooperation between universities and industry

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Abstract

Education at the technical universities has demanding requirements for the technical laboratory equipment and a high level of teaching staff knowledge. The use of laboratory exercises in the education process increases the efficiency of the learning process and prepares the graduates of technical universities for their real job. Effective cooperation between technical universities and companies from the industry synergistically increases the knowledge and the level of practical skills of the graduates and their rapid adaptation for the job. Employers can use the laboratories at the technical universities for further education of their employees as well. The paper describes the experiences of cooperation between University of Zilina and railway companies in the railway transport laboratory and at the technical practices and excursions.

Keywords: : cooperation; education process; transport laboratory

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1. Introduction

University of Zilina is the only university in Slovakia which is specialized in the all means of transport in research. The original name of university was the University of Transport and Communications. Nowadays the University of Zilina consists of seven faculties. Six of these faculties are directly oriented on transport problems in the sphere of operation and economics, mechanical engineering, electrical engineering, civil engineering, informatics and solution extraordinary situations. Practical knowledge of the graduates of the University of Zilina is at a very high level, because of a very good long-term cooperation between the university and the industry. Students from the Department of Railway Transport from the University of Zilina are a good example of this cooperation. The Department of Railway Transport can be found at the Faculty of Operation and Economics of Transport and Communications.

2. Didactic principles

By their experiences the teachers have found out that upon applying some principles in education process, their students reach better results. The basic didactic principles are an outcome of these principles summarization. The teacher has to apply these didactic principles at education process.

The basic didactic principles are (Špánik, 1998):

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- principle of consciousness,
- principle of scientism,
- principle of gradualness,
- principle of activity,
- principle of visualisation,
- principle of adequacy,
- principle of systematic,
- principle of never-ending.

Applying these principles is no simple process. It is necessary to apply these principles by the different forms of teaching process to make the education process more effective. The basic teaching forms at the university are:

- lectures,
- computing exercises,
- laboratory exercises,
- technical practice,
- excursions.

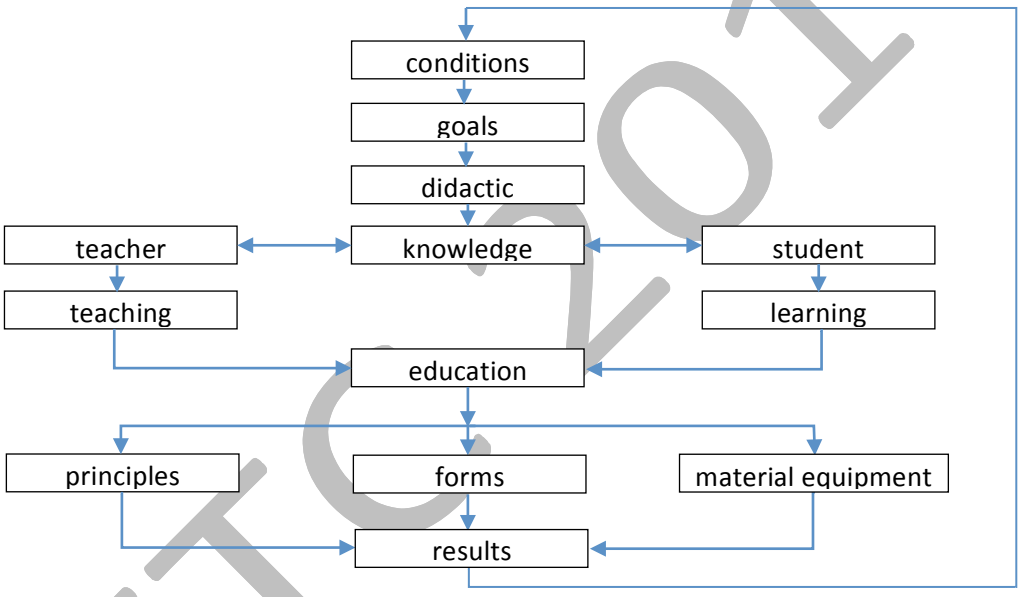


Fig. 1. Didactic system of the technical subjects (Pavlásek, 1998)

We can reach synergistic effects by an appropriate combination of all these principles and forms in the education process to make knowledge more attractive, understandable and memorized for a longer time.

Most of these didactic principles are applied by the education process in the transport laboratory for students from Department of Railway Transport.

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3. Application of the didactic principles at department of railway transport

3.1. Transport laboratory – a simulation tool for transport operation

At the Department of Railway Transport there is a transport laboratory available with an arrangement of train lines simulation model for student laboratory exercises. This transport laboratory is unique and the only such one in Slovakia. It is possible to make simulation of the transport process operation in the

railway stations and at the track lines with different type of signalling systems (Nedeliaková, E., Dolinayová, A., Nedeliak, I., 2013).

The lab provides a modern arrangement of train lines with a total length of 100 m of tracks. The design of the tracks forms a simple oval with the area of 50 m x 2.5 m. There are five railway stations.



Fig. 2. Scheme of railway model in transport laboratory

The scale of model is H0 (1:87). The equipment of the transport laboratory allows to make an almost ideal simulation of the real railway transport operation. The students are able to learn how to operate with different types of railway station and track line signalling systems which are used in the Slovak Republic and in some other countries in Europe.

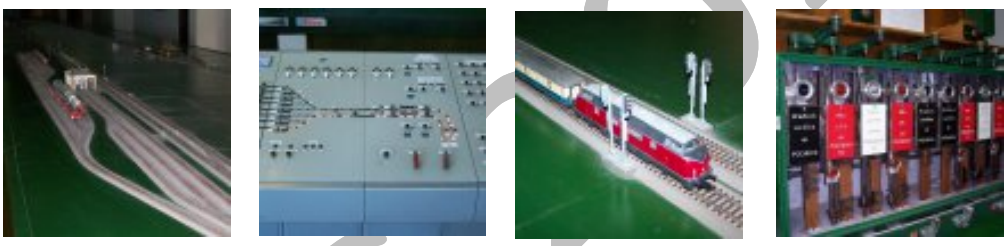


Fig. 3. Equipment in transport laboratory

The main advantages of the railway transport simulation model are (Barta, Mruzek, 2014):

- the work environment is identical with the real workplace,
- the research and education processes run at different type of operation places (including the most modern ones),
- the theoretical research and tuition is complemented by practicing the model transport situations with stochastic processes,
- management of the transport processes in real conditions is trained,
- extraordinary transport situations, errors etc. may be trained.

An application for modelling logistic centres is also projected in the area of the transport laboratory. It is possible to make a simulation of a logistic centre, consisting of the following three different modules and their combinations (Meško, Gašparík, Lalinska, 2012):

- module of a marshalling yard,
- module of an intermodal terminal,
- module of a warehouse.

Each of these modules can be rendered in a different window. To create a new model of a logistic centre, the user of the simulation model will choose which modules will be used in the model.

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3.2. Education process in the transport laboratory

The transport laboratory of the Department of Railway Transport provides also laboratory exercises for the students in the fourth semester of the bachelor degree course. During the first three semesters the students get theoretical knowledge of the transport management and operation, necessary to make the railway transport continuous and safe, by the means of lectures and computing exercises. In the fourth semester they continue with their practice in the transport laboratory. These laboratory exercises are obligatory for them.



Fig. 4. Education process in transport laboratory

Each of the students has to pass 13 obligatory laboratory exercises, for two hours each. They have to prove their ability to practically operate every type of the signalling systems. The education process itself is arranged in such a way that every student is able to make practice at each work place with different signalling system minimal two times through the semester within a short time gap. It is very important to have a chance to repeat it for the student, as he or she gets a better understanding and a chance of a long-term remembering of the new knowledge and skills.

The students can continue with the laboratory exercises in the transport laboratory in the fifth and sixth semesters, too. They can develop their knowledge and skills in the management of the railway transport operation under extraordinary situations, accidents, operation closures and under difficult working conditions.

3.3. Usage of the transport laboratory by students from secondary schools and people from the industry

They are not only university students who can use the transport laboratory. It is open also for students from technical secondary schools for practical exercises (especially from schools with an interest in the railway transport), as well as for the new employees in the railways companies for trainings, excursions for public etc.

The new employees of the railway infrastructure manager in Slovakia (Železnice Slovenskej republiky, ŽSR) employ the transport laboratory the most. They employees are engaged in regular laboratory exercises after passing the theoretical exams but before being allowed to operate the railway transport independently.

Students of technical secondary schools are also frequent visitors of the transport laboratory. One of the advantages of this cooperation is also promoting the university in the public area. Many students, who visited the transport laboratory during the secondary school, continue their study at the Department of Railway Transport as well.

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3.4. Cooperation between the university and the industry

The laboratory exercises are by no means the only opportunity for the students of the Department of Railway Transport to get new practical skills. The Department of Railway Transport have a very good long-term cooperation with the railway infrastructure managers, railway operators, forwarders and other companies from the railway business in Slovakia and in the Czech Republic. The students are able to take advantage of this cooperation and may take part at:

- additional lectures with the industry experts,
- technical excursions,
- obligatory technical practice,
- optional technical practice.

Additional lectures with the industry experts are usually organized for each technical subject at the end of the semester. The lecturers are often former students of the University of Žilina who have become successful managers in the railway or forwarding business. The students are very interested in these lectures although they are not obligatory.

The technical excursions are provided for all the students through the whole academic year. The focus of these excursions is in those areas which are not possible to practice in the transport laboratory. For example the technical excursions are organized in the areas of:

- production of rails,
- unconventional transport systems,
- forming of trains in the railways yards,
- loading, fixing and unloading of goods,
- logistics,
- testing of the railway vehicles,
- operation of undergrounds,
- and others.

Each student has to pass obligatory technical practices. It is realised at the railways stations and at the workplaces which ensure the railway transport. Each student has to pass a technical practice at different workplaces for 13 weeks. For every week, a minimum of four hours of the technical practice is obligatory.

In case that the student is interested in the technical practice for a longer time, he has an opportunity to do it individually. The Department of Railway Transport has signed bilateral agreements with the railway infrastructure manager in Slovakia (ŽSR) and with the passenger and freight railway operators (ZSSK and ZSSK Cargo), where the students are able to pass their technical practices.

3.5. Final works of students

The very good cooperation between the Department of Railway Transport and the industry reflects also in preparing the students' final works. Many final works become topics inspired or directly brought from the industry. The students solve therefore specific problems for a specific railway or forwarding company in their final work. The students are able to apply all the theoretical knowledge and practical skills in their final works. The feedback from these industry companies is very positive. Some students continue a job directly in these companies, immediately after the final state exams.

The practical skills of the graduates from the Department of Railway Transport are significantly better after establishing the technical excursions, technical practice and the laboratory exercises in the transport laboratory. The graduates are more adaptive in their jobs for practical solving of problems. The demand

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for graduates from the Department of Railway Transport is therefore constantly increasing, and there is nearly zero unemployment among them.

4. Conclusions

Applying the didactic principles in education process is very important. The students remember 10% of reading, 20% of hearing, 30% of seeing, 40% of combined seeing and hearing, and 90% of their practice (Špánik, 1998).

Educating the competent experts for the railway transport involves necessarily gaining both the new theoretical knowledge and the practical skills. The Department of Railway Transport allows for achieving these important goals. Specifically it publishes study literature for the students, organizes laboratory exercises in the transport laboratory, additional lectures, technical practices and excursions. All this is possible only thanks to the very good long-term cooperation between the Department of Railway Transport and the industry. This way, firm conditions for educating top-level experts with complex theoretical knowledge and practical skills are established.

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Increasing practical lessons and inclusion of applied examples to motivate university students during programming courses

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Abstract

This study investigated the influence of increasing practice and the inclusion of applied examples (exercises with a direct application or related to real problems) during programming and numerical analysis courses. The results obtained from this experiment demonstrated that examples related to students engineering careers have a very positive impact on learning and awaked up the student interest on programming courses; in comparison with students who just follow examples from a textbook as in an ordinary course. The conclusions of this work were obtained from the analysis and comparison of the statistical information of the students' performance during 2 programming courses and an additional mathematical course (numerical analysis). Finally, a questionnaire (at the end of the courses) about the methods used for teaching was applied in order to investigate students' opinion.

Keywords: Increasing practical lessons; Teaching/learning strategies; Real-life examples; Programming courses.

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1. Introduction.

Programming and computational methods have been developed to create very friendly and interactive virtual environments for all users of digital services like computers and cell phones, internet and TVs programs. Nevertheless, people often forget how these gadgets and software were created and just enjoy about; people usually do not think about the work behind. Maybe this is the reason why programming and computational courses, (including some mathematical courses like numerical analysis) are frequently considered only as complementary courses during the university student formation. Students who take these courses (including students in sciences and engineering) frequently ask themselves if it is required to take them or if they have any application on their corresponding career. They frequently ask themselves why I have to learn to program in any programming language. May be there is a software already developed to do it in somewhere or it is possible to download an app; thus they decline importance to these courses. They think that it is more important to pay attention on other courses, for example, mechanics, aerodynamics, chemistry, engines, thermodynamics, technology, etc.

Some authors have been working on the development of new and more efficient techniques and methods to improve learning using new technologies or creating didactical software (Depradine et al. 2004, Smith et al. 2006, Ellis et al. 2006 & Doornekamp et al. 1993), some of them developed support learning materials and implemented evaluation systems for students and the methods used to teach and learn, some others have studied the student behavior towards computers (Donker et al. 2007, Lang et al. 1992 & song et al. 1997), others have studied the ability of the students in different school levels to use computer equipment and accessories like keyboards, mouse etc. and assessed their response to the use new technologies in the classroom, including the use of graphical and interactive tools in order to help the students to un-

derstand some problematic courses like physics, mathematics or chemistry, where the use of audio-visual material is widely recommended for students on high schools and universities (Donker et al. 2007 & Henning et al. 1993). All these studies have been providing important information about the way to improve the teaching and learning processes using new technologies. Nowadays the contact with computers, virtual environments & electronic devices has been increased since the students were children. Undergraduate and graduate students were born at the end of 80's or at the beginning of 90's. They are between 17 to 26 years old. They belong to a new generation. Nevertheless many of them have trouble understanding programming courses and others related to mathematical, chemical and physics topics because the notation and the concepts are abstracts and new (Du Plessis et al. 1995, Rowe et al. 1999 and Cox et al 1994). Thus this work was focused on investigating the influence of new methodologies that includes the solution of some real-life problems and increasing practice during programming lessons in order to motivate the students for learning about programming and feasible applications (Hietala et al. 1993).

2. Programming and numerical courses.

Two samples of engineering students for each of three courses were considered to participate in this study. They were enrolled in the following courses:

1 Programming course I

2 Programming course II

3 Numerical analysis

The contents of the courses are described next:

A first programming course is elementary to get the students feet wet, they learn the basics of a programming language and are introduced to the integrated development environment (IDE) of the corresponding programming language. Then, they continue learning how to define data types and they learn about the language basic capabilities and management. Subsequently, the students are involved on the language syntax, they study the difference between expressions and statements and the use of punctuators and operators; so that students learn about the use of functions, classification and work modes, their importance and applications. At the end of the course the students make their own programs using advanced concepts like arrays management, loops nested commands and routines. Students learn to employ instructions and create their own routines and subroutines to be included in a main function. Finally the students develop their own header files too. Although the programs developed during this course are very easy to program, not all of the students finish in satisfactory terms.

Nowadays university students are strongly influenced by video games and Internet that they think that this kind of programs are older, ambiguous and bored, and their interest on programming is frequently missed. This is the reason why motivation is a very important factor for a better student performance.

In the second course (programming course II), students receive information about hot new rapid application development (RAD). These applications are used in visual programming languages that allow them to take advantage of object-oriented programming (OOP). Students can write Windows programs more quickly and more easily than ever possible before thanks to the new programming languages. They can create complex applications with Win32 GUI (graphical user interface) programs. In other words they can

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create the user interfaces to a program (the user interface means the menus, dialog boxes, bottoms, pop ups, windows, etc.) and so on using drag-and drop techniques for true rapid application development. They can also drop controls on forms to create specialized programs such as Web browsers in a matter of minutes. After this, they have the ability for modifying the component properties and events of their programs. At the end of the course students learn about the basic instructions to initialized graphical process on the screen.

Numerical analysis is the third course; this is especially difficult for all the students, because it is necessary to have a good knowledge of mathematical and programming concepts. A very good understanding of loops and nested loops is desirable in students because these are platforms to develop the iterative routines to find mathematical solutions with numerical methods. The use of graphics is also recommended for a better understanding, for this reason, the authors have included the use of some mathematical software such as Excel, Matematica, MATLAB, MAPLE, etc. in addition to the traditional routines and flow charts developed for programming languages in order to show a new way to learn these themes. The numerical analysis course is divided in 4 stages during which the students must learn to implement different numerical methods as is shown in Table 1. Every stage is focused on teaching a different mathematical aspect of numerical analysis.

Table 1. Stages, themes and particular topics of the numerical analysis course.

Stage	Theme	Particular topics
1	Solving Nonlinear Equations	Newton's method. Method of false position. Muller's method.
2	Solving set of equations	Matrix notation. The elimination method. Gauss and Gauss-Jordan methods. Determinants and matrix inversion.
3	Interpolation and curve fitting	Lagrangian polynomials. Interpolation with a cubic spline. Bezier curves & B spline curves. Euler & Heun methods .
4	Numerical Differentiation & Integration	Extrapolation techniques. Simpson's rule. Trapezoidal rule. Gaussian quadrature.

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3. Participants (samples and students).

Six groups of undergraduate (engineering) students were considered in the present work. They were classified in 2 samples (A and B) for each of the 3 previously mentioned courses. Their designation and corresponding populations are shown in Table 2. Students in any course were randomly assigned to group A or group B. Their school records, previous formation, social status are also variables, and these factors were not considered in this work. Nevertheless some of them had a previous experience on programming due

to their formation as computer technicians that help them to obtain a better performance than students who did not have. The population of the original groups was reduced for numerical analysis courses because some students did not approve the programming courses and, in consequence, they were not authorized to take the last course. All of the participants received the same courses with the same containing but some differences were implemented during teaching process to the students of samples as is described next.

4. Teaching methodologies.

Professor for sample "A" only followed the textbook examples and no additional information was provided to the students. All the topics were treated as traditionally. Nevertheless, a good way to motivate the students was to increase the contact with them during practical lessons for groups of sample "B". A brief explanation of the topics was taught in theoretical lessons and examples related to their career (aeronautical engineering) were included. The programs and exercises solved by students were developed profiting the professor's personal and professional experience.

Table 2. Population of samples and groups.

Sample	Group	Students Original groups	Students for numerical analysis course	Students with a previous programming formation	Students without a previous programming formation
A	1A1M	30	22	10	20
	1A2M	25	21	8	17
	1A3M	25	20	8	17
B	1A4V	27	25	10	17
	1A5V	30	28	9	21
	1A6V	29	27	8	21

Programming courses I and II are taught weekly in 4 lessons of 90 minutes each. Students of sample "A" had 2 theoretical and 2 practical lessons, but students of sample "B" had 1 theoretical and 3 practical lesson. Numerical analysis course is taught in a similar way in 4 lessons weekly of 90 minutes although due to the complexity of the mathematical topics 2 lesson are dedicated to theoretical topics; here the students learn the nature of the methods and solve some cases using only calculators pen and paper. The other 2 lessons are practical; here the students run programs for the corresponding numerical method.

5. Evaluation of the student performance.

Student assessment is the result of 4 partial evaluations for the programming and the numerical analysis courses every one is 25% of the final assessment. The first 3 of them are partial evaluations referred to the stages of the course. Every partial evaluation consists of a pair of tests, one is theoretical and the other is a practical test. The same test was applied to all the students in both samples; and for the final stage, the students developed a final project; then they had to work in groups of 4 students and create a computer program. The students of the samples were randomly divided forming teams according with the group populations in order to develop their project. In the first course the projects were very simple but for the

second course students of sample "B" decided to create a personal version of software to sell and print tickets for a virtual airline, including options to select different airplanes and different departures and arrivals, some teams used national destinations and others employed foreigner destinations.

During the development of the final project for the programming II course, students employed their imagination and knowledge to create useful software. They created an environment where the user can select a flight with a departure and a destination. Every team designed different airplanes sketches (some of them were Boeing 727, 747, 757 & DC10) using graphical instructions to be displayed on the screen. Registration of the passengers and seat assignation were done by using arrays and then stored and saved in new files. In addition, routines to change and correct information for passengers and reprogramming flights were included. Although the programs could not be placed on a web site or generate a database, they were good examples for students who had to develop their own routines without downloading Internet files. While for the final project of the numerical analysis course students of sample "B" decided to develop as a final project a computational display for calculating the position of an airplane. This project involved the creation of reading data routines to define the initial position and the new conditions of the airplane for every attitude change. The airplane was treated as a simple particle; so that the movement was obtained from a simple integration method as a function of a step time (Δt) that controls the finest of the graphical display and the precision during the simulation; and some aeronautical quantities were calculated like the True air speed, the real air speed and vertical speed. Graphical routines to calculated and display the airplane updated position (displacement on the air & the on ground) were also programmed. The main screens for the final projects that were developed by students of the sample "B" are shown in Fig. 1 and Fig. 2, respectively. These programs are not complex or sophisticated as a professional simulator, but they are interesting examples of possible situations for the students to apply the knowledge learned.

In contrast, students of sample "A" were free to develop the project whatever they wished. Unfortunately, they had many problems. They did not know how they could use their programming techniques. It was difficult for them to find an application to their knowledge. Another disadvantage was their shorter practical time. These factors limited the examples and exercises treated in class. In consequence the quality of the projects presented by students of sample "A" was considerably inferior.

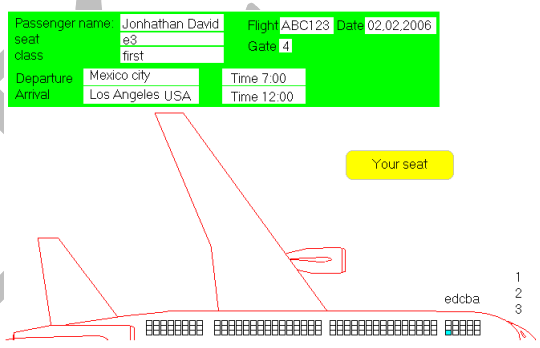


Fig. 1. Main screen of the project developed by student of sample "B" at the end of programming course II.

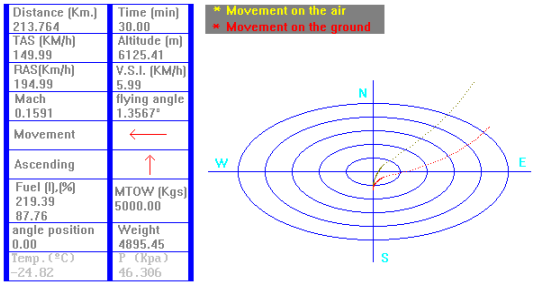
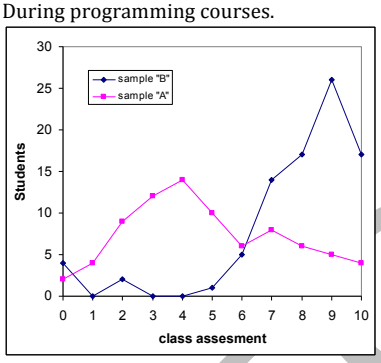


Fig. 2. Main screen of the project developed by student of sample "B" at the end of Numerical analysis course.

6. Student Assessments, Analysis and Results.

Some aspects like student attendance, and their performance during the courses were taken as parameters to evaluate the effectivity of the methods used to teach. The number of practical lessons was increased for student of sample "B" they had a (75%) of the course time in practical lessons; in contrast students of sample "A" only received (50%) of the total lessons working on programming practices. Fig. 3 shows a comparison between the class assessment obtained by the students of the 6 groups analyzed. It is clear that students of sample "B" got the best assessment during all the courses. While Fig. 4 shows the average of the class assessment obtained by every group of the sample "B" during the 3 courses. The final assessment scale goes from zero to ten. Six is the minimum required to approve a course. Statistics of the total approved, non-approved students and their corresponding average assessment during the 3 courses are shown in Fig. 5 and tables 3 to 6. As can be noticed, the average of class assessments for students of sample "B" was considerable superior than those of sample "A" in every participant group. This difference is increased if the students who did not approve the course are considered. In addition, the percentage of non-approved students in sample "B" was reduced considerably in comparison to students of sample "A".

During programming courses.



During numerical analysis course.

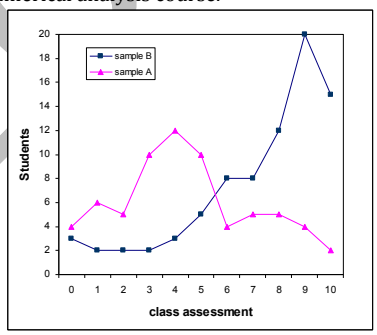


Fig. 3. Comparison of class assessment records between students of samples "A" & "B".

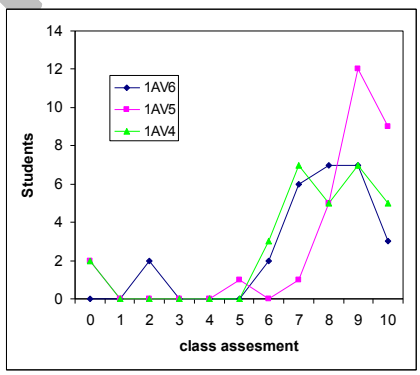


Fig. 4. Class assessment records of the groups for sample "B" during programming courses.

Table 3. Class assessment for sample "A" (total average) during programming courses.

Groups	1A1M	1A2MV	1A3M	Final average
Class assessment Averaged	5.1152	4.7654	4.7069	4.8625
Class assessment averaged considering Only approved students	7.9187	7.5845	7.7726	7.7586

Table 4. Class assessment for sample "B" (total average) during programming courses.

Groups	1A4V	1A5V	1A6V	Final average
Class assessment Averaged	7.5862	8.3333	7.6667	7.8620
Class assessment averaged considering Only approved students	7.8571	9.2592	8.2800	8.4654

Table 5 Performance of the students of samples "A" & "B".

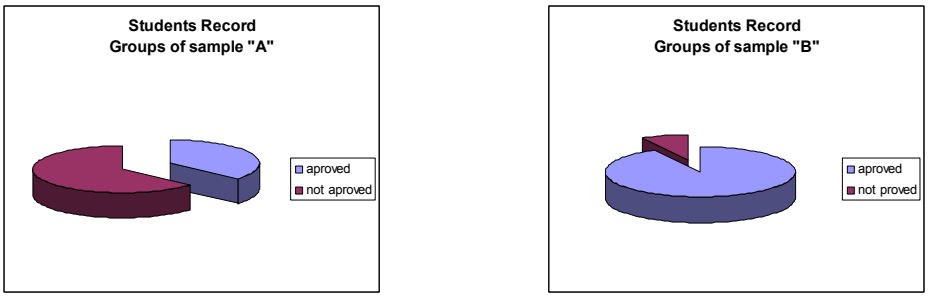
Course	Programming I & II		Numerical Analysis	
Sample	A	B	A	B
Approved	36.25	91.86	29.85	78.75
No approved	63.75	8.14	70.15	21.25

Table 6. Performance of the students of samples "A" & "B" with or without a previous programming formation.

Approved						
Group	1A1M	1A2M	1A3M	1A4V	1A5V	1A6V
With	9	8	7	10	9	9
Without	2	1	2	15	18	18
Total	11	9	9	25	27	27
No approved						
Group	1A1M	1A2M	1A3M	1A4V	1A5V	1A6V
With	1	0	1	0	0	0
Without	18	16	15	2	3	2
Total	19	16	16	2	3	2

a) during programming courses

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b) during numerical analysis course

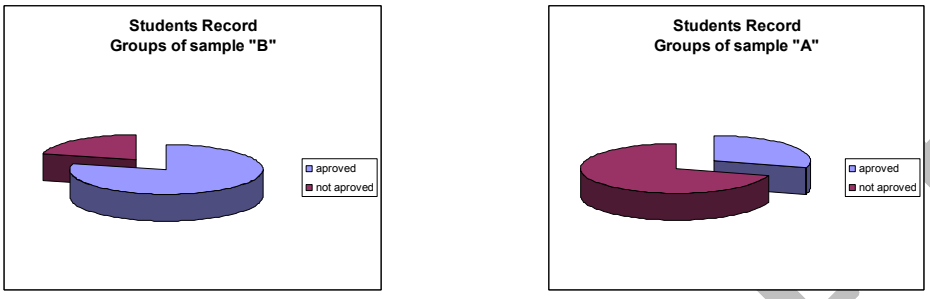


Fig. 5. Comparison about the performance of the student of samples "A" & "B".

Numerical analysis is considered the most difficult course, the performance and class assessment was lower than for programming courses, as is shown in Fig. 3 and Table 5, including for students of sample "B". Nevertheless the performance of these students remained better than students of sample "A". The percentage of unauthorized students to take this course was 21.25% (of the original population) for sample "A" in contrast to only 6.98% of the students for sample "B".

In addition, the students' class attendance was considered as another good indicator to evaluate the students' interest on the course. Fig. 6 shows the statistics from classroom attendance for students of sample "A". It can be noticed that attendance remains almost constant during the courses. In Fig. 7, a comparison between the 2 samples is shown. Attendance of the students in the 2 samples remains nearly constant at the begging of the courses. Nevertheless it was observed for the 3 courses that after the second evaluation, students of sample "A" had a lower performance. Unfortunately some of them missed the possibility to approve the courses and therefore attendance was considerably lowered during the last stages, and the final average assessment of these groups went down. Many students missed interest in the course. In contrast students of sample "B" had a better performance in practice and theoretical tests. The student presence remained (80-90%) until the final due to they remained motivated about the topics of the course because they had the opportunity to develop a project related with their career.

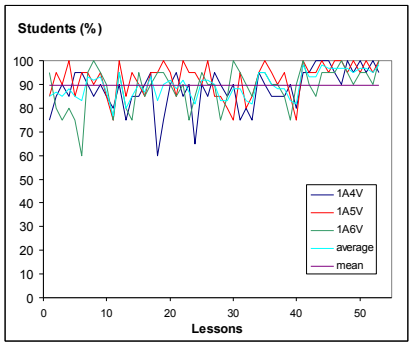
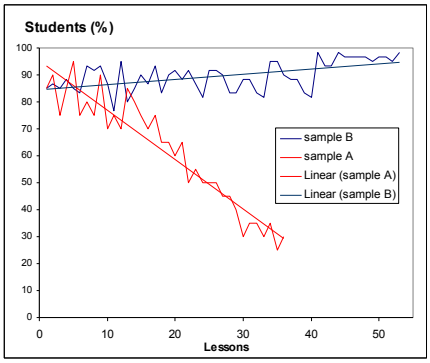


Fig. 6. Presence records for students of the sample "B" during programming courses.

a) During programming courses.



b) During numerical analysis course

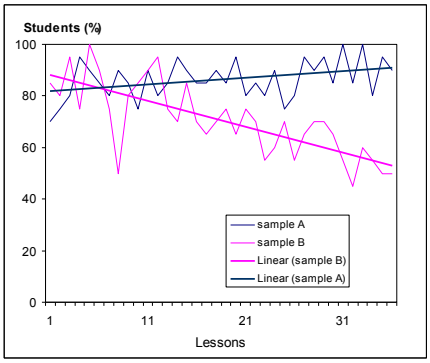


Fig. 7. Comparison of presence records between students of the samples "A" & "B".

7. Students Opinion.

The students who participated during programming courses I and II were classified in 2 classes as it was shown in Table 2, some of them with and some others without a previous programming formation or experience in computers and programming. Students who had received a previous formation as a programming technicians in High School found the course interesting, they commented that the tests applied were easier to solve than they expected; in contrast, students without a programming formation found more difficult to understand the programming courses, nevertheless at the end of the courses, students of the sample "B" commented that programming was not very difficult at all. These students concluded that they had not imagined the possibilities of programming development with an aeronautical application. Finally they told, felt happy to have found a connection between the course and their university studies.

It is important to illustrate that, for the sample "A", 83% of the total approved students were students with a previous background in programming, only 17% of the students without a previous programming background approved the courses; unfortunately 4% of the students who had a previous background did not approve the courses. In contrast, all the students with a previous background approved the courses of sample "B". The percentage of students without a previous background who approved the courses was also increased as is shown in Table 7 and Fig. 8.

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Table 7. Population of the groups in second generation.

Professor	Method for instruction	Group	Students Original groups	Students for numerical analysis course	Students with a previous programming formation	Students without a previous programming formation
A	Traditional	1A1M	30	22	12	18
	New	1A2M	28	26	11	17
B	Traditional	1A3V	27	20	10	17
	new	1A4V	30	27	12	18

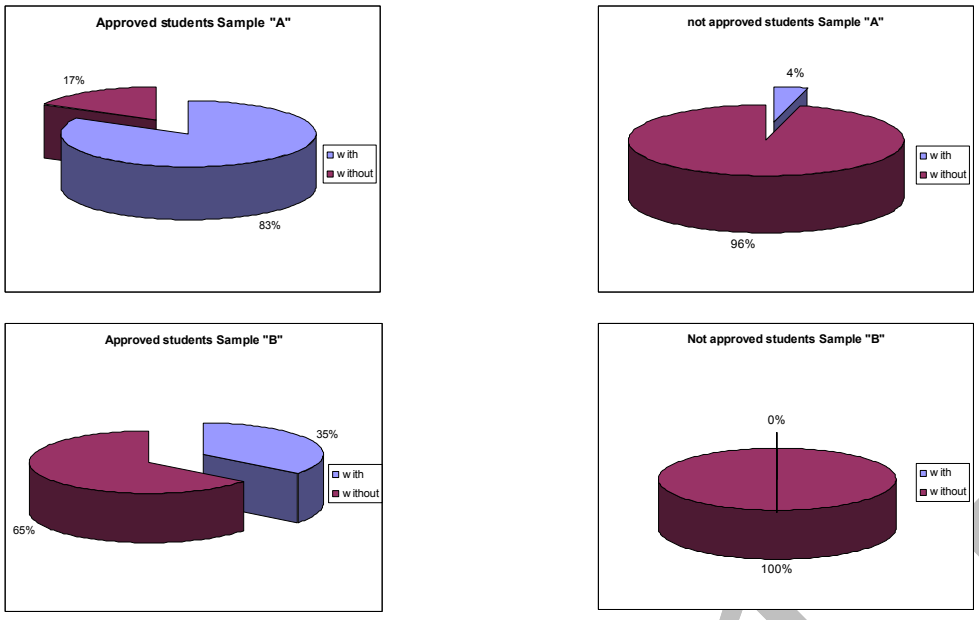


Fig. 8. Compassion between approved and non approved students during programming courses as a function of their previous formation (with or without pervious computational studies).

During the numerical analysis course, nearly 70% of the students had troubles understanding the topics of the course, including students of both samples and students with or without a previous programming background.

Mathematical courses are always difficult for the students; for numerical analysis it is necessary to know the basic concepts of geometry and calculus. Numerical methods request to understand and repeat a procedure in order to obtain the solution.

The students answered the following questionnaire after they concluded the 3 courses. The questions were designed to know the students' opinion about the teaching methods used by professors; a little modification on question "9" was required because of the differences in the methods used.

The results obtained from the questionnaire are shown in the graphics of Fig. 9. Students of sample "B" considered that the examples used by the professor in lessons were more appropriate than those used by the professor of sample "A", many students of sample "B" considers that they really learned about programming and numerical analysis. They think that these courses really can help to solve problems in the future or in a real workplace.

During lessons the students of sample "B" considered as good the communication with the professor and many of them said that they had paid attention and feel motivated. In the other hand students of sample "A" considered that they felt frustrated and unhappy due to the absence of a relation with the rest of knowledge acquired.

The result of the question (9) is shown separately in Fig. 10 to evidence the student feelings. They think it was a good idea to increase practice time during programming and mathematical courses for a better understanding.

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Difficulties in terminology, definitions, and introduction to topics related to computer science are examples of frequent problems, which difficult the students' understanding of programming topics during the courses. Some authors have studied this situation (Asai et al. 1991, Woodhouse et al. 1983, & Brusilovsky et al. 1997) and have developed some methods and techniques to improve the way to introduce the students to programming. An example is the mini-languages approach. The main idea is to design a small simple language to support the first steps in learning programming. Many of the mini-languages have been developed as tutorials and use an actor to guide the users, they are considered as a powerful tool to introduce students to programming. Tutorials and interactive guides are good ways for a better learning during programming courses; these works develop the student intuition, (Baldwin et al. 1999, Rocchi et al. 1998, Dagdilelis et al 2001 & Milne et al. 2002). The promise of multimedia learning is that students can learn more deeply from well-designed multimedia messages consisting of words and pictures than from more traditional modes of communication (Van der Meij et al 2006, Schmitz et al. 2006 & Summers et al. 2007). Nevertheless the application of programming in sciences is wide; thus it is required to develop particular tutorials for students of every career. A good option is to profit the professional experience of the professors; and begin to create personalized exercises, tutorials.

1.- Were appropriated for the courses the examples employed by the professor?

a) yes b) sometimes c) no

2.- How do you consider your courses?

a) interesting b) bored c) without purpose

3.- do you think you learn programming in the courses

a) yes b)enough c) a little bit

4.- The project developed really helped you to apply your knowledge?

a) yes b) partially c) no

5.- Do you think these course will help you to solve problems in the future?

a) yes b) maybe c) never

6.- How do you consider it was the communication (student-teacher)?

a) good c) regular d) bad

7.-How did you feel in the classroom?

a) motivated b) bored c) uncomfortable

8.- Did the professor help the students if they were in problems or during lessons?

a) yes b) sometimes c) no

9.- Do you think it cold be good to increase the practice time and reduce theoretical lessons and include examples with direct or real application on the course?

A

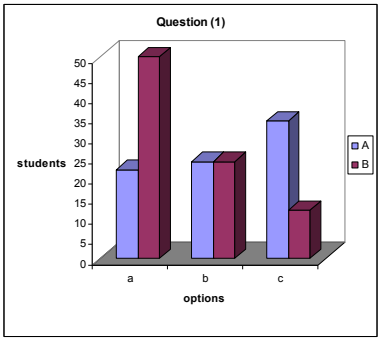
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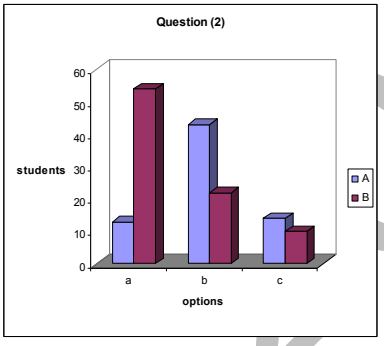
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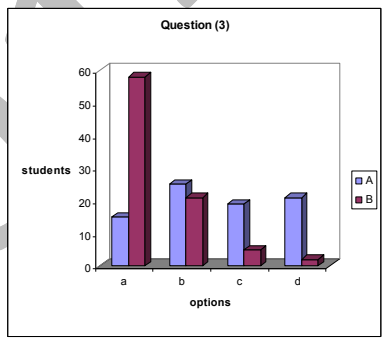
9.- Do you think it was good to increase the practice time and reduce theoretical lessons? B

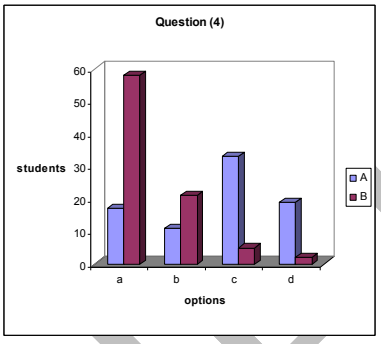
a) yes b) no

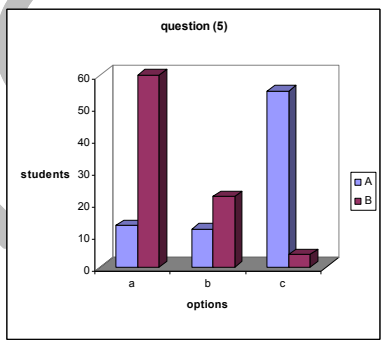
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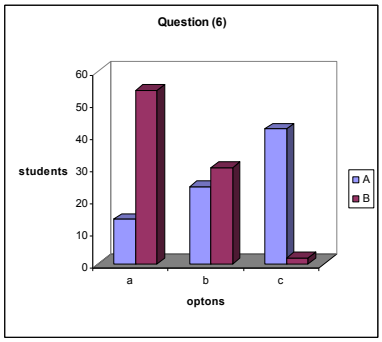


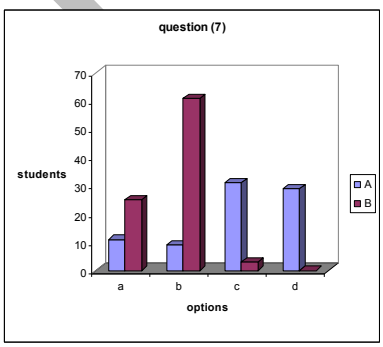












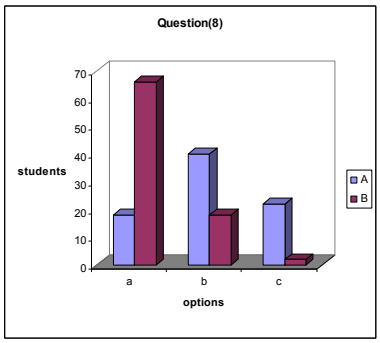


Fig. 9. Results for the questions answered by students on the questionnaire.

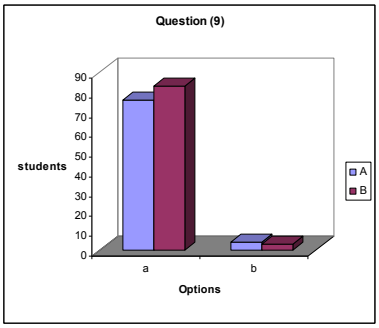


Fig. 10. Results for the question (9) answered by students on the questionnaire.

8. Conclusions & comments.

It is possible to make the following conclusions & comments about this work.

New student generations demand new methods to teach and learn.

Motivation is one of the most important factors that influence the effectiveness of explanations and understanding on students, especially in classes where the topics are abstract or difficult to explain like mathematics and programming.

Increasing the practical lessons was a good idea to avoid students were bored or upset on the classroom.

Examples related with real problems and situations or with direct applications are learned easily by students.

Final projects helped the students to find a direct application of their new knowledge. They discover that they are capable to create interactive tools for solving problems related with their careers.

Programming is an opportunity for the students to develop their abilities to treat a problem.

Increasing of practical lessons helps the students to develop abilities and criterion.

Professors with teaching experience and professors with industrial experience must work together in order to develop more interesting examples and better methods for teaching.

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Influence of assessment in the teaching-learning process in the higher education

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Abstract

The new European Higher Education Area (EHEA) involves a change in the way of understanding learning and the teacher's work. In this field, assessment is a very important aspect in education. It influences determinedly in the process of helping and encouraging the students to learn and understand their progresses in learning. This paper shows, from the results obtained in the subject "Concrete as a Structural Material", of fourth grade in Building Degree, the factors which affect the teaching-learning process through assessment.

Keywords: assessment; motivation; autonomous learning; significant learning.

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1. Introduction

In the new European Higher Education Area (EHEA), the teacher and the student acquire new roles different to those they had before. In the new context, the teacher helps the student to learn, with the intention that the student not only acquires contents but also builds them. The new student, apart from learning contents, has to have initiative, oral and written communication skill, ease to work in team and ease to adapt to the new situations that the current job market demands (Álvarez, González & García, 2007). This has led to suppose a change in the way to guide the teaching, departing from specific and general objectives, which allow training professionals, as of general and specific skills which the student has to be able to develop and some learning results that the student has to demonstrate.

One of the most important facets in the teaching is assessment (Hannan & Silver, 2005). Contreras proposes a very complete definition to this term: *Assessment is a process that involves obtaining reliable information concerning the students' commands (objectives, knowledge, aptitudes, skills, behaviors, etc.), establishing judgments of value (acceptable, suitable, good, good enough, etc.) and making decisions (to accept, to pass, to recommend, to promote, to release, to recognize, etc.)* (Contreras, 2004).

What would be ideal is that assessing and grading intertwine benefiting the learning and relating to the planned objectives and the obtained results (Ames, R. & Ames, C., 1991). In assessment also affects, apart from the used method, the human factor, what is to say the perception the student has about the assessment method, whether it is appropriate or not (Bain, 2004).

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Despite there are many researches that relate objectives and assessment (Contreras, 2004; Alonso Tapia, 1997; De Miguel, 2004), in this paper we try to study the factors that take part in the teaching-learning process through assessment, analyzing the human factor (the student and the teacher's skills) and the student's perception of the subject, as the force that increases their interest and motivation.

2. Approach to work

2.1. Stages of the research

The objective of this paper is to study the factors that take part in the teaching-learning process through assessment, in students who have studied the compulsory subject "Structural Concrete" of fourth year and with 6 ECTS credits, during the year 2013-2014. The factors which are going to be studied are: the student's ability, the student's valuation of the subject, the valuation of the type of assessment and the valuation of the teacher, in order to study how these factors affect in the teaching-learning process.

In the subject there are two different ways to pass, through continuous assessment or through a final test.

Continuous assessment lies in:

- Four partial tests, without a minimum score, done along the semester, which are equal to four points in the final score. Each test involves a particular part of the contents different from the other tests.
- Class practices, homework, group work, etc., done along the semester, which are equal to two points.
- A global test, done at the end of the semester, which contributes to the final score with two points. In this test, which is global and concurrent to all students, regardless of their group, all the contents of the subject are included and it is necessary to obtain a minimum mark of 3 out of 10 in order to pass the subject.

Final assessment lies in a final and global test which is the only reference to grade the student.

In order to be able to know how the student's ability affects the learning, the basis with which the students start to study the subject has been studied, taking data whether the students have passed the subjects from previous years or not which are considered as basic to study the subject "Structural Concrete" or whether they have passed or not the subjects related to structures from previous years (construction structures and geotechnics and materials resistance).

In order to know how the student's perception of the subject affects the teaching-learning process, data of the correspondence of the spent hours with the ECTS credits that the subject has been assigned in the education program, the methods and means used in the teaching and his valuation of the reached objectives have been taken.

In order to know how the student's perception of assessment for purposes of motivation, interest and feedback affects his results, we have obtained data of his valuation of the type of assessment used, its usefulness to detect weak points and to work on them, the motivation it creates and the perception of the relation between the obtained scores and the effort and of the acquired knowledge.

Finally, we have also studied the influence of the teaching activities of the teacher in the teaching-learning process.

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2.2. Data gathering strategy

In the data gathering the following documents have been taken into account:

- The students' scores, which are in the database of the teachers who teach this subject.
- The obtained data of the students, which have been provided by them through a datasheet fulfillment. This datasheet was fulfilled individually in the classroom, three months after having started the classes, but without having done the fourth partial test and the global test, in order to avoid that the obtained score could affect the valuation of the subject. All the valuations were made in a scale from 1 to 5, in this way: 1-strongly disagree; 5-strongly agree. The sheet was divided into four large blocks, which allowed the data gathering in the following aspects: The call in which they passed the basic and fundamental subjects for the understanding and the learning of the subject, the student valuation of the fulfillment of the learning objectives planned in the subject, the method of assessment used and the effectiveness of the system of assessment concerning the learning and the encouraging.
- The students' valuation of the teaching activities was done by the School of Building, in an anonymous way. These results were afterwards provided to the teachers.
-

3. Results

The global analysis of the gathered data from the students for this research is detailed below:

- The number of students to whom we have made the research is 182. 105 of them have passed all the basic subjects (57.7%) and 122 students have passed the two subjects related to structures from the previous years (67.0%).
- The average valuation of the students about the subject is 3.9 out of 5.
- The average valuation of the students about the assessment done is 3.8 out of 5.
- The average valuation of the teaching activities is 4.54 out of 5.
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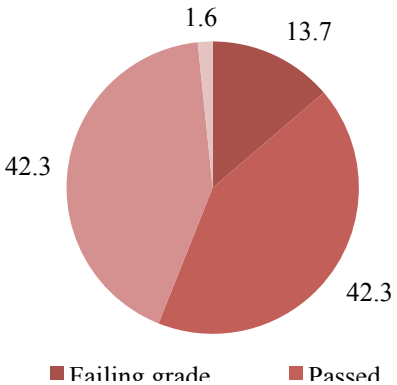
Firstly, we show the obtained results of the scores in both assessment systems (continuous assessment (Fig. 1) and final assessment (Fig. 2)), in the subject "Structural concrete" in the year 2013-2014.

In the continuous assessment method, the percentage of students who failed the subject is 13.7%. The percentage of passed students is 86.3%. This shows that many students pass the subject through continuous assessment because it is a very practical method and it is based in the continuous work (Fig. 1).

Fig. 2 shows the results obtained by the students through final assessment. As it can be seen, the students who are assessed by this method obtain much worse results. Only the 8% of the students have passed through this method.

Next we show the results obtained by the students depending on their abilities, tested by their ease to pass the subjects from previous years indispensable for the comprehension of this subject.

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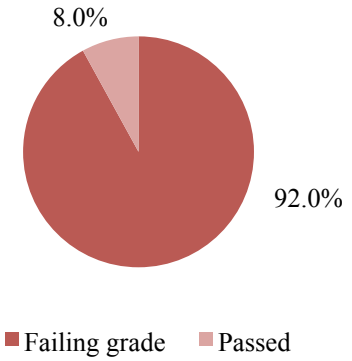


Fig. 1. Percentages depending on the scores in continuous assessment. Fig. 2. Percenteges depending on the scores in final assessment.

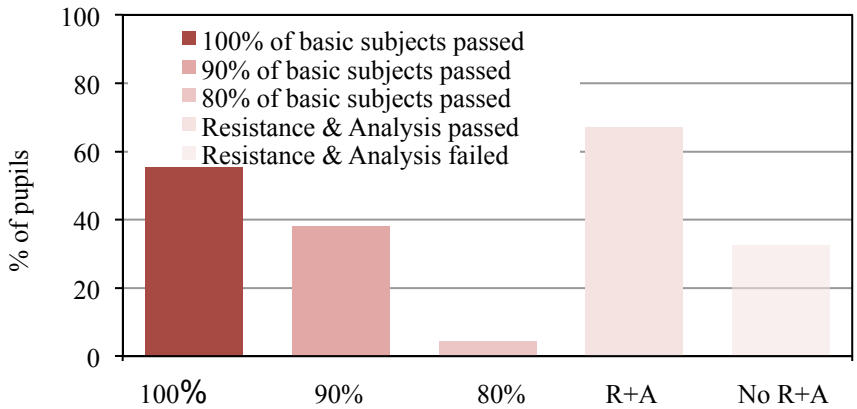


Fig. 3. Base of knowledge of the students.

Fig. 3 shows the knowledge base that the students who study the subject structural concrete have, through the percentage of students who have passed the subjects from previous years considered as basic (Mathematics I, Physical mechanics, Mathematics II, Facilities physics, Statistics and Technical projects) and as essentials (Materials resistance and elasticity and Construction structures and geotechnics).

As can be seen, 57.7% of the students have the base of knowledge necessary to confront the subject and the 67% has passed the subjects from previous years considered as essentials.

Next the students' valuation of the different aspects of the subject (Fig. 4) and of assessment are shown. All of them valuable between 0 and 5 points (0-strongly disagree; 5-strongly agree) as explained in section 2.2.

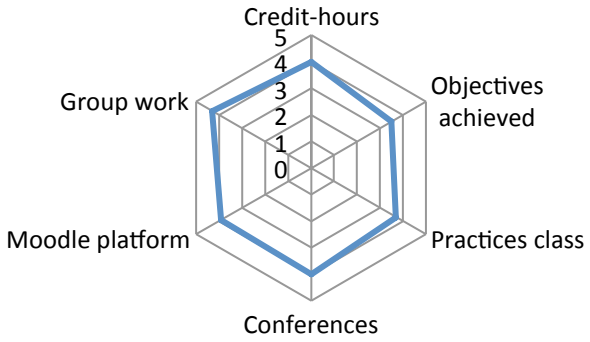


Fig. 4. Students' valuation of the different aspects of the subject.

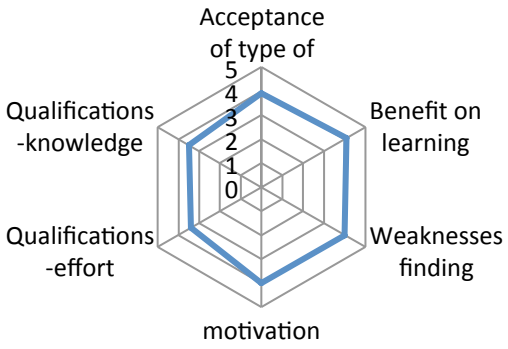


Fig. 5. Students' valuation of the different aspects of assessment.

Regarding the valuation of the subject, all the items are above 3 points, valuing the students in an especial way the usefulness of the conferences as support to the regulated teaching, the use of the computer platform "Moodle" and the group work and its usefulness to learn how to work in groups properly, as information searching and as possibility to explain orally their

The student's valuation of the assessment done is very satisfactory also, especially valuing its feedback and weak points searching capacity and therefore, its benefits regarding the learning and the personal motivation.

Fig. 6 shows the student's valuation of the teaching activities, in which can be seen his satisfaction, reaching all the items valuations above 4 points in the different variables of the teaching-learning process.

4. Results analysis

In this section we are going to show how the variables, whose results were reflected in the section 3, affect the scores and therefore, the teaching-learning process.

Fig. 1 and 2 analyses show how a teaching-learning method based in the continuous work and continuous assessment improves the performance and the results of the learning in the students.

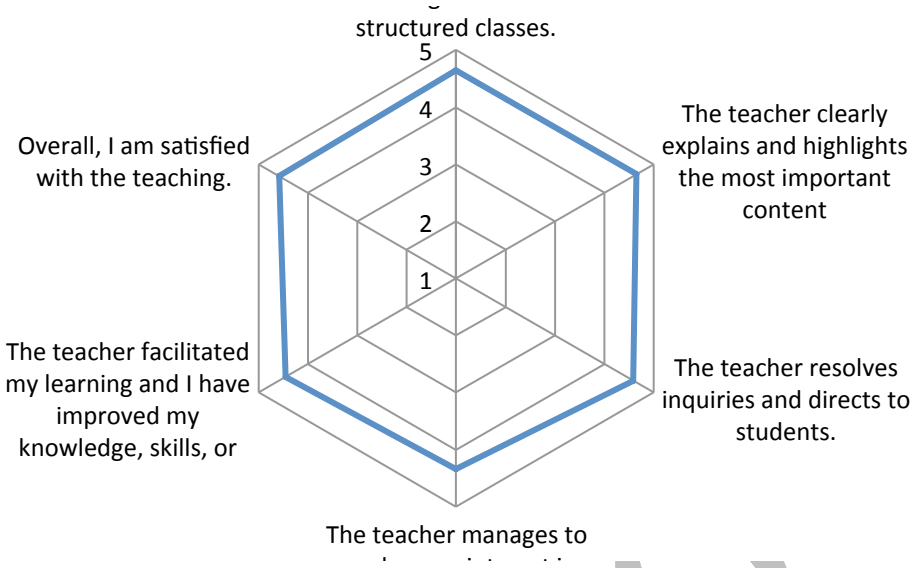


Fig. 6. Students' valuation of the teaching activities.

Fig. 7 shows the relation between the scores obtained by the students and the base of knowledge they had when they started to study the subject. Fig. 8 shows the relation between the scores obtained by the students and the fact of having passed or not the subjects considered as essential. As can be seen, the number of passed is higher in the students who have passed all the basic subjects, as in the students who have passed the two subjects considered as essential and therefore, the intrinsic ability of the student in the teaching-learning process is very important.

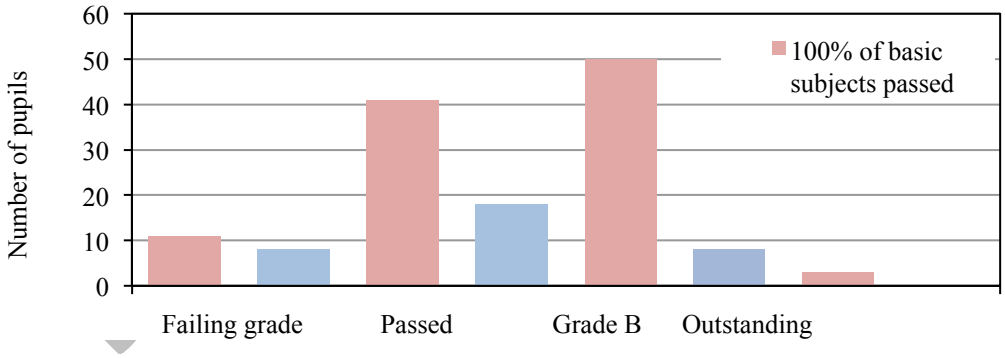


Fig. 7. Relation between the scores and the basic subjects passed.

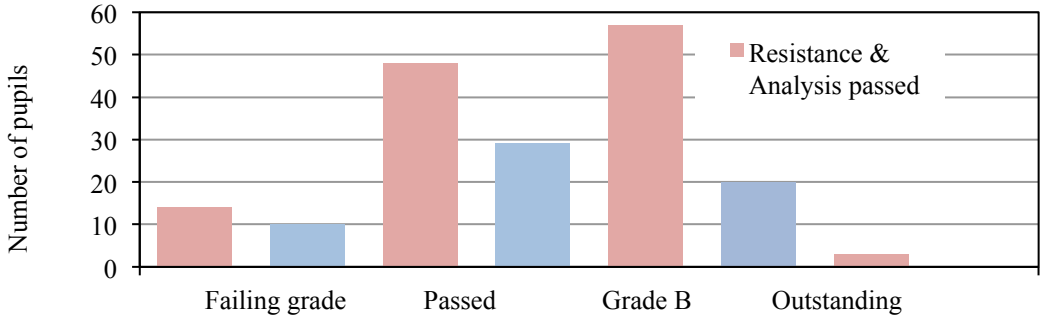


Fig. 8. Relation between the scores and the essential subjects passed.

Fig. 9 shows the relation between the scores obtained by the students and their perception of the subject. As can be seen, a good perception of the subject favors the student's answer, obtaining better scores the students with better valuation of the subject and therefore, it is important to interest the student in the contents of the subject, as make them active part of the teaching-learning process in the classroom and through the new technologies.

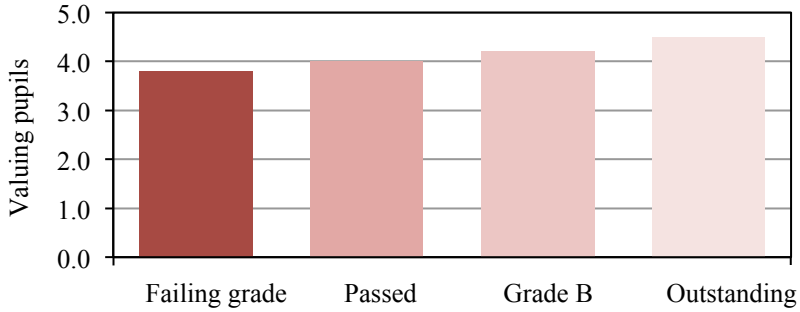


Fig. 9. Relation between the scores and the perception of the subject.

Fig. 10 shows the relation between the students' perception of the type of assessment used and the obtained scores. As can be seen, the students who obtained better results also had a better perception of the type of assessment. Because of this, it is fundamental that the assessment encourages the motivation and the feedback, in order to help the student to see it as one more part of the teaching-learning process.

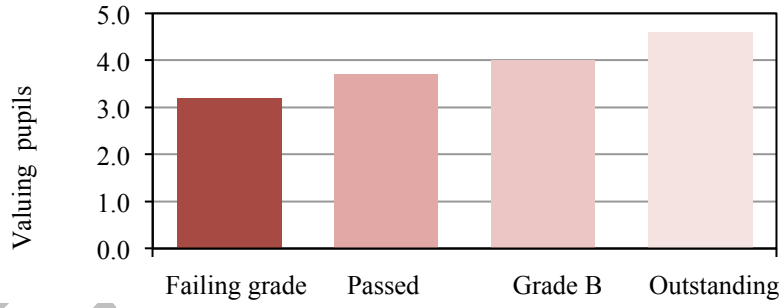
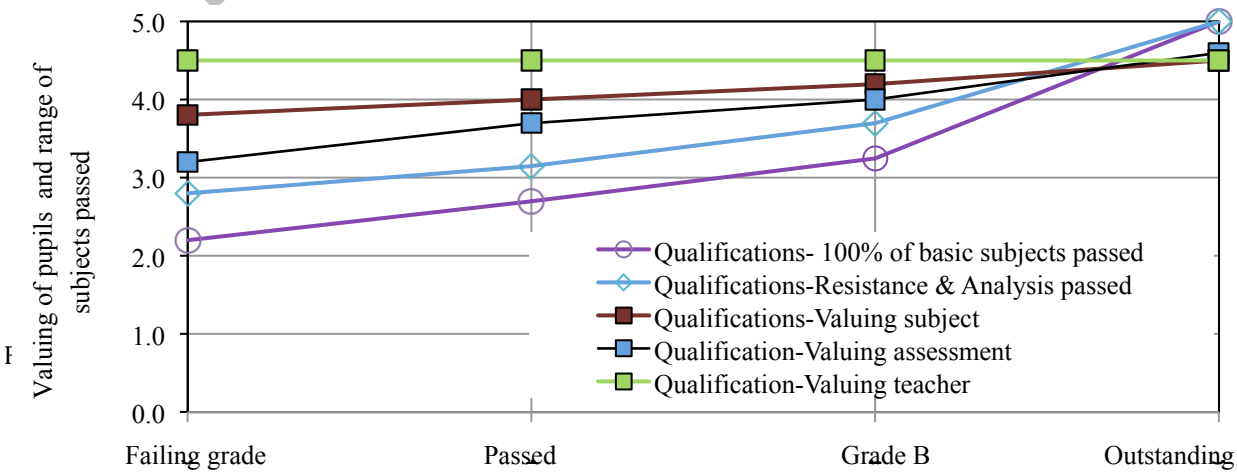


Fig. 10. Relation between the scores and the perception of the assessment.



Finally, Fig. 11 connects all the variables studied before (base knowledge of the students and their perception of the subject, assessment and of the teacher) with the obtained scores.

As can be seen in figure 11, except the valuation of the teacher, which is anonymous and therefore cannot be related to each group of students, all the other lines are ascendant from the passed to the outstanding. This indicates clearly that the analyzed variables affect directly in the level of learning reached by the students and therefore can be used as orientation to guide our efforts as teachers.

It can also be seen how even being positive all the valuations, the one related to the teaching activities is better, followed by the one related to the valuation of the subject and the assessment valuation one.

5. Conclusions

As a response to the objective of the research, the conclusions are detailed below:

- Continuous assessment improves the performance and the results of the learning in the students, encouraging their work in a continuous way, the easiest way to acquire the necessary skills.
- The overcoming of basic and fundamental subjects from previous years affects, clearly, the marks.
- The student perception of the subject is a determining factor in his motivation, obtaining better results the students who have a more positive valuation of the subject.
- It is fundamental that the assessment benefits the learning, encouraging the feedback, the motivation and the comprehension ability of the student of his own learning process. This way, the students will assimilate it as one more part of their learning process and they will improve their results.
- The valuation of the teaching activities affects in an important way the teaching-learning process and our knowledge of its perception has to give us hints to know how to improve continuously.
- Despite the students' valuation of the subject "Structural concrete" was very positive we want for the next year to improve the usefulness of the practices done in the classroom and influence in a better achievement of the planned learning objectives.
- As a general conclusion it can be affirmed that the student's ability and his perception of the subject and its teacher affect in a determining way in the teaching-learning process.

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Infusing mobile technology into undergraduate courses for effective learning

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Abstract

The number of courses higher education institutions are offering online, blended, or web-enhanced traditional classroom setting, continues to grow exponentially. At the same time, there is an upsurge of mobile technology that has multiple capabilities to support different instructional strategies. Among all adult groups, undergraduate students' use of mobile technology in everyday life is relatively highest. This paper identifies the impact of infusing mobile technology in undergraduate course instruction for effective and quality learning. The paper also discusses the benefits of using mobile technology in undergraduate students' learning process.

Keywords: Mobile Technology; Effective Learning; Web-enhanced; Undergraduate Course.

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1. Introduction

Integration of emerging mobile technology is now inevitable in every sphere of life. This phenomenon has led to tremendous interest among educators (Godwin-Jones, 2011). Mobile technology and how they are being used in education has evolved in such a way that the achievement of learning objectives is no longer limited to personal computer, but extended to the use of mobile devices that provide a greater range of applications. As developments in mobile technology progress, more opportunities for mobile technology supported learning environment emerges, enhancing the role of mobile technology as learning platform (Asselin & Moayeri, 2011). Mobile technology with its power to change the instruction and learning method are new instrument for education in higher education. The mobile-based learning pedagogical method provides many possibilities (Razaque & Elleithy, 2012). Many educational opportunities are made possible because of unique characteristics of mobile technology and its positive impacts on instruction and learning process. As a result, increasing numbers of higher education institutions are integrating these innovative technology as instructional tools (Musawi, 2011).

Mobile technology refers to the wide range of web-based tools and devices with Apps. Mobile technology in learning, as defined in this paper, involves the mobile digital devices within and between pedagogically designed learning environments or contexts. That is, mobile devices are used as tools to mediate a wide range of learning activities and facilitate collaborative learning environments (Cochrane, 2010). The freedom of time and location is related to the concept of anytime and anywhere access that

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represents the two main characteristics of mobile technology - mobility and reachability. A mobile learning device could be laptop, Tablet (iPad, Android), e-Reader (Kindle, Nook), and even Smart phone (Godwin-Jones, 2011). Many of these tools provide constant access to learning resources allowing extensive communication and collaboration that are changing instruction and learning environment (Abrantes & Gouveia, 2010).

The *effective learning* process: (1) enables active learning by allowing students to learn anytime, anywhere; (2) facilitates cooperation and teamwork by providing functions such as virtual collaboration; (3) improves learning by facilitating teamwork and group projects, and (4) provide knowledge or information from real world (Sheng, Siau, & Nah, 2010). With its advancement, mobile technology has become more versatile, user friendly, and cost effective. Thus, mobile technology can provide pedagogically designed learning contexts, facilitate learner-generated content (both individual and collaborative) while providing personalized and global social connection (Zhao, Waldman, Perreault, & Truell, 2009). Research found that student centered approach is fundamental to the success of learning process (Male & Pattinson, 2011).

2. Significance of mobile technology as learning tools in undergrad courses

A primary reason for infusing mobile technology in undergraduate courses is students' interest. Today's typical college students have grown up with and been exposed to all different kinds of mobile technology in almost every aspects of their lives. On a daily basis they use laptop, online social media, social networks, cellphones, text messages, RSS feeds, wikis, blogs, online learning tools, and much more. How students integrate these instruments into their lives has been the focus of much attention in research (Labach, 2011). According to a research finding, 92% of undergraduate students are mobile wireless (laptop or cellphone) users – the highest percentage among all adult groups who are using mobile technology in their everyday life (Rainie, 2011). A number of mobile devices are being used in learning environment are: laptop, net book, E-reader (i.e. Kindle, Nook), Tablet (iPad, Android), Smart phone (iPhone, Android, Windows), etc. Being familiar with mobile technology such as Web 2.0, students can find and use information; produce content in various formats such as post, blog, or video; and push content to recipients by various media such as smartphones or laptops (Cassidy, Britsch, Griffin, Manolovitz, Shen, & Turney, 2011, Diaz, 2011).

As the advent of mobile technology has deeply impacted the educational environment and mobile technology is becoming a valuable tool for learning, it is important for educators to know how to keep up with rapid growth of this technological development. Educators need to be adaptable to this emerging technology, as the majority of their students are the generation who grow up and living in the world of mobile technology. The development of mobile technology has generated a considerable amount of excitement among practitioners and academics because it results in shifting the academic environment from traditional settings to mobile learning settings. Increasing number of institutions of higher education offer courses using mobile technology as alternative teaching and learning tools (Razaque & Elleithy, 2012). However, despite the significant potential of mobile technology to be used as powerful learning tools in higher education, its current use appears to be predominantly within a didactic, instructor-centered paradigm, rather than a more general learning environment. Although, mobile technology has been identified as emerging tools to enhance teaching and learning, but the use of mobile technology in education is in its infancy at best (Cochrane, 2010).

Given that mobile technology for education is a new phenomenon that is gaining popularity, the values of using mobile technology to support education need to be further researched and better understood. In this context, the purpose of this paper is to identify the impact of infusing mobile technology in undergraduate course instruction to ensure effective and quality learning. The paper will also focus on the benefits of using mobile technology in undergraduate students' learning process.

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3. The role of mobil technology in improving learning effectivenes

The literature on mobile technology-based education points to a variety of benefits that mobile technology could have on the learning environment. Empirically, the impacts of mobile technology on educational outcomes that are identified in the literature can be classified into two broad categories. Mobile technology impacts learning outcomes by improving access to education while maintaining the quality of education delivered. In addition, mobile technology impact learning outcomes by facilitating alternative learning processes and instructional methods (Cochrane, 2010).

Mobility and Accessibility - The most publicized advantage of mobile technology is mobility, which enables anytime, anywhere learning removing time and space constraints in accessing learning materials. Mobility also enhance capabilities for communication, coordination, collaboration, and knowledge exchange. Students who work full time or travel a lot, can use mobile technology to catch up with school work, lectures, or assignments at their convenient time and place.

Personalized learning - The benefits of mobile technology are not merely limited to increased access to educational services. Mobile technology can enable personalized learning, which is learner-centered and allow students to learn at their own pace. The greater availability of educational resources provides greater opportunity for students to discover and construct new knowledge. Learning using mobile technology can be particularly appealing for those students who have not succeeded in traditional learning environments. Mobile technology presents an appeal simply by presenting something new and exciting for a great array of new generation students. Thus, mobile technology can attract those students who are not encouraged or interested by traditional generalized learning approaches. Providing immediate feedback, mobile technology can ensure continued motivation for those students who are not motivated by traditional educational settings. Mobile technology facilitate designs for personalized learning that encourage diversity in the learning process (Sheng, Siau, & Nah, 2010).

Collaborative learning - The ability of mobile technology to enable any place and any time communication can provide more opportunities for students to interact with instructors, as well as collaboration among students. Students can communicate and interact with peer students, instructors, and experts even when they are traveling. They can work on group assignments in a flexible and efficient way without the need to meet face-to-face. Collaborative learning is a process in which students develop higher-order thinking skills by creating an environment where knowledge is shared among learners in an effort to achieve common learning goals (Brindley, Walti, & Blaschke, 2009). As collaboration is key to learning in today's educational environment, mobile technology has tremendous potential in supporting and improving collaborative learning.

Situated learning - Mobile technology can also facilitate changes in the character of learning modalities that in turn impact learning outcomes (Sheng, Siau, & Nah, 2010). Facilitating alternative learning processes and instructional methods mobile technology can ensure effective learning. Mobile technology facilitate designs for situated learning by providing learning during the course of the activity. For example, using mobile device a botany student can learn in the field, or an engineering student can learn in the workshop. Thus, mobile technology facilitates designs for authentic learning that targets real-world experience involving relevance and interest of learner (Renes & Strange, 2011).

Communication - The importance of communication between students and instructor in supporting positive learning outcomes is well-documented. The incomplete or ineffective communication is a barrier to effective learning (Hart, 2012). Instructor's quick and timely response and prompt feedback to assignments assure students and promote active learning (Heyman, 2010). Research findings emphasize on communication because good communication among peer students, and students and instructor results in improvement of instructional and learning processes. The greatest benefit derived from mobile technology is the communication that deliver effective learning ensuring collaboration among students

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and instructor. Mobile devices with learning Apps can ensure this communication. Even if smart phones do not have as many learning capabilities as laptops or tablets have, they provide instructors and students communication opportunities. Consequently, some instructors have begun to use smart phones in teaching because those can facilitate advanced learning environments with even faster response speeds.

4. Conclusion

Mobile technology is changing the way educators think about education. Mobile technology has multiple capabilities to support different instructional strategies and provide an efficient way of delivering course material and improving learning comprehension. Unlike traditional method, mobile technology can enhance student learning by instantly updating vast number of additional learning resources that are easily accessible and provide a low-cost educational solution to the students. Thus, mobile technology has become major resource for teaching and learning in higher education. The most important advantage of mobile technology is its accessibility from anywhere using mobile devices with wireless connection. Mobile technology can also deliver personalized and collaborative learning for students. Almost all undergraduate students are now using mobile technology in their daily life. Consequently, the infusion of mobile technology into undergraduate courses can revolutionize the processes of learning and teaching by changing the educational environment.

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Innovative approaches to education in natural sciences at the Charles University in Prague

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Abstract

Number of students in natural sciences in the Czech Republic decreases steadily each year. Without proper intervention this trend would soon despoil the pool of human resources necessary for sustaining and further enhancing country technological competitiveness. To reverse this unfavourable trend, Charles University in Prague implements various methods of collaboration with both basic and high schools. The paper presents some innovative approaches focused on raising pupils´ interest in natural sciences and on change of teachers´ attitude in order to teach both in an understandable and attractive way.

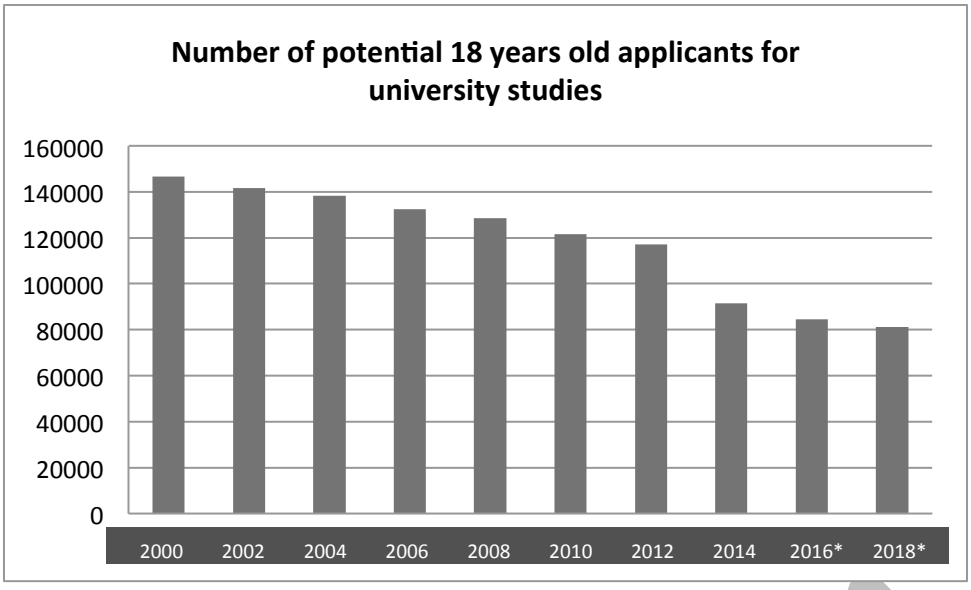
Keywords: education in natural sciences; innovation; Charles University in Prague

1. Objectives

The results of the Analysis performed to illustrate the acute necessity to solve the lack of interest in natural sciences in the adolescents group proved that the number of individuals interested in the scientific work is steadily decreasing. This trend is visible not only in the field of natural sciences, but in the interest in research as such. This negative aspect is even more stressed in the regions outside the capital. Besides, the overall numbers of potential university students are also diminishing which even worsens the situation for the years to come.

Chart 1: Number of potential 18 years old applicants for university studies (* - forecast)

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Source: CSO (Czech Statistical Office)

Having in mind the necessity to assure competitiveness of the Czech economics supported by the results of science and research turned into innovative approaches we must consider the contemporary situation as unbearable.

On the other hand the results of the Analysis also proved, that there exists a cohort of pupils and students in grammar, secondary and higher specialized schools rather interested in R&D results. These selected individuals should be encouraged to continue their professional education in this area to reverse this unsatisfactory trend. Their support should be done through interactive methods as well as via modern media, which play a substantial role in the lives of this target group.

New tools have to be developed to enhance the interest of the young generation in science to make the scientific achievements accessible through modern attractive methods as audio-visual materials, webinars, communication via social networks, visits of interactive multimedia labs and intense systematic work with teachers, lecturers and students, including wide-scope offer of out of class voluntary activities for pupils and secondary-school students led by "real scientists" i.e. university and academic research staff.

Charles University in Prague with the total number of 17 faculties, more than 53 000 students and 7 900 employees (out of them 4 500 being academicians and researchers) is the largest university in the country offering the potential to effectively promote research oriented education. The goal is not only to attract the future students, but to involve them in the research activities to the extent that the science and research remain their life-long hobby and mission. This is rather not easy, as in the Czech Republic the social position, reflected also by the low financial evaluation of scientists, lags behind those of many other professions as e.g. economists, lawyers, entrepreneurs and others.

To fulfil the goals of the Europe2020 strategy we have to support strongly the process of technology and knowledge transfer from the academic sphere to the commercial one and enhance thus the competitiveness of the small and medium enterprises having their headquarters in our region. The commercialization process has the potential to bring more investors into the technology firms located in the Czech Republic and support its economic growth.

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To tackle the problem of lack of interest in natural sciences among the young ones the Czech Ministry of Education, Youth and Sports published in the framework of Structural Funds - Operational programme Education for competitiveness - a call focused on popularization of science. More than € 7 270 000 are being spent to perform 24 projects during the period of 16 months (starting from March 1, 2014). We are referring herewith to one of the interesting projects being implemented by Charles University in Prague.

2. Concept and approach

At Charles University the necessity of the systematic presentation of scientific results has been underestimated until recently. The contemporary comprehensive approach is ambitious, conceptual and strategic. While the past activities have been rather accidental and fragmented, usually focused just on the interests of an individual faculty, the innovative aspect lies in an overall centralised concept of popularisation published on one web-site and promoted via modern methods. The important role is played by the interdisciplinary attitude, so as a large involvement of partners outside university – not-for-profit organisations, SMEs, as well as industrial bodies. We are building on traditional aspects of work with schools and public, but new methods are being used to address wider audience and enable deeper cooperation. The faculties have suggested visits of their labs and fellowships where the participants are able to put their hands on and be totally involved into the process. Such an experience brings more interest into the studied discipline than just a passive acceptance of information. For those coming from distant regions the interactivity will be processed via internet presentations, webinars and e-learning. The Open days and meetings with scientists secure the space for face-to-face discussions offering the possibility to better understand the specific terminology and sense of science.

Lectures for academicians aim at fostering their capability to communicate the complicated research and scientific issues to public, to lay-men and even children. The easy description of their work is in most cases by far not easy and should be learned systematically.

3. Ambition

The Czech largest university together with the other partners in the project consortium offers a wide range of experience and contacts to fulfill the goal of natural sciences´ propagation through the science oriented education. The systematic work of all stakeholders will increase the number of individuals willing to spent their productive age in research and thus strengthen the human resources available in this area. New research facilities which are now being opened in different regions of the Czech Republic will have the chance to find enthusiastic persons with a real expectancy and understanding what the science and research is about.

4. Methods

4.1 Partners

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Besides Charles University in Prague, the main body participating in the project, another 8 partners are involved in the activities of natural sciences promotion, each of them having a specific role in the game:

- **Association TEREZA** is focused on work with primary and secondary schools integrating the science oriented education into the daily praxis. The education in natural sciences is more attractive and interesting when such an approach is applied. The model of systematic support of individual lecturers (mentoring) has been introduced with sharing the experience within regional group located around focal schools playing the key-role in the network. An important aspect is also the feed-back for the scientists giving them insight into their activities – whether they are understandably presented and correctly interpreted by the mentored persons. Participating lecturers as well as students are naturally involved also in other activities performed in the project. Foundation for future close cooperation between schools, university and other partners is being built in this way.

- **Association ARACHNE, o.s.** is a civic society which builds on its past activities and wants to extend them by more practical training in the framework of scientific workshops and courses. Arachne aims preferably on biology and organises a two-week long training camp in summer, where lectures are combined with excursions and practical training in labs. Lecturers come from different faculties of the university, most of them being from Faculty of Natural sciences. Those coming from Czech Academy of Science and/or other scientific institutions are invited as well. Shorter field visits are being held in spring and autumn. After arrangement with the scientists students can also anytime visit their research laboratories.

- **BRITISH COUNCIL** will organize a conference named "Popularisation of Science" and is preparing a course, where the foreign experts share their knowledge in this field. It is responsible for keeping the level of courses corresponding to the international standards. This partner is also responsible for the international contacts of the whole consortium and cooperation with media on both national and international levels.

- **EDUCATIONAL CENTER TURNOV, o.p.s.** is a not-for-profit organisation which will prepare a set of educational materials used in the courses organized for gifted children. The materials will be distributed among other schools involved in the regions Turnov and Liberec. As a motivation for children participating on the courses, the possibility for the best ones to take part on the workshops organized by the university has been offered.

- **INSTITUTE OF PHYSIOLOGY AS CR, v. v. i.** offers to the secondary students attendance of so-called "Memory Park" and individual fellowships. The persons interested may apply through the on-line reservation system of the university enabling also the combination of complementary visits of different laboratories enhancing thus the interdisciplinary approach which is a must in the contemporary research. Within the Memory park 5 half-day workshops are being organized where the students can test their memory, orientation and thinking (standardized cognitive tests and software used by the Department of neurophysiology of brain) followed by analysis of the results. This gives a good example how science can be used in practical life. Besides, the scientific workers of the Institute are offering 300 hours of individual consultations, which are tailor-made to the interests of participants. Sessions can be focused on questions of nutrition, diabetes, obesity and other civilisation problems.

- **Secondary school and Vocational school Jilemnice** have a long tradition of collaboration with The Charles University in Prague. The Faculty of sports measures the performance of students in Jilemnice within a longitudinal study focused especially on the cross-country skiing. Data collected are further analysed and used to support the interest of other schools in physical efficacy and sports from the professional point of view.

- **Secondary school of Josef Jungmann** cooperates with the faculty of Mathematics and Physics. It will participate on most of the activities running in the project and give a valuable feed-back of the impact of individual actions realised. The students and teachers of this school are testing the new interactive educational materials and amend them from their practical point of view.

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- **ILA, s.r.o.** is a private SME active in innovations which facilitates the activities among faculties and partners. Its goal is to disseminate the results of the project via the web-portal www.inosfera.cz. The role of ILA is also to analyse sources of inspiration for further development of activities, especially case-studies and examples of good practice. ILA offers to the participants in the project the meeting premises where the webinars and on-line broadcasted seminars can be attended. E-learning based on long-term experience with this form of education is a domain of this partner as well.

4.2 Key activities to promote natural sciences (KAs)

KA 1: Science in praxis for teachers, academic workers and selected pupils/ students

KA 2: Science oriented education in regions

KA 3: Production of educational materials for lecturers in natural sciences (reflecting science oriented education and interdisciplinary approach)

KA 4: Production of educational aids for individuals interested in scientific and research work (students at primary, secondary and vocational schools)

KA 5: Efficient ways of popularization of natural sciences in media, usage of modern tools for transfer of knowledge, experience and attitudes

KA 6: Strengthening of professional capacities in scientific camps and workshops organized for students interested in research work

KA 7: Bootcamps for lecturers of natural sciences focused on science oriented education

KA 8: Popularization of research work through education using examples of civilisation illnesses (obesity, DM)

KA 9: Even the sport is a science

5. Expected impact

The aim of the Ministry of Education, Youth and Sports is to change the low interest of young generation in science through the money invested into the projects similar to ours. Although the number of university students is increasing, the involvement of alumni in further doctoral education is far behind satisfactory rates. The number of doctoral students is more or less the same during the last years, and compared to total number of tertiary students it is decreasing steadily, as shown on the Table 1. Taking into account the fact, that the numbers of potential university students in the future are also diminishing, the situation with human resources in the Czech science seems to be almost critical.

Table 1. Tertiary education – alumni in the school-years 2003/4 – 2010/11

Students in tertiary education	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11
Altogether	32 977	38 406	44 342	53 467	63 800	73 242	81 732	87 941
Doctoral studies	1 538	1 750	1 950	2 057	2 267	2 378	2 373	2 189
Doctoral studies in %	4,66	4,55	4,40	3,85	3,10	3,25	2,90	2,49

Source: databases UIV (Institute for Information in Education)

The systematic work with students and their lecturers will deepen the interest of this target group in science and research. Based on presentations, discussions, practical trainings, on-line courses as well as

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using other new modern means of communication as webinars, teleconferences, social networks (Facebook, Twitter) will make the information more attractive and digestive for the young generation. Also the lecturers will be taught how to teach effectively. The academicians will get the information on the best way of communication with lay-men.

The target group will get new knowledge either in a selected specific topic or in the transdisciplinary area giving thus the chance to find out the specific field of interest for each individual.

The activities performed are developed to cover a wide-range of potential participants corresponding to different age groups and knowledge levels. They are scalable not to overwhelm the listener.

We hope in influencing most of the students taking part on the training in their decision about future studies and their professional career. Newly opened research facilities will have a chance to find in them enthusiastic and dedicated scientific workers in the future.

The pedagogical workers at different schools (basic, secondary and vocational) will be acquainted with recent findings in science and will get valuable contacts with academic milieu to be used even in their future work. The researchers will learn how to communicate better and in more understandable manner their special expertise.

6. Conclusion

The activities focused on popularization of science and research should lead to increased numbers of persons involved in R&D in the Czech Republic. The interdisciplinary approach to science is essential not only in natural sciences. The activities of the presented project therefore cover many faculties of the university, as well as many experienced partners, and are using modern innovative tools for learning and communication such as: videos, e-docs, tablets and smart-phones´ applications, webinars, on-line games and competitions etc. Besides the more traditional methods of teaching many practical experiments, personal contacts in labs, workshops and camps are integrated into the project. This should lead to positive changes of attitudes of the teachers in order to enable the target group to gain real hands-on experience with science and raise their natural curiosity and interest in the subject and motivation to become life-long researchers.

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Abstract

The purposes of this study are to 1) synthesize an instructional design framework from the three instructional design theories, and 2) create an instructional design framework for educational media, and 3) study students' opinions for educational media. The synthesis was first made through the Delphi technique with 17experts to identify their perspectives on the three instructional design theories. The sampling group was 42 undergraduate students of Rajamangala University of Technology Thunyaburi, Thailand. The instruments were educational media according to Instructional design framework; an achievement test; and a questionnaire to assess students' opinions toward the developed educational media. Statistical procedures for data analysis included the E_1/E_2, mean, standard deviation, and t-test. The results revealed that the framework provides excellent potential for development and evaluation. The study confirmed that for instruction to be successful, various aspects of the environment should be considered such as application of domain knowledge, conceptual theory, and evaluation of the overall quality of the designed environment. Educational media had the efficiency at the 82.5/80.5 efficiency criteria, students were learned from the packages achieved significant learning progress at the .05 level and their opinions were at the highly agreement level regarding the appropriateness of the instructional media.

*Keywords:Instruc*tional Design; framework; Educational Media; Synthesis; Delphi technique.

1. Introduction

One of the most useful applications of the World Wide Web (WWW) integrated with information technology is for education use as the web-based, distance, distributed or online learning to maximize student learning, providing learners and educators a wide range of new and interesting learning experiences and teaching environments different from the traditional classroom context of education. Electronic media technology-enhanced and student-centred learning environments can facilitate the learning and understanding of abstract concepts since students can notice graphically displayed changes of concrete experience (Hannafin & Land, 1997; Alexander, 2001). Effective e-learning environments allow students to work socially with each other. To achieve it, the core elements are the presence of the teacher, the availability of printed resources and the purposive interaction with the computer by students (Phillips, 2005).

Although education medias are widely used in all educational levels, it should be known that vocational education needs both academic and practical approaches. Each approach requires different instructional design frameworks. Therefore, the instructional design for education media which this paper are discussed in behavior learning, creative thinking learning, and organization learning, with their were tree psychology theories framework were as a guide for create and development a questionnaire to submit to educational experts. Based on the Delphi technique, these three synthesize were in order to create a new method for process learning via instructional of education media, which may be applied to both online and offline in education media and teaching of vocational level.

The researchers used the Delphi technique so that experts were able to express their opinion on what they agreed in order to create an instructional framework that complies with psychological principles according to an instructional design framework for autonomy. This framework will help learners achieve their learning objectives effectively and efficiently, as well as help learners to understand in a faster and more stable way (Sangsawang; Jitgarun; & Kaittikomol, 2006,). Theoretical frameworks provide a myriad of ways in which instructional design framework for education media practicums may be used, based

upon the instructional and pedagogical needs of the vocational course. The development of instructionally effective online learning environments that meet these pedagogical needs requires the application of appropriate instructional design principles. In designing an online instruction, the underlying pedagogical philosophy and application of learning theories, including constructivism and constructionism influence decisions regarding what instructional strategies may be adopted (Dick, Carey & Carey, 2005). Furthermore, the relationships between the design process framework and the effectiveness of the instructional design framework for education media environment are discussed.

2. Literature review

This study develops a framework based on three theories which include learning theories in behaviourisms, creative thinking, and organization learning. Each of the theories involves the psychology of learning as follows -:

2.1 Behaviourism's Theories.

Cognitive processes and the ways in which thoughts occur and the ways in which behaviourism arises from them are the subject of considerable study. This particular study looks at how learning is affected. It is believed that instructional design needs to be applicable to cognitive, behavioural, and attitudinal learning so that the strategies work together to create understanding (Taylor, 1996), to be applicable (Merriam &Caffarella,1991), to create cognition and elements of situated cognition, to build on cognitive or mental phenomena (Lynch & Bogen, 2005), to create cognitive activity (Jetin, 2006), and cognitive organizers (Tan, Dawson, &Venville, 2008), and to operate processes of memory. Therefore, taken as a micro theory, it sets out a set of procedures which can be followed for each instructional event that can enhance learning. A nine step procedure was developed by Gagné and these steps work together with the cognitive strategies learning theory (Kruse, 2000). In the instructional design framework the first principle is 'attention', which follows the cognitive strategies learning theory, and the second principle, 'announcing the objectives further focuses the trainees' attention The recall of what has been previously learned brings the memory into action. The nine step procedure of instruction is examined in more detail later, with additional information coming from the relevant sections of social learning theory (Blanchard & Thacker, 2007), and the way in which an instructional event corresponds with a learner's internal mental process is also explained. How the interactive content in an e-learning course can keep the learners' attention is described in Gagné's nine step procedure of instruction (Muzio & Mundell, 2002).

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Table 1. Gagné's nine events of instruction (Kruse, 2002)

Instructional Event	Internal Mental Process
1. Gaining attention.	Stimulates and activates receptors.
2. Informing learnersof objectives.	Creating level of learning expectation.
3. Stimulation ofthe recall of prior learning.	Retrieves and activates short-term memory.
4. Presenting the content.	Selective perception of content is formed.

5. Providing learning guidance".	Leads to semantic encoding of long term memory.
6. Eliciting Performance(practice).	Responding to questions which enhance encoding and verification.
7. Providing feedback.	Reinforcement and assessment of correct performance.
8. Assessment of performance.	Retrieval and reinforcement of content for final evaluation.
9. Enhancing retention and transferring to thejob.	Retrieval and use of learned skill in newsituation.

2.1 Creativethinking Theories.

Learning by doing is the most popular and effective process of learning ever adopted by psychology, and it is based on practical training in order to create vocational skills the trainees gain experience in group participation in techniques or technology learning. The focus is on constructivist learning theory, the ways of doing and thinking, (Piaget, 1972), and humanist activities in which thoughts occur (Merriam &Caffarella, 1991). Most agree that learning by doing, which focuses on knowledge construction based on the learner's previous experience, is a good fit for e-learning (see Harman &Koohang, 2005; Hung, 2001; Hung &Nichani, 2001; Koohang& Harman, 2005).Theories advanced by Dewey (1916), Piaget (1972), and Bruner (1990), state that the constructivism learning theory is based on a learner's prior experience (Koohang, Riley & Smith, 2009). Woolfolk states, 'the key idea is that students actively construct their own knowledge: the mind of the student mediates input from the outside world to determine what the student will learn. Learning is active mental work, not passive reception of teaching' (Koohang, Riley & Smith, 2009). Honebeins proposed a target to aid the design of constructivism in learning settings in which there were seven goals. These were: to provide experience with the knowledge construction process; to provide experience in and appreciation of multiple perspectives; to embed learning in realistic and relevant contexts; to encourage ownership and voice in the learning process; to embed learning in social experience; to encourage the use of multiple modes of representation and to encourage self-awareness in the knowledge construction process (Honebein, 1996).

2.2 Organization learning Theories.

There is a focus on constructionism (Papert, 1991); knowledge-building, situating constructionism, society and situation (Bandura, 2000 & Merriam &Caffarella, 1991), situated learning, social negotiation (Baptista&Fowell, 1996), social constructionism and constructivism, and social contexts. These theories rest upon the supposition that there must be a social context in which the learner can build and develop his ideas (Kafai& Resnick, 1996). Ideas cannot be transmitted by a teacher, peer, or book-they must be created. A person comes up with an idea, and constructionism then adds to this fundamental notion that knowledge is built up more effectively when a person is engaged in an activity which means something to him. In constructionism, both the effect and the gaining of knowledge are equally important, so when used for vocational Internet-based training, the curriculum must be set out to ensure that the learner becomes part of it and gives him the desire to proceed further. Online-training should make the trainee interested in building his/her own meaningful online tools, otherwise, he/she might become unresponsive, and socially, an instructional design model should have the objective of preparing learners for the world of workthat influences students to work hard and achieve academically. Students to be in a state of flow engagement in learning tasks. It is also predicted that being in a state of flow will contribute to high academic performance. (Muzlia, Eliasb, Noahb, and other., 2010)

2.3 Educational media.

Electronic learning media in technology-enhanced and student-cantered learning environments can facilitate the learning and understanding of abstract concepts now that students can notice graphically displayed changes of concrete experience (Hannafin& Land, 1997; Alexander, 2001). Effective e-learning environments allow students to work socially with each other. To achieve it, the core elements are the presen-

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ce of the teacher, the availability of printed resources and the purposive interaction with the computer by students (Phillips, 2005). The e-learning in high schools and academic performances were evaluated through several assignments designed by the IT course instructors affect tostudents were indicated that computer skill levels did have a direct correlation with a student's academic performance level. The database was further parsed based on demographical factors,resulting in a set ofcommendations to enhance the effectiveness of e-learning. (Pardamean&Suparyanto,2014). Therefore, In parallel with the technological developments dominating usage of digital tools in science and education, the traditional education methods which are still using in many design school, the endeavor indicates that determine the appropriate learning method by considering individuals different cognitive style. The cognitive styles mean classify individuals according the way of perceive information and process it. Through this way, as subjects of the study, students categorized in respect to their cognitive styles whether field dependence or field independence, and then the relation between their cognitive style and spatial knowledge acquisition from virtual environment was observed. While defining digital tools in design education, the need of differences related to cognitive styles should be considered, this is supported by the data from this study which are indicating the increase of students' spatial knowledge in different scale of virtual environments. (Yildrim& Zengel, 2014) and the effect of screen reading and reading from printed out material on student success and permanency in Introduction to computer lesson is investigated. Learners were showed that reading from printed out material is more efficient than screen reading. (Tuncer&Bahadir, 2014).

Chapter 13 2. Objective of the study

This study aims (1) to synthesize an instructional design framework from the three instructional design theories, (2) to create an instructional design framework for education media, and(3) to study students' opinions for education media.

3. Research approach

3.1 Sample

The sample was seventeen experts were chosen through the purposive sampling method. Seven experts were qualified in educational psychology and ten in educational technology. They all had a doctoral degree and had worked for over five years in at least the position of assistant professor. Sampling group was 42 undergraduate students of Rajamangala University of Technology Thunyaburi.

3.2 Tools for data collection

1. Semi-structured interviews:Semi-structured interviews (Patton, 1990, p. 339) were used for first round: brainstorming was related to the framework Behaviourism's Theories andCreative thinking Theoriesand organization learning Theories.

2. Questionnaire I: Questionnaire I was used for the second round: the evaluation of the experts' ideas on Behaviourism's Theories andCreative thinking Theoriesand organization learning Theoriesconcerning an instructional design model for self-regulated, online learning at the vocational level. Questionnaire I for evaluating 17 experts on Behaviourism's Theories andCreative thinking Theoriesand organization learning Theories concerned an instructional design model for self-regulated, online learning at the vocational level and used a five-point Likert scale.

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3. Questionnaire II:After questionnaire I had been returned, the responses were synthesized and developed through a diagram chart (as shown in chapter 4 and figures 4.1 - 4.8) and then categorized into: similarities and differences. Questionnaire II used a five-point Likert scale (Likert, 1932; Verhagen et al., 1998; Linacre, 2002) (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = moderately agree, 5 = strongly agree).

4.Questionnaire III:After questionnaire II had been returned, the responses were identified, categorized and condensed into major themes and suggestions and sent back to all experts for review and consensus for the fourth round. Questionnaire III was used to check the content validity by 17 experts based on 'yes' or 'no, 'unsure'.

5. Pre-test - Post-test: Learner was do Pre-test before learn with education media, after that they was do Pros-test for a questionnaire to assess students' opinions toward the developed education media. Statistical procedures for data analysis included the E_1/E_2, mean, standard deviation, and t-test.

6.Questionnaire IV: Questionnaire for student' appraisal, Instrument for data collection was a questionnaire regarding student's self-appraisal for education media.

3.3 Data analysis

1.The data was analyzed by using frequency, percentage, content analysis, and Mind Manager application.
2.The operation was done by using three types of tools (1) brainstorming, (2) evaluation, and (3)re-evaluation.
3. Data analysis was done using SPSS/FW (Statistical Package for Social Science/for Windows) software. The part I with selection items was analyzed using frequency and percentage. The part II with five scales was analyzed using mean ($\overline{x}$), standard deviation (S.D.) and correlation.The levels of agreement from respondents were as follows: Average Score of 1.00–1.49 means strongly disagree whereas average score of 4.50 – 5.00 means definitely agree.
4. Collection Data was collection opinion of teachers at vocational education for confirms using an instructional design framework for education media.Study students' opinions for education mediawasundergraduate students of Rajamangala University of Technology Thunyaburi.

3.4 Method

The data were collected through the Delphi technique. There were four rounds for the data collection as follows:

First Round: Brainstorming

The first round involved brainstorming from the experts through semi-structured questionnaires based on behaviourism's theoriesandcreative thinking theoriesand organization learningtheories, all of which focus on cognitive processes, the learning by doing approach, and social context. The first round of data collection proceeded as follows:

1. Connected with/contacted/called 17 qualified experts by phone to request their agreement to participate in the study using the Delphi technique.

2. When all 17 qualified experts had agreed, the researcher issued official letters of invitation to invite experts.

3. Appointments were made with all qualified experts on the date and time preferred.

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4. Eight experts allowed the researcher to meet them in person. The questionnaire was handed to all experts at the appointment. Three experts wrote comments on the questionnaires in front of the researcher. Five experts gave opinions while the researchers were making notes.

5.Nine experts preferred to fill out the questionnaire by post and they were returned to the researcher. There were no other comments from these experts.

6. Answered questions and explained the purpose of the questionnaires.

7. The researcher separated the replies into similar and different categories to get a majority opinion.

8.The data from the interviews based on the semi-structured questionnaire were grouped and arranged to draft Questionnaire I concerning teaching and learning design based on the three psychology theories, Behaviourism's Theories andCreative thinking Theoriesand organization learning, which focus on cognitive processes, the learning by doing approach, and social context. The researcher who prepared Questionnaire I followed Likert's five rating scale. Data analysis used frequency and percentage. The part with five scales was analyzed using mean (*M*), standard deviation (SD) and correlation. The levels of agreement from respondents were as follows: average score of 1.00-1.49 means strongly disagree whereas average score of 4.50-5.00 means definitely agree.

Second Round: Evaluation of the experts' ideas

The second round evaluated the ideas using the Likert five-rating scale in questionnaire II.

1. Connected with/contacted/called 17 qualified experts by phone to request their agreement to participate in the study using the Delphi technique.

2. When all 17 qualified experts had agreed, the researcher issued official letters of invitationto invite the experts.

3.Appointments were made with all qualified experts on the date and time the experts preferred.

4. Eight experts allowed the researcher to meet them in person. Questionnaire II was handed to all experts at the appointment. Three experts wrote comments on the questionnaires in front of the researcher. Five experts gave opinions while the researcher was making notes.

5. Nine experts preferred to fill out the questionnaire II by post and it was returned to the researcher. There were no other comments from these experts.

6. The researcher then processed the new data from the first round open-end questionnaire to check for a consensus. The researcher selected the items from the results of the semi-structured interview questionnaire.

7. The results of synthesis of similarities and differences led to diagrams, "Work well for decision trees", (Strawbridge, 2007, p. 640)

8. The data collection from 17 experts and was conducted through the post or by interview.

9. The values: median, mode, and interquartile range in each question item were measured.

10.The data regarding the similarities and the differences based in three psychology theories regardingbehaviourism's theories andcreative thinking Theoriesand organization learning Theories; all three theories focus on mental processes, learning by doing approach, social contextwere synthesized. After that, the researcher created an instructional model of learning process theories for self-regulated education media, online - offline learning at vocational education.

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Third Round: Re-Evaluation

In the third round the 17 experts were required to respond 'yes' or 'no' and 'unsure' to the questionnaire III.

1. Selected the items from the results of Questionnaire II. These included all principles, teaching-learning activities strategies, teaching-learning environments, and stages of instructional sequence which make up mental processes, learning by doing, and social context.

2.The findings were pooled together as similarities or differences. The similarities meant that most of the 17 experts agreed while the differences meant the reverse. The results of the synthesis were used to develop Questionnaire III.

3. Appointments were made with all qualified experts on the date and time the experts preferred.

4. Eight experts allowed the researcher to meet them in person. Questionnaire III was handed to all experts at the appointment. Three experts wrote comments on the questionnaires in front of the researcher. Five experts gave opinions while the researcher was making notes.

5. Nine experts preferred to fill out the questionnaire III by post and it was returned to the researcher. There were no other comments from these experts.

6. Created an instructional model of learning process theories for self-regulated online learning in vocational education.

7. After the researcher concluded Questionnaire IV, the framework for an instructional model of learning process theories for self-regulated online learning in vocational education was developed.

Fourth Round: Solution-Report

In the fourth round, the experts came to a resolution and made a report since the feasible ideas had been identified. Furthermore, the experts would acknowledge all the group's opinions with the ideas or strategies and details of implementation.

4. Findings and discussion

4.1 Delphi technique

First round: In the brainstorming session, the researcher focused on Behaviourism's Theories andCreative thinking Theoriesand organization learning Theories, covering cognitive processes, learning by doing, social context, and the results from this analysis was used for the framework for the semi-structured interviews. The questionnaire was sent to a group of 17 experts who were given two to two and a half weeks to complete and return the first round of questions. After the responses were received, the answers were categorized, synthesized, and developed into another questionnaire I.

Second round:This was the evaluation of the experts' ideas phase and consisted of the evaluation of the experts' responses by using a Likert five-rating scale (Likert, 1932, p. 1-55). In round two evaluations,

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Questionnaire I was used for the management of the experts' ideas on Behaviourism's Theories andCreative thinking Theoriesand organization learning Theories concerning an instructional design model for self-regulated, online learning at the vocational level.

Third round:In this re-evaluation stage, the selected items from the results of questionnaire I included all principles, teaching-learning activities/strategies, teaching-learning environments, teaching-learning models frombehaviourism's theories(cognitive processes) andcreative thinking theories (learning by doing) and organization learning theories(social context) concerning an instructional design model for self-regulated, online learning at the vocational level were pooled together as similarities or differences.The similarities meant that most of the 17 experts agreed, while the differences meant the reverse. The results of the synthesis were used to develop questionnaire II (using a five-point Likert scale) which was sent to the experts for the third round.

Fourth round:By this round, the feasible ideas had been identified, resolved and reported. The experts would acknowledge all the group's opinions with the ideas or strategies and details of implementation.

4.2 Brainstorming

The researchers conducted semi-structured interviews with 17 experts for the first round: brainstorming of experts' opinions would be related to the framework developed frommental processes, learning by doing approach and social context.

The researchers analysed the interviews of the experts' opinions about each idea. The details interview form was in fourparts as follows: key ideas and principles, teaching- learning activities, strategies, instructional environments and stages of the instructional sequence.

The researchers synthesized the first round of opinions of the experts using a Likert five point rating scale. Following this step, an instructional design framework was prepared covering Behaviorisms Theories and Creative thinking Theories and organization learning Theories.

4.3 Evaluation

The ideas gained from the experts were evaluated using Likert, a five-point rating scale, questionnaire for the second round as shown in the evaluation of the 17 experts' ideas on cognitive processes, creative learning, and organization learning concerning an instructional design framework for education media.

The items from the results of questionnaire I were selected. This meant that all key ideas, principles, teaching-learning activities, strategies, instructional environments, and stages of instructional sequence comprising cognitive processes, creative thinking, and organization learning were pooled together as similarities or differences. The similarities meant that most of the 17 experts agreed while the differences meant the reverse.

The results of the synthesis of similarities and differences led the researchers to develop a diagram chart. Then, the 17 experts were required to respond "Yes" or "No" to questionnaire II.

4.4 Re-evaluation

The researchers selected the items from the results of questionnaire II. These included all key ideas and principles, teaching-learning activities, strategies, instructional environments, and stages of instructional sequence comprised fromcognitive processes, creating thinking, and organization learning.

After the researchers concluded questionnaire III, the framework for instructional design framework for education media was developed.The results of this research focus on three clusters that help create the

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framework for the theories and also include aspects of the learning process. The study allowed for the expression of experts' opinions, and similarities and differences could be described in the framework.

Re-evaluation was found teaching-learning activities/strategies for education mediaframework
that instructors are able to apply the results of this research in developing both education media and online media learning or offline media by using instructional design framework for education media with there were psychological principles via multimedia, preparing the suitable content for instructional design for education media, learning by themselves, designing the approach for online learning which suits learners most and understand the problems arisen from online learning so that learners can integrate ideas, build up body of knowledge by themselves and self-appraisal.

4.5 Self-Appraisal for education media.

Phase I : Students' Self-Appraisal for education media.

In order to obtain the data concerning students' self-appraisal for education media, the researchers developed a semi-structured questionnaire regarding to student's self- appraisal for education media. The questionnaire focuses on the effectiveness of online learning. After collecting the data from the sampling group of 100 Rajamangala University students in the academic year 2014 by random sampling method, the following self-appraisal for online learning from students were: 1) To make online learning effective, there must be appropriate materials supporting information resources, 2) Instruction must improve learner's learning skills, 3) Instructors must update data to students with electronic learning, and 4) Education learning on one's own must be convenient and easy for students.

Phase II : Online Learning Model as Perceived by Learners.

From the responses of the questionnaires regarding Online Learning Model, it was found that: 1) Most students look forward to learning new skills, but they would rather have face-to-face interaction and need faculty to constantly remind them of due dates and assignments, 2) Most students can go to campus anytime, and the amount of time they have to work on an online course is less than that for a class on campus; therefore, online learning is a personal interest that could be postponed, 3) As of other items, most students need reminding to get things done on time, classroom discussion is sometimes useful to them, they try to follow the directions on their own, then asking for help as needed, and sometimes need help to understand the text.

Phase III: Online Learning Model as Perceived by Instructors.

5. Conclusion

In this article, the researchers have offered a framework and design process for education media environment. The implementation of the internet-based involves several steps including a consideration of various aspects of information, conceptual development, theories of psychology and an evaluation of the overall quality of the system environment. In particular, the research aims to improve the design process and usability of the Internet-based environment. The study also confirms that for GCC Framework for

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education media to be successful, various aspects of the online environment should be considered. These include the application of domain knowledge, conceptual theory, theories of psychology and an evaluation of the overall quality of the design process.This is presented in the two parts that follow as in part Iin Figure 1: key idea and principle and part II: in Figure 2:GCC frameworks.

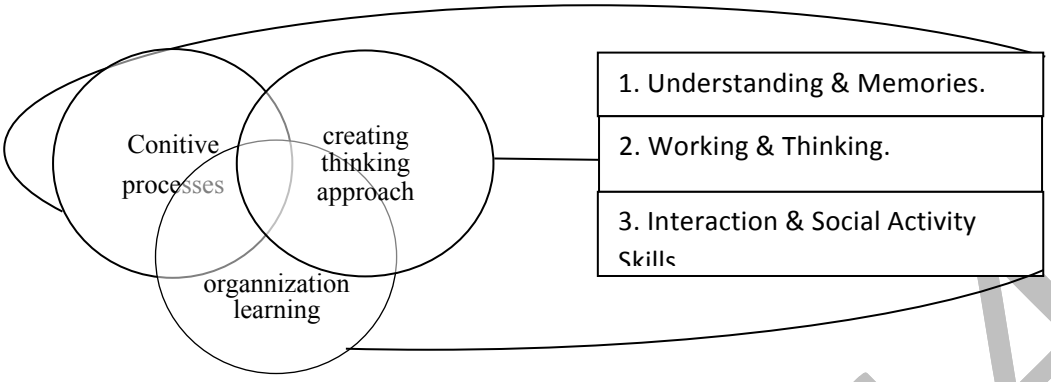


Fig. 1.Key idea and principle

Stages of instructional sequence of three theories

Table 2: Stages of instructional sequence according to mental processes, learning by doing and social context as follows: (Thosporn, 2006)

Cognitive processes	Creating Thinking	Organization Learning
-Instructors create stimuli to activate receptors.	-Learners rethink to activate pre-knowledge.	-Learners and instructors share thoughts and build their own self- knowledge.
-Instructors create level of Expectationfor learning.	-Learners find questions.	-Learners and instructors build structures to construct their own -self- constructionism
-Instructors build retrieval and activation of short-term memory.	-Learners perform self-regulated learning by doing theirtasks.	-Learners and instructors construct knowledge - building communities.
-Instructors select perception of content.	-Learners share activities together.	-Learners and Instructors discuss and construct knowledge organization.
-Instructorscreate semantic encoding forstorage of long-term memory.	-Learners share understanding of knowledge with instructors.	-Learners and Instructors share and construct information to manage knowledge.
- Instructors guide how learners respond to questions to enhance encoding.	-Learners share regulating activities to transfer knowledge.	-Learners and Instructors construct and collaborate on their tasks.

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-Instructors create verification, (reinforcement and assessment of correct performance).	-Learners present activity.	-Learners and instructors combine experiences to develop their own self.
-Instructors create retrieval and reinforcement of content as final evaluation of learning, and retrieval and generalization of learned skills for learners to build new situation		

4.5 GCC framework

In this section, the researchers present Instructional Design Framework for education media or researcher called GCC framework that there have got it's from experts' congruence of selected psychology theories, namely cognitive processes, creative thinking learning, and organization learning classified by "Teaching-learning models."The researchers created an instructional design framework for education media. The research involved a framework with the sample for the study consisting of 100 instructors who developed electronic media (such as e-Books, and e-Learning, WBI, and CAI) in the vocational education fields of electrical engineering, electronics, civil engineering, and mechanics from several faculties of technical education in universities in Thailand.The teaching-learning activities/strategies for education mediaframework thatit's call GCC framework as show in picture1, there have three parts such as stages of instructional sequence; teaching-learning environments; Students' self-appraisal for education media.

Stages of instructional sequence of GCC framework

These frameworks have stages of instructional sequence for teaching and learning6 steps.The core components as follows:

Step 1: Creating conditions for internal mental learning process as in insight information. Instructors provide on operating conditional learning, giving information, signal learning, objectives, expected outcomes,benefit from learning and activities and create teaching criteria to suit the learners with external conditions.

a) Chaining: Instructors provide events of learning as well as a step-by-step process of learning.
b) Verbal association: Instructors use a process learning and instruction model.
c) Discrimination: Learners learn through testing and feedback.
d) Concept learning: Instructors create tasks and conditional learning as a method and stages of learning process for learners.

Step 2: Creating processing memory.Learners learn how to achieve the objectives of learning and to meet conditional learning and created rule learning by them own.

Step 3: Perception knowledge andInformation.Instructors provide programmed instructions, tutorials, simulation, games and drill as well as practice and test for learners. They were solving problem by them self.

Step 4:Providingsituated cognition, a teacher was created content and activities learning.Learners are encouraged to recognize and understand reflective thinking and thinking initiatives. They can be them creative thinking.

Step 5:Performing,processes access. Teacher was designed Drills and practices.Learners can plan, set assumption, investigate and solve problems by themselves. They should use simulation and gaming media by themselves, self-learning.

Step 6:Supporting construction of knowledge.

GCC framework
Teaching&learningActivities&strategiesInnovation & Attributions.

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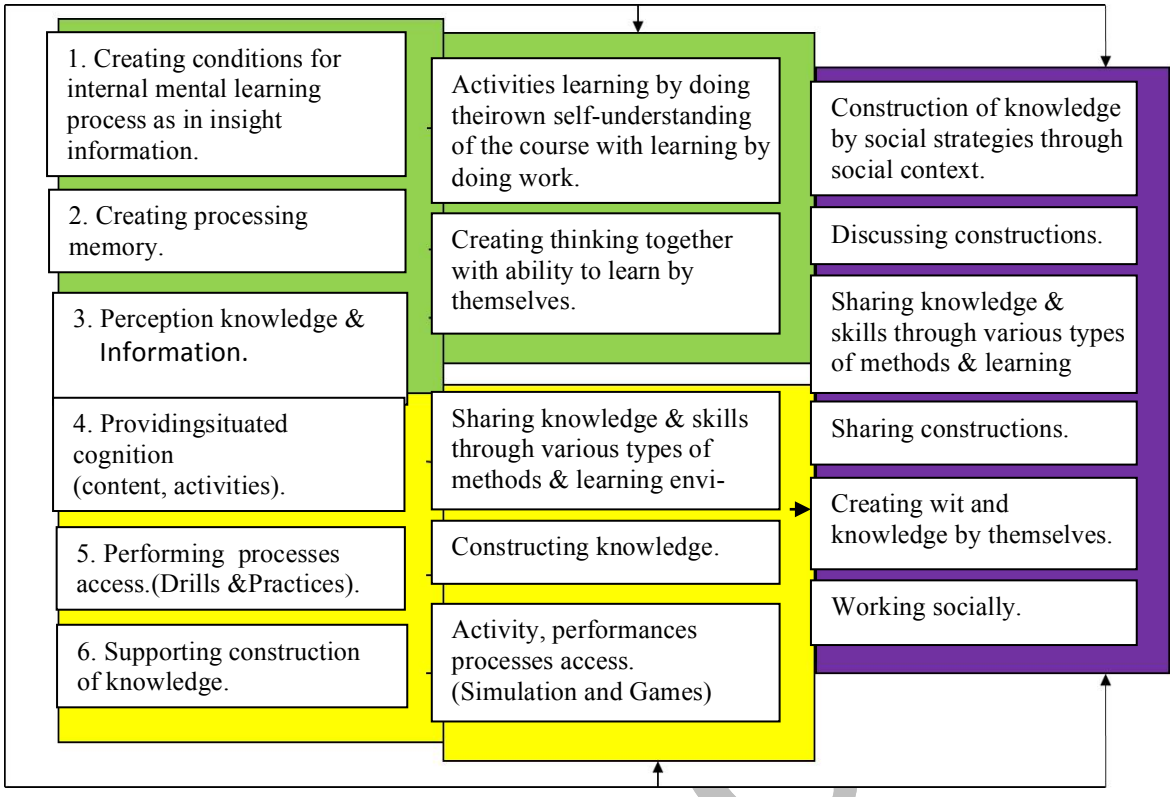


Fig. 1. GCC framework

Activities/ strategies

1. Learner's activities/strategiesstep 1 to step 3, Learners should be activities learning by doing theirown self-understanding of the course with learning by doing work and creating thinking together with ability to learn by themselves.In prat,step 5 to step 6, Learner should be sharing knowledge & skills through various types of methods & learning, Constructing knowledge, Activity, performances processes access.Simulation and games)

2. Instructor encourages to learners cognitive.Teacher should be give signals learning; chaining;verbal association; discrimination learning; concept learning; rule learning; problem solving; creative thinking; reflective thinking; thinking initiatives.

3. Learner created thinking by them self. Teacher should be encourage to leaner by self-learningCo-operative learning; Project-based learningProblem-based learning;Situation learningGroup InvestigationInquiry method; New knowledge Simulation and Gaming.

4. Instructor and learner should be creating teaching-learning typeswithorganization learning together by learner dobrainstorms for project based; planning their own learning; learning by doing; presentation; learning assessment; modifying actions.

Innovation and Attributions

Instructor was correlatedwith learners for creating innovation. The core components as follows:

a) Construction of knowledge by social strategies through social context.
b) Discussing constructions.
c) Sharing knowledge & skills through various types of methods & learning
d) Creating wit and knowledge by themselves.
e) Working socially.

Teaching-learning environments.

Learning environments according to cognitive processes, learning by doing approach, and social context.

a) The cognitive processes should be using education media,concept map**,** spider diagram, Fishbone, Structured**,** T-chart.

b) Creating thinking should beusing action, activities and environments;sharing knowledge & skillsthrough various types of social activities; Activity/ opportunities to develop meta-cognitive knowledge about persons; Tasks; Strategies to evaluate their learning as part of the total experience.

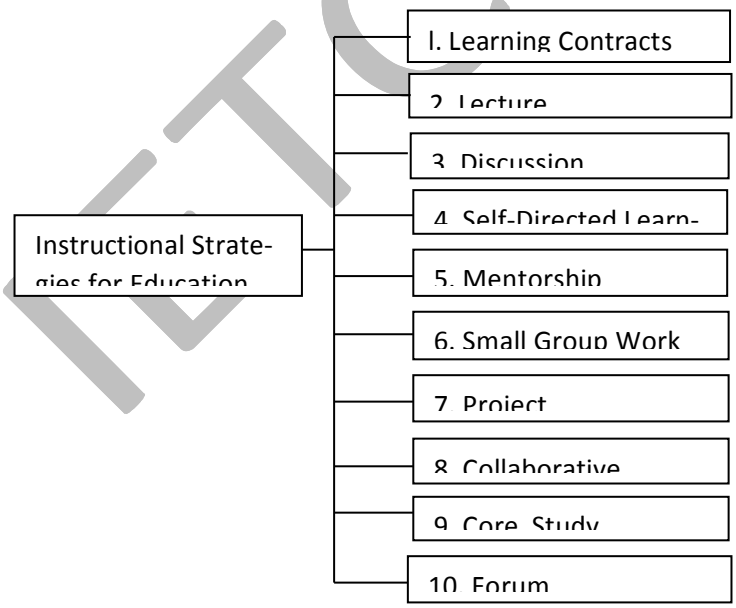
c) Organization learningshould beusing interaction with social constructionists, Experiential learning; Perceptions of experience from their own understanding; Construction of their own thinking of it as "learning- by-making"; Actions their working socially; Interaction and cognitive processes.

Students' Self-Appraisal for education media

From the course designed for self online learning, it was found that the course began with designing appropriate contents in accordance with the curriculum and objectives. Learners and instructors have their roles in learning together as well as expressing opinion, analyzing, and solving problems on their own. Instructor is just a mentor. Learners will succeed if an instructor provides them with appropriate learning strategies for online learning. Those are:

1) Learning environment under supervision from instructors in online learning in accordance with the course objectives.
2) Collaborative learning should be used for online learning.
3) Instructional strategies need tools to design online learning with ease under 10 teaching commandments, which are often used in classroom and could be used in online learning as well. Ten teaching commandments are: (a) Learning Contracts,(b) Lecture, (c) Discussion, (d) Self-Directed Learning, (e) Mentorship, (f) Small Group Work, (g) Project, (h) Collaborative Learning, (i) Case Study, and (j) Forum.

According to instructors' opinions, online learning can be included with instructional strategies as shown in Mind Map or Figure 3:



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Fig.3.Students' Self-Appraisal for education media

From the research results, the discussions could be as follows:

1) Most students look forward to learning new skills, but they would rather have face-to-face interaction and need faculty to constantly remind them of due dates and assignments. The probable causes for this finding were given by Northover (2002). There are fourmajor barriers to students' participation in online activities: (1) Lack of convenient access to technology and low technological literacy, (2) Students' immaturity and genuine eagerness to learn, (3) Language confidence – poor students are likely to have an extra disadvantage, and (4) Learning style – both individual learning preference and the experience of previous education systems. It is within the capacity of the tutor to have an effect on some of these possible barriers, more than on others.

2) Most students can go to campus anytime, and the amount of time they have to work on an online course is less than that for a class on campus; therefore, online learning is a personal interest that could be postponed. Normally, instructors are the main characters in classroom. Every learner depends on instructors. However, for online learning, learning resources and information are the center of this approach in order that each learner can search for new knowledge and information regarding the instruction. Without instructors, some learners get lost and do not know what to do. This type of learners is called by Annette Vincent and Dianne Ross "perceptive students". They often postpone doing an assignment until the very last minute. It is recommended to divide a complex project or paper into a series of sub-assignments and providing deadlines for each sub-assignment. The deadlines keep the perceptive students on target. The sub-assignments provide for continuous feedback.

3) Most students need reminding to get things done on time. Classroom discussion is sometimes useful to them. They try to follow the directions on their own, then ask for help as needed, and sometimes need help to understand the text. This is in accordance with Musaw(2000) in that learners are satisfied with learning by themselves but they still need to depend on instructors since they are accustomed to learning with instructor in classroom.

4) Suggestions from students' self-appraisal for education media were as follows: (1) New technology tips and tricks need to be regularly updated; (2) Lecturers should be available when learners need advice; (3) Due date for task is required and learners must be reminded but learning time should not be limited; (4) Portfolio should be a requirement to track students' progress; (5) Discussion should also be held in class where instructors facilitate each learner in building up his/her own body of knowledge. From students' self-appraisal for online learning, learners would like to be able to apply knowledge in solving problems in daily life. However, Dabbagh&Kitsantas (2005) had already pointed out the difficulties of online learning in their paper. Their analyses of qualitative data collected revealed that Web-based Pedagogical Tools were highly effective in activating the use of Self-Regulated Learning processes necessary to support specific types of learning tasks required for completion of course assignments only. Therefore, the researchers would like to suggest course developers and providers to offer learners with various kinds of online learning in order to satisfy the demand and the skills of each learning style.

Therefore, All education media level which is focused on teaching both theory and practice, instructors create operational conditional learning. When learners learn by doing it leads to self-discovery. All of education media might be said to be the teaching of procedural knowledge, in contrast with declarative knowledge, usually used in education in the broader scientific field, and which concentrates on the theoretical and abstract conceptual knowledge which is characteristic of tertiary education. Vocational education can be taught at the secondary or post-secondary level and can interact with an apprenticeship system, and increasingly it is recognized in terms of prior learning and partial academic achievement. However, it is rarely considered to meet the traditional definition of higher education. Motivation in the learn-

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er is strongly dependent on the learner's confidence in himself or herself and his or her feelings of competence and belief in his or her potential to solve new problems is derived from first-hand experience in the mastery of problems in the past and these are much more powerful than motivation or knowledge obtained from any outside source. The successful completion of challenging tasks helps learners gain confidence and understanding and achieve learning objectives with effectiveness and efficiency, as well as helping them understand in a faster and more stable way. This reflects the National Education Act 1999, which reads: "In organizing the learning process, educational institutions and agencies concerned shall provide training in thinking process, management, how to face various situations and application of knowledge for obviating and solving problems." That view of learning sees learners as active participants who can construct their own understanding of the world around them. Using past experience and knowledge, learners can make sense of the new information that they have assimilated. In addition, constructivist theory also asserts that meaningful learning occurs within an authentic situation with authentic learning tasks and that learning is facilitated through social interaction, shared thought, and decision making. This is a system which will make Thai learners capable of developing themselves and able to compete in the world's knowledge-based economy.

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Integrating an e-book software with vector graphic technology on cloud platform

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Abstract

Many e-book applications have been available on the mobile devices in the recent decade. People read the electronic contents on their mobile devices. Meanwhile, a variety of mobile device platforms have emerged in the market. To make the e-book content compatible on different mobile device platforms, the layout or e-book application design needs to be adjusted based on the display resolution. However, different resolution settings are available in the mobile devices. For example, Android can runs on a variety of devices that offer different screen sizes. Android also can support different resolutions from 320*240 to 1280*720. Hence, the resolution becomes a critical problem for e-book content provider. Besides, image scaling is another problem for e-book applications. If the e-book application load bitmap images as its contents, the bitmap contents may be distorted when user scales up the size of contents or images. Therefore, the different resolutions and image scaling are two important issues in the design of e-book application. Vector graphic library can solve the above problems. However, vector graphic has bad performance in mobile devices and just few e-book contents are available in vector graphic format. Hence, file format conversion is another high-cost task in e-book with vector graphic. This paper proposes a cloud system integrating an e-book reader with vector graphic technology, called CloudVG. CloudVG optimizes the vector graphic library through a Renderscript method and offloads the conversion of bitmap to vector format on cloud platform. The experiment results show CloudVG can achieve 250% performance improvement over the original library and the procedure of file format conversion can achieve a near-linear speedup on cloud computing platforms.

Keywords: Vector graphic; e-book; cloud computing; android apps; renderscript

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1. Introduction

Smart mobile devices become the center of our daily lives. Hence, many system manufacturers produce a variety of mobile devices in the market. In the IDC report, Android system occupies a considerable market share of smart handheld device. Android is a Linux-based operating system and is maintained as an open source project by Google. Many programmers and manufacturers have joined the system development due to open source. Hence, there are many applications and hardware devices which are developed based on the Android operating system.

Today's advanced mobile devices are well integrated with the Internet and have far more functionality than mobile phones of the past. Some peoples use handheld devices to be personal multimedia de-

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vice for playing music and movie through Internet. Some other people read books on mobile device. Hence, many software developers design applications of multimedia player and E-Book reader.

E-book application has been widely studied by research group and industry manufacture in recent years. However, so far, the e-book applications are not widely used in the mobile device because e-book applications have following weakness for mobile devices.

- Image distortion: The contents and image of e-books may be distorted when user scales up the size of contents or images. Because the image's format of e- book is the bitmap type.

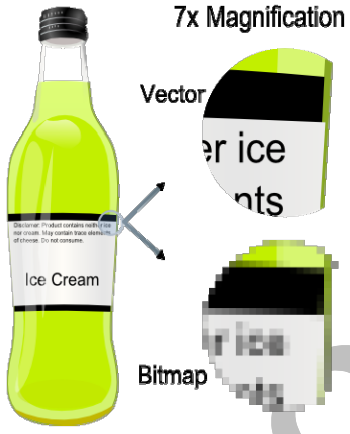


Fig. 1. Bitmap and vector graphic comparsion

- Performance efficiency: E-Book applications spend a lot of time to process path calculation and drawing when E-Book application is developed based on vector graphic library. Vector graphic library has a major strength for E-Book application. Vector graphic library avoid image distortion when user scales up the size of contents or images on E-Book application.

- Resource limitation: Users usually have many e-book contents and electronic comic books in their mobile devices. It is very inconvenient for user to manage their e-book content in small storage device. It occupies a large part of storage space in their device. Besides of storage limitation, processing image transformation is also a heavy load work on mobile device. Due to battery life, mobile devices try not to do a task with long processing time. Therefore, cloud platform help E-Book applications to solve the resource limitation problem.

In this paper, we develop CloudVG to solve the above problems. CloudVG integrates the e-book software with vector graphic technology to cloud platforms. Cloud platform can help e-book software to offload the procedure of file format conversion and it also provides large storage resource for mobile device to store the e-book contents. The performance of CloudVG for displaying contents is also optimized by GPGPU in mobile devices through Rederscript function.

The rest of this paper is organized as follows. Section 2 shows the related works which include E-Book applications, vector graphic library, Android Renderscript and cloud image file conversion processing. Section 3 presents our system architecture in the cloud service. In Section 4, we present our system execution results and benchmarks. The brief conclusion is presented in Section 5.

2. Related work

E-book application has been widely studied by industries and academia. Some previous studies probe E-Book's applications [1, 2], security [3, 4], platform and standardization [5]. According to [5], we

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know that there are many different e-book file formats and each file format is not compatible with another e-book file format. Therefore, file format compatibility is an important issue for e-book application. Vector drawings can enlarge to any size without any loss in quality. Then, vector graphic is a free file format and it is also readable on both handheld devices and computers. So that, we can convert e-book file to xml descriptor of vector graphic. There are many libraries to support vector graphic reader in embedded platform [6] [7]. We integrate OpenVG [6] library with Android system and we also optimize it on our embedded platform.

2.1. Overview of OpenVG

OpenVG is a standard vector graphic API, which is developed by Khronos Group, Inc, for hardware-accelerated 2D vector graphics. .OpenVG primary is implemented on smart phone, handheld devices and consumer electronic devices and it is composed of three basic components: path, paint and image. All images to be drawn are defined by single or multi paths grouping a sequence of commands. OpenVG provide a method to offload computationally intensive graphics processing from the CPU onto a GPU to save energy. However, the offloading solution needs to be implemented by hardware manufacturers. We propose a solution to increase the performance of OpenVG through Renderscript. Our solution can be designed for different OpenVG applications.

2.2. Renderscript

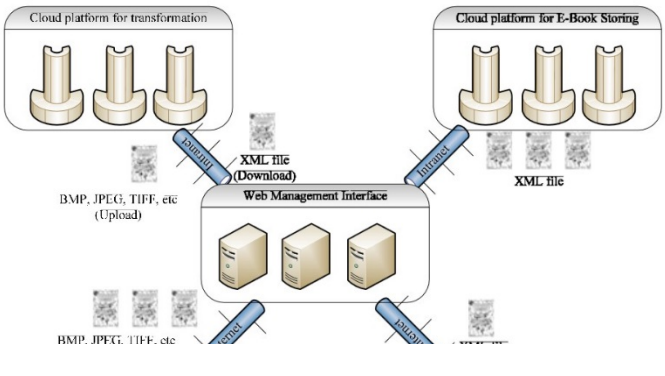
CloudVG use embedded GPGPU to increase the performance of application. The embedded GPGPU is based on ARM Mali architecture. The Mali series of graphics processing units (GPUs) are semiconductor intellectual property cores produced by ARM Holdings. Mali-T604 supports Android Renderscript library. Renderscript [11] is a low-level API for intensive computation using heterogeneous computing. It allows developers to maximize the performance of their applications at the cost of writing a greater amount of more complex code. Some researches use it to optimize 3D graphics library [12] and multimedia development [13]. In CloudVG, Renderscript is used to optimize the performance of vector graphic library in Android system.

2.3. File conversion

In [8], they proposed some algorithms for converting file to vector graph format. They only deploy client server architecture to execute their algorithm. However, converting file format produce a huge workload when user need to transfer large amount of files. Our solution is a parallel implementation of the Autotrace that uses multi-VM and it achieves near-linear speedup on cloud computing platform.

3. System architecture

Figure 2 shows CloudVG architecture. CloudVG is composed of three components: vector graphic library, cloud platform and cloud storage. The vector graphic library focuses on drawing the contents with vector graphic file format. The object of cloud platform is to process conversion of bitmap to vector graphic and the cloud storage stores user data after file format conversion.



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Fig. 2. CloudVG system architecture

A. *Vector graphic library in mobile devices*

We modify the vector graphic library based on ShivaVG and port it on Android system. ShivaVG is a vector graphic library that follows OpenVG standard for library implementation. OpenVG separates the procedures of drawing vector graphic to seven steps. We use two-level optimized solution to increase the performance of vector graphic library. First-level is algorithm optimization and we optimize the vector graphic library in step four of OpenVG flow on Android system. We use GPGPU to optimize the vector graphic library through Renderscript API in second-level.

1) OpenVG algorithm optimization

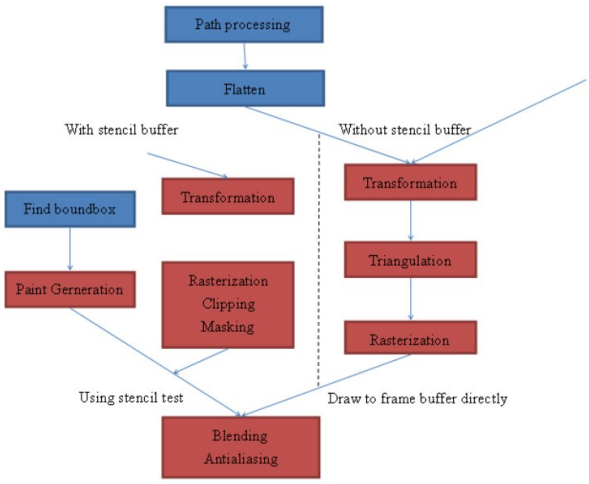


Fig. 3. Optimization algorithm flow

The step four of OpenVG is the rasterization. Rasterisation is the task of taking an image described in a vector graphics format and converting it into a raster image (pixels or dots) for output. Triangulation is the main process in rasterization step. The time complexity is $O(n^3)$ in original algorithm. We replace original triangulation algorithm with monotone triangulation and polygon partitioning. In the result, the time complexity of triangulation reduce from $O(n^3)$ to $O(n*\log n)$. The optimization flow is shown in Figure 3.

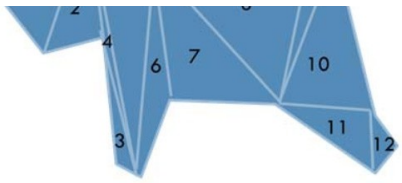


Fig. 4. Example of monotone triangulation

There are some problems in monotone triangulation. If the picture is not a monotone graphic, monotone triangulation will get error in execution. So, we deploy polygon partitioning before monotone triangulation. Polygon partitioning separates any graph shape into monotone graph.

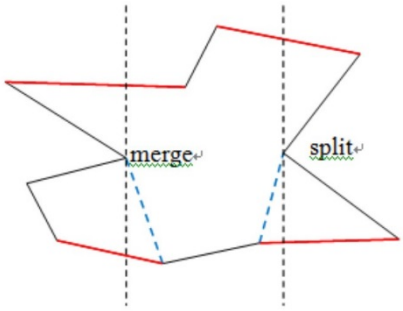


Fig. 5. Example of polygon partition

2) GPGPU optimization

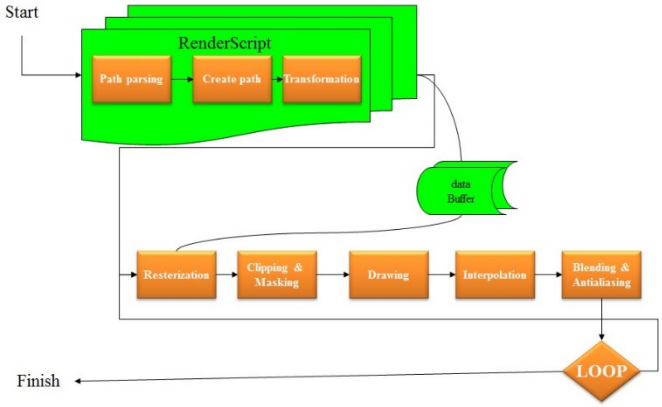


Fig. 6. Renderscript integration

OpenVG has three computing-intensive components: path parsing, path creating and transformation. So, we use Renderscript to rewrite the procedures of three components Renderscript provides some computational API to offload the computing function to GPU unit.

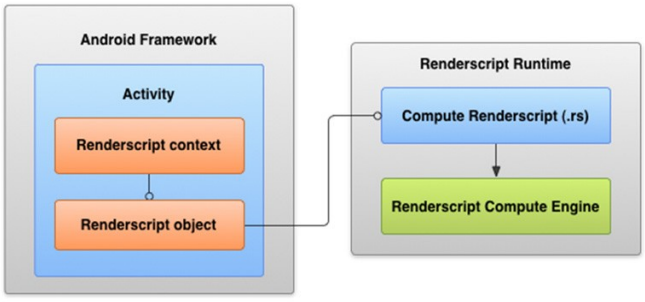


Fig. 7. Flow of Android to Renderscript

Figure 7 shows the flow to call Renderscript function. We use Android NDK to trigger Renderscript object and then pass the computational data to GPU memory through Renderscript object. After computing in Renderscript engine, CloudVG can receive the computed result from Renderscript object. In this subsection, we describe the optimization of CloudVG in mobile devices. The rest of this section shows optimization in cloud platform.

B. *CloudVG optimization in cloud platform*

This research work converts a variety of image format to vector graphic descriptor in order to support more and more file format. However, file transformation procedure is a heavy workload process in embedded platform. For that reason, our solution takes advantage of cloud computing in order to enhance our computing power.

We deploy the Autotrace [5] code in cloud. Autotrace is software of file transformation. And we build up a domination machine to dispatch converting task to back end cloud platform. We parallelize the file format conversion task in group of images method. Our solution splits all images which are in e-book file to different group and the system assigns these group tasks to different computing virtual machine in cloud. We present our cloud solution in figure 8. The parallel algorithm is shown in Table 1.1) OpenVG algorithm optimization

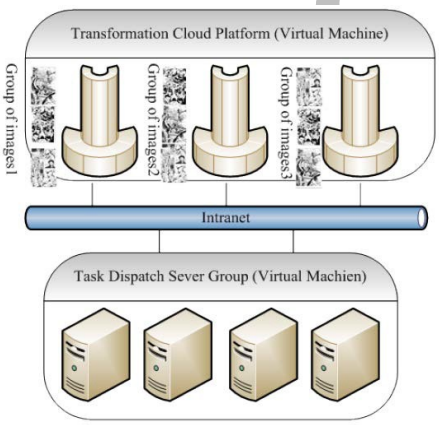


Fig. 8. Cloud parallel method

Table 1. GOP ALGORITHM IN CLOUD PLATFORM

Algorithm: GOP Conversion Algorithm
Input: A collection of bitmap B_m
Output: A book with vector graphic format B_{vg}
1. Receive B_m from user request.
2. Divide B_m into N groups
Dispatch N groups of pictures to computing node via Hadoop framework.
4. Merge N groups of pictures to B_{vg}

Users manage their contents through our web interface. Users can do some operation on management website, such as: uploading contents, downloading their contents and sharing their contents with copyright. We also put all contents which are uploaded by same user in single cloud storage. The placement method can increase data locality.

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4. Experimental result

In this section, we present the result of experiments to scrutinize the correctness of CloudVG system. Futhermore, we use experiments to compare the effectiveness of CloudVG system with existing ones, in terms of time complexity and display latency.

A. Experimental environment

The experimental environment is described as follows: smart phone, pad and embedded development platform (PAC Duo platform), and ten Hinet Hicloud platforms. Figure 9 shows our experimental environment in cloud.

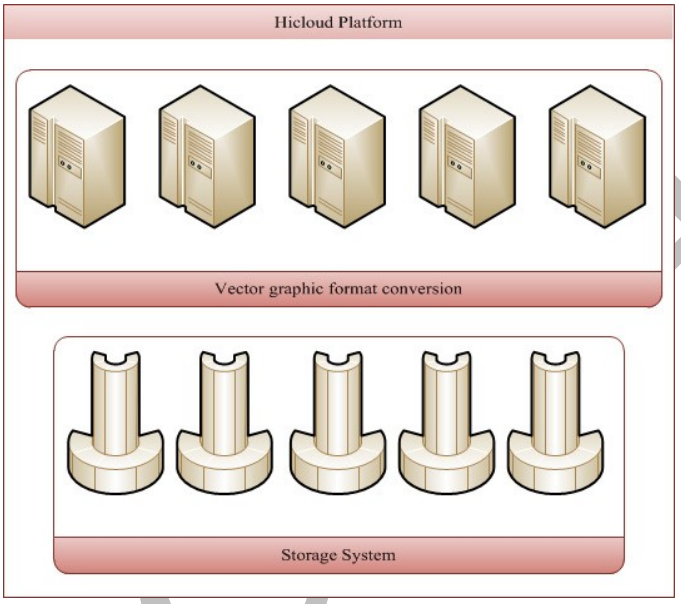


Fig. 9. Cloud machine arrangement

B. Vector graphic demonstration

In this sub-section, we use a mobile device to access the vector graphic file in cloud storage. Figure 10 shows the E- book with vector graphic library on PAC Duo platform and a smart TV.

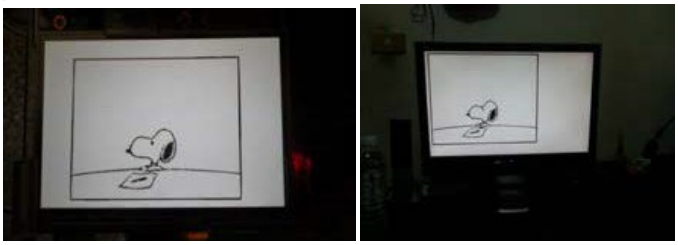
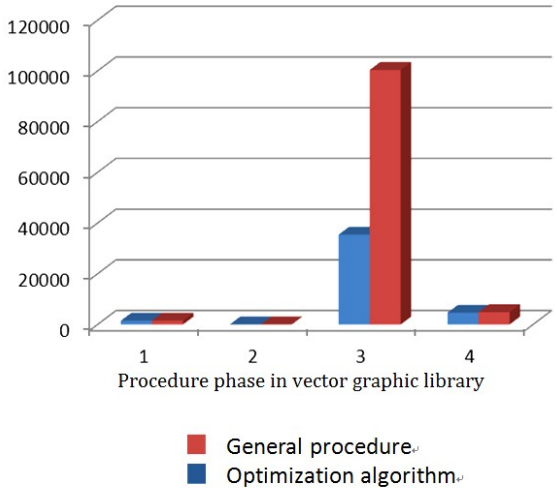


Fig. 10. Execution screnn on PAC Duo and smart TV

C. Analysis result of CloudVG in mobile device

We ran CloudVG on Google Nexus 10. Google Nexus 10 equipped a Mali-T604 which supports the Renderscript programing in Android system. Figure 11 shows the performance speedup by optimization algorithm and GPU offloading mechanism. We can see that optimization algorithm increase the performance 250% in phase III of OpenVG comparing to ShivaVG.



D. Analysis result of CloudVG in cloud platform

Figure 8 presents our performance speedup. CloudVG uses multiple virtual machines to convert the bitmap to vector graphic format and achieves near-linear speedup on cloud computing platforms.

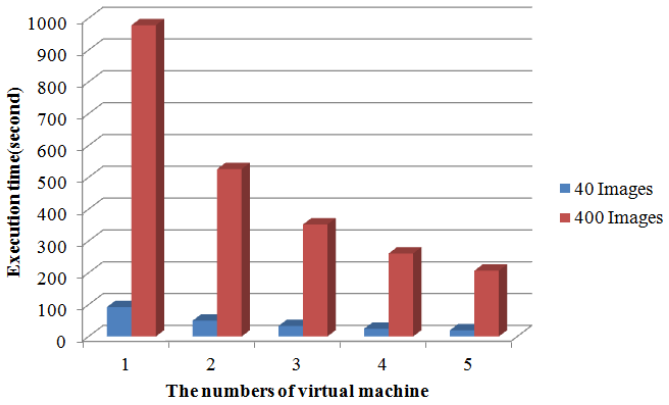


Fig. 12. Performance of file transformation in Cloud

5. Conclusion

In this paper, we present an E-Book software with vector graphic technology on Cloud Platform, called CloudVG, which consider three factors affecting the user experience of image distortion, perfor-

mance and resource limitation. The basic development tool of CloudVG is the vector graphic library and we optimize the vector graphic library by replacing original triangulation algorithm with monotone triangulation and polygon partitioning. We also integrate Renderscript programming model into CloudVG. In addition, CloudVG also achieves a near-linear speedup by parallelizing the process of file transformation on the cloud platform.

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Integration of multiple learning methods in modern college education

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Abstract

Compared to leaning approach of traditional teaching, autonomous, cooperative and exploratory learning are three useful learning methods in college education. Only mastering one learning method for a college student is not enough. In order to improve students' abilities such as innovation and cooperation, an integration of multiple learning methods in teaching system is proposed in this paper. Firstly, we introduce characteristics of three learning methods. And then features of modern knowledge are pointed out. We discussed relationships among autonomous, cooperative and exploratory learning further. Finally, we illustrated how to integrate the above three learning methods in college education.

Keywords: Automous learning; cooperatiive learning; exploratory learning; collage education

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1. Introduction

The rapid advances in economy and technology have changed the way of students study today. In current years, research of effective learning methods in college education has been aroused extensive attention (Raymond, 2012; Riek, 2013). On the one hand, most people think cooperative learning is a useful skill that should be mastered by a university student (Steve, Emma, Liz & Andrew, 2012). On the other hand, autonomous learning is highlighted by some researchers (Gwen, Amber, Katerina & Wim, 2014; Douglas Elliot, 2013). Moreover, some people argue that exploratory learning should be paid more attention to by the students(Foote Stephanie, Harrison David, Ritchie & Dyer, 2012; Seri & Gal, 2014). In fact, autonomous, cooperative and exploratory learning are three effective learning methods which are different from each other, but have correlative dependence.Only applying one of them is not enough in undergraduate phase. For that reason, it's necessary to explore difference and relationship among themselves. To meet the specific learning needs of students, how to integrate the three learning methods effectively in college education is very important, especially for improving the undergraduate learning efficiency.

2. Characteristics of three learning methods

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2.1. Autonomous learning

Autonomous learning is a type of highly self-conscious, self-directed and personalized learning. Autonomous learning is flexible. An investigation shows that most excellent students master the skill of learning knowledge autonomously. During the study process, they usually have clear aim and choose their learning content with a suitable learning method. They excel in solving problem and overcoming difficulties.

Autonomous learning is the core competence required in lifelong learning, it is not only important for the students' academic achievements, but also benefits improving their learning motivations. Particularly important is autonomous learning increases individual autonomy.

2.2. Cooperative learning

Cooperative learning is a form of autonomous learning (AL) in which small groups of students work together on an issue. This method provides opportunities to develop social and communication skills and group thinking. The aim of cooperative learning is to achieve higher levels of cognitive learning using personal knowledge within a collaborative team.

2.3. Exploratory learning

Exploratory learning, proposed by the scientist of university of Chicago, is the production of education modernization of USA in 50's of last century. For the students, learning process is similar to the explore work of scientist. This kind of learning is open, and not limited to class hour and classroom practice. What the students study are not fixed at text books or subjects. Raising questions and solving the problems are very important in exploratory learning. So openness and critical thinking are the main characters of exploratory learning.

3. Characteristics of three learning methods

In modern society, the knowledge has characteristics of constructiveness, situatedness, complexity and tacitness.

- Constructiveness
  Knowledge building includes individual knowledge building and collaborative knowledge building, which was proposed by Carl Bereiter and Marlene Scardamalia. Task of knowledge building is to create or modify public knowledge. The built knowledge can be used by the people.
- Sociality
  Knowledge not only exists in the individual, but also consists in a team or a community.
- Situatedness
  What the students learn in the university should be similar to the situations that they will meet probably off campus in the future.
- Complexity.

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The knowledge structure has the characteristic of openness. We can't master the knowledge with an isolated way.

- Tacitness

  Concept of tacit knowledge was proposed by Polanyi in 1958. He pointed out that there are two types of knowledge contained in a brain: explicit knowledge and tacit knowledge. As explicit knowledge, which can be expressed as information, is codified and formally stored in specific media. While tacit knowledge is that which cannot or has not yet been expressed as information. Knowledge could exist in both explicit and tacit forms, but tacit knowledge is the larger and more important of the two (Chilton & Bloodgood, 2008).

4. Relationships among the three learning methods

It was pointed out that modern learning includes three aspects, namely content, motivation and interaction (Illeris Knud, 2010).The content means what knowledge should be studied. The motivation is the power source of learning, and it plays an important and necessary role in learning process. The motivation affects persistence and effectiveness of learning also. The study usually happens in a social situation, it needs interpersonal communication. Therefore, Autonomous learning, exploratory learning and cooperative learning correspond to content, motivation and interaction.

Group work has been recognized as an effective way of improving students' learning experiences. Cooperative learning helps to promote work-related skills, develop deeper level of understanding of complex tasks and manage time-consuming tasks. However, cooperative learning is based on the autonomous learning. As any individual of a group, if he wants to contribute to a rise in knowledge of the team, he must learn more and more knowledge autonomously as he obtained knowledge from his group member. The more knowledge he learns autonomously, the more chances he will have to exchange information and cooperate with others, which will promote autonomous learning further.

Exploratory learning is based on the autonomous learning also. But different from cooperative learning, interest is highlighted in exploratory learning. Long time in-depth autonomous learning may change to exploratory learning. So exploratory learning is a higher level of study. When exploratory learning is extended to a certain degree, an effective learning approach that is called cooperative exploratory learning is need. In process of cooperative exploratory learning, every member executes a sub-exploratory task, and they cooperate with each other to finish a complete complex exploratory task in a group. Cooperative exploratory learning integrates the features of cooperative learning, exploratory learning and autonomous learning.

5. Integration of learning methods in college education

College education comprehends the training of many kinds of ability. In undergraduate phase, only master one learning approach for a student is not enough. They should obtain new knowledge through various channels and improve their abilities such as innovation, cooperation and so on.

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Therefore, integration of multiple learning methods in modern college is proposed which is shown as figure 1. The teaching activities include theory and practice. And these activities are executed in class or outside class. For the in-class activities, anywhere cooperative discussion and cooperative project belong to cooperative learning training, which will provide the student ability of Knowledge fusion and interpersonal communication. The other two in-class activities are lecture teaching and lab work, which are traditional teaching methods and implanted in fixed room.

Anywhere outclass reading is a useful theory learning approach, and it can widen student's thoughts. This reading work can be done outside class. In order to increase the student's ability of exploring unknown world without limits, anywhere exploratory experiment is essential. This type of experiment is based on the interest of the student. Any fantastic idea is reasonable and encouraged.

There is no doubt that the proposed integration enables teachers to enrich their language courses. The multiple learning methods training provide students with experience that is reflected upon, which will be translated into useful knowledge for their career in the future.

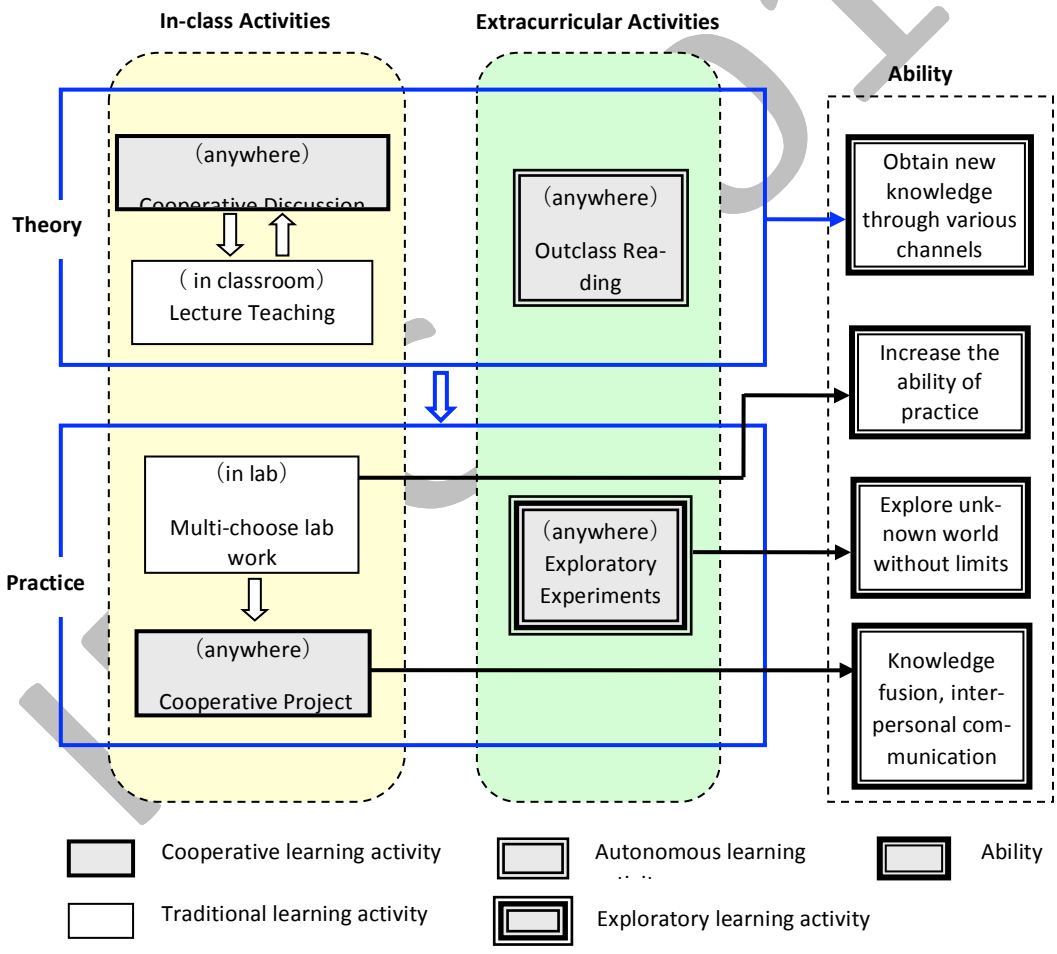


Fig. 1. Active, cooperative and exploratory learning in modern college education

6. Conclusions

In today's higher education institutions, students should not to be passive recipients of knowledge from the lectern. Therefore educators should integrate multiple learning methods training in the teaching activities, and create opportunities for students to master various learning methods. Autonomous, cooperative and exploratory learning are three useful learning methods for college students. Relationships among the three methods are mutual independence but complementary each other.

Acknowledgements

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Integration of Web 2.0 Tools in to Non-formal Learning Practices: A Case Study of IBM

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Abstract

This research identified the specific benefits of online collaboration tools, and explored how their usage has been appropriated by employee volunteers for their practice of volunteering and how they influenced the process of their meaning-making. By doing so, it raised an awareness of the digital tools that provide collections of traits through which individuals can get involved in non-formal learning practices by having digital interactions with others.

Keywords: digital learning, IBM, volunteering, Web 2.0, e-collaboration, blog, wiki

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1. Introduction

This study provides an insight into how online engagement enabled the continuation of non-formal workplace learning practices such as volunteering and opened up possibilities for new ways to contribute to the learning process of employees. Today's workplace settings are in constant need of recurrent learning processes interwoven with daily tasks on digital spaces. However, these digital spaces are not devoid of any issues and hence suggest the need for employees to be conscious of the emerging issues. As every knowledge-intensive entity needs to support their employees' development in non-classroom and non-instructional type of learning the crucial aspect of digital applications in terms of contributing to related processes of knowledge creation by fostering collaboration needs an emphasis. While doing this I reflect upon the strategies adopted in alignment with the umbrella term of "Web 2.0".

This research study explores how online communities are created by employee volunteers and also provides an understanding of non-formal learning practices within such fluid settings; important issues for organizations interested in non-formal learning practices of their employees are also being raised.

The study conveys a context-driven collaboration model focusing on learning through collaboration throughout a volunteering programme. This volunteering program matches communities' needs in the developing world to IBM employees' learning processes in a collaborative and integrated manner. This volunteering model involves a decentralized, employee-generated learning process that is driven by collaboration with colleagues, online resources and experts within the organizational setting in IBM. I identify the affordances of various digital tools from the perspective employee volunteering, and how these affordances can be leveraged to support employee choice and autonomy. The volunteers made a decision for using these online collaboration tools on their own without being under the influence of any

institution, and based on their own needs and ideas they utilized these tools. In addition to being a generic space for sharing documents, the digital environment serves as a joint place populated and created by the volunteers to navigate through information, find personal routes and pathways. This set of tools provides contextual information in a seamless manner based on the learning needs of the IBM employees. My inquiry in this thesis related to different volunteering cases that deal with the changing usage patterns. I delve into the collaborative processes facilitated by the use of digital tools within their volunteering context, in other words, whether and how volunteers were supported by the content conveyed to them via means of relevant digital assets and tools. The volunteering setting embeds aspects of both virtual and physical parts of workplace learning.

2. Literature Review and Conceptual Work

The last decade has been witness to a shift from the individual to the constructive and social aspect of knowledge in the existing epistemologies (Easterby-Smith & Lyles, 2003). Such a direct shift of focus onto the social nature of meaning and practice can result in the redefinition of the organisation itself as a community of practice (CoP), with organisational dimensions that convey meaning to these practices meaning.

The prominent scholars Lave and Wenger who firstly made a definition of CoP in their famous book with the title *"Situated Learning: Legitimate Peripheral Participation"* studied how situated learning takes place as a result of the relationships built by "master practitioners" and "newcomers". CoP 's can also refer to places in which which "communicative action" occurs (Polanyi, 2002). The mutual creation of knowledge mediates these actions (Wenger, 2004). While CoP's function as a ground for knowledge creation and transfer (Lesser & Prusak, 2000; Wenger, 2004; Wenger & Snyder, 2000) they exist at the crossroads of intellectual and social capital. Within the current body of literature it is a common belief among scholars that CoP's support the basis of social capital, which is mandatory for creating knowledge and its dissemination (Lesser & Prusak, 2000, p. 124).

According to Wenger (1999), CoP framework can be implemented within both "intra" and "inter" dimensions of organizational settings due to being "an integral part of our daily lives" (Wenger, 1999, p. 6, 7). Building further upon the concept of CoP, Wenger utilized it to establish a comprehensive theory of how individuals within collective settings such as organizations work together (1999; 2000; 2004). In his book, *Communities of Practice: Learning, Meaning, and Identity*, Wenger (1999) states that organizations can be considered as assemblies of CoP which can reach even beyond their confines and be situated either within or between formal networks (1998, p. 30). In addition, some scholars utilized the concept of CoP to put cross-sector collaborations under scrutiny (Lathlean & le May, 2002; Dewhurst & Navarro, 2004). These scholars have also contributed to my motivation for approaching the CSC Program from the perspective of CoP. These studies suggest that organizational initiatives provide a fruitful ground to implement the CoP theory.

The term "joint enterprise," referred to as the shared purpose of practitioners in a particular field is used as one of the main characteristics of a CoP (Wenger & Synder, 2000). Similarly, according to O'Donnell *et* al (2003) CoP's are formed around a common interest established upon the values of their members. These shared interests are set into a negotiation on a communal basis (Wenger, 1998, p. 78) around a common purpose. Wenger (1998) describes a "practice as a process by which meaning is provided for one's engagement within the world" (p. 51). According to Wenger (1998), "mutual accountability" (p. 81), which refers to the degree of reciprocal relationship among its members, acts as a glue in terms of holding

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these joint enterprises together. The "shared repertoire" is another feature underpinning CoP (Wenger, 1999, p. 82) and this "shared repertoire" includes the tools and techniques in order for negotiating the meaning and making learning happen (Wenger, 1999). Possible forms for this repertoire range from an informal discussion during a coffee break to a structured meeting based on some decision-making criteria. According to Wenger & Synder (2000), as CoP's often have connotations to business units or teams; additional effort is required to integrate them into organizational settings in order for their power to be realized (Wenger & Snyder, 2000).

IBM's CSC employees can be considered as communities of voluntary practitioners and their means of communication should also be taken into account. These means of communication range from face-to-face interactions to the use of various digital tools. In other words, it is not sufficient to focus only on the individual elements of the CSC Programme such as the volunteers or online collaboration tools, but in particular on their mutual interplay. Crossan *et* al. (1999) states that one of the main barriers against theory development with regard to any organizational practice is whether the unit of analysis should be individual, group, organizational and/or interorganizational. Furthermore, some theorists assert that an organizational practice would not be complete without the sharing of information and the development of common meaning (Daft & Weick, 1966; Huber, 1991; Stata, 1989). Consequently, as an organizational practice must be shared and integrated with the learning done by others (Brown, 1993; Daft & Huber, 1987; Daft & Weick, 1966) the unit of analysis should be the group. Other scholars assert that the unit of analysis should be the organization itself as much needs to be done by organizations themselves due to the fact that the activity is stored with organizational structures, procedures or systems (Duncan & Weiss, 1979; Hedberg, 1981; Shrivastava, 1983; Fiol & Lyles, 1985; Levitt & March, 1988; Stata, 1989; Huber, 1991; Chi-Sum *et* al., 2008). By taking into account these theoretical perspectives, the unit of analysis of this study will be the group as it focuses on the different CSC groups made up of IBM employee volunteers.

2.1. Literature about CSCL

Any academic discussion of online collaboration involves the practice and theory of CSCL (computer-supported collaborative learning). While the focus of much current CSCL work with regard to workplace learning is rooted in workplace interaction, we should keep in mind that contrary to popular belief, CSCL could especially make a difference when it comes to learning outside the boundaries of organizational settings. So, apart from the daily work practices of individuals, the social "situatedness" of learning (Winograd & Flores, 1986) should also become the focus of these discussions (Lave, 1988). Due to the adoption of such an alternative approach "outside-class" activities are considered as a crucial aspect of the social background with regard to the process of learning (Cole & Griffin, 1987).

From the theoretical perspectives of CSCL, learning should be assessed on the group level while technology can support the group processes: According to Scardamalia and Bereiter (1996), the community learns as a whole in a computer-supported learning community while the term "community" itself needs a re-conceptualization taking into account the definition provided by Lave and Wenger (1991). Engeström (1999) took a wider learning approach and studied how learning occurs during the interaction of multiple groups among each other. Stahl (2001) claims that these theoreticians (e.g: Lave, 1996; Engeström, 1999) derive their social theories based on Hegel (1967), Marx (1976) and Vygotsky (1978) and that these CSCL theories are disputative due to the increasing complexity of the history of philosophy and theory since the times of Descartes. According to Kant (1787), our conceptualization of the outer world was represented by the human mind, which involves a basic structure rather than being simply given by the material world. Hegel (1807) adopted a developmental view and grounded the process of representation in changes throughout the history. According to Marx (1867/1976), these changes are grounded within socio-economic phenomena. Later on, another famous scholar, namely Heidegger (1927), suggested another perspective in which the human being is more firmly situated in the world than Descartes' approach. Figure 1 shows a graphical representation with regard to the different social and individual theories of learning.

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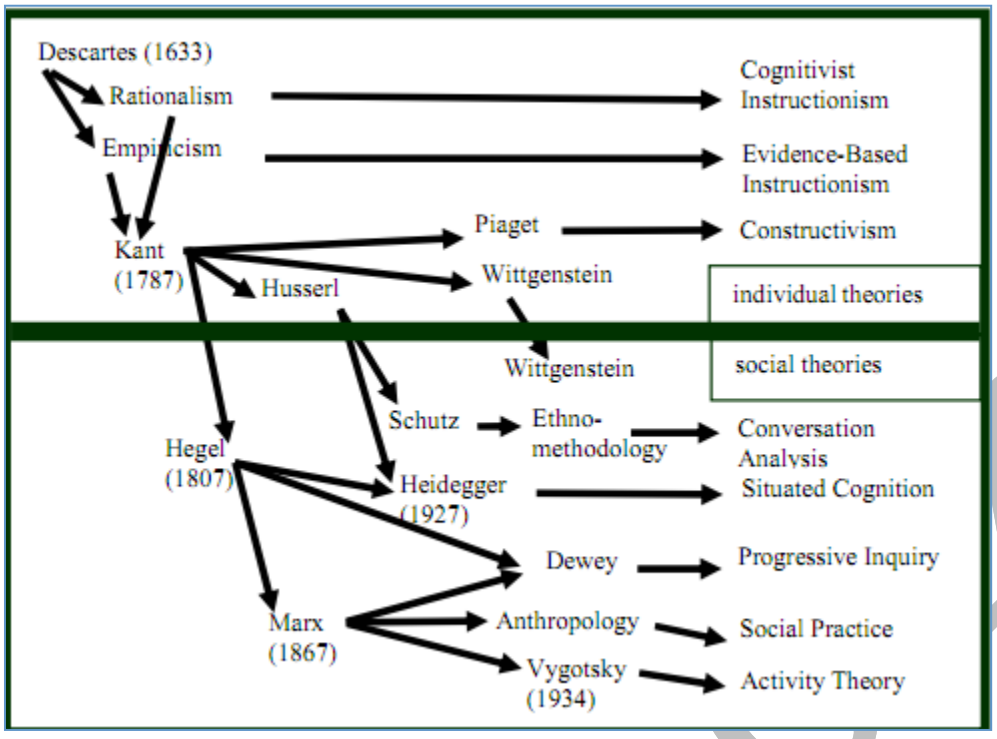


Fig 1. Graphic representation of individual and social theories of learning (Stahl, 2001)

Taking into account these individual and social theories of learning there are two main approaches of defining CSCL:

According to the first perspective, CSCL can be seen as an "umbrella term" which provides a fertile ground with regard to the development of multi-faceted perspectives on related topics. In fact, this approach provides a further ground for the creation of many new research areas such as Computer Supported Cooperative Work (CSCW) (Bannon et al., 1988, Bannon & Schmidt, 1992).

The second perspective is related to understanding the related problems and concerns in detail and establishing a shared understanding on the object of study which would further contribute to the development of the field. As there is no unified definition for CSCL, a compositional perspective might be taken in which the meaning of the term is built from its components. So, possible questions that can be asked include what do people mean by collaboration or learning and by CSCL. Rather than imposing an exclusive interpretation on the meaning of CSCL, the focus of research can shift to workplace learning, in this case to the specific initiative of employee volunteering, and how it might be supported by the online collaboration tools.

Table 1 provides the differences between traditional and collaborative learning as explained by Mandl & Krause (2001). A constructivist learning theory underpins the concept of CSCL. According to this theoretical approach, learning involves a process guided on one's own which requires a conscious knowledge creation and hence the previous experiences, skill set and mindset of the individual influence this process (Mandl & Krause, 2001). Additionally, there is a second constructivist approach with regard to knowledge-sharing: "to solve problems in a self-organized way" (Arnold & Schussler, 1998, p. 78). Within this regard it is crucial for organizational stakeholders that different types of learning are facilitated by supporting learner-oriented, social and situative learning (Mandl & Krause, 2001).

Table 1. Differences between the traditional and collaborative e-learning model (Mandl & Krause, 2001)

	Traditional Approach	Collaborative Approach
The objective of learning	Being qualified for expertise	Skill
Know-how	In progress, memorized	Construed
Paradigm	Solving a problem, gaining an understanding	To enhance related experiences and practices
Technology use	Dissemination	Communication, learning in collaboration The metaphor of participation
The mode of involvement for learner	The metaphor of acquisition metaphor	Dynamic and complex model
Interaction type	Delivery model	

Timothy Koschmann, one of the prominent scholars in this field asserted that this shift in pedagogical models due to the use of technology represents the start of a new paradigm according to the Kuhnian perspective (Koschmann, 1996). Koschmann (1996) further stated that with CSCL the emphasis shifts from the personal development onto the group cognition and due to the incompatibility of this perspective with the conventional view which is more individualistic, it meets the requirements of a new paradigm as determined by Kuhn (1962).

In my view, rather than trying to come up with a unified approach for empirical research in CSCL researchers should focus on how individuals collaborate with digital tools which might also be relevant for the CSC Programme. In my point of view, the aim should be to elaborate on the ways of using these tools in an effective way in order to obtain the commonly shared goals which is one of the underlying features of collaboration.

3. Research Methodology

This section discusses the key research questions, the overall methodological approach, the design of the study and research methods and strategies as well as ethical issues, and a short precursory description of data analysis planned including a pilot study.

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3.1. Research Questions

The study aims to answer the following research questions:

- How are collaborative learning tools used for the volunteering practice of knowledge workers?
- What are their assumptions about the benefits and challenges in using these tools for such a practice?

In conceptualising the participatory nature of this research study, I have derived my approach from the framework offered by Fajerman and Treseder (2000) that specifies six different ways for involving participants ranging from no involvement at all to the involvement of the participant initiated on his own or based on decisions shared with the researcher. The methodology used in this study belongs to the group of "consulted and informed" as defined by Fajerman and Treseder (2000), in other words I as a researcher designed the study while the participants' opinions are taken seriously. Needless to say, the participants are informed of the complete research process (See Figure 2).

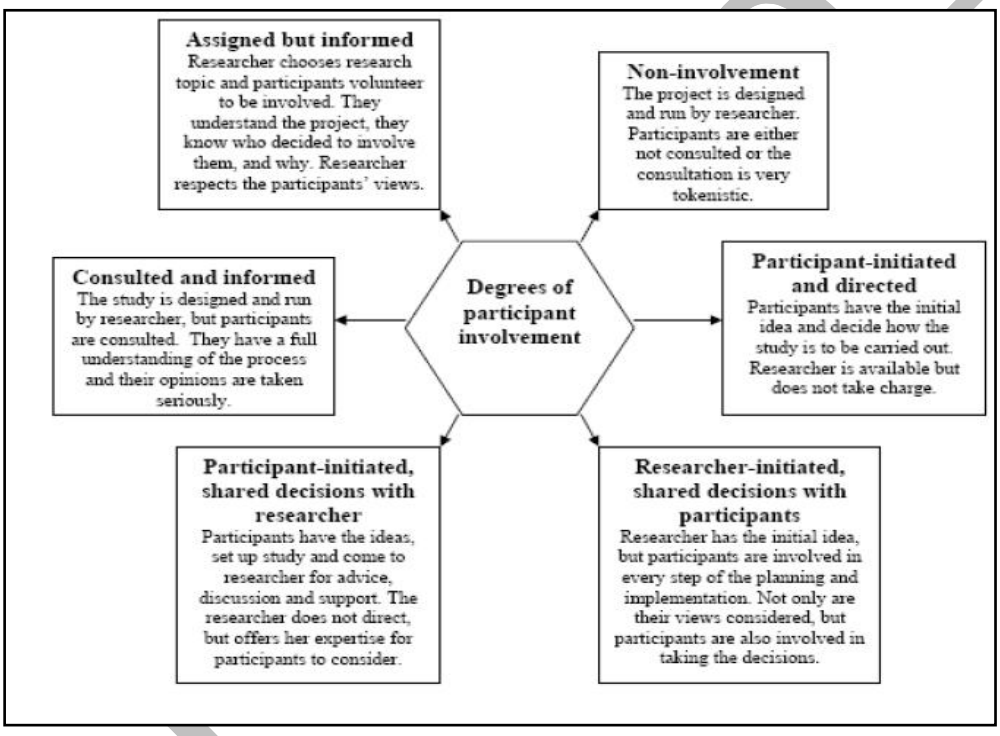


Fig 2. Fajerman and Treseder (2000)'s model for levels of participant involvement

3.2. Data Collection

Data collection has the following main sources:

- information based on the online survey,
- digital artefacts such as blogs and wikis and
- transcripts from the interviews.

The data collection methods of this research study include an interview an online); and review of digital artefacts all of which have been utilized in both participatory design and related participatory research. A cross table in order to match the online survey and interview details was developed. Table 2 provides the data collection methods based on each stage.

Table 2. Breakdown of data collected

Stage One- context	Stage Two- case studies	
Survey	Interviews	Digital artefacts
12	17	30

3.3. Data Analysis

To conduct the quantitative data analysis, SPSS was used while for qualitative analysis Excel was used by separating content into appropriate sections and manipulating it. Open comments provided about the answers were put into an additional column in the Excel file. In order to see whether some general patterns emerge an overall descriptive analysis was conducted based on the available dataset. A further analysis of these patterns showed whether there were differences among the volunteers. Based on the emerging patterns I coded the qualitative data and ranked the results or directly quoted to support the quantitative findings.

After data collection at the level of individual participants, I tried to put each case study into analysis individually followed by an overarching study across the cases (study of cases). The main purpose of the qualitative data analysis was to extract and abstract from the complex data any evidence with regard to the activities and experiences with online collaboration tools to convey responses to the research questions. I transcribe relevant extracts from the interviews to supplement the results of the survey. I used this analysis to convey more detailed information about the approaches that the participants put into use and in which ways the tools had an impact on both their approach to collaboration and their knowledge-sharing activities.

For further analysis, all verbatim transcripts of the online interviews with the interviewees were imported into NVivo. Table 3 provides an overview of the alignment of suggested coding categories with research questions and interview questions. Digital artefacts such as entries into the CSC Programme wiki, blog or Lotus Notes tools served as supporting sources. The themes and the categories to which they belong have been changed in case of any differences until a common agreement has been reached among the participants.

Table 3. Overview of the alignment of the suggested interview coding categories with research questions and interview questions

Research Questions	**Mapping with Interview Questions**	**Mapping with an Interview Coding Framework**
How are collaborative learning tools used for the volunteering practice of knowledge workers?	1. How does your organization make an effort to contribute to the usage of online collaboration tools during the CSC Programme? 3. How many times in a day do you use any of the online collaboration	DESCRIPTIONS OF USAGE (i.e. where participants describe how they use online collaboration tools thro-

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	tools to exchange information with your colleagues and other related individuals involved in this CSC Programme? Please give me some examples of what you use and how you use it.	ughout the CSC Programme) CHOICES ABOUT APPROACH: Reasons why participants use
	8. What are the factors that can contribute to your engagement with online collaboration tools?	online collaboration tools throughout the CSC Programme
	10. Is there anything else about your use of online collaboration tools that I could have asked you? Or anything else you would like to add?	
What are their assumptions about the benefits and challenges in using these tools for such a practice?	2. What are the main factors that allow/limit your organization to facilitate the use of the use of online collaboration tools within this context?	FEELINGS ABOUT USAGE (confidence, difficulties, concerns)
	4. What are the main factors that allow/limit your organization to facilitate the use of the use of online collaboration tools within this context?	SUPPORT- SOURCES (who provides the support; influential people)
	5. Are there any downsides to using online collaboration tools for professional knowledge-building and sharing? For example?	SUPPORT- NATURE (what kind of support)
	6. Do you think using technology – specifically for collaboration in this CSC Programme can be improved? Please give specific examples.	SUPPORT- EVALUATION (how useful or effective was the
	7. What are your key concerns of the use of online collaboration tools in relation to knowledge-sharing?	support perceived to be)
	8. What are the factors that can contribute to your engagement with online collaboration tools?	

4. Results

In line with the approaches above the CSC participants devise and adopt a variety of approaches when using technology to support their volunteering process. The most common types of approach adopted by participants seem to be related to sharing of experiences, knowledge and best practice which can establish the ground for encouraging the use of online collaboration tools. These are outlined in Table 4.

Table 4. Overview of the types of approaches used by CSC volunteers

Volunteers' Approaches	**Examples**
Having co-presence/ Sharing experience, knowledge and best practice	Using Instant messaging; participating in discussion forums; or uploading videos or photos onto the Internet

Meeting new colleagues and experience parts of the world	Having discussions through Lotus Notes communities and tracking the experience of the participants
Navigating through information, find personal routes and pathways	Using internal Lotus Notes platform
Increasing one's knowledge on CSC Programme	Using Edvisor especially before leaving for fieldwork
Reflecting on one's experiences	Blogging
Accessing, creating, sharing and continually improving ideas	Participating in exchange of ideas via blogs and wikis
Participating in networks of distributed volunteers engaging in activities	Using popular Web 2.0 tools such as Ning, FaceBook
Facilitating ongoing communication, dialogue and shared activity	Creating digital artefacts
Supporting one's learning process	Attending online trainings on culture, security and literature reading on social responsibility projects online
Receiving informal support	Using Skype or MSN to communicate with others
Aiming toward a common goal of knowledge creation	Participating in exchange of ideas via Lotus Notes communities, e-mail and wiki
Participating in a team evolution process	Observing others' online behavioural pattern on discussion forums or the wiki
Supporting online communities and relationships between people	Participating in Lotus Notes communities
Having a more authentic collaboration through the creation of digital artefacts	Posting mainly on blogs or contributing to wikis
Recombining the information shared by others to create new concepts, ideas, and services	Utilizing Web 2.0 tools (mostly blogs and wikis)

At the heart of the CSC Programme lies the process of project-based learning that enables the individuals to gain a shared understanding and construe a common basis for knowledge creation. This does not necessarily leave aside individual contributions and perspectives, yet volunteers are not required to segregate their work into discrete tasks to be completed individually and bring them together later on. Rather, they are required to make contributions to the point of views of their team mates for the mutual negotiation of meaning and the joint construction of a project by using online collaboration tools (Roschelle & Teasely, 1995). Coordination is a necessary element only when putting together the partial results of the discrete tasks of the related project (Roschelle & Teasely, 1995). On the other hand, the construction of a joint project through genuine collaboration necessitates a coordinated effort for a joint problem-solving (Roschelle & Teasely, 1995). It involves an interactive process that requires the participation of all group members for mutual negotiation and sharing of ideas (Roschelle & Teasely, 1995).

All these factors displayed in Table 5.0 lead to the emergence of a new volunteering practice that I call as 'distributed' or 'technology-enhanced' volunteering. It is the amalgamation of the social affordances of digital tools, with new informal learning goals and priorities that provide an opportunity for metamorphical shifts in employee volunteering practices.

Table 5 Mapping between research questions and the findings

Research question	**Findings**	**Sub-themes**

	While connection is about enabling a space for activities co-presence is about requiring that everybody participate in these activities.	Usage & Approaches Strategies/Choices Feelings
	Informal and formal distributed cognition are apparent throughout the CSC project.	Usage & Approaches Strategies/Choices
How are collaborative learning tools used for the volunteering practice of knowledge workers?	Through participation in these forms of discussion and interaction, volunteers are provided with the ability to construct their own informal learning trajectories as well as shaping proactively those of others. This observed distributed cognition among CSC volunteers as supported by online collaboration tools directly leads to the temporary construction of one or more group minds.	
	Intersubjectivity is obtained when there is a shared ownership of the activity and a common conceptualization about the objective as a result of the collaborative redefinition of that activity. So, perspectives are negotiated on an ongoing basis.	Usage & Approaches
	The perceived benefits of online collaboration tools can also engender epistemic fluency (Goodyear & Zenios, 2007) which allows volunteers not to underestimate the complexity of existing ideas, norms and practices.	Usage & Approaches Feelings

Evidence of both interdependent use (using the tools for the purpose of collaboration), independent use (e.g: independent use of tools for other purposes than collaboration) are evident throughout the study. Such practices do not often conform with the norms and practices of the conventional volunteering practice. Individual traits such as personal values act as a mediator for the methods of collaboration and learning in social contexts, such as digital environments.	Usage & Approaches Choices
Interrelations among the values of the participants and the digital actions give form to the individual engagement within the collaborative practice of volunteering.	
Volunteers' participation in digital collaboration should not be assumed as being certain. Meaning and value are important for what is afforded for them to participate in online conversations and learn. So, there are different kinds of invitational qualities required such as the ability to make reluctant participants get involved in conversation and support them for finding a meaning through their participation in ways that enable the transformation of existing values and practices.	
Given the situatedness within the context of relations and distributed volunteering networks, the volunteering experience requires a certain amount of commonality in order for collaboration to take place.	Usage
The main challenges were how to find meaningful insights, to decide for the individual roles and responsibilities as well as the delicate balance of internal and external capabilities.	Feelings

What are their beliefs about the benefits and challenges in using these tools for such a practice?	Two individual aspects that appeared to influence participants' decisions about technology use are: • A tendency to participate in a shared endeavour; • A feeling of co-presence	Choices Use & Feelings
	Retention of the co-presence and eventedness, involve to some degree retaining the volunteer's perspective.	Usage & Feelings
	One of the key affordances of various tools used throughout the CSC Programme is its collaborative affordance. That is, the tools have properties that allow them to be used to collaborate.	Usage & Approaches Choices
	Although the tools were not mainly designed for the purpose of learning, volunteers perceived its potential to support learning.	
	The tools cannot be used for arriving at a precise decision.	Critical moment Feelings & Assumptions
	The clarification of mutual roles and responsibilities is essential to effective utilization.	Feelings & Assumptions
	Some participants mentioned that receiving informal peer support is an important alternative to receiving timely formal support.	Support
	Participants equipped with various levels of expertise and areas of interests nourish the volunteering environment with ideas and knowledge that are befitted by volunteers based on their needs. Expertise is therefore distributed amongst all volunteers. Given the 'transformative' nature of such interactions (Pea, 1994), individuals acquire more expertise as the dialogue unfolds and they co-construct knowledge.	Choices Usage & Feelings

There is also the opportunity provided by the online collaboration tools to go through a team evolution process and recognize common patterns in communication styles of group members.	
Some participants expressed some issues of concern such as privacy. Still some of the participants indicated they would collaborate without technology, but they would prefer not to.	Choices Usage & Feelings
Commitment to joint work comes from those we know well and trust -- our strong ties in social network terms. Thus, according to Haythornthwaite (2008) e-learning settings also need to support strong tie formation in order to get work done.	
The different tools enabled the volunteers to navigate through information, find personal routes and pathways.	Usage Choices Skills
The volunteers are also endowed with a flexibility that enables 'collaborative remixability' (Boyd, 2007) – a transformative process which denotes the state of the information which can be recombined to further develop new concepts, ideas, and services.	Usage & Approaches Choices Skills
As the tools can offer individuals access to crucial components of knowledge related to their volunteering projects, it is important that these tools are highly invitational.	
A more liberated definition of community occurred derived from the notion of social networks with an emphasis on social ties rather than geographic location. These virtual communities are place independent, liberated from geography and dependent on technology.	
In CSC Programme, online interaction support offline geographically dependent communities whereas online interaction and engagement go hand-in-hand with overall civic engagement. Also, by using information and communication technologies to improve communities community informatics becomes more important.	

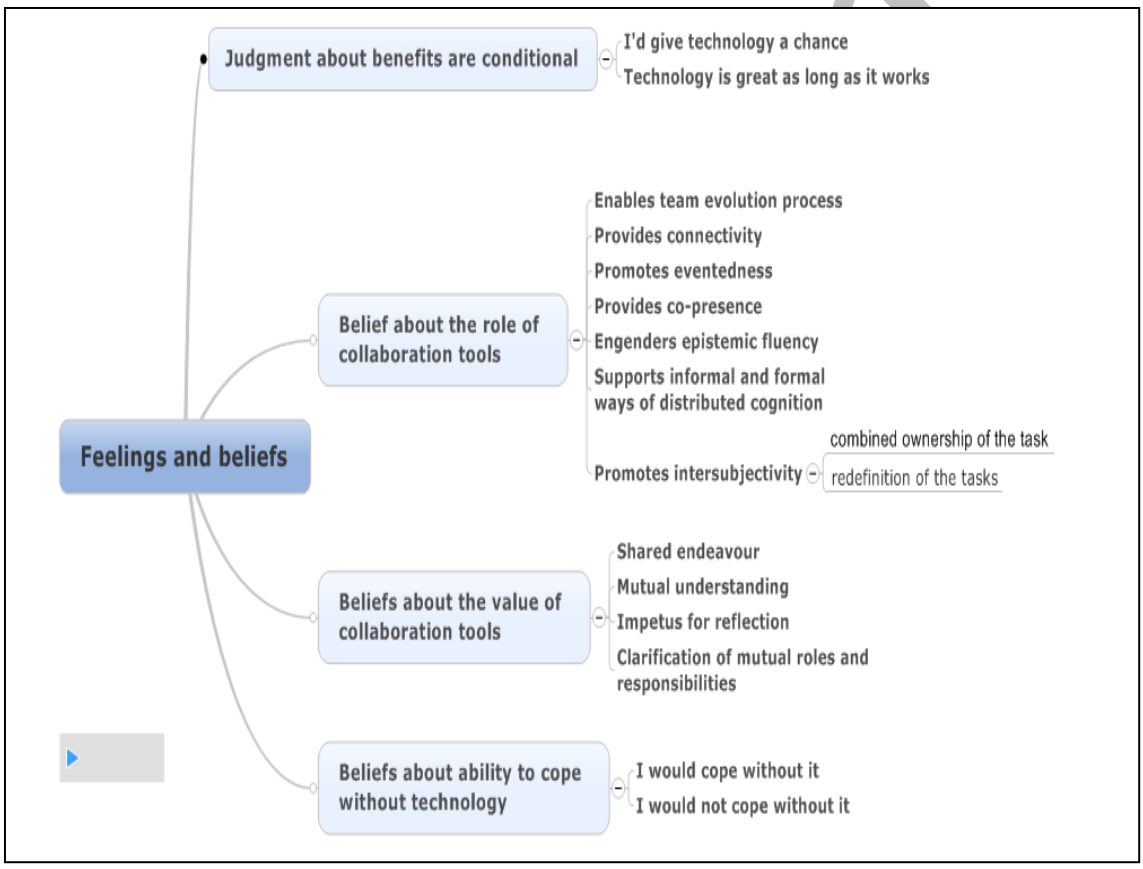


Fig 3. Samples of answers to interview questions

According to Selwyn (2006), who came up firstly with the term "digital decisions", when individuals make empowered decisions to use or not to use technology, they exercise a genuine choice by taking into account its relevance, usefulness or even happiness caused by its usage throughout their everyday lives (Selwyn, 2006).

The choice for not using the technology is also evident in the CSC data. One of the underlying reasons for not using the technology was no being able to "get on with them". It is also evident from the data that several CSC volunteers think that it is up to them to take refined and complicated decisions for the usage of digital tools to aid their volunteering practice. The affordances and features of digital tools mainly underlie this decision-making process in addition to other factors.

The results from the study suggest that the opportunity of both being provided with a feeling of co-presence and eventedness are reasons why participants liked using online collaboration tools mostly CSC participants mentioned that the feeling of belonging to a networked community of colleagues sharing resources and asking for support the value of peer support is also an influential factor

Finally, if there were a particular amount of dependence on collaboration tools due to the assumption that it facilitates an easier collaboration; CSC participants preferred to refer to specific aspects and stated their views in a confident manner, rather than just being in favour of a particular tool or using it.

5. Conclusion

Technologies can provide many possibilities, but they cannot "fix" meanings (Suthers, 2005). Based on this fact, this research identified the specific benefits of online collaboration tools, and explored how their usage has been appropriated by employee volunteers for their practice of volunteering and how they influenced the process of their meaning-making. By doing so, it raised an awareness of the digital tools that provide collections of traits through which individuals can get involved in non-formal learning practices by having digital interactions with others.

It would be disingenuous and naïve of me to promise that the research study will by itself transform the online collaboration experiences of all users. I do however argue that the finding of this research study would increase an awareness amongst institutional stakeholders interested in the practice of employee volunteering to take further action and to provide direct responses to what the participants have said and done.

Furthermore, the concept that the process of employee volunteering should make a shift from the conventional model that has been depicted through this research study and elaborates that participants have created a variety of refined and customized strategies for putting the digital tools into practice to aid their process of collaboration. I assert that the most pragmatic way to view online collaboration tools with respect to supporting employee volunteering or other non-formal learning practices is to consider it an enabling medium through which the individuals can structure and complete their activities. The possibility of making use of the tools to reach beyond the individual volunteering activity and facilitate access to other contexts of activity which can be reciprocally supportive breaks down some of the employee volunteering stereotypes that have been moved back and forth for such a long time.

One of the main challenges faced during technology-enhanced volunteering programs will be the composition of the available digital tools and activities so that each tool can be utilized for its affordance. Despite the fact that this study has taken a step in that direction, there is certainly a need for more studies about what works and what does not in a project-based learning environment. The alignment all the affordances in such a way that volunteers gain an understanding of them and make use of the many affordances can be difficult. So, online collaboration tools should better be distributed within the network of volunteers and embodies within their practice of volunteering so that volunteers have more opportunities to realize and

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take benefit from the affordances of the digital tools. For this purpose, a thorough structuration of the complete environment and the various actors within that context are required: volunteers, digital tools, digital resources and other project stakeholders such as managers.

In the final analysis, the incorporation of online collaboration tools into the CSC Programme is about change in the way the volunteers collaborate with each other, not about technology. This collaborative phenomenon raises the point about socio-technical systems thinking, which stipulates that technology in itself has little meaning. Within the context of employee volunteering, technology gains its value with regard to the collaborative interactions of the volunteers. It's about people and their behavior, not computers. It is about inventing new visions of employee volunteering in the context of a digital world. While the lack of online collaboration tools is a barrier to change, the presence of these tools does not guarantee change.

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Interactive e-learning through second life with blackboard technology

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Abstract

In todays' economically viable worldview scenario, everyone wants to earn sufficient money which can be spent to maintain better lifestyle. There are many factors such as people living in the remote areas without appropriate communication systems or the physically challenged people et al who are not able to attend the traditional college system hence they seek an alternative option to gain education. E-Learning is a best alternative that provides suitable opportunity to all such individuals to obtain the desired qualifications or degrees as quality education even without attending any face to face college system in the educational institutions. The most positive point in E-Learning is that students find opportunity for access to the course materials anytime and anywhere whenever they find time through the use and application of electronic gadgets. Today, every reputed educational institution especially universities worldwide run their distance learning courses under the E-Learning system. Most powerful feature of E-Learning is that it remains an extremely interactive experience. Too many applications and tools are already available abundantly in the market today to promote E-learning in multiple ways. Take for example Moodle, Blackboard, LectureCast, Classroom 2.0, ELE (E-learning Environments) and E-Learning 2.0 amongst others. In this paper, we have focussed on the Second Life by Linden Lab (USA) for educational trainings. It has special instructiveness as we compare to rest E-Learning training methodologies available before us nowadays. It gives an opportunity to the students to attend virtual classrooms and attend lectures. The good thing is that Second Life develops a sense of presence in the students who feel as if they are physically present in the university campuses and spend time with their faculty members or peers. There are several other impeccable and strong features in Second Life. We have focused on Second Life education project to connect with Blackboard which we have already started to use in our university.

Keywords: Second Life, E-Learning, 3D Virtual World, Blackboard, Moodle

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1. Introduction

E-Learning is mushrooming in most universities and Institutions of Higher Learning worldwide where it is used as an alternative education system today. Mainly there are two types of e-Learning concepts namely Synchronous and Asynchronous. Synchronous environment is more interactive than Asynchronous environment because in Synchronous environment users are empowered to exchange all sorts of information during the same time frame. There is no dearth of applications when it comes to supporting e-Learning nowadays. Such applications are easily available in the market and are especially meant to make e-Learning a hassle-free experience through all possible supports required. Some popular applications, widely practiced in every nook and corner of the world, include Blackboard, Moodle, OpenSim (Linden_Labs, Second Life 2009) and Second Life (The_Open_Simulator_Project, 2009) Today, Second Life (SL) has emerged into one of the most popular 3D multiuser virtual environment applications with its practises increasing each passing of the day. Many leading universities in the world prefer using SL for teaching and

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learning purposes. Approximately 500 universities and colleges around the world have preferred SL (http://secondlife.com/; M., Fominykh, E., Prasolova-Førland, M., Morozov, and A., Gerasimov, (2008). The advantages of SL are variegated in nature so most users have options to build their own knowledge bases through the help of the tools present in SL. This paper describes the main features of SL like how it is useful for educational purpose and what are the challenges which one might face during its usage? An important idea which has summed up through connecting SL with Blackboard is to explore the avenues which bring more attractiveness and user friendliness environment for students and faculty members alike. This concept though also carries many disadvantages (C., Allison, A., Miller, T., Sturgeon, J., Nicoll, and I., Perera, (2010) which mainly relates to the restricted programming, backup problems & network conditions besides other issues such as server loads. Such aspects prevail due to it being centralised in nature and concept (C., Allison, A., Miller, T., Sturgeon, I., Perera, and J., McCaffrey, 2011). According to a research done recently, by the end of 2012 approximately 70% organizations have already started using virtual world tools through setting up their own Lands and experiential spaces (Hew, K.F., & Cheung, W.S., (2010) & so was the prediction for 80% Internet users to use Virtual Avatars which seemed coming true (Chang, V., Gütl, C., Kopeinik, S., & Williams, R., (2009).In this paper, we have described our new experiment, "how to get the benefits of two e-Learning technologies with the combination of their services and facilities (Blackboard and Second Life). First tool lacks some features and the other fulfilling such things and vice versa. The methodology of this paper clearly describes how and why this decision has worth.

1.1 History of second life

Second Life was launched by Linden Lab in 2003 for the public use. It though gained ample popularity during 2005-06 with drastic increase of its users. Nowadays, it has already attained 36 million registrations. Linden Lab was founded by Philip Rosedale in the year 1999. Earlier, Linden Lab's motive was to develop hardware for the Virtual world. The product name given was **The Rig** but after sometime they began working on SL to support the Virtual world. Learners can now create objects and textures in SL through the help of its variety of built-in tools which are already made available in SL. Linden Lab developed a scripting language named Linden Scripting Language. Residents (Avatars) can use other's scripts as well. Residents have good scope to communicate with each other through the Avatars (Y., Zhao and L., Wu, (2009). Learners can import the objects, textures and animations through the support of external software available in SL which provides a Virtual market to sell and buy products.

1.2 Benefits of second life in education systems

It might look strange but the fact is undeniable that you may visit to other countries without leaving your classroom while using SL. Of course, you feel at home while use SL especially once learn about other's cultures besides acquiring newer skills, engaging yourself in the entirely new forms of communication to interact with others and so do you increase 'people's skills' further. You have an entirely new way to solve the problems that might not been possible to perform in the 'real world' scenario. Other advantages include connecting to other online communities, forging new links and friendships and last but not the least finding new opportunities to collaborate and go for social interactions while you are at self-paced learning route to suit all possible learning styles. You have best opportunities to create, comment and share contents with other users through SL and in the meanwhile there is an opportunity to integrate within the blended learning system to avail maximum benefits. SL therefore offers range of opportunities for researchers because of collaboration and connection between the users. You are exposed to whole range of possibilities which you might not have utilized on the previous occasions.

1.2.1 Changing the trend of existing traditional system

In SL, users have privilege of creating Objects and Avatars as per one's wish or preferences. Users can also exchange information and so do they publish their work on SL.

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1.2.2 Availability to remote area

Students can use SL who live in the remote areas. It therefore saves time and energy of those students staying at any far off distant regions from the universities or colleges they have enrolled. It provides them real scenario through the 3D presence.

1.2.3 Interactive

Students feel as if they are present in the institutions in real terms through the help of Avatars. It is equipped with voice and chatting facilities for exchange of information between the users. They can definitely share their knowledge and experience through literally living in a second life while they use SL.

1.2.4 Collaborations & connectivity with other e-learning applications

Students and instructors can create their own groups and connect with the other Educational Groups or Organizations to share knowledge without even having any physical presence. There is no need to be present physically at any Institution from which any group wants to share desired information. It ultimately reduces the cost of education which is one of the added benefits. It can be linked with 2D Web, Blackboard, & Moodle with the help of Sloodle (Sloodle, http://www.sloodle.org/moodle/) Moodle is used to create online learning sites (Moodle, http://moodle.org/). It is an open source application for e-Learning.

1.3 Business opportunities

It is unique and interesting fact that SL runs its own currency which has been named Linden dollars. Near about sixty thousands of SL users do exchange their real currencies with Linden dollars to go with the business opportunities of one kind or another. Most users do earn sufficient money through buying and selling lands, involvement in advertising activities, stores, scripting & several other roles which are professionally impeccable. It is worth noticing to see hundreds of thousands of companies already existing in SL who often involve the users to work on the roles like 2D and 3D animation etc., for their active involvements. Good number of World Tour Agencies operate through SL. If it is in the field of Education then users have opportunity to set up their own institution for specific training options to explore (http://secondlife.com/destinations/business; http://secondlife.wikia.com/wiki/Business.). Those willing to attend such classes are charged certain fees to attend the classes. In some cases such classes are also offered free of cost depending upon the educational world and the nature of trainings given. One of the recent examples can be witnessed in Egypt where SL became a medium of training for the annual "HAJ."

1.4 Issues and challenges in second life

1.4.1 It takes a lot of time

It requires a lot of time to obtain skills to create objects and Avatars in SL such as in a case students and faculty members plan to create some project in SL, they require sufficient time to create the projects. You

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have to first learn how to create the objects like wall, chair etc., and Avatars which students or faculty members or both want to use.

1.4.2 Internet availability

SL requires high speed internet connection and computer devices. It should be noted that operation might become difficult in the developing & poor countries where lack of infrastructure and high speed broad-band services are not easily available so bunch of problems welcome users. Furthermore, the next issue is factors related to the economic conditions of such countries. All learners willing to utilise SL must spend sufficient money for computer devices & high speed broadband services to avail such benefits.

1.4.3 Privacy issues

(i) All Avatars present in a particular area can see other's names and an Avatar can't change his SL name.
(ii) Residents can interfere in the conversation between other residents through the help of scripts. \

2. Literature survey

Case studies and surveys done ever and those evaluated by previous researches shows that Virtual 3D e-Learning environment boost distance education sector. It is highly beneficial for students which can increase students' engagements and experiences (Brown, J.S., and Adler, R.P., 2008; Carr, D., 2008). Martino (Martino, J., (2007) & Van den Brekel (Van den Brekel, A.J.P., (2007) found that Virtual environments are best substitutes for those students unable to attend traditional face to face teaching systems. According to A., Jamaluddin, Virtual experiments give great environment for Teaching & Learning (A., Jamaludin *et al*., (2009). According to Kemp, J., and Livingston, D., SL can be used to create 3D experiential based the projects for e-Learning (Second Life, Last accessed 7th April 2008 From:http://www.secondlife.com; Kemp, J., and Livingstone, D., 2006). SL was not designed especially for the education sector but it is widely used in the education field nowadays. There are many other virtual worlds available in the market today from Open Sim, ThereWorlds and et al. But SL is best among such Virtual world tools. SL provides communication, group discussions and collaboration of groups and communication between group members (M., Hobb *et al*., (2006)). Several researchers agree that SL has great impact due to its effectiveness on both either hybrid or fully online courses (Jarmon, Keating, & Toprac, 2008; Jarmon & Sanchez, 2008; Nicosia, 2008). According to an estimation more than two hundred educational institutions and universities use SL presently to deliver their online lectures. An Educators listserv (SLED) helps and promotes best practices in education. It provides important materials for the instructors willing to use it in the classroom. Another Listserv, Second Life Research listserv (SLRL) deals with the current applications in SL, new methodologies, measurement, assessment & virtual conferences. More than eighty per cent universities in the UK are associated with SL. Over one hundred and fifty universities in the United States of America (USA) own their islands in SL. It gives classroom feeling with fun learning experiences. SL needs technical experts in the fields of multimedia and programming to create their educational projects. It also needs full training to use SL for instructors. If we compare SL from rest traditional e-Learning techniques such as LMS (Learning Management System) for example Moodle, Blackboard etc., it is clearly an indicative that it is tough to use SL (Virtual Learning Techniques).

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3. Methodology

Northern Border University (NBU) in Saudi Arabia has already started using Blackboard to promote e-Learning in its various colleges. Although Blackboard is an excellent e-Learning tool but the concept of virtual reality facility is still not available in it. Blackboard definitely gives facility to integrate with Second Life. Keeping in view the use of SL in our university we conducted a survey for that purpose. It started with providing platform to university's coordinators and faculty members for thorough discussion with all those parties involved in the e-Learning concept as a team representing different departments of NBU. The initial steps were through showing demos and short trainings on Second Life from its application to use amongst others.

We selected the variables for a survey which are listed below, and their description is mentioned in the table. We compared these two applications according to the facilities they offer and according to our needs in NBU at present. These are key factors which we have taken for comparative study. The table below shows comprehensive comparison between SL and Blackboard.

The Key factors (variables) on which we have taken the decision is:

(i) Application

(ii) Environment

(iii) Tools

(iv) User Friendliness

Table 1. Comparison between Second Life & Blackboard

Parameters Used	Second Life	Blackboard
Applications	It can be used for educational business, and religious or anything which any user wants to create.	It is only for Educational purpose.
Environment	3D Virtual Environment helps the Participants to Represent it through the help of Avatars.	Interactive Websites, No concept of Avatars.
Tools	Fully User Created Ideas are Implemented via Videos, Audios and Chats etc.	Predefined learning tools are available like courses, tasks and questionnaires.

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User Friendliness led	Required Highly Skilled People to Use	Not required high skil-
and Create Contents.	People as it is easy to use.	

Results:

We selected few Questions (Multiple choice) which are based on the variables selected that we have selected according to our needs. For example-

Q. On which e-Learning application you can represent yourself virtually (Imagine your cybernetic **(means your Virtual Image)** will be there during class time (It is called 3D Virtual Learning) and can talk with the students & vice versa.

Options were:

a. Face to Face (Traditional) Learning

b. Online Learning

c. 3 D Virtual Learning

d. Blended Learning

Figure1: First Data is collected for Second Life

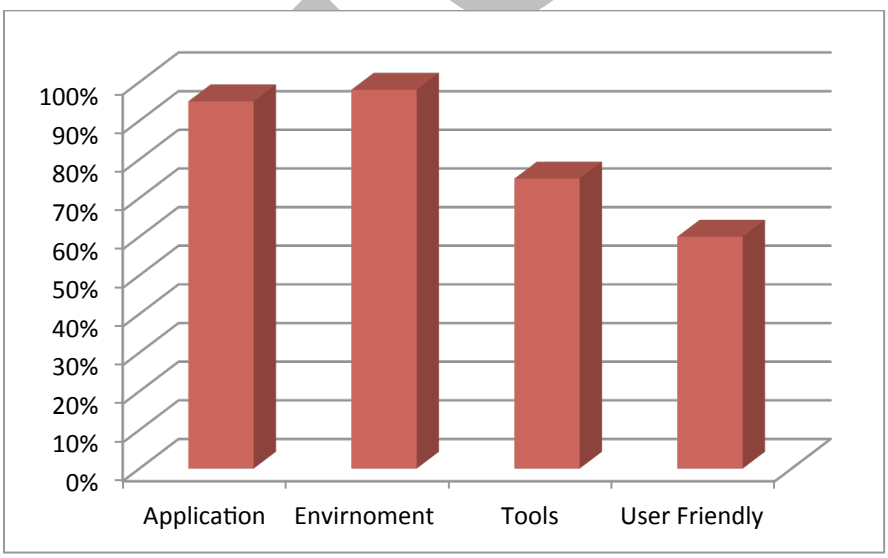


Figure 2: Second Data is Collected for Blackboard

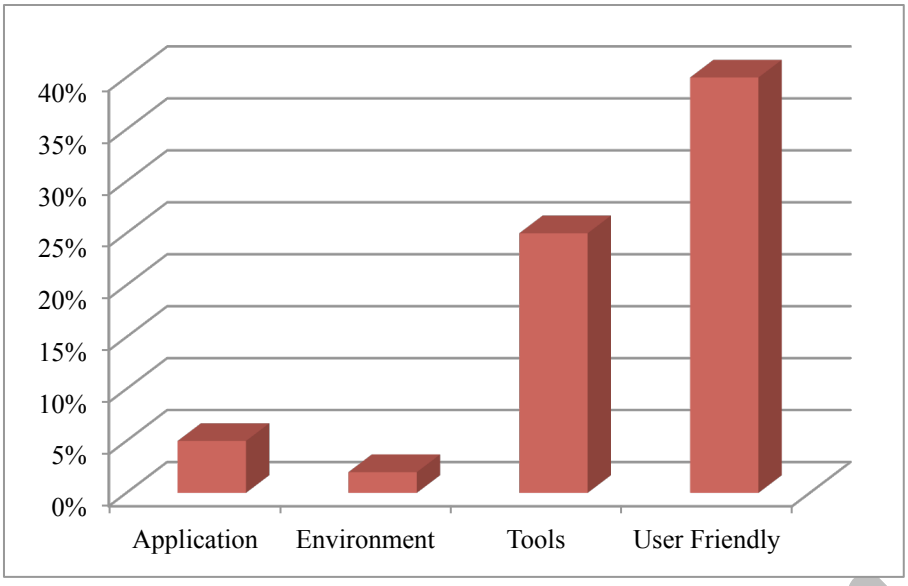


Figure 3: Compare Graph between Second Life & Blackboar Data

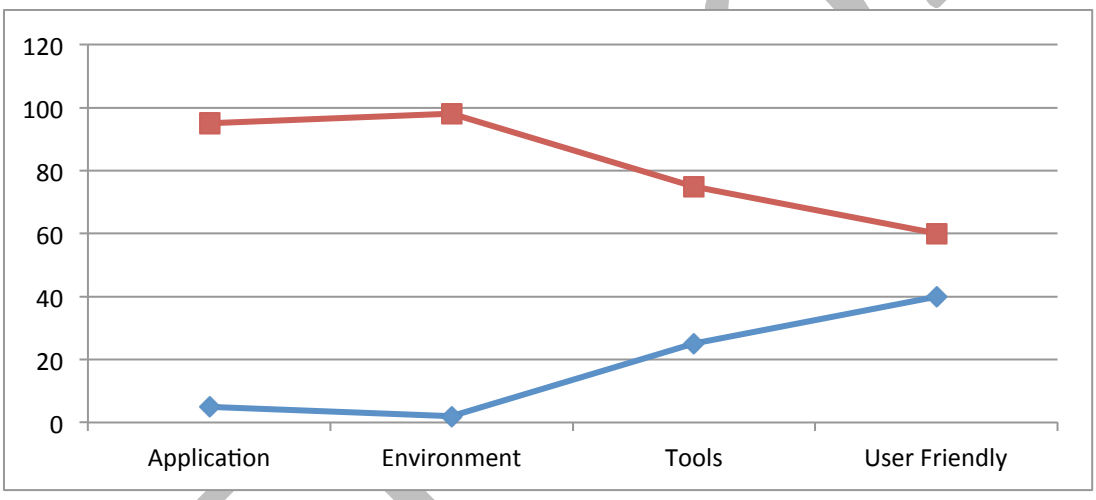


Table 2: The Compare Table Percerntage is:

Compare Percentage	Second Life	Blackboard
Applications	95%	5%
Environment	98%	2%
Tools	75%	25%
User Friendliness	60%	40%

After the completion of our survey, we found that 95% people like application part of SL while 98% liked environments of SL but it is not easy to use and prepare materials on SL with the percentage going down to 75% and 25% respectively. If we look at Blackboard part then people voted for the tools are 25% while for the user friendliness it was 40%.

People who voted in this survey represented technical background. It is noticeable that with such backgrounds their suggestions were approximately 25% for tools use and for the user-friendliness it was 40% then it remains a tedious idea that persons from rest departments would have maximum usability.

We concluded that the need is to combine Second Life & Blackboard in the current scenario in NBU for effective promotion of e-Learning tools. Combined benefits like Blackboard offering best of prepaid materials and Second Life providing easy networking tools with its features of virtual reality will pave the way for a newer perspective.

Blackboard gives facility to integrate it with SL. One of the most important factors to use both is that we still don't have technically sound members in all departments in our university but they are gearing up to adopt the new technologies. From combination of these two applications we will definitely have unlimited benefits and advantages.

4. Conclusion

Virtual world will be the most effective arm for universities in the near future to support all sorts of distance learning systems. It is a latest technology 3D (MUVE) which supports education system in an attractive manner. Right now, SL fulfils most of the facilities and function which educational institutions require to make best use of their e-Learning applications on the basis of several comparative studies. Various types of 3D (MUEVs) are present in the market these days but SL dominates in almost all leading universities worldwide due to its unique features and functions. Ultimately, if we connect to Second Life alongside Blackboard it would be a great combination of services towards e-Learning because there are many prepaid formats to assist both faculty and students in Blackboard from Syllabus to Content to Texts and Videos et al. Blackboard gives a very easy method to make such things and beside this SL offers a virtual platform to create the virtual classes for an experience of real classes to attract the students. For our university we have started work on SL project after the decision of survey, and in near future we will deliver our trainings through virtual world. We are planning to implement this for conferences and want to create research and development in Science, Engineering and Medical fields. We will connect our teams with other research groups that are now present in Virtual world. It will save time and cut the travelling expenses.

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5. Future work

Although there are many drawbacks in SL but its benefits make it at par and attractive. In the current scenario, SL can't replace traditional online e-Learning systems completely. Linden Lab has to focus on the privacy issues mainly to maintain thorough discipline in the teaching environments. There should be a strong system to resolve the matters related to offences or violence without any delay. Linden Lab has to create some easy tools which must be user-friendly and least complex in the processing. Make the processes easier as much as possible so that it doesn't require any special training to use SL unlike in the current scenario when it requires certain amount of desired skills for complete operation.

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Interpretive structural activity-based mlearning implementation model of undergraduate English language learning: a theoretical mapping

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Abstract

This paper aimed at describing how mobile learning (mLearning) could be incorporated in formal setting exemplified through developing an mLearning implementation model for English Language skills course among undergraduates. Based on Moore's transactional distance theory and Park's Pedagogical framework for mobile learning, the study adopted a hybrid NGT-ISM technique in developing the model via experts' views. Mapping against the theories adopted, the model was further elaborated on how mLearning is implemented through language activities. The findings of the study could impact technology mediated education specifically on the implementation of mLearning as learners' performance support in formal language learning at university undergraduate level.

Keywords: mLearning; informal learning; Interpretive Structural Modeling; transactional distance theory

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1. Introduction

In the instruction of language subject, it is often an uphill task for lecturers in providing adequate time and space for meaningful language exposure in the classroom for every student to develop their fluency due to large numbers of students with limited time allotted for formal language classes. To add to the odds, most formal language instructions are still based on drill and exercise principles. MobileLearning (mLearning) or learning mediated through mobile devices and technology coupled with robust mobile interaction environment could aid students to fulfill their language learning needs. Past researches have evidently stressed on the positive effect of mLearning on students' learning. For example, a mobile learning tool (MOLT) developed by Cavus and Ibrahim (2009) showed that undergraduate students enjoyed learning new vocabulary using Short Message Service (SMS) text messaging through their mobile phones. In another study, mobile phones are more effective as a vocabulary learning tool compared to traditional vocabulary tool (Basoglu & Akdemir, 2010). Through mLearning as complement to formal classroom learning, students could facilitate own learning (learner's autonomy) and indirectly allowing a sense of ownership (Truby, 2010; Dlodlo, Tolmay, & Mvelase, 2012). In this study, employing mLearning not only could be regarded as a complement to formal classroom learning but also to augment classroom learning (Quinn, 2011; Terras and Ramsay, 2012). Learning activities which are engaged in the classroom could be continued and developed through mobile interaction beyond classroom walls and time, facilitating more students to fulfil course learning outcomes despite of students' individual different learning needs

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(Muhammad Ridhuan & Saedah Siraj, 2010). As a solution, mLearning could help more students especially the low achievers to improve their language competence and communication skills. However, how mLearning is viable as a solution would depend on how it should be implemented (Abdullah & Siraj, 2011). Thus in this study, this paper seek to illustrate an example how a sustainable mLearning initiative could be employed through the development of an mLearning implementation model for an English Language communication course. Here, mLearning is incorporated in the formal classroom learning as a solution to fulfill learners' language learning needs especially the low achievers at the undergraduate level.

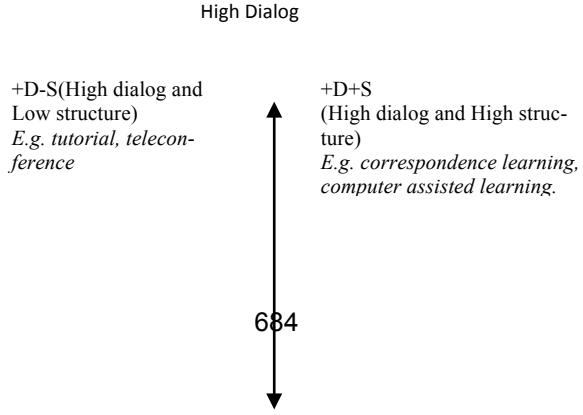
2. Theoretical framework

This section discusses the theoretical framework in framing the development of the mLearning implementation model for undergraduate English Language learning.

2.1. Transactional distance theory

Transactional distance theory proposed by Moore (1997) falls under educational theory to define the concept of distance learning. His theory capitalizes on the cognitive distance which is pedagogical in nature between instructors (lecturer or teacher) and learners in educational setting especially in the field of distance education. The distance is seen to affect the teaching and learning strategies and techniques employed by the instructors. The strategies and techniques should aim at minimizing transactional distance to maximize learners' learning outcomes. In shortening the transactional distance, Moore introduced three key interactive variables, which have to work together to provide an effective and meaningful learning experience namely dialog, structure, and learner's autonomy (Moore, 2007, p. 89-105). On the basis of the presence or absence of dialogue (D) and structure (S), Moore (1997) presented four types of transactional distance ranging from low dialog and low structure (–D–S), low dialog and high structure (–D+S), high dialog and high structure (+D+S), to high dialog and low structure (+D–S) which could generate endless types of teaching and learning (Park, 2011). The four types of types of transactional distance here could be illustrated as in Figure 1.

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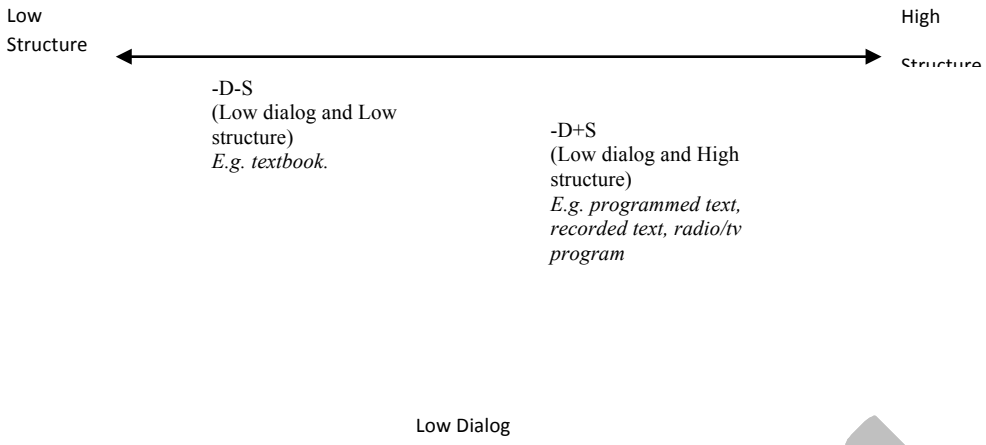


Figure 1. Types of transactional distance (Moore, 1997). Adapted from *Theory of Transactional Distance*, by M.G. Moore, 1997, in Theoretical Principles of distance education (pp. 22-38) by D. Keegan (Ed.), NY: Routlege Studies in Distance Education.

Since mLearning is categorized under distance education, the theory could describe the types of learning activities involved in the development of the mLearning model in this study where pedagogical spaces exist between the learners and the instructors mediated through mobile devices. Based on the types of transactional distance introduced in the theory, the types of language learning activities could be theorize according to interactions among dialog, structure, and learners' autonomy. For instance, in the introduction of a learning topic, structure could be high and the amount of dialog could instead be low to allow students an overview on what they have to learn. As the learning progresses to practical session, structure would be loose allowing more interaction (dialog) among learners and instructors to develop learners' language skills.

2.2. Park's pedagogical framework for mlearning

In the context of this study, we adopt Park's pedagogical framework for mobile learning (Park, 2011) to conceptualize the implementation of mLearning in this study. The pedagogical framework is a modification of transactional distance theory (Moore, 1997; 2007) to serve as a theoretical framework for the implementation of mLearning. This framework could further elaborate the types of mLearning activities based on learners' interaction in effective implementation of mLearning. Park (2011) designed the framework (Figure 2) as reference to instructional designers to effectively design and implement mLearning. In this framework, Park focused on the social aspect of learning with mobile devices as mediating artifacts. Park's pedagogical framework is comparable to the purpose of the study in the context of learning through social interaction among learners, instructors, devices, content and learning context mediated by mobile devices; hence the adoption of the framework. In his framework, Park (2011) proposes four types of mobile learning activities generated in the context of distance education as the following:

(1) High transactional distance socialized mLearning (HS)
(2) High transactional distance individualized mLearning (HI)
(3) Low transactional distance socialized mLearning (LS), and
(4) Low transactional distance individualized mLearning (LI)

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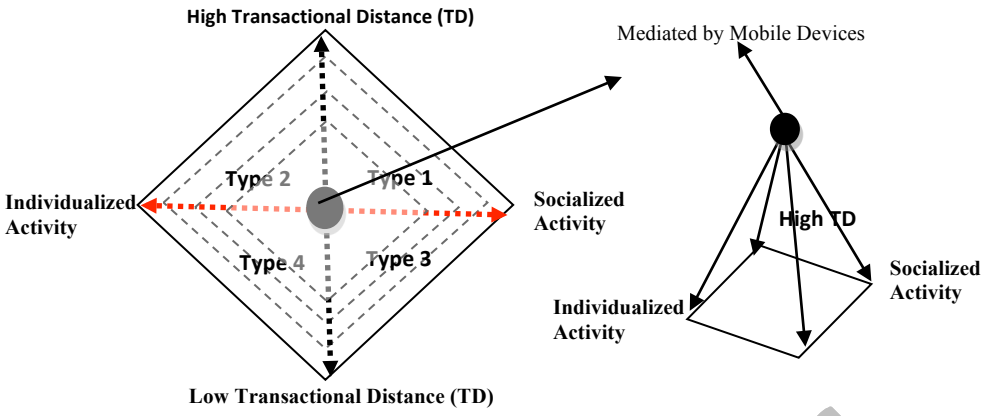


Figure 2. Four types of mobile learning: A pedagogical framework. Adapted from "A Pedagogical Framework for Mobile Learning: Categorizing educational applications of mobile technologies into four types," by Y. Park, 2011, The International Review of Research in Open and Distance Learning, 12(2), p. 89.

3. Objectives of the study

This study seeks to develop an mLearning implementation model to overcome language learning needs in an English communication course among undergraduates using experts' opinion. The implementation model consist of a network of language learning activities connecting both mobile language learning activities and formal classroom activities. Thus, the elaborated objectives of this study are:

- to identify the appropriate network of language learning activities in mLearning implementation model to aid learners to be competent in communication skills in professional settings;
- to propose a structural model of activity-based implementation of mLearning for language learning.
- to map the proposed model to Transactional Distance Theory and Park's Pedagogical Framework to interpret the model to guide in the undergraduate language learning using mLearning.

4. Method

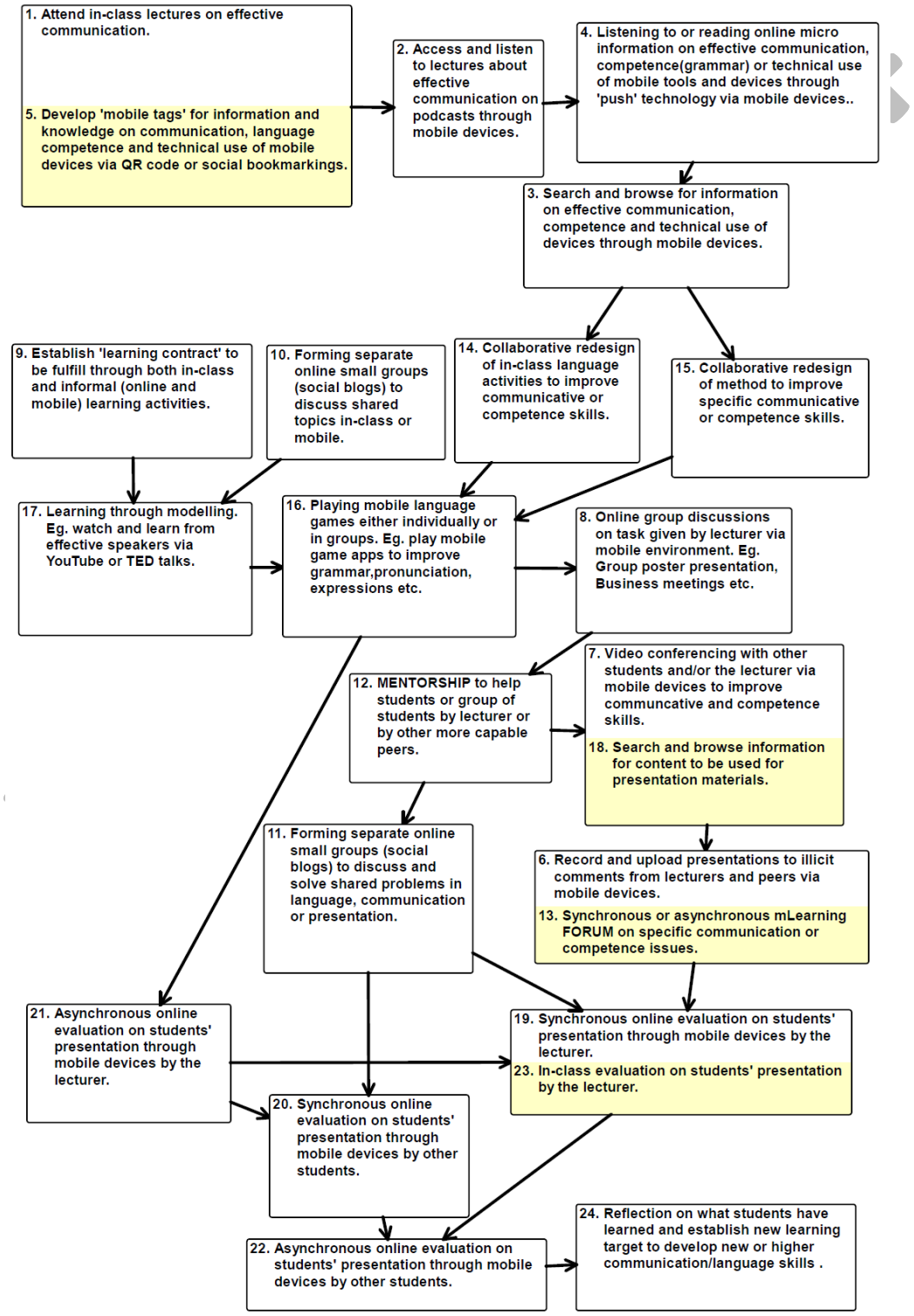
Based on the objectives of the study, Interpretive Structural modeling (ISM) (Warfield, 1976) was employed because not only it could facilitate investigation into the relationships among the learning activities but an overall structural model could be extracted based on the relationships. The various steps involved in the ISM technique are as the following: (1). Identifying elements which are relevant to the problem or issues. In this study, the authors employed a Nominal Group Technique (NGT) (Delbecq, 1971) to identify the elements. In the scope of this study, the authors chose to develop it for 'Professional Communication Skills (PCS)' course, an undergraduate English Language course offered by a private Malaysian university. It is a compulsory subject to be taken in fulfillment of a four year undergraduate study among engineering students. The NGT involves selected experts from the university as well as from other institutions. The experts consist of four (4) Content Experts, who are course instructors of PCS from the private institution, two (2) Information Technology or mLearning experts, one policy stakeholder of the institution and one curriculum expert; (2). Determine the contextual relationship and relation phrase with respect to how the learning activities (elements) should be connected with each other; (3). Generate the ISM model. This was done by the software after the pairings of elements was successfully conducted. The software derives the model based on the concept of pair wise comparison as and transitive logic; (4). The model was then being

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reviewed by the experts to check for conceptual inconsistency and making the necessary modifications; (5) The final model was then presented after the necessary modifications were made.

5. Findings

The findings from the modified nominal group technique (NGT) and the ISM session resulted in the development of the mLearning implementation model for undergraduate English Language Learning as shown in Figure 3.



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*Figure 3.*Mlearning Implementation Model of English Language Communication Skills for Undergraduates.

6. Discussion

Tying to Moore's transactional distance theory (Moore, 1997), the language activities from the model (Figure 3) support the description of the pedagogical distance concept as proposed in the theory. For example, the mentorship activity (activity 12) through mLearning exemplified a type of learning activity, which has low structure and allows high dialog between the instructor and learners yet promotes high learner's autonomy as part of their language learning process. The activity has low structure as it focuses more on learners' input (questions, comments, evaluation, and reflections) which requires more dialogs in fulfilling learners' language learning needs. This is consistent to Moore's argument that low structured

educational activities could promote high dialog, which offer more dynamic learning experiences for the learners (Moore, 1997, p. 27). This type of activity (activity 12) also supports type 3 mLearning activity (Low Transactional Distance Socialized mLearning) of Park's pedagogical framework (2011) where the activity has loose structure but involves frequent interaction among learners (refer to Table 1). However, activity 17 (learning through modeling) has high structure as it is in the form of recorded presentations where learners as individuals or in groups could learn through examples. This type of activity supports type 1 mLearning activity (High Transactional Distance Socialized mLearning) or type 2 mLearning activity (High Transactional Distance and Individualized Mobile Learning Activity) of Park's pedagogical framework as learners have more psychological and communication space with the instructor due to the structure of the learning content. High interactions could mainly occur among learners when they discuss among themselves about the quality of a speaker's recorded presentations (Type 1 mLearning) or the learners as individuals could interact only with the recorded presentation (Type 2 mLearning) to learn best presentation practice on their own. Thus, learners could have more options on the types of learning which suit their preferences. As a summary in relating the language activities to transactional distance theory, Table 3 aimed at proposing how the activities could be categorized according to Moore's types of educational activities (refer to Figure 1) that are based on the presence or absence of dialog (D) and structure (S). In comparison, Table 4 shows the summary on how the language activities could be categorized based on Park's mLearning types of activities.

Table 3

Category of mLearning Language Activities Based on Moore's Types of Educational Activities (based on presence/absence of dialog (D) and structure (S))

Moore's Types of Educational activities	**Learning Activities of mLearning Implementation Model**	
–D–S (Low dialog and low structure) *Note: High transactional distance between the instructor and learners.*	5.	Develop 'mobile tags' via QR code or social bookmarking.
	10.	Forming separate online small groups (social blogs) to discuss shared topics in- class or mobile.
	11.	Forming separate online small groups (social blogs) to discuss and solve shared problems in language, communication or presentation.
	14.	Collaborative redesign of in-class language activities to improve communicative or competence skills.
	15	Collaborative redesign of method to improve specific communicative or competence skills.
	18.	Search and browse information for presentation materials.
	24	Reflection on what students have learned and establish new learning target to develop new or higher communication/language skills.
–D+S (Low dialog and high structure) *Note : High transactional distance between the instructor and learners.*	2.	Access and listen to lectures through mobile devices.
	3.	Search and browse for information through mobile devices.
	4.	Listening to or reading online micro information through 'push' technology via mobile devices.
	8.	Online group discussions on task given by lecturer via mobile environment. Playing mobile language games
	16.	Learning through modeling.
	17	Synchronous online evaluation on students' presentation through mobile devices by other students.
	22	Asynchronous online evaluation on students' presentation through mobile devices by other students.
+D+S (high dialog and high structure) *Note: low transactional distance between the instructor and learners.*	9.	Establish 'learning contract'
	19.	Synchronous online evaluation on students' presentation through mobile devices by the lecturer.
	21.	Asynchronous online evaluation on students' presentation through mobile devices by the lecturer.
+D–S (High dialog and low structure) *Note: low transactional distance between the instructor and learners.*	6	Record and upload presentations to elicit comments from lecturers and peers via mobile devices
	7.	Video conferencing
	12.	Mentorship
	13.	Synchronous or asynchronous mLearning forum

Table 4

Category of mLearning Language Activities based on Park's Pedagogical Framework for mLearning

Types of mLearning activity	**Learning Activities of mLearning Implementation Model**

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	5.	Develop 'mobile tags' via QR code or social bookmarking.
Type 1: (HS)	14.	Collaborative redesign of in-class language activities to improve communicative or competence skills.
	15	Collaborative redesign of method to improve specific communicative or competence skills.
	16.	Playing mobile language games either individually or in groups.
	17	Learning through modeling.
	18.	Search and browse information for presentation materials.
Type 2: (HI)	2.	Access and listen to lectures through mobile devices.
	3.	Search and browse for information through mobile devices.
	4.	Listening to or reading online micro information through 'push' technology via mobile devices.
	8.	Online group discussions on task given by lecturer via mobile environment.
		Playing mobile language games
	16.	Learning through modeling.
	17	Synchronous online evaluation on students' presentation through mobile devices
	20.	by other students.
	22	Asynchronous online evaluations on students' presentation through mobile devices by other students.
Type 3: (LS)	9.	Establish 'learning contract'
	10.	Forming separate online small groups (social blogs) to discuss shared topics in-class or mobile.
	11.	Forming separate online small groups (social blogs) to discuss and solve shared problems in language, communication or presentation.
	14.	Collaborative redesign of in-class language activities to improve communicative or competence skills.
	15	Collaborative redesign of method to improve specific communicative or competence skills.
	19.	Synchronous online evaluation on students' presentation through mobile devices by the lecturer.
	21.	Asynchronous online evaluation on students' presentation through mobile devices by the lecturer.
Type 4: (LI)	6.	Record and upload presentations to elicit comments from lecturers and peers via mobile devices.
	7.	Video conferencing
	12.	Mentorship.
	13.	Synchronous or asynchronous mLearning forum
	24	Reflection on what students have learned and establish new learning target to develop new or higher communication/language skills.

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According to Moore (1997) in his theory, the aim of an effective distance education is to minimize the transactional distance between the instructor and the learners. However, aligned with Park' pedagogical framework for mLearning, both Tables 3 and 4 show the types of activities which could demonstrate how low or high transactional distance could be exploited or integrated to support learners to achieve their learning targets. In short, the findings here could implicate Moore's theory of transactional distance. For example, activities 12 and 17 as discussed earlier could serve as examples on how the different gaps in transactional distance between the instructor and the learners for each activity could be exploited based on the structure of the learning activity and learners' autonomy in aiding students' learning process. However, it is the integration among language activities instead of the application of language activities in isolation, which support the learner's language needs. Further discussion on the integration of these activities focusing on how mLearning could support learners' language learning is presented in the following section.

7. Conclusion

This study was conducted to describe how mLearning as new technology tool of learning could be used as a guidepost in aiding learners to achieve their learning goals. As a result, an interpretive structural implementation model was developed to guide how mLearning could augment formal classroom learning in catering the learning needs of undergraduate students especially the low to intermediate level achievers. The model as discussed in this paper not only shows how mLearning could be implemented but further describes how formal and informal learning could be bridged as a solution to cater the students' learning needs. In the process, the model redefines what mLearning as a tool to augment learning and as performance support (Quinn, 2011; Terras and Ramsay, 2012) rather merely as a system to deliver a course. In the implementation of mLearning as learning support, the discussion of the model also demonstrated how transactional distance theory (Moore, 1972, 1993, 1997) and Park's pedagogical framework for mLearning (Park, 2011) described the mLearning concept and practice as learning support in formal learning which capitalized on the interactions among students, course instructors, learning content, mobile devices, and learning course outcomes. Through the theory and framework, the model showed that several types of mLearning could be necessarily involved in stages of the learning process based on the interactions and students' autonomy. Based on the framework, learning activities which are selected should describe how students could interact and collaborate with each other to learn and how they could be aided to achieve their learning goals with the help of others. Although the pedagogical framework guides how mLearning could be implemented specifically for language learning among undergraduates, the study could contribute as a proposal on how mLearning implementation models could be developed for other areas of learning disciplines for other types of learners learning using mobile technology-one which is sustainable.

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8. Acknowledgement

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Investigating the relationship between foreign language learning and call attitudes among EFL freshman students

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Abstract

Over the last two decades rapid developments in computer sciences and technology have established the persistent role of technology-based learning in all walks of education, more specifically in second or foreign language learning. Thus, the current study was an attempt to investigate the relationship between attitudes towards foreign language learning and computer-assisted language learning. A total of 128 university students majoring in English as foreign language from a major state university were randomly selected for the study. Data were collected using the Attitudes towards Foreign Language Learning (A-FLL) and Attitudes towards Computer-Assisted Language Learning (A-CALL) scales. Findings revealed that there are statistically positive correlations between attitudes towards foreign language learning (A-FLL) and attitudes towards computer-assisted language learning, suggesting that the bidirectional relationship between computer technology and human interface greatly influences learning a L2. Moreover, some of the subcomponents of A-FLL including teacher influence, tolerance of ambiguity and extrinsic motivation greatly contributed to the prediction of the participants' attitudes towards computer-assisted language learning. Gender and age differences were also found to potentially affect some aspects of human interface, and the participants' years of language learning experience and their academic achievement also correlated positively with degree of inhibition component of CALL. It is concluded that inquiry into language learners' attitudes towards technology-based L2 learning will greatly constitute a viable and secure avenue towards the betterment of L2 learning programs and quality language learning.

Keywords: Foreign language learning; computer-assisted language learning (CALL); attitudes; Turkish students; English as a foreign language

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1. Introduction

Over the past few decades there has been a growing interest in researching numerous variables which affect achievement in learning a second or foreign language (L2) in an effort to give the most comprehensive account of language proficiency as well as successful L2 use. A myriad of variables such as cognitive, affective disposition, personality, attitudes, values, mood, motivation, intelligence (Dörnyei, 2005, 2009, 2014) have been found to account for a significant proportion of the variance in L2 learners' performance. Gardner's (1985, 2001) socio-educational model of motivation claims that various individual differences, more specifically integrativeness, i.e. attitudes towards the target language community, attitudes towards learning situation, and instrumental motivation greatly contribute to the establishment of language learners' level of motivation referred to as integrative motivation. Dörnyei (2005), however, asserts that the concept of individual differences is "rather loose" by definition since it contains a myriad of "certain core variables and many optional ones" (p. 7). Thus, he opts for *personality*, *ability/aptitude*, and *motivation* (encompassing Gardner's integrative motivation and plus (Dörnyei, 2005, 2009)) as principal learner variables which have the potential to account for a significant proportion of the variance in one's achievement in learning an L2.

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The integration of technology and computer-assisted tools into education during the past few decades has also provided the necessary impetus to explore the role of technological developments in L2 teaching and learning. Researchers have attempted to investigate the issue from a variety of perspectives. The main objective has often focused on an attempt to find out the relationship between language learning capacity or aptitude and ability to use technology, especially computers, for language learning purposes. In other words, investigating the role of technology-based instruction and pedagogically-oriented implementation of technological and pedagogical developments in L2 learning and teaching have gained more momentum during recent decades. According to Chapelle (2001), a great majority of research on computer-assisted language learning (CALL) has been revolving around issues such as software developed for language learning purposes and designing language learning tasks. However, the potential role of language learners in how to use computers and technology for successful language learning, i.e. the human interface and computer use aspect of CALL (Rahimi & Yadollahi, 2011), has not been given much attention in CALL studies. Put another way, language learners' interaction with computers and individual differences such as their capacity and attitudes towards using CALL, or " human ware" (Warschauer, 2002), for foreign language learning (FLL) and success in learning an L2 have not been taken into account appropriately (Vandewaetere & Desmet, 2009; Tunçok, 2010).

The strength of research on CALL with emphasis on L2 learners' attitudes towards CALL is that "learners can be ensured against failure and a more adaptive way of CALL becomes possible" (Vandewaetere & Desmet, 2009, p. 350). However, relatively little research has been done to examine the relationship between attitudes towards foreign language learning and CALL, especially in the Turkish context. To address the lack, this study aims to investigate the relationship between attitudes towards FLL and CALL, and determine to what extent attitudes towards FLL contribute to the prediction of attitudes towards CALL, in the hope of shedding some light on the betterment of CALL-based instruction in Turkey.

2. Literature review

The history of the thriving area of L2 motivation and attitudes towards language learning situation as well as target language community dates back to the studies in social psychology pioneered by Wallace Lambert and Robert Gardner in Canadian context during the 1970s, and Gardner's (1985) socio-educational model of L2 learning. This model integrates aspects of traditional motivational research on L2 learning, which puts emphasis entirely on individual and social psychological insights addressing the relationship between L1 and L2 communities (Dörnyei, 2005). Gardner (1985) asserts that students' attitudes towards specific language community will certainly influence the degree of success in incorporating aspects of that language. This assertion highlights the significance of learners' attitudes as one of the most important motivational factors that have impact on learning an L2. Indeed, the socio-educational model highlights integrative motivation as the cornerstone. Later, Tremblay and Gardner (1995) broadened the scope of Gardner's social psychological model of L2 motivation only to integrate socially oriented construct with new elements from other cognitive motivational and goal-oriented theories. Based on the new extended model, the construct of language attitudes included attitudes towards L2 speakers, integrative orientation, interest in foreign language, attitudes towards L2 course, attitudes towards L2 teacher, and instrumental orientation.

Information and Communication Technologies (ICT) have become an integral part of our lives, affecting all walks of human life and endeavor. Through widespread availability and practicality, computers in particular have made their way into education, attracting teachers' and students' attention. Over the past decade, computers have been widely used for educational purposes, and more specifically for second or foreign language learning in a way that computer assisted language learning (CALL) has become an indispensable part of language learning process in the third millennium. However, no single well-defined definition of CALL-related attitude has been offered so far. The construct of CALL is often defined as incorporation of computers into language learning process for presenting language learning materials, or "any process in which a learner uses a computer and, as a result, improves his or her language" (Beatty, 2003, p. 7).

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Research has shown that affective variables such as personal attitudes are important factors to affect an individual's language learning and use (Baker & Macintyre, 2000; Gardner, 2001; Gardner & MacIntyre 1993; Gardner et al., 2004; Karahan, 2007; MacIntyre, MacMaster, & Baker, 2001). The core content of attitude/motivational studies in foreign language learning (FLL) and second language acquisition (SLA) is the contention that positive attitudes towards language learning motivates learners and contributes greatly to achievement in different domains. Conversely, negative attitude serves a psychological barrier against successful L2 learning (Dörnyei & Csizér, 2002). Recent developments in SLA research have established the fact that the degree of desire to be identified with international community or international posture (Yashima, 2002, 2009), intercultural communicative competence (Byram, 1997; Mirzaei & Forouzandeh, 2013), and international citizenship (Byram, 2013) play a crucial role in motivating L2 learners to successfully learn and use an L2.

Similarly, positive attitudes towards the effectiveness of CALL applications in language learning can raise learners' behavioral intention of using it (Akbulut, 2008; Ayres, 2002; Başöz & Çubukçu, 2014; Desmet, 2007; Fatemi Jahromi & Salimi, 2013; Felix, 2005, 2008; Liaw et al., 2007; Rahimi & Yadollahi, 2011; Tunçok, 2010; Vandewaetere & Desmet, 2009). It is concluded, therefore, that understanding language learners' attitudes towards foreign language learning and application of ITC for language learning purposes facilitate the use of appropriate CALL, paving the way for the implementation of CALL-based pedagogy and the use of CALL applications for teaching and learning languages. Akbulut (2008), for instance, investigated attitudes of Turkish university students (N = 155) towards effectiveness of CALL. The students all had high levels of proficiency in English. The findings revealed that the participants had positive attitudes towards CALL since computers were found to be helpful in sustaining "independence, learning, collaboration, instrumental benefits, empowerment, comfort and communication" (p. 1).

Most studies have shown that the attitudes towards FLL and CALL can be decomposed into a tripartite model, consisting of a *cognitive* component which entails beliefs about attitude-related situations, an *affective/evaluative* component expressing feelings arising about cognitive element and appraisal of these feelings, and a *behavioral* component which includes particular learning behaviors adopted by the learners (Vandewaetere & Desmet, 2009, p. 351). These attitudes towards foreign language learning and CALL are interrelated. The close association between these two constructs is central to the successful application of CALL in FLL (Liu & Reed, 1995; Masgoret & Gardner, 2003). In line with this, the present study aimed at exploring the viable relationship between attitudes towards FLL and CALL, in the hope of shedding more light on the relationship between "hardware", "software", and "human ware" in the application of CALL in language learning process. For this purpose, the following research questions were formulated to guide the study.

1. What are Turkish freshmen EFL students' attitudes towards FLL and CALL?
2. Is there any relationship between attitudes towards FLL and CALL?
3. How well can the variance in attitudes towards CALL be predicted by attitudes towards FLL?
4. Do demographic factors such as gender, age and GPA moderate on attitudes towards FLL and CALL?

3. Method

3.1. Research design

This study was carried out with a quantitative research design using survey methodology to collect data about participants' attitudes towards foreign language learning (A-FLL) and attitudes towards computer-assisted language learning (A-CALL). As a cross-sectional study conducted at one point in time, this design is useful to employ when researchers try to gather information quickly and economically (Creswell, 2012). Further quantitative data were also gathered from the participants' course grades and cumulative grade point average (GPA) scores.

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3.2. Setting and participants

This study was conducted in an English as a foreign language (EFL) teacher education program at a major state university in Ankara, Turkey. Convenience sampling was used to select the participants of the study. A total of 128 undergraduate freshman students (females: 75% and males: 25%) enrolled in the department voluntarily participated in the study, responding to the statements on a 7-point Likert scale. Their mean age was 19.08 years (*SD* = .88, range 18~22). Without any consultation among themselves they completed the anonymous survey during the regular class hours and also gave consent for data collection.

3.3. Research instruments

3.3.1. Attitudes towards foreign language learning (A-FLL)

Attitudes towards foreign language learning were measured by the English version of Attitudes towards Foreign Language Learning (A-FLL) Scale (Vandewaetere & Desmet, 2009). The A-FLL consists of 31 statements which participants rate on a 7-point (ranging from *1. totally disagree* to *7. totally agree*) Likert scale. It has three major components: *cognitive* component, *affective/evaluative* component with three sub-scales of *extrinsic, intrinsic*, and *teacher influence,* and *behavioral* component with four subscales of *exhibition, inhibition, tolerance of ambiguity,* and *learning effort*. The scores for factors are calculated by adding the scores on statements related to each factor. Higher scores represent more positive attitudes towards FLL. The internal consistency of A-FLL in this study was α=.83 for the entire scale.

3.3.2. Attitudes towards computer-assisted language learning (A-CALL)

Attitudes towards CALL were measured by the English version of Attitudes towards Computer-Assisted Language Learning (CALL) Scale (Vandewaetere & Desmet, 2009). The A-CALL consists of 20 statements which participants rate on a 7-point (ranging from *1. totally disagree* to *7. totally agree*) Likert scale. It has four major components: *effectiveness of CALL vs. non-CALL, surplus value of CALL, teacher influence,* and *degree of exhibition.* The scores for factors are calculated by adding the scores on statements related to each factor. Higher scores represent more positive attitudes towards CALL. The internal consistency of A-CALL in this study was α = .83 for the entire scale, ranging between .69 and .89 for the subscales. The instrument employed in the study was also used to gather demographic and background information with regard to participants' grade point average (GPA), gender, and age.

3.3.3. Procedures for data collection and analysis

This study was conducted in an undergraduate EFL teacher training program at a major state university in Ankara in May 2014. It took participants around fifteen minutes on average to complete the survey. Data analysis was carried out in order to address the research questions formulated for the present study. The statistical analyses were performed using IBM SPSS Statistics 21, a comprehensive computer program used to help researchers perform statistical analysis quickly and accurately.

In order to characterize the scores of the participants' attitudes and for the ease of interpretation of results, the perfect scores were computed and mean values were obtained. Descriptive analyses such as frequency and mean were obtained to characterize the collected data. Other statistical analysis tests conducted for the study consisted of the Pearson product-moment correlation test, the independent-samples t-test, the one-way analysis of variance (one-way ANOVA), and regression analysis. Statistical tests conducted for this study were assessed at the 0.01 and 0.05 levels of significance.

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4. Results

4.1. Descriptive statistics for EFL students' attitudes towards FLL and CALL

When the participants were asked to rate their attitudes towards foreign language learning, 75% of the participants agreed with cognitive component, 79% with affective/ evaluate component and 64% with behavioral component of A-FLL. Understandably, 73% of them expressed positive attitudes towards foreign language learning with higher mean score (M = 71.62, SD = 11.11) ascribed to affective/evaluative component. Furthermore, the highest mean score (M = 38.42, SD =6.48) was observed in intrinsic motivation subcomponent of affective /evaluate component, while the highest mean score (M = 17.94, SD =3.13) was ascribed to exhibition subcomponent of behavioral component.

With regard to the importance of CALL in second or foreign language learning, the ratings also indicated positive attitudes (Table 1). Specifically, 60% of participants expressed positive attitudes towards the overall impact of CALL on language learning with higher mean score observed in *surplus value of CALL* (M = 41.55, SD = 8.66). It was also found that 58% of the participants expressed positive attitudes towards the effectiveness of CALL, 66% for surplus value of CALL, 65% for teacher influence, and 54% for the degree of exhibition to CALL.

Table 1. Descriptive statistics for components of A-FLL and A-CALL

Components of A_FLL	Subcomponents	N	Mean	SD	%
Cognitive	-	128	26.28	5.77	75
Affective/Evaluative	Extrinsic	128	16.25	4.37	78
	Intrinsic	128	38.42	6.48	79
	Teacher Influence	128	16.93	3.60	81
Total		128	71.62	11.11	79
Behavioral	Inhibition	128	7.50	2.67	54
	Exhibition	128	17.94	3.13	86
	Tolerance of ambiguity	128	14.93	3.25	72
	Learning Effort	128	17.19	5.12	50
Total		128	57.58	8.63	64
Components of CALL					
Effectiveness of CALL	-	128	16.25	4.72	58
Surplus Value of CALL	-	128	41.55	8.66	66
Teacher Influence	-	128	13.56	3.59	65
Degree Of exhibition	-	128	11.34	2.17	54
Total		128	82.71	12.58	60

4.2. Relationship between attitudes towards FLL and CALL

The Pearson correlation coefficients revealed a statistically slight positive correlation between three components of A-FLL and CALL, $r(128) = .29$, $p < .01$ for *cognitive component*, $r(128) = .26$, $p < .01$ for *affective/evaluative component*, and $r(128) = .19$, $p < .01$ for *behavioral component*. Moreover, there was

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statistically a moderate significant correlation between overall A-FLL and overall A-CALL, $r(128) = .51$, $p < .01$. Significant correlations were also found between some sub-scales of A-FLL and A-CALL. These are presented in Table 2 below.

Table 2. Correlation between A-FLL and components of A-CALL

Components of A-FLL	Subcomponents of A-FLL	Effectiveness of CALL	Surplus value of CALL	Teacher influence	Degree of exhibition	Overall CALL
Cognitive	-	-.12	.36*	.27**	.03	.29**
Affective/ Evaluative	Extrinsic motivation	.16	06	.06	.09	.26**
	Intrinsic motivation	.11	.36*	.23*	-.06	
	Teacher influence	-.06	.19*	.41**	-.10	
Behavioral	Inhibition	.19*	-.06	-.15	.34**	.19*
	Exhibition	-.08	.38**	.32**	-.03	
	Tolerance of Ambiguity	-.16	.27**	.19*	.11	
	Learning effort	-.20*	-.17	.-.20*	.27**	
Overall FLL	-	.11	.31**	.21*	.13	.51**

* Significant at .05 level.

** Significant at .01 level.

4.3. Attitudes towards FLL as predictors of attitudes towards CALL

Multiple regression analysis was conducted to test if Attitudes towards Foreign Language Learning (A-FLL) significantly predicted the participants' ratings of Attitudes towards Computer-Assisted Language Learning (A-CALL). Cognitive component of A-FLL explained 13% of the variance in surplus value of CALL ($R2 = .13$, $F(1,126) = 17.86$, $p < .01$) with ($\beta = .36$, $p < .01$) power of prediction and 7% in teacher influence ($R2 = .7$, $F(1,126) = 9.19$, $p < .05$) with ($\beta = .26$, $p < .01$) power of prediction.

The results of the regression analysis indicated that the three subcomponents of affective/evaluative component of A-FLL, namely extrinsic and intrinsic motivation along with teacher influence, as predictor variables explained 18% of the variance in teacher influence component of CALL($R2 = .18$, $F(3,124) = 8.80$, $p < .01$), 13% in surplus value of CALL ($R2 = .13$, $F(1,126) = 18.40$, $p < .01$). It was also found that teacher influence subcomponent of A-FLL significantly predicted teacher influence in CALL ($\beta = .41$, $p < .01$) while intrinsic motivation significantly contributed to the prediction of surplus value of CALL ($\beta = .36$, $p < .01$).

Concerning behavioral component, the results of multiple regression analysis revealed that the four subcomponents accounted for 11% of the variance in effectiveness of CALL ($R2 = .11$, $F(4,123) = 3.77$, $p < .01$), 20% in surplus value of CALL ($R2 = .23$, $F(4,123) = 8.95$, $p < .01$), 15% in teacher influence ($R2 = .15$, $F(4,123) = 5.45$, $p < .01$), and 14% in degree of exhibition to CALL($R2 = .14$, $F(4,123) = 4.83$, $p < .01$). The findings also indicated that learning effect significantly predicted effectiveness of CALL ($\beta = .23$, $p < .05$), exhibition significantly predicted surplus value of CALL ($\beta = .33$, $p < .01$) as did tolerance of ambiguity ($\beta = .24$, $p < .05$). Likewise, exhibition ($\beta = .30$, $p < .01$) and learning effort ($\beta = -.18$, $p < .05$) greatly contributed to the prediction of teacher influence component of CALL, while inhibition significantly predicted degree of exhibition to CALL ($\beta = .26$, $p < .05$). Finally, the overall attitudes towards FLL explained 26% of the variance in A-CALL.

4.4. Demographic factors and attitudes towards FLL and CALL

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Gender differences were also found, to some extent, to moderate on the participants' attitudes towards FLL and CALL. The results indicated a statistically significant difference, $t(126) = 2.02$, $p < .05$, between males ($M = 15.65$, $SD = 4.61$) and females ($M = 17.70$, $SD = 5.20$) only in learning effort subcomponent of A-FLL. Regarding attitudes towards CALL, the findings also revealed statistically significant differences between groups in relation to their perceptions of *effectiveness of CALL*, $t(126) = 2.38$, $p < .05$, with females scoring higher ($M = 16.82$, $SD = 4.25$) than males ($M = 14.56$, $SD = 5.67$) and *surplus value of CALL,* $t(126) = -2.23$, $p < .05$. Unlike effectiveness component, males had higher mean score ($M = 9.37$, $SD = 1.65$) in *surplus value of CALL* than females ($M = 8.23$, $SD = .84$) did. Moreover, 'Effect Size' statistic based on the 'Eta Square' value (η^2) of Cohen (1988) indicated a slight significant difference between groups ($\eta^2 < 0.059$) in all significant variables.

The results of one-way ANOVA showed a statistically significant difference in the participants' attitudes towards CALL regarding their academic achievement only in *degree of exhibition component, F* (62, 65) = 1.67, $p < .05$, with a moderate effect size, $\eta^2 = .06$ ($\eta^2 < 0.14$). Likewise, the participants differed significantly in their attitudes towards CALL, $F(9,118) = 2, 77$, $p < .05$, with a large effect size, $\eta^2 = .17$ ($\eta^2 > 0.14$), in relation to their years of experience in learning EFL. Regarding age differences in the attitudes towards FLL, the results indicated statistically significant differences between age groups of 18 and 20 in exhibition subcomponent of behavioral component, $F(4,123) = 2.56$, $p < .05$, with a moderate effect size, $\eta^2 = .08$ ($\eta^2 < 0.14$). Moreover, there was a statistically significant difference among age groups of 18, 19, 20 and 22 regarding their attitudes towards CALL only in degree of exhibition to CALL, $F(4,123) = 4.20$ $p < .05$, with a moderate effect size, $\eta^2 = .12$ ($\eta^2 < 0.14$).

5. Discussion and conclusions

The main goal of the current study was to explore the relationship between language learners' attitudes towards foreign language learning (FLL) and computer-assisted language learning (CALL) in the Turkish context. The findings yielded important insights into attitudinal/motivational factors influencing attitudes towards the two interrelated constructs. The findings indicated that Turkish EFL students have positive attitudes towards FLL and integrating CALL-applications into language learning process. Other studies (Akbulut, 2008; Ayres, 2002; Mahfouz & Ihmeideh, 2009; Rahimi & Yadollahi, 2011) have also reported positive attitudes towards the effectiveness of CALL in learning an L2. Mahfouz & Ihmeideh (2009), for instance, found that university students' attitudes towards using video and text chat with anonymous English native speakers for improving their English language skills were higher regarding speaking skills, followed by listening, reading, and writing skills. Similar results were reported by Rahimi and Yadollahi (2011) who found that Iranian students expressed positive attitudes towards CALL and FLL.

The findings also showed a positive strong correlation between attitudes towards FLL and CALL. This indicates that overall attitudes towards CALL can be predicted by students' attitudes towards FLL since these two constructs are interrelated. As shown in the results section, the participants' overall attitudes towards FLL account for 26% of the variance in their attitudes towards CALL. This suggests that students' positive attitudes towards FLL and CALL applications will greatly enhance their performance both in the subject matter, i.e. learning an L2, and using information and communication technology (ICT). Obviously, this will, in turn, lower computer resistance among language users in a CALL-based curriculum (Brosnan, 1998; Nævdal, 2007).

The findings of the present study also revealed that male and female students have positive attitudes towards FLL and CALL except for differences in the *learning effort* sub-scale of A-FLL, with females having higher mean scores than males. This suggests that female students believe that language learning becomes more enjoyable when the learning effort decreases. Similarly, gender differences were found to moderate on the students' attitudes towards CALL in *effectiveness* and *surplus value of CALL*. This indicates that female students believe that language learning, assisted by computers, is better than learning by oral practice, more adequate than traditional language learning, and enhances language proficiency in comparison with non-CALL instruction. On the other hand, male students believe in the *surplus value of CALL* and that computer-assisted language learning is a valuable extension of the traditional learning methods. These findings are congruent with those of Fatemi Jahromi and Salimi (2013) who also found that gender differ-

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ences potentially affect attitudes towards CALL. However, these findings are inconsistent with Akbulut's (2008) study which reported that there was no relationship between gender and attitudes towards CALL.

The participants' academic achievement (their grade point averages), years of learning experience, and age were also found to influence their attitudes towards FLL and CALL. Concerning academic achievement and learning experience, the participants only differed in their attitudes towards *degree of exhibition to CALL*. That is, great performance and having more language learning experience make students feel less inhibited when communicating in the foreign language via computer (chat) than in a face-to-face situation. Moreover, the participants differed in their attitudes towards *exhibition subscale* in FLL and *degree of exhibition* to CALL. In other words, the degree of exhibition to both FLL and CALL was found to be crucial in integrating CALL to foreign language learning process. This suggests that the degree of feeling confidence and controlling anxiety in a face-to-face learning situation (classroom) vary across age groups both in A-FLL and A-CALL. Put differently, the threshold to start a face-to-face conversation may be bigger to some students than starting a virtual (computer-assisted) conversation and vice versa. This study has also confirmed the findings of Tunçok's (2010) study which found that A-FLL and A-CALL are interrelated and that most of the students have positive attitudes towards CALL and foreign language learning. Moreover, other factors such as age, grade, gender, years of studying English and prior CALL experience affect students' attitudes. These findings enhance our understanding of students' attitudes towards FLL and CALL.

As the need for classroom CALL as a part of online courses, CALL-based materials assessment, participation in institution-wide and inter-institution partnerships, and, more specifically, the need for using or administering multimedia language laboratories are inevitable in CALL in the third millennium (Fotos & Browne, 2004; Walker & White, 2013), it seems necessary that teachers, instructors, and curricula should be equipped adequately with new technological tools that address both teaching practices and curriculum evaluation. It is actually obvious that these objectives can be met, in part, if we take the attitudes of both teachers and students toward foreign language teaching and learning into account within a CALL-based pedagogical framework. The teaching practices of teachers, their approaches toward both teaching and assessment are to be given due attention when CALL-based curriculum is designed. Thus, a multi-disciplinary research is needed to make the most of a CALL-based pedagogy.

The primary objective of the present study was to investigate the relationship between Turkish freshman EFL students' attitudes to FLL and CALL in an English as a foreign language classroom. The results indicated that A-FLL and other demographic factors such as gender, age, academic achievement, and years of language learning experience have the potential to exert influence on language learners' attitudes towards CALL, thereby, enhance or deter their ultimate achievement in a CALL-based language learning context. However, other studies found that students' attitudes towards CALL may be shaped by their accessibility, and their ability to sustain autonomous learning, language achievement, and instrumental benefits (Akbulut, 2008) as well as faculty and seniority of university, i.e. freshman, sophomore, junior, and senior students, (Mahfouz & Ihmeideh, 2009). Therefore, further research is needed to investigate the issue from various aspects of CALL-supported language instruction including conducting attitudinal studies on online chat with native speakers, and other important factors such as computer ownership and use which are potentially liable to affect CALL-application in language learning process in different learning environments.

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Investigation of pre-service teachers' intentions to use of social media in teaching activities within the framework of technology acceptance model

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Abstract

In recent years, social media is used frequently in daily life, as a result of this; it affects different fields in our lives. Intensive use of technology in teaching activities causes the social media to enter in this filed too. In this context, teachers and students started to use social media in terms of teaching and learning activities such as information sharing, web based learning, creating discussion groups etc. The aim of the study is to investigate pre-service teachers' intentions to use of social media in teaching activities which becomes indispensible in technologic environments. In accordance with this purpose a survey was prepared within in the framework of Technology Acceptance Model (TAM) which was developed by Davis (1986) and extended by Venkatesh and Davis (2000). The survey was implemented to pre-service teachers who are studying at a university in the faculty of education. Reliability, validity and factor analysis for the scales in the survey were performed. For each items in the scales, frequency distribution, percentages, means and standard deviation were calculated

*Keywords:*Technology Acceptance Model, social media, pre-service teachers

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1. Introduction

Social networks which are used by a group of people and defined as a total of a number of activities that are made possible by social technologies (Hamid, Chang, & Kurnia, 2009), have been covering an overwhelming part of our daily lives in recent years with the variety and usage rates. According to comScore's, a research company's research while Turkey stands as the fifth most time spending country in social networks (Kural, 2012), and %94 percent of the online population of Turkey is also registered user of Facebook, a social network company (Kaymaz, 2014). Leaving aside the negative sides of this percentage of usage, the fact that a common area used in this scale will also be used by educators in activities of education is an inevitable outcome. In this respect, now, social networks are used in areas of information, education, learning and teaching, apart from communication and social goals. As the user interfaces are quite easy, social network sites are beneficial to academicians in many ways and they provide practical solutions for students and researchers in terms of forming groups, sharing within these groups and communication and feedbacks (Gülbahar, Kalelioğlu, & Madran, 2010).

In recent years, there has been an important progress in terms of professional utilization of communication technologies and the admission and prediction of the acceptance of these technologies by the users (Vankatesh & Davis, 2000). One of these studies is Davis's (1989) Technology Acceptance Model (TAM), which was developed later by Venkatesh and Davis (2000) as Technology Acceptance Model 2 (TAM2, Fig.

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1). According to TAM2, individuals' intentions of using a system are affected by two variables: First, "perceived usefulness" which comes from the belief that the work performance of the individual will improve when a system is used, and the second, "perceived ease of use" which covers the belief that there is no need to try hard to learn this system (Vankatesh & Davis, 2000). These two variables are also affected by two concepts as processes of social effect (subjective norm, voluntariness and image) and cognitive instrumental processes (job relevance, results demonstrability and perceived ease of use) (Vankatesh & Davis, 2000).

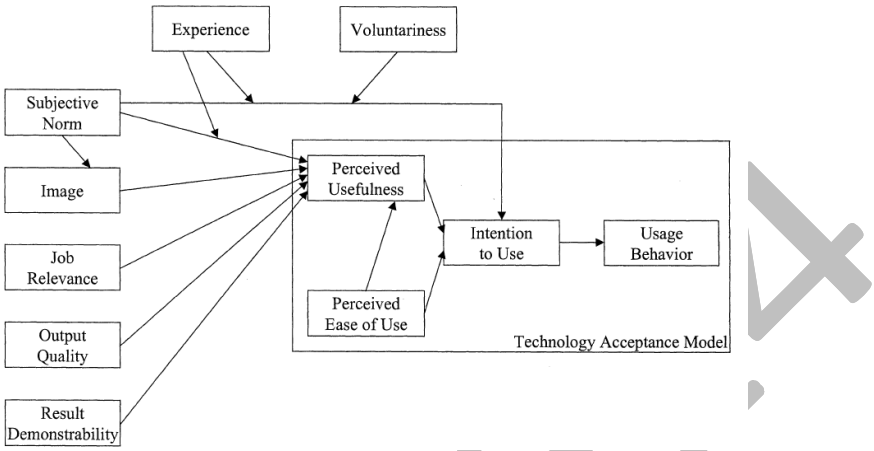


Figure 1- TAM2 (Vankatesh & Davis, 2000).

The purpose of this study is to develop a measuring tool to determine the tendencies towards the usage of the social media, which has become an indispensable part of electronic mediums, in teaching process by the candidates of teaching as a profession. In this respect, a scale has been prepared by using Technology Acceptance Model 2 (TAM2) and the resulting data has been presented.

2. Methodology of research

This is a quantitative research. Data were collected by using a questionnaire, developed by the researchers by using the Technology Acceptance Model 2 (TAM2; Venkatesh & Davis, 2000).

2.1. Sample

The research has been carried out with 322 teacher candidates who are students in different teaching programs in the city of Ankara. %82.3 of these candidates was females and %17.7 of them was males. %82.9 of the candidates has stated that they use social media every day. The most commonly used social media were Facebook (305 people), Twitter (205 people) and Instagram (148 people). The most common purposes of using social media were communication and online chat (277 people), spending spare time (211 people), sharing videos, photos and status and profile updates (201 people) and educational purposes (183 people).

2.2. Data collection and instrument

In this research, in collecting the data, the scale that was developed within the framework of Technology Acceptance Model (Venkatesh & Davis, 2000) was used. The items in the scale were graded according to Likert 5 type as; "totally agree = 5", "agree = 4", "partly agree = 3", "do not agree = 2", "absolutely do not agree = 1", and listed from 1 to 5 in accordance with these choices. In this study, first of all, a first level

confirmatory factor analysis was made for eight lantent variables (intention, subjective norm, perceived ease of use, perceived usefulness, image, job relevance, result demonstrability and voluntariness) that constitute the main dimensions of Technology Acceptance Model 2(Venkatesh & Davis, 2000), along with the model constructed with 33 observed variables. The output quality, which is the 9th variable, was not included in this study as the samples were teacher candidates and did not have any professional experiences yet.

2.3. Data analysis

Confirmatory factor analysis was made for the dimensions in the developed scale by using AMOS18 program. While less than 3 was considered as a good Klem (2000), X2 / df value for the model compatibility tests, any value under 5 was considered as acceptable. In the study, this information was taken into consideration for the X2 /df value. Schermelleh – Engel et al. (2003), have stated that in the model compatibility tests, .any values less than .08 in the Root Mean Square Error Approximation (RMSEA), .10 in the Standardized Root Mean Square Residual (SRMR), and higher than .9 in the Comparative Fit Index (CFI) were acceptable compatibility standards. Moreover, any value higher than .9 in Non-normed Fit Index (NNFI), also named as Tucker-Lewis Index (TLI) is considered as acceptable (Tucker & Lewis, 1973). In this research, the compatibility of these values in constructing models for confirming factor analysis was tested.

3. Results of research

The modification indexes that were proposed by the results of the first analysis were analyzed and clauses in which the answers could have affected each other, the clauses that were explained by the same dimension were determined and after the required modifications were made, they were analyzed by restarting the program. The value of voluntariness which had bad values was entirely dismissed from the model by a modification. The results of the analysis showed that the compatibility indexes had acceptable and/ or over acceptable values ($\chi 2/df=2.346$, p=.000, RMSEA=.06, SRMR= .03, GFI=.90, CFI=.96, TLI=.96).

The factor load values, averages and reliability of the developed model that is realized by the confirmatory factor analysis are summarized in Table1. Cronbach Alpha (α) or, for the dimensions with two clauses, considering they have a normal distribution, Pearson correlation parameter (r) was calculated in reliability calculations.

Table - 1. Results of factor analysis

Scale items	**Factor load**	**Mean**	**Reliability**
Intention to use			
1. I am planning to use social media in my teaching activities.	.77	3.84	r=.70
2. During my professional life as a teacher, I am thinking of using social media for teaching activities.	.91	3.79	
Subjective Norm			
1. The people whose opinions I value expect me to use social media effectively during my teaching activities.	.75	3.55	α=.85
2. The people whose opinions I value encourage me to use social media during my teaching activities.	.83	3.47	
3. The people who are important for me support me to use social media	.83	3.55	

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during my teaching activities			
Perceived ease of use			
1. It is easy for me to carry out teaching activities on social media.	.78	3.66	α=.83
2. For me, social media is suitable to carry out teaching activities.	.79	3.63	
3. I can do the things I want, in terms of teaching activities, on social media	.82	3.74	
Perceived usefulness			
1. Using social media will improve my performance in teaching as a profession.	.81	3.69	α=.90
2. Using social media will improve my productivity in my profession.	.79	3.69	
3. Using social media will improve my efficiency in my profession.	.84	3.65	
4. I think that using social media in my teaching activities will be beneficial for me in terms of my profession	.84	3.73	
Image			
1. The teachers who use social media in their teaching activities will be more prestigious than those who do not.	.86	3.42	r=.61
2. The teachers who use social media in their teaching activities will be more popular.	.71	3.43	
Job relevance			
1. Using social media is important for my profession.	.78	3.74	α=.84
2. Using social media is related to my profession.	.82	3.48	
3. Using social media serves the purpose of my profession	.80	3.46	
Results demonstrability			
1. I don't think that I will have any difficulty in explaining advantages/ disadvantages of using social media.	.63	3.79	α=.75
2. I believe that I can get in touch with my colleagues about the results of using social media.	.73	3.78	
3. I think that I will be able to see the results of using social media clearly.	.77	3.70	

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4. Conclusions

The data acquired by the scale that is developed by the results of the study in question, is presented in the outcomes section. In evaluating the factor analysis results, the information that the factor load values of the clauses that are in the scale should be equal to or higher than .45 was taken into consideration (Tabachnick & Fidell, 1989). In the analysis within the study, the factor loads of the scale were found to be changing between .63 and .91. In the reliability calculations of the scale, it was taken into consideration

that the reliability parameter for each dimension should be (cronbach alpha) .70 or higher (Büyüköztürk, 2006). Cronbach alpha values are changing between .75 and .90 for this study. As for the correlation values that are calculated for dimensions with two clauses, they were of avarage values (r=.70 ve r= .61). When these statistical values are examined, it can be concluded that the scale is suitable for determining the tendencies of teacher candidates' in terms of usage of the social media in their professional lives. When the average values of the answers of the candidates are considered, one can conclude that they are eager to use social media in their professional lives. However, in order to have a more sound result, the developed scale should be applied to wider groups. Moreover, the subject can be examined in a more detailed way by applying a comprehensive statistical technique which takes the relationships between the dimensions of the scale into consideration, and by the analysis of different demographic variables.

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İşbirliğine dayalı öğretim tasarımında senaryo temelli öğrenmenin kullanılması: amaçlı senaryo tasarımı

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Abstract

Bu araştırma, Schank (1994) tarafından senaryo temelli öğrenme başlığı altında geliştirilmiş olan amaçlı senaryoların işbirlikli öğrenmeye entegre edilmesi amacıyla örnek bir öğrenme materyali tasarımını ve uygulanmasını içeren deneysel bir çalışmadır. Amaçlı senaryolar belirli kısıtlar dahilinde öğretilecek materyali, öğrencinin ulaşması beklenen hedefleri, öğrencinin çalışacağı öğrenme ortamını, öğrencinin yerine getirmesi beklenen görevleri, ve öğrenciye sunulacak kaynakları içeren bir çeşit yaparak öğrenme ortamı olarak tanımlanmaktadır (Schank, 1994). Bu çalışma kapsamında amaçlı senaryo tasarımı ilkelerine yer verilmiş ve yetişkin eğitiminde problem çözme becerilerini geliştirmek hedefi ile takım çalışmasına ve işbirliğine dayalı bir öğrenme materyali tasarlanmıştır. Tasarlanan öğrenme materyali dörder katılımcıdan oluşan gruplar halinde toplamda 100 katılımcı ile test edilmiştir.

Keywords: İşbirlikli öğrenme; amaçlı senaryo; problem çözme.

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1. Giriş

Senaryo temelli öğrenme bir amacı gerçekleştirmek üzerinde kurulmuş gerçek bir durum doğrultusunda bir dizi başarılı ve başarısız yol takip edilerek gerçekleşir. Schank (1982) etkili bir öğrenmenin, gerçekçi problemler ve ayrıntılı olarak tanımlanmış roller içeren senaryolar üzerinden yapılabileceğini ve senaryolarda yer alan problemi çözerken öğrencinin motivasyonunun artacağını, böylelikle kazanılan deneyimler ile gerçek yaşam sorunlarının da çözülebileceğini belirtmektedir. Burada iki temel yenilik, pedagojik açıdan öğrencinin aklını vererek, yaparak öğrenmesi; teknik olarak da bu tür öğrenmeleri sağlayacak olan ortamların sistematik olarak hazırlanması, malzemelerin endekslenerek sistemce otomatik ve dinamik olarak sağlanmasıdır (Schank & Clearly, 1995).

Okul dışında insanlar, tipik olarak istedikleri amaçlarına ulaşmaya çalışırken edindikleri deneyimlerinden öğrenirler. Amaçlı senaryo (Goal Based Scenerio) ara yüzü bu basit gerçeği kullanan bilgisayar temelli öğrenme ortamlarını tanımlamaktadır (Schank, Fano, Bell ve Jona, 1993/1994). Amaçlı senaryolarda esas fikir, tasarlanan ortama giren öğrencinin kendi ilgi ve merakı doğrultusunda, ustalık kazanması amaçlanan alanda, kendi üzerine alacağı bir rol üzerinden, ustalık gerektiren tecrübeleri bizzat yaşaması ve eylemlerinin sonuçlarını görmesi olarak ifade edilebilir (Schank, 2005). Bir başka deyişle amaçlı senaryolar öğrencilerin tanımlanmış amaçlar ve bu amaçları gerçekleştirmek için destek sunan ilgileri etkisinde olan problemlerdir. Amaçlı senaryo öğretilecek materyalin seçildiği, öğrencinin çalışabileceği bir ortamın olduğu, öğrencinin yapacağı görevlerin yer aldığı ve kaynakların öğrencinin erişimine sunulduğu belirli bir şekilde yapılandırılmış bir yaparak öğrenme seklidir. Örnek olarak bir müzik parçası besteleme, bir araç tasarımı, ya da bir şirket kurma ve yönetme gibi görevler verilebilir (Schank, Fano, Bell, & Jona,

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1993/1994). Schank ve çalışma arkadaşları (1993/1994) amaçlı senaryoların öğrencinin öğrenebileceği beceriler üzerine geliştirilmesi gereğinin üzerinde durmaktadır. Bu fikir doğrultusunda öğrenciler, pratik bir rasyonalite içinde, hâlihazırda bildikleri ve ihtiyaçları doğrultusunda kendileri için en iyi olan ne ise onu yapmak isteyen ve bu amaç uğruna bir strateji belirleyip uygulayan kişiler olarak kabul edilmektedir. Sonuç itibariyle öğretim tasarımcısının öğrenme kazanımlarını öğrencinin meşgul olacağı konular olarak değil, öğrencinin uzmanlaşabileceği beceriler şeklinde ifade etmesi gerekir. Amaçlı senaryolar açık ve somut bir amacı, bu amaca ulaşmak için öğrenilmesi ve deneyimlenmesi gereken hedef beceriler kümesini, ve bu işi yapacağı bir faaliyet ortamını içerir. Araştırmacılar buradaki "amaç" kavramını tanımlamak için öğrenciye verilen bir "misyon/görev" metaforunu kullanmışlardır.

Amaçlı senaryolar bir eğitim yazılımı türü olmaktan öte bir öğrenme yaklaşımıdır ve bilgisayar ortamında sunulmak zorunda değildir. Buna rağmen bilgisayar ortamları amaçlı senaryoların uygulanması için sınıf ortamında sağlanması zor ön koşulları sağladığı için tercih edilebilir (Schank, Fano, Bell, & Jona, 1993/1994).

Bu çalışmada Schank (1994)'in önerdiği amaçlı senaryo tasarımına ek olarak işbirlikli öğrenme yaklaşımı eklenerek çok kullanıcılı bir amaçlı senaryo tasarlanmıştır. İşbirliği kişisel bağımsızlık, üreticilik, yansıma, etkin katılım, kişisel uyumluluk ve çoğulculuğa dayanmalıdır. Açıkgöz(1992) işbirlikli öğrenmenin en önemli özelliği olarak, öğrencilerin bir amaç doğrultusunda küçük gruplar halinde birbirinin öğrenmesine yardım ederek çalışmalarından bahsetmektedir. İşbirlikli öğrenmenin diğer grup çalışmalarından farkı, grup üyelerinden hem kendilerinin hem de diğerlerinin öğrenmesini en üst düzeye çıkarmaya çalışmalarının beklenmesidir. İşbirlikli öğrenme gruptaki her üyenin, gruptaki diğer üyeler başarmadan kendisinin de başaramayacağını bilmesi ve bu nedenle arkadaşlarının öğrenmesine yardımcı olmasını sağlayacak şekilde düzenlenmelidir. İşbirlikli öğrenme sonunda elde edilen başarı, tek tek bireylerin katkısıyla elde edilmiş grup başarısı olmalıdır. Bir gruptaki bireylerin birbirinden bağımsız olarak işin bir kısmını yapmaları işbirlikli öğrenmenin gerçekleşebilmesi için yeterli değildir. İşbirliğinde esas olan öğrencilerin birbirleriyle etkileşerek birbirine yardımcı olmaları ve ortak bir ürün ortaya koymalarıdır (Açıkgöz, 1992).

2. Amaçlı senaryo tasarımı

"Hırsız Kim?" adlı bu amaçlı senaryo ile çalıştıktan sonra öğrencilerin sahip olması hedeflenen iki temel beceri vardır. Birincisi; problem çözme becerisini geliştirir, ikincisi ise; arkadaşları ile işbirliği içerisinde çalışır.

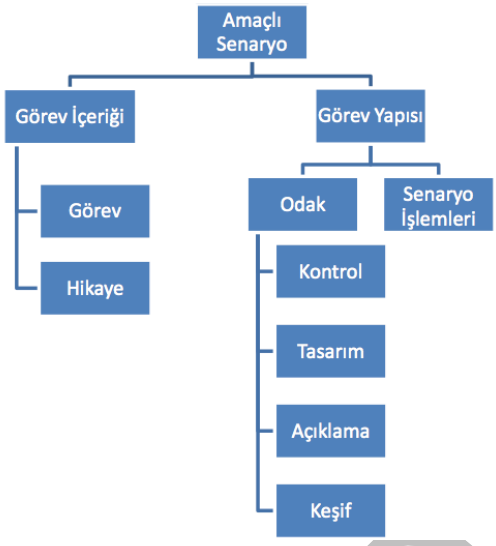
Amaçlı senaryoların nasıl tasarlandığını anlamak için, onu ortaya çıkaran farklı bölümleri, bütün yapıda rol oynayan her bir parçanın rolünü ve bölümlerin birbirleri ile nasıl ilişkili olduğunu tanımlamak oldukça önemlidir. Bir amaçlı senaryo her biri kendi içinde alt bölümlere ayrılan iki ana bölümden oluşur: Görev içeriği ve görev yapısı. Amaçlı senaryoların organizasyon yapısı Şekil 1'de gösterilmektedir (Schank ve diğ., 1993/1994).

2.1. Görev içeriği

Görev içeriği özellikle tematik açıdan amaçlı senaryoların geliştirilmesi ile ilgilidir. Bu başlığın altında görev ve hikaye olmak üzere iki alt başlık yer almaktadır. Görev amaçlı senaryonun bütününde yer alan amaçtır. Örneğin bir ayakkabı fabrikası kurmak ve üretimi sağlamak amaçlı senaryo yaklaşımı için uygun bir görevdir. Hikâye ise görevin altında yatan takip edilecek öncül görevdir. Ayakkabı fabrikasının özellik-

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leri ortaya konulmalı, üretilecek ürünler tasarlanmalı, rakipler ve müşteriler hesaba katılmalı ve sonra ayakkabı fabrikası kurma görevi için hikâye oluşturulmalıdır.



Şekil. 1. Amaçlı senaryoların organizasyon yapısı

2.1.1. Görev

Amaçlı senaryoda öğrencinin tamamlamaya çalıştığı amacı belirleyen görev**,** amaçlı senaryonun öncelikli bileşenidir. Amaçlı senaryodaki pedagojik amacı karşılayan bir görev seçildikten sonra tasarımın kalanı daha açık odaklı olmaya başlar. Diğer taraftan amaçlı senaryo, hikâye ve senaryo işlemlerini oluşturan bileşenler ile yakından ilişkili olmalıdır. Öğrenci görevi çeşitli yollardan tamamlayabilir. Bu nedenle nasıl devam ettiği değil, neyi başardığı daha ön planda tutulmalıdır.

Görev gerçek ve hikâye içerisinde anlamlı olmalıdır. görevi tanımı belirsiz nitelik ve etkinlikler içermemelidir. Örneğin, "görevin dürüst olmak" ya da "sorumluluk duygusu ile hareket et!" gibi ifadeler yeterince açık değildir. Verilen görevlerin bütün öğrencilerin hayal gücünü kapsaması mümkün değildir. Homojen bir şekilde bütün öğrencilerin ilgisini çekme girişimi, kimsenin heyecan duymaması ile sonuçlanabilir. Bu nedenle küçük bir hedef kitlenin gerçekten ilgisini çekebilen bir amaçlı senaryonun hedef kitlesini arttırmaya çalışmaktan kaçınılmalıdır.

Görevin gerçek bir amaç içermesi gereğinin yanı sıra hikâye bağlamında takip etmek için makul bir amaç belirlenmelidir. Öğrenci senaryonun içeriğinden görevinin ne olduğunu çıkarabilmelidir. Ayni şekilde görevi duyduğunda da hikâyeyi tahmin edebilmelidir. Örneğin, öğrencinin bir şirketin yöneticisi olarak rol aldığı bir hikayede, şirket bir takım problemler ile karşı karşıya kaldığında, görev muhtemelen gerçek bir yöneticinin yapabileceği eylemler ile bu problemleri çözmek ya da bu problemler hakkında bir rapor yazmak olduğu tahmin edilebilir olmalıdır. Eğer görev ve hikâye tutarlılık içerisinde değilse bu öğrenci için bir motivasyon problemi oluşturabilir. Öte yandan, görevin mükemmel bir amaç içerdiği bir amaçlı senaryoda uygun olmayan bir hikâye görevin anlamlı şekilde ilerlemesine müsaade etmez. Benzer bir şekilde, büyüleyici bir hikâyenin öğrenciyi önemli bir görevi başarmak için işe koşmadığı da görülebilir.

Amaçlı senaryoda görev tasarlanırken göz önünde bulundurulması gereken en önemli nokta öğrencinin motive olması için öğrendiklerinin kullanışlı, alakalı ve heyecanlandırıcı olmasıdır. Amaçlı senaryo ile

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ilgilenmesi için birçok öğrencinin motivasyonu özellikle başlarda, görevi tamamlama isteğinden gelir. Görevin uygun şekilde motive etmesini sağlamaya yardımcı olacak bazı öneriler şöyledir:

- Görev, mümkün olan her zaman, öğrencinin hali hazırda sahip olduğu ya da öğrencinin benimsemek için gönüllü olduğu amaçlar içermelidir. Bazen öğrenciyi motive etmek için halihazırda sahip olduğu bir amacı gerçekleştirmek için bir fırsat sunulduğunda dahi öğrenci bu amacı benimsemez. Bu durumda öğrencinin amacı neden benimsemediği dikkatlice düşünmelidir. Bunun nedeni örneğin, verilen amacı gerçekleştirmenin mümkün olmadığını düşünmesi olabilir. Astronomi konusuna ilgi duyan bir öğrenci başka bir galaksiye gitme konusunda çok istekli olabilir fakat bu hali hazırda mümkün olmadığı için muhtemelen öğrenci için aktif bir amaç olmayacaktır.

- Görev çeşitli etkinlikleri kapsayacak yeterlilikte olmalıdır. Kapsamı çok dar olan görevler, bu göreve dâhil olan farklı ilgi alanları olan öğrencilerin dikkatini çekmeme riski taşır. Görevi başarmak için ulaşılabilir çeşitli yollar barındıran geniş kapsamlı bir görev birçok kişinin ilgi alanına hitap eder

- Öğretilmek istenen hedef becerilere ulaşmak için görevin tamamlanması çok önemlidir. Bir görevin tasarımında, amaçlı senaryo tasarımcısı sonuçta öncelikli hedef becerinin edinimine ulaşılması gerektiğini unutmamalıdır. Görev söz konusu hedef becerilere bağlı olmaksızın motive edici olabilir ve farklı amaçlar içerebilir. Tasarımcı görevi belirlerken, hedef becerilerin görevi başarmada yardımcı olabileceği durumları aklında bulundurulmalıdır. Bunun için sorması gereken sorular şunlardır: Bu durumlar makul mü? Birbirlerine tutarlı bir hikaye ile bağlanılabilirler mi? Hedef beceriler bu hikayeye dahil edilmek için zorlanıyor mu yoksa kendiliğinden dahil oluyor mu?

- Motivasyon etkisinin yanı sıra, hedef becerilerin gerçek bir senaryo içerisine gömülmesindeki temel neden öğretilen bilgiyi konumlandırmaktır. Hedef beceriler öğrenci için sadece öğrenci onunla ne yapacağını bildiği zaman kullanışlı olur. Buna rağmen hedef becerileri basitçe uygulayabilir olmak yeterli değildir. Öğrenci görevi başarıyla tamamlamanın esasında amaçlı senaryo dışında bir takım genel amaçları gerçekleştirmek olduğunun farkında olmalıdır. Bu vurgu hedef becerilerin yararının açığa çıkarılmasına yardımcı olur. Görev öğrenciye "Eğer ben bunu yapabilirsem, diğer her şeyi de yapabilirim" dedirtebileceği gibi tam tersi "Tamam, bunu yaptım ve eğlenceliydi, peki ama şimdi ne oldu?" da dedirtebilir. Örneğin kurye rolünde trafiği yoğun bir bölgede motosiklet sürmeyi öğrenmek öğrenciye eğer burada motosiklet sürebiliyorsa, her yerde bunu yapabileceğini düşündürtebilir. Ancak trafikten uzak bir park etrafında motosiklet sürmek, aynı becerileri içermesine rağmen, öğrenciyi bu becerilerin aynı yolla kullanımı ve sağlamlığı konusunda ikna etmez

- Görev farklı yaklaşımlar doğrultusunda başarılabilir olmalıdır. Bir yöntem ya da yaklaşım kullanarak görevi başarmayı deneyimleyen öğrenciler geri gidebilmeli ve tekrar deneyebilmelidir. Görev öğrenci kontrolünü ve böylece amaçlı senaryo oturumunun sahipliğini azami boyuta çıkarmak için, öğrenciye nasıl mücadele vereceğinin kararını verme konusunda serbestlik tanır. Bazı öğrenciler doğrudan bir çözüm oluşturmak için girişimde bulunmak isterken diğerleri ipuçları toplamak ister, tavsiye alır ve sonra devam eder. Görev çözüme götüren basitçe tanımlanmış doğru yolu, karmaşık hale getirmekten kaçınmalıdır. Amaçlı senaryo tasarlanırken öğrenci için tuzaklar kurulmamalıdır (Schank ve diğ., 1993/1994).

2.1.2. Hikaye

Bu bileşen amaçlı senaryonun öğrencinin aklında tutarlı olması bakımından oldukça önemlidir. Hikâye görev ile birlikte amaçlı senaryonun içeriğini oluşturur. Hikâye öğrencinin rolünü, eylemde bulunacağı sahneleri ve diğer amaçlı senaryodaki ayrıntıları tanımlar ve öğrenci için daha makul ve cezbedici hale getirir. Motive edici bir hikaye oluşturmak için insanların yapmayı sevdiği ya da ilgi duyabilecekleri bir şeyi ya da insanların gerçek hayatta korktukları bir şeyi seçmek gerekir. Böylece öğrenci hikâye için daha güçlü duygulara sahip olur ve kendisine verilen rolü benimser. Hikâyede öğrenciye başta verilen görev çok önemlidir. Sıkıcı bir hikâyede öğrenci, tıpkı başlangıçta okuması zevkli gelmeyen bir romanda olduğu gibi amaçlı senaryonun bütününde kaybolur. Devamında ilgi çekici olacağını düşünmediği bir hikaye içerisinde devam etmesi pek olası değildir. Hikayeler üç temel bileşenden oluşur; rol, kurgu ve sahneler.

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Rol: Rol, öğrencinin hikaye içerisinde oynayacağı rolü tanımlar. Rolün doğası öğrencinin görevi nasıl gerçekleştireceğini etkiler. Rol genellikle bir meslek alanı tarafından tanımlansa da rolü tanımlamak için mesleki deneyim, refah, ideoloji ve sosyal durumlar gibi çeşitli faktörler göz önünde bulundurulabilir. Örneğin, borsa öğretmeyi amaçlayan bir amaçlı senaryoda, çevre dostu şirketleri desteklemek isteyen bir yatırımcı belirlemek iyi bir fikirdir.

Kurgu: Kurgu görevin neden önemli olduğunu ve öğrencinin kimlerle birlikte çalışacağı gibi senaryo ile ilgili detayları içerir. Öğrencinin hangi araçları ne için kullanabileceğinin, nerede faaliyet göstereceğinin, karşılaşacağı güçlüklerin ve alacağı ödüllerin neler olduğunun belirlenmesi gereklidir. Görev öğrenci faaliyet gösterdikçe artan bir beklenti ile devam ederken kurgu da bu beklentilerin nasıl karşılanacağına dair somut bir fikir vermelidir.

Sahneler: Hikâye, akış içerisinde tutarlı öğeler ile birlikte birden fazla mekânda ve sahnede geçebilir. Böylece, bir sahne öğrenciye senaryodaki işlemler ile meşgul olması için fırsat sağlayan ve bazı mantıksal bağlantılar sunan belirli fiziksel ayarlardan oluşur. Örneğin bir sahne fabrikada üretim bandını ya da ürünlerin gemilere yüklendiği bir iskeleyi içerebilir.

2.2. Görev yapısı

Görevi takip edecek öğrenci için bir araç olan ve bir çok şekilde geliştirilebilen görev yapısı, hikâyeyi desteklemek için geliştirilmesi gereken planları belirtmelidir. Burada tasarlanan görevler, amaçlı senaryo ile öğretilmek istenilen becerilerin işe koşulmasında gereken alt planları desteklemek için tasarlanır. Örneğin, bir ayakkabı fabrikası tasarımında, öğrenci ayakkabı fabrikasının hangi birimlerden oluştuğu üzerine düşünebilir, çizim ve tasarım yapabilir, ürünlerini çeşitlendirebilir, rakip şirketleri araştırabilir ya da ürünlerin satışında ve üretim yönetiminde önemli noktaları tespit edebilir. Bütün bu eylemler ayakkabı fabrikası tasarımını içeren bir senaryonun görev yapısında bulunabilecek eylem noktalarıdır.

Görev yapısı içerisinde göz önünde bulundurulması gereken bir diğer durum ise öğrencinin yapacağı eylemlerin gerçekçi eylemler olması gereğidir. Örneğin öğrencilerin yazı mi yazacağı, çizim mi yapacağı ya da birbirleriyle sözel iletişim mi kuracağı belirlenir. Öğrencilerin yapabilecekleri bu eylemler senaryo işlemleri olarak tanımlanır. Dikkatle seçilmesi gereken bu işlemleri kullanarak öğrencilerin hedef becerileri öğrenmeleri amaçlanmaktadır.

Görev yapısı öncelikle, uygulanacak etkinliklerin tarzı göz önünde bulundurularak oluşturulur. Bu görev odağının seçimi problemidir. Görev odağı; tasarım, açıklama, keşif ve kontrol gibi yaklaşımların kombinasyonunu içerir. Bu ana odaklardan birini seçmek şart olmamakla birlikte amaçlı senaryodaki görev odakları kümesini tanımlamak tasarım esnasında kullanışlı bir yöntemdir (Schank ve diğ., 1993/1994).

2.2.1. Odak

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Görev seçildikten sonra amaçlı senaryonun ikinci bileşeni görevin neye odaklanacağının belirlenmesidir. Görev odağı amaçlı senaryonun kalanı etrafında ara yüzün tamamının yapılandırılmasını sağlar. Amaçlı senaryo alanının birtakım kısıtları vardır. Örneğin bir program demiryolu istasyonu inşa etmek için bir görev sunarken diğer taraftan bir başkası öğrenciden tehlike altındaki türlerin korunması için devlet toprakları üzerinde bir bölge oluşturmasını isteyebilir. Fakat hikâye ve görev gibi açık özelliklerin ötesinde, bir amaçlı senaryoda birbirinden farklılık gösteren derin anlamlar bulunabilir. Bu farklılık esas etkinliklerin genel anlamda türü ve odağı ile ilişkilidir. Odak öğrencinin yapması beklenen etkinliklerin organizasyonunda temel niteliktedir. Aşağıdaki tabloda tanımlanan dört tür görev odağının özeti sunulmuştur:

Table 1. Dört çeşit görev odağı

Görev Odağı	Tanım
Açıklama	Öğrencinin odağının olguların değerlendirilmesi, sistemlerin teşhisi ve çıktıların tahmini üzerinde olan senaryoları içerir.
Kontrol	Öğrencinin bir organizason yürüttüğü, system işlettiği vb. senaryoları içerir.
Keşif	Öğrencinin içerisinde kanunları uyguladığı, etkinliklere katılım için fırsatların varkına vardığı bir mikro dünya sunan senaryoları içerir.
Tasarım	Öğrencinin temel faaliyetlerinin yeni ürünler oluşturmak, bir sistemin nasıl organize edileceğini belirlemek vb. olduğu senaryoları içerir.

2.2.2. Senaryo İşlemleri

Amaçlı senaryonun son bileşeni öğrencinin amaçlı senaryo ile meşgul olduğu sürece yapacağı asıl etkinlikleri belirleyen senaryo işlemleridir. Senaryo işlemlerinin doğası, pedagojik amaçların nihai gelişimi üzerindeki önemli etkisidir. Eğer eylemlerin gerekleri ilgisiz, tutarsız, anlamsız ve çok karmaşık ise öğrencinin motivasyonu ve ilgisi azalacak ve istenen beceriler öğrenilemeyecektir. Senaryo işlemleri terimi bir parametre ile ayar yapma, bir simülasyonda direktif verme, soruları cevaplama, bir ürünü şekillendirmek için bir araç kullanma, bilgi arama ve seçenekler arasında karar verme gibi etkinliklerden bahsetmektedir.

2.3. Hikaye temelli öğrenme / uzman videoları

Amaçlı senaryo öğrenme ortamlarında, bilgi zenginleştirme ve bağlam dayalı ilişkilendirme içerisinde öğütler verilerek desteklenir. Otomatik olguya dayalı ilişkilendirme analizi öğretim tasarımı için aranan problem durumlarının çeşitlerini gösteren öğretim durumlarını tanımlar. Öğrenme ortamı içerisinde öğrenenlere sunulacak aday olgular şu özelliklere sahiptir (Jonassen & Hernandez-Serrano, 2002):

- Belirli bir bilgiyi, bir bağlam içerisinde sunar.
- Geniş ya da dar zaman öbekleri sunabilir.
- Videolarda bahsedilen deneyimler beklenenden farklıdır.
- Problem çözenler için bazı amaçlara ulaşmada yardımcı olacak ya da olası başarısızlıklar konusunda uyaracak derslere sahiptir.

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3. "Hırsız Kim?"

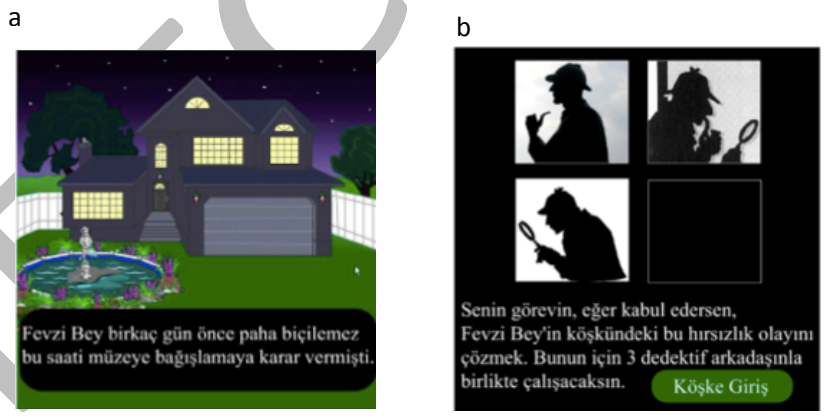
Bu bölümde amaçlı senaryoların tasarım ilkelerine dayanarak tasarlanan "Hırsız Kim?" uygulamasının detaylarına yer verilmistir. Tasarlanan bu amaçlı senaryoda görev içeriği şöyledir:

Hikaye: Bu amaçlı senaryoda sunulan hikâyeye göre Fevzi Bey'in köşkünde bir hırsızlık olayı gerçekleşmiştir. Fevzi Bey'in bir kaç gün önce müzeye bağışlamaya karar verdiği antika saat çalınmıştır. Fevzi Bey, yaşlı ama gösterişli bir köşkte Mukaddes Hanım ile birlikte yaşamaktadır. Köşkte ayrıca bir kalfa ve Fevzi Bey'in hemşiresi yatılı olarak çalışmaktadır. Olayın gerçekleştiği sırada köşk sakinleri dışında iki kişi daha evde bulunmaktadır. Bunlardan birincisi Fevzi Bey'in yıllar evvel ilk eşi ile birlikte evlat edindikleri Sadık ve Fevzi Bey'in abisinin oğlu olan yeğeni Selim. Hikâye kullanıcıya olayın anlatılması ve görevin belirlenmesi ile başlamaktadır.

Rol: Öğrenci bu amaçlı senaryo içerisinde "özel dedektif" rolüne sahiptir.

Görev: Öğrencinin görevi dedektif rolü içerisinde üç arkadaşı ile birlikte takım çalışması yaparak, hikâyede sunulan şüpheliler arasından suçluyu tespit etmektir.

Kurgu: Uygulama içerisinde öğrenciler şüphelileri inceleyebilir, şüphelilerin ifadelerini okuyabilir ve olayın gerçekleştiği köşkte, dört farklı mekânda araştırma yaparak ipucu toplayabilir. Bu sırada kullanabileceği büyüteç, fotoğraf makinesi, not defteri ve topladığı delillerin bulunduğu kanıt kutusu gibi araçlar mevcuttur. Ayrıca, uygulama içerisinde kullanıcıların dedektif arkadaşları ile işbirliği yapabilmeleri için bir mesajlaşma sistemi, topladığı delilleri, çektiği fotoğrafları ve aldığı notları arkadaşları ile paylaşabileceği bir panel ve arkadaşları ile çevrimiçi olarak iletişim kurabileceği bir anlık mesajlaşma penceresi bulunmaktadır.



Şekil. 2. (a) hikaye ekranı; (b) görev ekranı

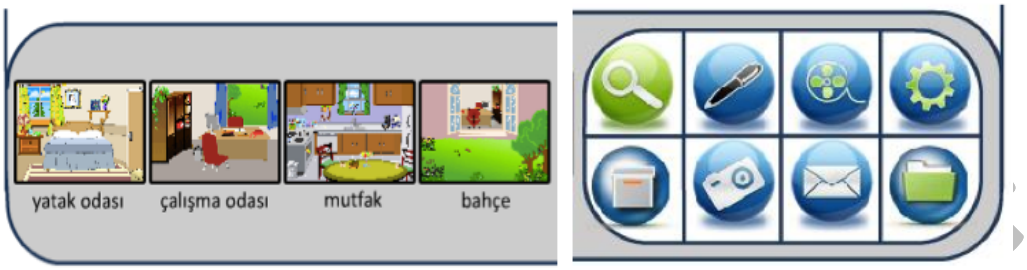
Sahneler: Öğrencilerin yukarıda bahsedilen görev ve hikaye içerisinde iş yapabilecekleri, yani bu amaçlı senaryo konseptinde araştırma yapabilecekleri dört farklı mekan bulunmaktadır. Bu mekanlar Fevzi Bey'in köşküne ait mutfak, yatak odası, çalışma odası ve çalışma odasının penceresinin baktığı arka bahçedir.

Odak: Bu çalışma için geliştirilen Hırsız Kim? adlı amaçlı senaryonun görev odağı karar vermedir. Bu odak yukarıda bahsi geçen dört odak türünden "Açıklama" altında yer alabilir. Kullanıcılardan beklenen

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hikâye içerisindeki olguları değerlendirmesi, sebep sonuç ilişkisi kurması ve mevcut durum ile ilgili çıktıların tahmini üzerine bir teşhis koyması ve buna göre muhakeme yaparak bir karara varmasıdır. Öğrenciden hikâyenin kendisine sunduğu ipuçları doğrultusunda hırsızın kim olduğuna dair bir tespit yapması ve bu tespitini takım arkadaşları ile paylaşarak ortak bir karara varması beklenmektedir.

a b



Şekil. 3. (a) mekanlar; (b) araç kutusu

Senaryo İşlemleri: Öğrencinin hedef beceri olan problem çözme basamaklarını amaçlı senaryo dâhilinde tamamlaması ve arkadaşları ile işbirliği içerisinde görevi tamamlaması için yapması gereken etkinlikler ve bu etkinliklere ait ekranlar aşağıdaki gibidir.

Görev: Öğrencilerin uygulama üzerinde çalışmaları sırasında istedikleri her zaman kendilerine verilen görevi [illegible] esinin yeniden izlenmesine olanak veren biçimde görevini hatırlatmak amacı ile tasarlanmıştır.

Şüpheliler: Bu ekranda olay esnasında köşkte bulunan altı şüpheliye ait kısa bilgiler sunulmaktadır. Öğrenciden olay sırasında köşkte bulunan kişilerin kim olduğu, Fevzi Bey ile yakınlığının ne olduğu, köşkte bulunma sebebi ve benzeri konularda fikir edinmek amacıyla bu bilgilere göz atmaları beklenmektedir.

İfadeler: Bu ekranda olay esnasında köşkte bulunan altı şüpheliye ait ifadeler bulunmaktadır. Her şüpheliye dört soru sorulmuştur. Bu sorular şöyledir: 1-Ne kadar zamandır köşktesiniz? 2-Dün aksam neredeydiniz? 3-Dikkatinizi çeken olağandışı bir şey oldu mu? 4-Size [illegible] bir? Öğrenciden beklenen bu şüphelilerin ifadelerini okumaları ve bunlarla ilgili notlar almalarıdır.

Mekânlar (Sahneler): Öğrenciler köşkte bulunan dört mekânda inceleme yapabilirler. Bu mekânlar çalışma odası, yatak odası, mutfak ve bahçeden oluşmaktadır. Kullanıcıların bu mekânlarda arama yapmaları ve delil olabileceğini düşündükleri nesneleri kanıt kutusunda toplamaları gerekmektedir. Ayrıca bu delillerin kime ait olduğu konusundaki tahminlerini de not almaları ve arkadaşları ile paylaşmaları beklenmektedir.

Araçlar: Bu bölümde bir dedektifin araştırma esnasında ihtiyaç duyabileceği bazı araçlar öğrencilerin kullanımına sunulmuştur. Bu araçlar büyüteç, fotoğraf makinesi, not defteri ve kanıt kutusundan oluşmaktadır. Öğrencilerden uygulama esnasında bu araçları etkin biçimde kullanmaları beklenmektedir.

İşbirliği Araçları: Öğrencilere diğer üç arkadaşı ile işbirliği yapabilmesi için birtakım araçlar sunulmaktadır. [illegible]

mesaj kutusu yer almaktadır. Kullanıcılardan beklenen yaptığı araştırmalar sırasında bulduğu delilleri ve aldığı notları diğer arkadaşları ile paylaşması, arkadaşlarından gelen paylaşımları dikkate alması, arkadaşları ile fikir alışverişinde bulunması ve ihtiyaç duyduğu zamanlarda arkadaşlarına çevrimdışı mesaj göndermesidir.

Yardım: Bir amaçlı senaryoda öğrenci istediği her zaman, hem içerik hakkında hem de uygulamanın kullanımı hakkında destek alabilmelidir. Bu kısım uygulamanın nasıl kullanılacağına ilişkin yardım ekranlarından oluşmaktadır.

Karar: Bu ekran kullanıcıların problemi çözdüğü ve suçlunun kim olduğunu belirlediği etkinliği gerçekleştirilmeleri üzerine tasarlanmıştır. Bu etkinlikte öğrencilerden bir tanesi altı şüpheliden birisini suçlu olarak önerir. Bu önerinin üzerine diğer üç kullanıcının yanıtları beklenir. Önerilen şüphelinin suçlu olup olmadığının sistem tarafından değerlendirilebilmesi için tüm öğrencilerin bu şüphelinin suçlu olduğu konusunda hem fikir olması gerekmektedir. Öğrencilerden herhangi birisi ret oyu kullandığı takdirde kullanıcılardan hem fikir olana kadar birlikte çalışmaya devam etmeleri beklenmektedir. Böyle bir durumda anlık mesajlaşma penceresini kullanarak durumu değerlendirebilir ya da araştırma yapmaya devam edebilirler. Bütün kullanıcıların aynı şüphelinin suçlu olduğu konusunda hem fikir olduğu durumda sistem takımı oluşturan öğrencilerin her biri için hesaplanan amaçlı senaryo puanlarının ortalamasına bakılır. Bu puan yeterli ise öğrencilere suçlu tarafı kazandıklarına dair bir mesaj gösterilir ve öğrenci arayüzü kapanır. Bu durumda sistem takımı oluşturan öğrencilerin her biri için hesaplanan amaçlı senaryo puanlarının ortalamasına bakılır. Bu puan yeterli ise sistem suçlu tarafı kazandıklarına dair bir mesaj göster

Uzman Videoları: Hikâyelerde [illegible] m-
dedaha önce benzer konularda çözüm bulunduğu gibi konularda fikir edinebilir. Bu videolar öğrencinin bu amaçlı senaryoda yerine getirmesi beklenen görevin nasıl tamamlanacağından bahsetmez. Tümüyle söz konusu videodaki uzmanın deneyimlerini aktardığı ve öğrencinin buradan kendi adına bir çıkarım yapmasının beklendiği bölümdür. Bu uygulamada görüşlerine yer verilen uzmanlar, Sir Arthur Conan Doyle tarafından oluşturulan hayalî dedektif kahraman Sherlock Holmes, Agatha Cristie'nin hikâyelerinin ve romanlarının ünlü dedektifi Her-
[illegible] n-
maktadır. Bunlardan ilki Müfettiş Gadget tarafından problemin belirlenmesi ve anlaşılması ile ilgili bir takım deneyimlerin aktarıldığı videodur. Sonraki iki video Hercule Poirot'un problem çözmenin aşamaları ile ilgili "Ölüden Mektup Var" adlı hikayeyi ve hipotezlerin oluşturulması, test edilmesi, en uygun hipotezin seçilmesi hakkında olan "Acı Kahve" adlı hikayeleri içermektedir. Dördüncü hikaye, Sherlock Holmes'un "Sussex Vampirinin Maceraları" adlı hikayesi ile genel bir sonuca varma konusundaki deneyimlerini içerir. Son video ise yine Sherlock Holmes'un bilgi toplama aşaması ile ilgili deneyimlerini aktarmak amacı ile Sherlock Holmes'un kadim dostu ve yardımcısı Dr. Watson tarafından anlatılan "Mavi Yakut" hikâyesi yer almaktadır.

4. Sonuç

Bilişim çağının gerektirdiği insan profilinin belirlemesinde, yalnızca oluşan bireysel ve toplumsal ihtiyaçlar değil, ayrıca teknolojik ve bilimsel gelişim de önemli bir katkıya sahiptir. Buradan hareketle, çeşitli kurumlar ve dernekler (21st century skills (P21); Assessment and Teaching of 21st Century Skills (ATCS)), 21. yy. İnsanının sahip olması gereken özellikleri belirlemek için çalışmalar yapmaktadır. Bazı küçük farklılıklar göstermesine rağmen büyük oranda benzerlik gösteren bu özellikler aşağıdaki şekilde sıralanabilir (Bates, 2000; akt. Yıldırım, 2001): Etkili iletişim becerileri (okuma, yazma, konuşma, dinleme); kendi başına öğrenebilme yeteneği; sosyal beceriler (sorumluluk, olumlu yaklaşım, etik); takım çalışması becerileri; etkin ve verimli düşünme becerileri (problem çözme, kritik düşünme); bilgi ustalığı (bilgiye ulaşabilme, kullanabilme ve yeni bilgi üretebilme); yaşam boyu öğrenme becerileri. Kısaca günümüzde eğitimin kurumlarının toplumun taleplerine uyan, birtakım temel becerilerde yetkin olan, yeni konularda öğrenmeye hazır, güncel problemlerin çözümü için işbirliği yapabilecek ve henüz var olmayan alanlarda dahi yenilikler yapabilecek bireyler yetiştirecek şekilde düzenlenmesi gerekmektedir.

Bu çalışmada, amaçlı senaryoların işbirlikli öğrenme yöntemlerine dahil edilmesi için takım çalışmasına uygun şekilde tasarlanması önerilmiş ve bu tasarıma örnek teşkil etmesi amacıyla bir örnek öğrenme materyali hazırlanmıştır. Bu çalışma dahilinde tasarlanan Hırsız Kim? adlı amaçlı senaryo tasarımı yaşam boyu öğrenme kapsamında işbirlikli öğrenme ve problem çözme gibi 21.yy. öğrenme ihtiyaçlarını karşılaması bakımından önem taşımaktadır.

Bu tasarım daha sonra bir Facebook uygulaması olarak geliştirilmiş ve etkinliği test edilmek için 100 yetişkin katılımcı ile deneysel bir çalışma yapılmıştır. Söz konusu çalışmanın detayları ve bulgularından başka bir makalede (Kıcı & Dilmen, 2014) ayrıntılı olarak bahsedilmektedir.

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ITC integration process in basic education: The case of Veracruz city in Mexico

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Abstract

The aim of this paper is to describe the attitudes of principals toward the integration of Information and Communication Technology (ICT) in public primary schools in the city of Veracruz, Mexico. This is a quantitative research through a survey. It was used a representative probability sample of 46 public primary schools in the municipality with a probability of occurrence of 90% and a standard error of 5%. The results indicate that the respondents believe that ICT apply to their work activities for both routine management tasks as for insertion into educational didactics in spite of the computer equipment insufficient.

Keywords: Attitude; Use of ICT; Teachers; Public Primary Education, Mexico

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1. Introduction

The incorporation of ICT has been modifying many ways in daily life and each day is affecting new people around the world. Fernandez-Tilve (2007) affirm that these technologies could help to the teaching process because there are so many different tools and pedagogical ways to work in teams and provide solutions to the users.

However, the inclusion of ICT in education is still a big challenge to the concepts of traditional learning and teaching (López de la Madrid & Chávez, 2013) without take in consideration the educational level. The application of these technologies into the classroom redefines the ways how the knowledge is being built, their value has been recognized by the literature but their full potential has not been consolidated.

Previous studies performed by Ana-Moreira, Cepeda-Romero, González-Salamanca & Sanabria-Mesa (2010) pointed that in spite of the increase of technological resources availability in the schools, the pedagogical practice in teachers do not reveal a significant modification in the traditional teaching model. In the case of Mexico, we have lived this situation with the technological provisioning executed by the national program of Enciclomedia with few positive results.

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Meanwhile others authors [Fernández, Rodríguez & Vidal (2007); Fernández, Hinojo & Aznar (2002); Tejedor & García-Valcárcel (2006)] consider that attitudes of teachers towards ICT is one of the element that can explain the problems that affects their incorporation. They believe that having this knowledge it can be built specific programs to promote the effective use of ICT by the teachers in their initial and continuous training.

As usual, the teachers play a relevant roll in the results of any educational reform, so the reform that involves in the incorporation of ICT it is not the exception. The teachers must have a series of competencies and attitudes that allow that specific reforms help them to modify their practices. Thus, is about the understanding about what is happening in the classroom about the incorporation of ICT how we can glimpse the way for a right implementation of these technological tools, and is precisely the study of the attitudes of teachers one of the key elements to take in consideration in these integration process.

2. Methodology

In order to know about the attitudes of principals towards ICT in public basic schools of Veracruz City was chosen the quantitative method. The population was of 214 principals of public basic schools. It was used a representative statistical sample of 41 principals.

The survey used has a Likert scale to measure attitudes developed by Sigalés, Mominó, Meneses and Badia (2009). This instrument was composed by 31 questions or items with one possibility of answer between 1 and 5 (1: Totally agree; 2: Agree; 3: Neutral; 4: Disagree; 5: Strongly Disagree).

The reliability of the instrument was corroborated by Cronbach alpha coefficient getting an acceptable value of 0.891. The application of the instrument was face to face in a printed format sheet. In order to analyze the results of this survey SPSS software was used.

3. Conditions of the schools and their principals

It was possible to get information from 46 principals of the 55 public primary schools visited. The sample was composed by 36 women (78.3%) and 10 men (21.7%). The average age of the sample was 48 years old, with a minimum of 38 and a maximum of 63. Regarding to the formal education, at least 50% of the principals have a bachelor´s degree and 10.9% have a master degree. Meanwhile 15.2% studied basic specific training for primary teacher and 19.6% expressed have finished the full formal specific training for primary teacher. Finally, 4.3% have a special education studies after the full formal specific training for primary teacher.

Referring to the years of experience as principal in the same school or in any other school, 8.7% has less than a year. The most prolific group was found between 1 and 5 years working in the same position (32.6%), follow with the gays with 6 and 10 years old working as principals (23. 9%). While most of the lowest percentages are distributed among those with more time in that position (8.7% between 11 and 15 years; 4.3% between 16 and 20 years; and 4.3 between 21 and 25 years). A final group is represented by the principals who have more than 26 years working in that position (17.4%).

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In terms of the technological infrastructure of the principals, 97.8% said to have at least one computer in their house and 95.7% of the principals noted that have Internet in their home. On the other hand, most of the principals expressed that they have computers in their schools (80.4%), but unfortunately 71.7% said that their schools do not have media classroom.

However, concerning the status of the computer equipment available to the school 47.8% of the principals expressed that they do not have any broken computer or out of service computer. Meanwhile, 41.2% said that they have between 1 and 5 computers broken or out of service. On the other hand, 10.9% said as out of service between 7 and 20 personal computers. It is relevant to mention that in most schools with computer equipment which feature is in use, it means those schools do not have backup equipment.

In relation to the total personal computers in the school, at least 15.2% of the principals said that they didn´t have any personal computer. Meanwhile, 41.3% expressed to have between 1 to 5 personal computers. While 17.4% of the principals stated to have between 6 to 10 personal computers. Also 15.3% said that have between 11 to 15 personal computers in their facilities. Only 6.6% of the schools have between 26 to 30 personal computers. Finally, one school reported 27 personal computers (2.2%), other school stated 28 personal computers, one school with 36 and other schools said 45 personal computers.

Reviewing the existence personal computers in operation in these public primary schools that are been used with educational purposes, we found that 43.5% of the principals expressed that none of these personal computers is been used for this purpose. However, 37% of the schools dedicate between 1 to 5 personal computers for educational purposes. In the range from 6 to 10 personal computers we could found just 2 schools (4.4%). Meanwhile, 10.8% of the schools dedicate between 11 to 15 personal computers for educational matters. Only two principals said dedicate more computers to education (25 and 34 personal computers).

About the members of the community that use personal computers in the school is in this way: 73.9% for principals; 60.9% for teachers; 8.7% for staff personnel; and 37% of the students in the schools.

The digital presence of the school in Internet was expressed by the principals in this way: 78.3% schools have e-mail address. Just 2.2% of the schools have their own web page. And 6.5% of the schools have at least one Blog. These indicators show a minimum presence in Internet.

4. The roll of principals in the process incorporation of ICT

In the case of Mexico, there have been implemented several strategies to facilitate the incorporation of ICT in the education. We could say that at least there are five documents involved in the educational national policy: the third article of the constitution, the General Law of Education, the National Development Plan, the Regional Educational Program and the Alliance for Quality Education (Torres, Angulo, Valdés & García, 2013).

The Mexican Government recognize that there are relevant lags in the National Education System in order to get a quality education (Torres, Aviles & Romero, 2012), so the way to increase the quality for primary education, it was adopted to strengthen the teachers training and to modify the educational programs that allow to use ICT in learning. In this sense the roll of the principals is quite relevant because they know how effective are the teachers in their school, they can identify very easy the weaknesses and help to do something about it.

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In the other hand, the Mexican Federal Government and the National Union of Education Workers (SNTE), in the Alliance for Quality Education agreed to modernize schools with the necessary infrastructure (computer equipment, Internet connectivity, availability of computer use in a classroom). Also, they promised to provide personal computers to teachers that get the certification of digital competencies (Arras, Torres & Fierro, 2012). All these matters must be take in consideration in each School Development Program, for that reason the roll of the principals is crucial to get succes in the achievements of the teachers and students.

5. Results

In Table 1 is presented in condensed form the results on the attitudes of principals towards the use of Information and Communication Technology (ICT) showing the dimensions of attitude towards ICT from the beliefs, appreciations and perceptions of respondents considering aspects of their technological skills, teaching skills, possible pedagogical application, ease of use, interference with learning support, emotional considerations, professional application, role in communication and interaction, state of the technological infrastructure and possibilities of access to computing and the Internet.

The questions associated to the dimension of beliefs about technological skills of the principals were related with the roll and necessity to receive technological training and also with the degree of confidence that the director has in terms of self-learning.

Meanwhile the questions associated to the dimension of beliefs about teaching skills were related with the roll of ICT in pedagogical matters about the design of activities, form of organization of the learning and evaluation mechanisms.

On the other hand, the questions associated to the dimension of appreciation about possible pedagogical application were related with how ICT can support the student in finding information and content management.

For the dimension of perception about ease of use of ICT, the questions were related with the degree of usability of technology tools in areas of cooperation and collaboration between teachers or between teachers and their students.

Referring to the dimension of beliefs about interference with learning support relates to the perspective of principals about the facilities that provide ICT in conducting learning activities and teamwork.

Finally, the questions associated to the dimension of affective appreciation address the sense of comfort that the principals have over the use of ICT for both administrative and educational work perspective and also considerer how they think students feel in this regard.

Table 1. Dimensions of study on the attitudes toward ICT of the principals

Beliefs about technological skills	Mean	σ	Std. M
I consider relevant the training in ICT	1.43	.583	.086
I believe that ICT training courses should increase	1.24	.431	.064
I learn to use software easily following the instructions in the manual	1.07	.250	.037
Beliefs about teaching skills	**Mean**	**σ**	**Std. M**
ICT help you to make evaluations	1.09	.285	.042
ICT help you to set up lessons for teaching	1.13	.341	.050
ICT help you in the design of teaching activities	1.26	.491	.072
ICT help you for the feedback of evaluations	1.48	.691	.102
Appreciation about possible pedagogical application	**Mean**	**σ**	**Std. M**
ICT facilitate students to get information	1.28	.455	.067
I think that ICT helps to get scientific information	1.26	.444	.065

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I consider appropriate to use ICT to present content	1.61	.856	.126
ICT promote student motivation for learning	1.48	.691	.102
Perception about ease of use	Mean	σ	Std. M
It is easy to access educational virtual platforms	1.35	.526	.078
ICT facilitate the creation of workspaces with students	1.48	.658	.097
ICT facilitate the creation of workspaces with other teachers	1.80	.910	.134
Beliefs about interference with learning support	Mean	σ	Std. M
ICT facilitate students to perform learning activities	2.3	.986	.145
ICT facilitate students the cooperative learning	1.43	.655	.097
Affective appreciation	Mean	σ	Std. M
I like to use the computer	1.78	.841	.124
I feel that students learn best when they use ICT	1.61	.747	.110
ICT make more comfortable the administrative tasks	1.54	.585	0.86

6. Conclusions

The integration process of ICT in the public primary schools in Veracruz City is a pending task to be resolved. The data show a positive attitude by the most of the principals and we could say that they can manage these technologies with certain ease, buy mainly to perform their management job. They recognized the current weakness in terms of technological infrastructure, training and in the design of educational programs supported by ICT.

So is imperative to take actions against these weakness as soon as possible in order to propitiate the full incorporation of all schools in Veracruz city, but also in Veracruz State and of course in all Mexico.

The Mexican Government have made efforts in national program that tried to provide technological resources in several occasions. However, previous failed experiences show that each national program should be integrated with a national technological change plan that take in consideration that Mexico is a huge, different and complex country. So, differential and specific strategies should be used according to the region and their characteristics.

It is relevant that these national efforts include: (1) Provisioning of telecommunications infrastructure in order to provide free, fast and stable Internet to all the schools in the country; (2) Provide a continuous schema for induction, training and monitoring about the use of ICT with educational purposes; (3) Design national policies in the educational system in order to provide equitable and fair reforms focus in promote the development and evaluation of teaching career.

So, in these educational reforms it is imperative to ensure a higher presence of ICT in educational activities, a higher level of informational competencies in principals, teachers and students, and a mayor contribution of these technologies to improve the quality of learning.

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Learning styles and visual literacy for learning and performance

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Abstract

Identifying students' learning styles has been found to be a significant factor for planning effective instruction. Also, visuals have been proven to be a learning enhancer if it is connected to the learning styles. The aim of this paper is to address some of the fundamental questions about learning styles and visual literacy for learning and performance. Questions including how people learn; what are the learning styles, and how it is determined. It also focuses on how visuals can be connected to the learning styles including multiple intelligences of individuals with learning disabilities such as agenesis of the corpus callosum. It also differentiates between visuals for learning and performance. Some of the visual and learning theories, along with instructional and graphic design models will also be introduced and discussed.

Keywords: Learning styles; agenesis of the corpus callosum; multiple intelligences; information processing; visual literacy

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1. Introduction

The most essential question in education today is: how can teachers and instructors provide their students with effective instruction? The effectiveness of instruction is usually measured by the instruction's capability in enabling the target learners achieve the instruction's intended learning outcomes. Thus, in order for teachers and instructors to plan the instruction that meets their students' need, they ought to know how the students learn better based on their learning styles. The type of learning style mainly depends on the side of the brain, left and right, that a student uses the most. Therefore, teachers and instructors need also to know how the human brain functions in order to assess the learning styles of their students properly and so develop matching instructional strategies. However, the common belief among teachers in general, higher education instructors in particular, is that students learn by various learning styles. Hence, the instructional contents must be delivered to students in different ways, and multiple instructional methods should be utilized. However, visuals in particular have been found to be a strong learning enhancer in various learning settings and for students of varied learning styles. Research suggests that using visuals in teaching results in a more effective learning and, therefore, the need to utilize it in teaching is rationalized. The presence of visual elements in today's teaching and learning is increasing as the integration of images and visual presentations with text in textbooks, instructional manuals, classroom presentations, and computer interfaces broadens (Benson, 1997; Branton, 1999; Dwyer as cited in Kleinman & Dwyer, 1999 and Stokes, 2001).

Using visuals in teaching, however, is not entirely new. Over the years, teachers often used different visuals to illustrate certain learning concepts for their students. They first used colored chalk with blackboards, and then colored markers with white boards and flip charts. They also used Crayons and

construction papers for children. Still pictures, posters, storyboards, charts, etc. were also among the visuals used in early teaching. Later, slides and transparency presentations were also used. However with today's advanced technology, digital visuals are being used as a viable learning enhancer due to its capability in conveying the desired instructional message instantly and universally. Therefore, visual literacy has become a required competency for teachers and instructors of all levels as well as for students in many formal educational settings.**Visual Literacy** is defined as the ability to understand, use, and create with images effectively (Braden, 1996 as cited in Lohr, 2008).

This paper aims to address some of the fundamental questions about learning styles and visual literacy for both learning and performance. Questions including how people learn; what are the learning styles, and how it is determined. It also focuses on how visuals can be connected to the learning styles to enhance learning (connection and action), and differentiates between visuals for learning and performance. Some of the visual and learning theories like the information processing theory and the cognitive theory of multimedia will be referenced. Also, related graphic and instructional design models like the ISD (instructional system design) approach and ACE (analyze, create, and evaluate) will also be introduced and discussed.

2. Learning styles and the human brain

While some people learn by hearing or reading words, others prefer seeing pictures, and or learn by doing (hands-on). Also, there are some people who learn better by analyzing or socializing, or some people like to learn individually, while others like to learn in groups. These different preferences of learning are referred to as the **learning styles**. Figure 1 presents learning styles overview that includes seven-learning styles: (1) visual (special), (2) verbal (linguistic), (3) aural (auditory), (4) logical (mathematical), (5) physical (kinesthetic), (6) Social (interpersonal), and Solitary (intrapersonal). This overview is based on (Learning-styles-online.com, 2014)

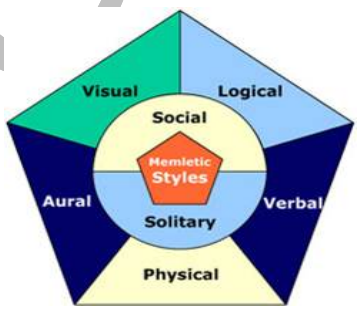


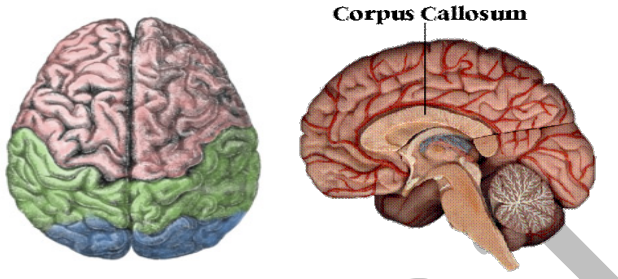
Figure 1: Learning styles overview

Also, students can have a combination of two styles such as visual-verbal, visual-nonverbal, auditory-verbal, or physical-kinesthetic, or can have a mix of multiple learning styles. Evidently, students with multiple learning styles can benefit from multiple instructional strategies. However, the research does not provide evidence of the superiority of a particular combination or mix of multiple learning styles over another. Hattie (2011) states that there is no scientific evidence, as of yet, that shows that people have specific, fixed learning styles or discrete intelligences, nor that students benefit when teachers target instruction to a specific learning style or intelligence. However, providing students with multiple ways to learn content has been shown to improve students learning (as cited in Edutopia, editor's notes, 2013).

In order for us to understand the origination of the learning styles, it is imperative that we understand how the human brain functions in general and how learning actually takes place. The cerebral cortex of the brain that houses the rational functions is divided into two-**brain hemispheres** connected by a

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thick band of nerve fibers (the corpus callosum) which sends messages back and forth between the two hemispheres of the brain. Figure 2 shows images of the two hemispheres of the brain and the corpus Callosum. While brain research confirms that both sides of the brain are involved in nearly every human activity, we do know that the left side of the brain is the seat of language and processes in a logical and sequential order. The right side is more visual and processes intuitively, holistically, and randomly. Most people seem to have a dominant side. The key word is that our dominance is a *preference*, not an absolute (Monroe Institute, 2014). Hence, people can and should develop both sides of their brain. However, knowing and understanding our multiple learning styles can help us learn more effectively by capitalizing on our strengths. Such determination has been found to make a difference for people with learning disabilities because of their multiple intelligences and different ways of learning.

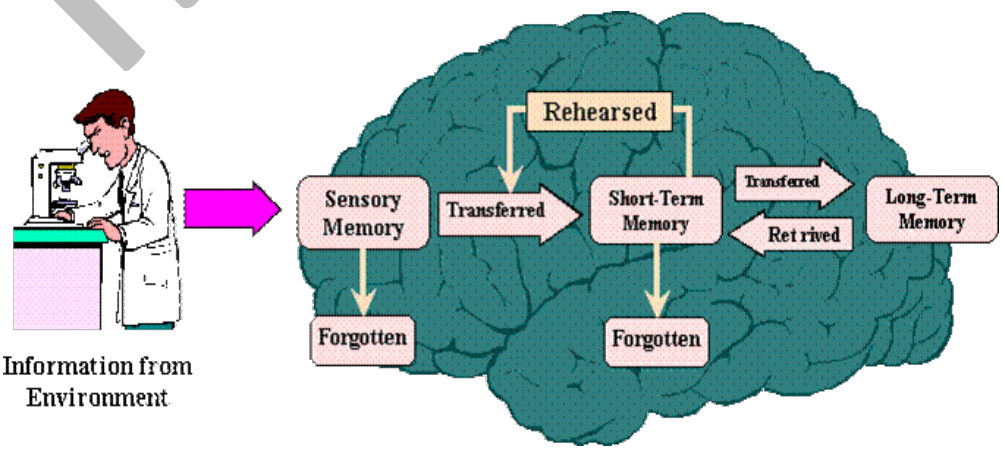


(a) Brain Hemispheres **(b) Corpus Callosum**

Figure 2: Images of the brain hemispheres and corpus callosum

3. Information processing theory

The **information processing** theory describes how information travels through memory. In 1968, Atkinson and Shiffrin propose a model of information processing based on two types of memory: (1) short-term memory (including sensory and working memory) and (2) long-term memory. This model shows that the short-term memory is limited to seconds and explains why it's hard for people to remember things for a long period or perform simple tasks. In this model, the working memory of the short-term memory works in a system in which has an executive capacity that manages information. In a way, it plays the role of the Gate Keeper. It filters the information and decides on what type of information is insignificant that needs to stay in the sensory memory where it gets forgotten in seconds; and what is significant and must be advanced to the long-term memory where it gets stored, retained, and later recalled. "Learning is attributed to the successful transfer of information from one type of memory to the next (Lohr, 2008, p.54). Figure 3 shows how the information travels through the memory.



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Figure 3: Movement of the information through the memory

4. Mayer's cognitive theory of multimedia

In (2001), Mayer identifies some strategies for extending the memory for learning by using instructional multimedia principles and explains how visual and verbal memories can interact. Mayer builds his theory based on Atkinson and Shiffrin's information processing theory and identifies three cognitive processes of **selection, organization** and **integration** to increase **retention** of information and **enhance learning**. While the information learning theory focuses on the structure of these same three principles in enhancing the information processing and storage in the memory, Mayer's cognitive multimedia theory focuses on the facilitation of these principles in retaining the information in which it can be utilized in a meaningful way. Mayer's theory emphasizes that the retention of the information starts at the organization stage in which significant information needs to be organized and visualized in order to be moved from the short-term memory to the long-term memory where it can be stored. Lohr (2008) offers an interpretation to Mayer's organization principle of the multimedia theory. She states, for the instructional designers, that: "learners are more likely to think about your visuals the way you want them to if you organize or present information, in a way that the mind is predisposed to grasp (Lohr, p.62). Figure 4 shows how pictures get processed in the memory based on Mayer's cognitive theory of multimedia.

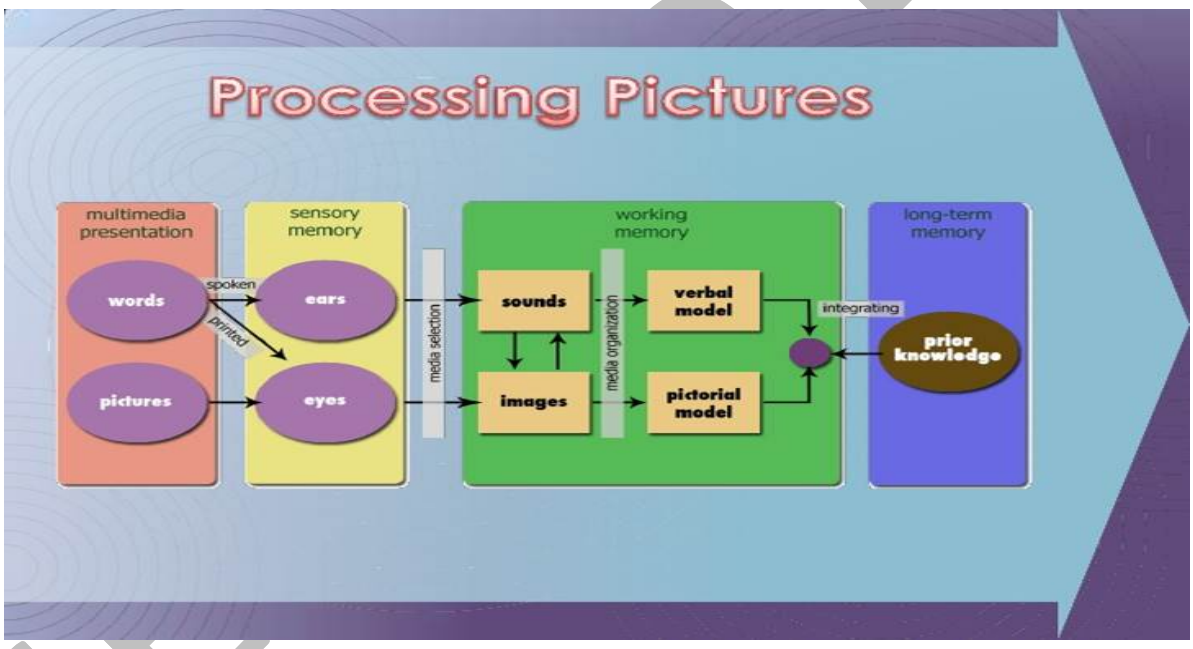


Figure 4: Processing pictures in the memory

5. Visuals for learning

The principle question here is how teachers and designers can organize and utilize visuals to help students learn and retain information in order to be recalled later for a meaningful use. **Visual** is a form of communication that is not verbal. It can be a picture or another form of illustration that appeals to the sense of sight. Figure 5 illustrates how the visual appeals to the sense of sight. In general, visuals can include but are not limited to: pictures, symbols, signs, maps, charts, graphs, diagrams, photographs, and models. Braden (1996) identifies five categories of visuals that have been studied by educational researchers. According to Barden, these visual categories are: (1) semiotics and film-video conventions, (2) signs, (3) symbols and icons, images and illustrations, (4) multi-images, and (5) graphic presentations (Braden, 1996 as cited in Lohr, 2008, p.13).



Figure 5: An illustration of how the visual image appeals to the sense of sight

A large body of research indicates that visual cues help us to retrieve better and remember information. The research outcomes on visual learning make complete sense when we consider that our brain is mainly an image processor (much of our sensory cortex is devoted to vision), not a word processor. In fact, the part of the brain used to process words is quite small in comparison to the part that processes visual images. Words are abstract and rather difficult for the brain to retain, whereas visuals are concrete and, as such, more easily remembered.There is countless studies that have confirmed the power of visual imagery in learning. One study asked students to remember many groups of three words each, such as dog, bike, and street. Students who tried to remember the words by repeating them over and again did poorly on recall. In comparison, students who made the effort to make visual associations with the three words, such as imagining a dog riding a bike down the street had better recall significantly (Kouyoumdjian, 2012, as stated in Psychology Today, 2014). In fact, just about every specialized study conducted for visuals and learning has emphasized the positive impact that visuals have on the students' memory, motivation, and performance. Visuals have been proven to engage students in the learning process, and images stimulate their critical and creative thinking. Also, visual thinking is conceived to be a learning style by which students learn better and retain more information when abstract words are associated with images. Teachers and instructors often hear statements from their students like these: I am a visual learner. I need to see it. Can you show me? Such demand is even stronger by online students who often struggle in an isolated learning environment where visuals and interactive multimedia can, to a degree, compensate for the social interaction of a traditional classroom.

6. Agenesis of the corpus callosum and visualized learning

As stated in the learning styles and brain hemispheric preferences sections, the learning styles are determined based on the two sides of the brain and learning requires movement of the information from one side to another through the corpus callosum. It was also concluded that identifying **multiple learning intelligences** for students with learning disabilities can help in capitalizing on the students' intelligence strengths, and teach them accordingly. However, how about individuals who were born without a corpus callosum and their learning disability is the lack of connectivity between the two sides of the brain that medically known as the agenesis of corpus callosum. How do these individuals learn, and how does their brain process information? While ADHD (attention deficit hyperactivity disorder) and other learning disabilities like non-verbal learning disability and autism are all widely known and have been reasonably addressed, ACC (agenesis or the corpus callosum) is not as known and relevant research is still limited. **Agenesis of the corpus callosum** is defined as a congenital (lifelong) brain abnormality that occurs when the corpus callosum does not develop as it should during the early prenatal period. It can occur as an isolated condition or in association with other brain abnormalities or physical or medical conditions. The corpus callosum is important for processing and integrating sensory, motor, and cognitive information. When the corpus callosum is missing or malformed, these functions may be affected (University of Main, 2008). Figure 6 shows an image of the brain with agenesis of the corpus callosum.

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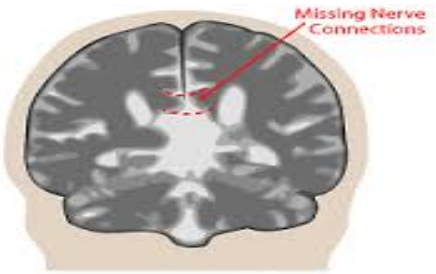


Figure 6:

Professionals in the field are still trying to have a better understanding of the impact of these types of disorders and the similarities and differences among and between them. Therefore, the question of how people with ACC exactly learn without a "connecter" between the two sides of the brain to send the information back and forth between the two-brain hemispheres is a question that is yet to be adequately researched. However, based on our personal experience for ten years with a child who has complete agenesis of the corpus callosum, we have found her to have multiple learning styles with visual-spatial is dominant. Auditory-verbal is also a favorable learning style for her. By which, she learns better by listening to a person reading a book or story than reading it herself. She also seems to benefit from the physical-kinesthetic learning style and the multiple learning intelligences by which she has learned to play the piano articulately, and had no difficulties learning to play other kind of musical instruments like clarinet and trombone. Also, stimulating her brain with visuals and provoking her to think visually has been found to be an effective learning technique for her. For instance, having her chunk long combined telephone numbers and associate each chunk with a special memorable event such as her birthday along with the motivation like calling grandparents overseas has enabled her to learn and retain up to 22-digit number. Evidently, Math is her hardest subject because it requires instant movement of the information back and forth between the two sides of the brain. Thus, it was hard for her to even remember, for instance, that 8 x 8 is 64. However, she was able to retain and recall the answer handily when she heard it as a song: 8 and 8 went to the store to buy game 64. And to reinforce her understanding of the concept, we also asked her to imagine always that 8 and 8 as twin sisters who are holding hands and walking in the Mall down to the game store to buy game number 64. Undoubtedly, visualization and rhyming were what enhanced the information and made it move to her long-term memory where it was retained and recalled later while she was working with more advanced Math that requires such multiplication. Also since the absence of the corpus callosum prevents her from seeing straight lines vividly in its actual places, she had a hard time performing relevant tasks precisely such as cutting along the line or placing a cup near a lined-edge of a dining table or kitchen countertop. Therefore, we trained her to disregard the line when she sees it and visualize the area where she can perform the required task instead. For instance, visualizing an area above or below the line where she can cut straight next to the line without crossing over it; or an area between the edge of the table and a plate on it where she can place the cup. Such visualization has helped her not only performs these tasks more precisely, but also promoted her comprehension of the concepts being learned. Also, the same technique of visualization and the motivation to be in control of the steering wheel has enabled her to drive a golf cart comfortably in streets with no lines in the middle, when driving for individuals with this learning disability is still altogether an area beyond the research scope. Based on our experience, we have found that our daughter can learn better with the utilization of various visuals to illustrate certain learning concepts, and can think and create critically by visualizing and performing cognitive and motor tasks. In conclusion, visualization coupled with motivation has been an effective learning approach that made learning less agonizing and an achievable task for her that would have been more difficult otherwise. However, this is only one case of teaching an individual student with an isolated condition of ACC (no other medical or mental complications). Therefore, our findings do not by any means offer a scientific breakthrough nor does it yield a generalization of our conclusion. It may, however, offer an approach to be tried and tested further in a larger and more inclusive research context.

7. Visual Literacy

What does visual literacy entail, and what exactly visual literates are capable of doing? Visual literacy is a group of acquired competencies for interpreting and composing visible messages. A visually literate person can: (a) discriminate and make sense of visible objects as part of the visual acuity; (b) create static and dynamic visible objects effectively in a defined space; (c) comprehend and appreciate the visual testaments of others; and (d) conjure objects in the mind's eye (Brill, Kim, and Branch, 2001as cited in Lohr, 2008, p. 5).

7.1 Visual literacies and utilization of visuals for performance: Visual literacy for performance can be defined as the ability to create and utilize visuals to support the human performance of achieving specific tasks. For instance, the ability to prepare visualized instructional steps to help people in performing some life tasks such as pumping gas in a self-service gas station or completing a bank transaction using an automated teller machine. Or the ability to develop instructional manuals to help people perform even more difficult tasks like operating a newly purchased electronic device like an iPad or assembling a computer desk. Also, there are some other professionals who use visuals for more planned performance. These may include someone as James, the instructional designer, who works for a company who demands excitement in the training; or Maria, a graphic designer, who wants to design an impressive logo for a client company. Visuals have been also found to be very powerful in conveying marketing and advertising messages. Imagine how memorable the visual graphics of some of the corporations' logos by which we recognize a company by merely seeing its visual graphic. To name few of the many companies who have impressive logos, these may include McDonalds, Apple, Nike, and Starbucks. In fact, Starbucks has simplified its logo by dropping the printed name and keeping only the graphic image. Without a doubt, the graphic designers of these corporations know precisely how the human brain functions and how visual graphics impact the memory.

7.2 Visual literacies for learning: It is the utilization of visuals in education for the purpose of helping students learn better wherever learning takes place, in schools, colleges, universities, in class, or online. As indicated previously, visual literacy is now a required competency in education that requires teachers and instructors to be able to organize, manipulate, and utilize graphics for the purpose of learning. By using their visual competency, they can enhance their students' learning and help them achieve academic success. For instance, being visually literate, Sue a 7th- grade science teacher can create highly visualized and attractive instruction for her science class and Robert, a community college instructor can develop an effective PowerPoint presentation or a computer-based instruction for his web-based class.

8. Graphic and instructional design models

Evidently, visuals can play a major role for both learning and performance. However, visuals have to be planned keenly and used purposefully in order to communicate the intended message. Just as professionals for performance are knowledgeable and skillful in graphic design, teachers and instructors ought to be able to create, manipulate and integrate visuals into curriculum. They also need to be able to work with and manage electronic files for digital images like GIF and JPEG, and draw graphics like shapes and or import pictures, clip arts, charts, tables, shapes, smart art, and animation to an instructional document. Also, teachers and instructors need to be able to use some graphic editing programs and software such as the Adobe Photoshop to work with a graphic design principles and tools for learning. In her book *Creating Graphics for Learning and Performance*, Lohr (2008) presents the **ACE** (analyze, create, and evaluate) model as a graphic design approach for learning and performance. The ACE model is directly tied to the two-learning theories introduced previously, the information processing theory and Mayer's cognitive theory of multimedia. She presents the ACE model as a micro design process in the larger context of the **ISD (**instructional system design**)** approach that is based on the **ADDIE** (analyze, design, develop, implement, and evaluate) macro instructional design process. Within the creating cycle of the ACE model, Lohr uses the **PAT** (principles, action, and tools) as a process to create graphics for instruction that cater to the learners' need and enhance certain learning events as part of a larger context of achieving a pre-planned instruction with specific learning outcomes. Also within the creating cycle of the ACE model, Lohr utilizes principles such as selection, organization, and integration that were discussed in both the information

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processing and Mayer's cognitive multimedia theories as learning enhancers. Lohr also presents a set of **Actions** and **Tools** to create these graphic design principles. The actions include the **CARP** (contrast, alignment, repetition, and proximity), and the tools include the type, shape, color, depth, and space (Lohr, pp.71-94). Figure 7 shows CARP and tools sample images.



(a) Example of CARP **(b) Example of type, color, shape, depth**

Figure 7: Examples of the CARP graphic principles and tools

9. Conclusion

Visuals have been found to be a powerful tool for both learning and performance. It enables people at the time of the need to perform specific tasks efficiently, and also helps students learn better based on their learning preferences. Visuals have been also found to be greatly effective for learning if it's connected properly to the students' learning styles and planned around the desired learning outcomes. In fact, utilizing visuals in light of the instructional system design (ISD) approach has been proven to increase the target learners' retention and optimize learning. Also, visualization of the learning concepts along with the motivation to learn it has been found to help students learn the concepts more forcefully and foster their critical and creative thinking. This approach has also been found to be greatly effective for individuals with learning disabilities, including agenesis of the corpus callosum. However, research tells us that the effectiveness of visuals can only be optimized if it's used in conjunction with other forms of learning tools such as auditory and tactile experiences. Also, the efficiency of teachers and instructors in using visuals for learning can make a difference in the students' success. In today's massive information age, the need for visual competencies and technology-related skills is increasingly high for a high-quality matching performance.

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MARKETING COURSE AT THE FACULTY OF MANAGEMENT SCIENCE AND INFORMATICS

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Abstract

This paper deals with our concept of teaching marketing at the University of Zilina – Faculty of management science and informatics. Our main educational goal toward the students is to teach them marketing approach and marketing way of thinking. The students work with real existing products. With study of market reality they try to understand strategic approaches. They work in teams. Single study groups deals with single products, which are direct competitors (e.g. Sony´s PS4 and Microsoft´s XBOX One...). At the end of the course students presents specific information and findings at a joint meeting. The results are also under discussion, which is necessary for a more comprehensive understanding of the market. Discussion results are generalized and confronted with theoretical knowledge. In our concept are crucial two factors: teamwork and the use of information-communication technologies that allow students to work better together. Our paper describes the concept of teaching the marketing course and its main meaning. Subsequently, we discuss a method of teamwork among students.

Keywords: marketing; marketing course; teamwork; marketing teaching; cooperation; collaboration, cooperation management

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1. Introduction

Our topic is considering course of marketing at the University of Žilina, but is close related to our research project called cooperation management (Slovak republic scientific grant 1/0992/11Cooperative management – effective approaches for gaining the competitive advantage 2011-2013 and 1/0621/14 Marketing management in cooperative environment - Proposal of strategic cooperation management implementation model - from 2014).

The term of cooperation management is covered of variety of interpretations. Lafleur (2005) understands cooperation management as a way of managing and developing collaboration in a competitive environment. According to Ray (2002), cooperation management represents a term for integrated management of company networks. Staatz (1983) sees cooperation management as cooperative decision making within heterogeneous preferences. He highlights the need for a model of cooperation based on a defined group choice. Zhang (2011) believes that cooperation management represents a basis for solving all managerial problems. According to him, cooperation management provides conditions for creating a system of cooperation based on effective use of resources and technologies. Veerakumaran (2006) summarized the most important characteristics of cooperation management into the following points:

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- Cooperation management is a complex decision making process and the decisions are made on all managerial levels.
- Primary goal of cooperation management is to satisfy the needs of the members of cooperation.
- All activities need to occur according to the agreed principles of management and cooperation.
- Suitable balance needs to be established between the efforts for commercial success and maintaining goals of the cooperating parties.
- Management focused on reaching a goal via effective use of resources.

Considering literature review and our own research in the area we have postulate our own definition of cooperation management: Cooperation management is effective and efficient management of relationships in a cooperation between separate and relatively independent organizations or individuals, with the goal of improving their competitiveness. (Soviar, et. al. 2013)

According to above mentioned topic we have tried to bring cooperation management processes into the education process.

2. Student´s cooperation at the marketing course

When we take responsibility for the marketing course our first problem was to realize our main educational goals:

- students must work with real products on real market;
- they will use only real and relevant data;
- the case on the market will be analyzed in detail;
- discussion will be just after proper analysis;
- there in the discussion the students will prioritize their strategic point of view.

Besides these main goals we also include theoretical knowledge about standard marketing topics (e.g. according to Kotler, P. – Keller, K. L. et. al. 2012 and Kotler, P. – Armstrong, G. et. al. 2013). Marketing course is required to be successfully ended in the undergraduate program (field of study – management) and it is also a requirement for continuing in postgraduate program (field of study – information management). For other fields of study in our faculty (informatics and computer engineering) is marketing course optional. Marketing course has an important thematic follow up in the course of marketing communication (which is optional for all fields of study). Marketing is obligatory subject in second year of undergraduate study program (bachelor study). The course is divided into 13 weeks. In every week are presentations and lectures (seminars). There are 65 students average in every year and 4 study groups (average). Every study group has single lectures. Presentations are open for all.

We have brought above mentioned educational goals into praxis in academic year 2011/2012. Students worked in teams inside single study groups. There are 5 major cases to work out during the semester (following the concept in Soviar, 2011). Every week the students worked on other case. Single cases are closely related to each other. Majority of time in the lectures was devoted to discussion about main findings, comparison of information between single teams and lecturer´s recommendations. Complete cases must be submitted in precise time and form via e-learning system (five times). The lecturers must review the submitted papers and evaluate them. Final cases are devoted to the work with obtained information and to determine the strategic approaches as well as to discussion. For brief familiarization with the topic and work during the semester all study groups representatives presented the main conclusions on the final presentation. This led to final discussion and to pointing out of the main themes, issues and further possibilities by lectures.

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In terms of strengthen the cooperation between the students on one hand and also of "healthy rivalry" on other hand we have decide to bring new rules of forming teams within the study groups into praxis (in academic year 2011/2012). The custom was that the students are allowed to from their teams by themselves. New rule was that the teams will be created by the lecturers.

Students fill up a brief questionnaire on the first lecture, which is in fact a self-evaluation. Following the self-evaluation results there were created teams to work on the first major case. Every team has 4 members minimum. Member of teams depends on the number of students in every study group. This questionnaire "ex-ante" holds 5 questions. Student evaluates him or herself on 5 point scale, where 1 is minimum and 5 maximum. The questions are:

- Am I a "team player"?
- How good am I in ICT and with the work with software (MS Office, Word, Excel, PowerPoint ...)?
- Can I analytically process information?
- How well can I point out the important issues from the big amount of information?
- When I have sufficient amount of relevant information, can I use them to build strategic processes?

According the "ex-ante" results the students are divided into groups as following:

- 20-25 points - self-evaluation level "Top"
- 12-19 points - self-evaluation level "Middle"
- 11 and less - self-evaluation level "Low"

If students evaluated themselves relatively identically we consider even minor gaps in results and divided them into three groups also. If possible - every group has at least one student, which evaluated his/herself as "Top" and at least one evaluated as "Low". Further work during semester will objectify these self-evaluation "ex-ante". Major cases are submitted for evaluation every two weeks. After submission single team members evaluate each other and there is also self-evaluation present. Submitted cases (papers) are evaluated by lecturers. Evaluation after submission by students is following:

- "Team member name" – Is he or she worked diligently and responsibly? (scale from 1 to 5)
- "Team member name" – To what extent was his or hers contribution creative and relevant? (scale from 1 to 5)
- "Team member name" – Was cooperation with him or her easy or difficult? (scale from 1 to 5)
- How was my contribution to the teamwork? (scale 1-5)
- Who was most beneficial for the team? (name/nobody)
- Who causes biggest problems in team? (name/nobody)
- Notes, suggestions… (open question)

Results from these evaluations are strictly confidential. According to that we provide no student´s names. After evaluation the students knows just statistically processed results (averages, etc.). Every student has access only to his or hers results (also just numbers, no names of evaluators). There is no way that anybody could see evaluation of some other student.

For every main case there were created new teams as following:

- First case: Teams are created as evenly as possible. In each team should be relatively equal representation of all categories of self-evaluation „ex ante" (Top, Middle, Low).Teams are created by lecturers.
- Second case: Teams are created according to the amount of points in self-evaluation „ex ante". That means to rank students according to the results of their self- evaluation from the highest to the lowest, and then inserted into teams according to the number of points. In each team will by students who rated themselves relatively the same.
- Third case: Teams are created as in first case.
- Fourth case: Teams are created randomly (with the use of random numbers generator at random.org).
- Fifth case: Teams are created by students (with no intervention of lecturers).

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3. Results

When Cluster analysis was made from data taken from evaluation of students this result was observed. More than 85% students that were evaluated themselves by mark 4,3 got average mark 4,5 from team. Only 15% students evaluate themselves by mark 3,19 got average mark 4,2 from team. It can be understood that 85% students guessed own abilities well or team evaluated members very benevolent.

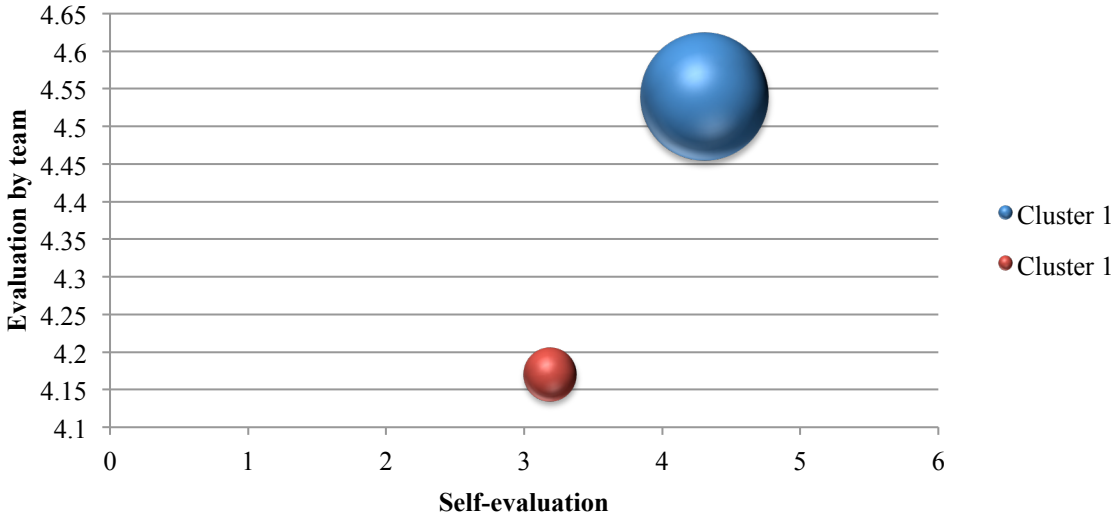


Figure 1 Cluster analysis of Self-evaluations vs. Evaluation by team (Academic year 2011/2012)

The final marks that students got during observed years are shown in following tables. In Academic year 2011/2012 (Table 3.1) most of the students (26) got final mark C. To get this mark they needed by average almost 41 points from semester and 37 points from final exam.

3.1. Academic year 2011/12

Marks	**A**	**B**	**C**	**D**	**E**	**Fx**
Count	2	15	26	22	4	1
Semester Points - mean	45,50	42,27	40,96	39,16	35,13	28,00
Exam Points - mean	45,50	41,87	37,35	32,34	30,75	0,00

In Academic year 2012/2013 (Table 3.2) most of the students (31) got final mark C as well. To get this mark they needed by average almost 38 points from semester and 37 points from final exam. It means that most of them were close to final mark D.

3.2. Academic year 2012/13

Marks	**A**	**B**	**C**	**D**	**E**	**Fx**
Count	3	14	31	14	2	1
Semester Points - mean	37,50	39,86	38,21	35,75	36,25	37,00

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Exam Points - mean	45,00	43,00	36,98	32,86	30,00	0,00

In Academic year 2013/2014 (Table 3.3) most of the students (30) got final mark D. To get this mark they needed by average almost 39 points from semester and 34 points from final exam. This confirmed the tendency of the last period. The question is whether this is due to the increasing demands of study, or declining quality of achieved results.

3.3. Academic year 2013/14

Marks	**A**	**B**	**C**	**D**	**E**	**Fx**
Count	1	9	21	30	5	2
Semester Points - mean	47,00	44,33	42,64	38,97	33,90	15,25
Exam Points - mean	46,00	43,22	38,90	34,17	30,80	0,00

For a better view of the trend are marks shown in the following Figure 2. There is possible to see normal distribution for each reference year, but his tendency is shifting as well.

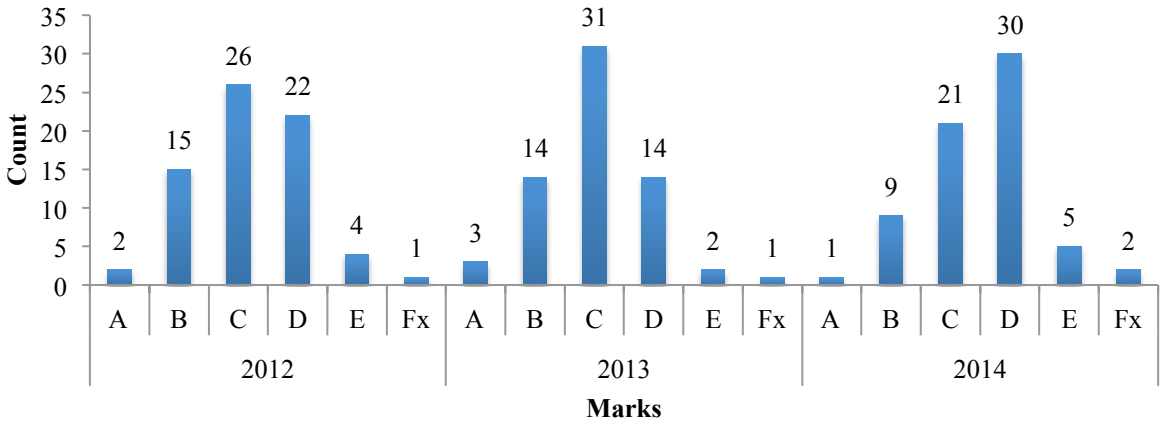


Figure 2 Given marks by years

4. Conclusion

On base the received data can be confirmed that is tendency to get worse final marks. During academic years 2011/2012 and 2012/2013 were teams built by teacher and randomly change for each case. The last year 2013/2014 students built the teams and they stayed for all cases. It was discovered that most of low teams stayed low and also they lost motivation to be better. On the other hand very good team lost rivalry. The result was that fewer students got enough points from semester. It is necessary to confirm that very good mark was not a gift and it was fair. As was mentioned in papers from Lendel, Varmus (2013) and Lendel (2013) every university teacher uses feedback in a different range and by different way and only future research will show if our model is correct.

Acknowledgements

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Math, English and netbooks at the university. Learning across contexts?

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Abstract

Nowadays, teachers and students at public universities in Argentina have mobile technologies. Mathematics and English are two areas that traditionally include diverse technologies in education, both at secondary school and at university. Taking into account the outcomes of our research project, the aim of this article is to show the analysis of the experience on the uses of mobile technologies –made and assigned– at the university particularly in these subjects, analysing the use of these technologies both in the classroom and through the different contexts that students cross in their lives.

*Keywords:*University, Mobile Technologies, Mathematics, English, Aprenticeship

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1. Introduction

Nowadays, students that begin engineering careers at Facultad Regional San Nicolás, Universidad Tecnológica Nacional, in Argentina, are part of a change as regards the technology they have available for studying. In general, all of them have mobile technological equipment, partly due to the Conectar Igualdad Program (www.conectarigualdad.gob.ar) which has delivered more than 4.300.000 netbooks at state secondary schools, and also because of the proliferation of mobile technologies (MT). Mobile devices are present in different ways in everyday life. This increase in technological equipment together with the advances in connectivity would enhance the learning processes, not only in the classroom, but also during students' transit across their daily contexts. Nevertheless, we ask ourselves to what extent this increase in MT, coupled with the growing connectivity, could really empower learning, in the classroom and through contexts.

This potential contribution of MT makes authors like Traxler (2009) and Kukulska-Hulme (2013), define "Learning across Contexts" as the learning that is developed through the use of these technologies at any place and any time of the students' daily lives.

In other words, these learning processes take place when teachers or students are aware of the differential advantage (Spiegel, 2010) of MT, meaning that the potential of the portability of the devices included in MT are significantly used. At this point, we wonder whether university teachers require their students to use MT and what kind of activities related to academic life are performed with these devices inside and

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outside the classroom. To answer these questions we will address general data and we will focus on the case of Mathematics and English, two of the subjects that traditionally make an intensive use of technologies.

The ongoing research project of the "Mobile Technologies Applied to Education" Group (TecMovAE), «Mobile Technologies at University. Social practices, challenges and opportunities at first year of University» identified as UTN1612, investigates about social practices, challenges and opportunities of mobile learning at university. Within the project, information was collected during 2012 and 2013. Data was constructed from:

- Surveys conducted to students of engineering careers, both at the beginning and at the end of their first year at university:

  - The first survey gathered information about the expectations on the use of MT at the university, and about the social practices that students developed with MT in their daily lives. Students were also asked about their experience at secondary school using MT, as most of them received netbooks from the Conectar Igualdad Program.
  - On the second survey experiences on the use of MT at the university, and their opinions, were gathered.

- Surveys conducted to teachers of first year of engineering careers at the university.
- Semi-structured interviews made to teachers and students.

Some results are shown here, together with some reflexions, analysis and conclusions.

2. Theoretical approaches

2.1 Mobile learning, learning across contexts

As Gaudreau Miranda, & Gareau (2014) say, smartphones tablets (and netbooks in Argentina, due to Conectar Igualdad program) have rapidly grown in popularity among undergraduate students. Mobile phones which used to enable only telephone conversations and minimal texting, now allow students to do the same as they could do with laptops, empowered by the improvement of broadband technologies. Students always carry with them this type of MT, and fortunately the access to broadband is becoming better in our country. Meanwhile, mobility, as Traxler (2009) points out, should be regarded not only in terms of spatial movement, but also by the ways in which mobility can allow temporary movement and boundary crossing.

Taking into account the definition of context that Spiegel (2013) adapts from Shuster (1995), society is conceived as a context within which the digital context is also included. Educational institutions may also be considered as contexts, with porous or shielded boundaries, to allow or to hinder seamless learning. Kukulska-Hulme, Sharples, Milrad, et al (2009) emphasizes an understanding of context as a general concept that covers interrelated aspects of mobility. In this sense, defines physical, technological, conceptual, social and temporal contexts of learning. The attractive aspect of this definition is that it covers a broad spectrum of issues relevant to characterize mobile learning. Thus, an extended notion of mobility and context would include physical, conceptual and temporal spaces.

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Kukulska-Hulme (2009) says that student's mobility creates a learning environment in constant change. The interactions mediated by technologies are intertwined with the direct interactions with people. Therefore, the interactions with mobile technologies within the frame of pedagogical interactions that take place around them, become the centre of attention. So it can be said that mobile learning is all learning that happens when the student takes advantage of learning opportunities offered by mobile technologies (O'Malley, Vavoula, Glew, Taylor, Sharples & Lefrere, 2003).

Goodyear (2011) points out that we are facing two perceptible changes in the field of educational research. The first one is a change in the sense of spaces and contexts in which education takes place, since different learning activities are becoming more commonly distributed through a variety of contexts. The second change relates to a broader understanding about the conception of educational practice. In this respect, a growing importance of design, in our case, the didactic design –to develop, to implement, evaluate and better the learning activities related to learning processes– to create and evaluate technologies to guide the learning activities.

The challenge, according to Pachler, Bachmair & Cook (2010), is to recognize the activities that students perform every day with their mobile devices, which take place in daily life, as skills that are relevant to academic learning and thus relate university with their daily lives in a significant way for everyone. The information in informal learning contexts can be combined with learning resources traditionally used in educational institutions. This could extend the learning activities, not only studying, but also experimentation and interaction among persons, beyond the classroom, library or laboratory.

Meanwhile, according to Fried (2008) and White & Martin (2014), mobile devices are seen as disruptive for the aims of learning in classroom contexts, because they are associated with informal use, like surfing the Internet, playing videogames, watching videos, listening to music, reading e-mails, etc. Fried (2008) goes further, expressing that educators have good reasons to be cautious about in-class laptop use.

We refer, then, also to a situated learning (Lave and Wenger, 1991) that promotes learning as social interaction. In this respect, the achievements are reached by means of communication among students in the construction and completion of the activities, and the collaboration to build and to understand.

Time and space converge also to create the right conditions for learning, and the available technologies guarantee the ready access to remote resources, as well as the use of the information and the potential available contacts in a particular place.

Despite the fact that mobile technologies can open new opportunities to situate learning in authentic contexts outside the classroom, there is still a huge mountain of challenges that needs to be dealt with before we can meaningfully realise the actual potentials of mobile learning. Even though mobile learning has recently been considered as a meaningful tool to support boundary –and context– crossing (Pachler et al., 2010), this has mostly been studied in terms of the role mobile technology can play in one context, usually in an outdoor environment, rather than studying the pedagogical value of crossing contexts as such. Still little is understood about how we can pedagogically orchestrate the utilization of different contexts to support learning. In fact, little is understood in general about how we can support learning in more dynamical contexts than the classroom environment, in terms of scaffolding learning processes (Nouri, 2012).

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2.2 Mathematics, English and mobile learning

Mobile technologies associated with decontextualized learning can support math learning. From a theoretical point of view, mobile learning can be motivated from different perspectives, such as situated learning (Nouri, J. 2011).

Examples of mobile learning apps for mathematics teaching can be seen in White & Martin (2014), and in Eliasson, Cerratto Pagman, Nouri, Spikol & Ramberg (2011). In these studies, they present projects that include mobile devices in environments beyond the classroom, for the learning of mathematical content such as the linear function and geometry, among others.

As regards teaching and learning of math, the inclusion of these technologies would enhance the design of the teaching sequences, as there are many applications that would be helpful to facilitate learning. In particular, the Conectar Igualdad netbooks have mathematical software like Euler Math, Toolbox, Geogebra, Graphmatica, Maxima, Modellus, etc.

In addition, there are a number of free apps, such as graphical software and sophisticated calculators, which can be downloaded to smartphones and tablets, and that would help both to the visualization and to the efficiency in obtaining results. Some examples of these applications are MyScript Calculator, Mathlab Calculator, Mathematics for Android and 3D Functions Plotter, among others. The advantages of using these software are well known, as visualization is a key tool in the process of concept formation in mathematics, and the time saved by not performing manual calculations can be used in the analysis of results.

Also, MT and wireless networks could provide flexible building schemes for learning a foreign language, both in time and space, allowing also alternative communication (synchronous and asynchronous, group and/or individual).

According to Kukulska-Hulme (2012), the learning processes that students can develop using MT are consistent with the spirit of constant inquiry about language-in-use, and with the frequent informal practice required when learning a foreign language. However, the question about how these should now be organized, by and for students, given the growth of new tools, services and resources, remains barely answered.

Searching beyond the "at anytime, anywhere" motto, faculty involved in foreign language teaching and in the teaching of mathematics need to examine how the learning of these subjects is changing in this new scenario, rich in mobile technologies, and under the influence of the students' new practices that come from their personal perspectives about the best utilization of the mobile technologies they carry with them every day as they move through contexts.

3. Findings and results

From the data gathered from the surveys conducted in 2012 and 2013 to students and teachers at the university, it was found that almost the 100% of university teachers and students have MT and Internet connectivity. In this sense, it is worth to be remarked that four out of ten students received netbooks from the Conectar Igualdad program. Both groups make similar uses of MT outside the classroom, in their daily lives, as it is shown on Table 1.

Table 1.Use of mobile device in the students and teachers' daily lives.

Some questions asked about the use of MT in daily lives	Students	Teachers
For communicating with family and friends	97%	100%
Download and listen to music	97%	90%
Search for information and get news about current events and politics online	100%	82%

In particular, it turned out that faculty also use their MT for preparing teaching materials such as notes and practical guides, and uploading them to Internet in educational platforms.

In the surveys conducted to faculty a question about the applications they used at university was included. The results on the most common programs are shown on table 2.

Table 2. Apps used by faculty.

Do you use weekly these software?	Teachers

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Word processor (Word, Notepad, etc.)	85%
Presentations Software (PowerPoint, etc.)	67%
SpreadSheets (Excel, etc.)	89%
Browsers (Google, Mozilla, etc.)	77%
Mathematical programs (Geogebra, Maple, etc.)	46%

When students were asked if their teachers had used MT for teaching, 48% said "sometimes". Taking into account the records of request about computer equipment, it appears that "mobile technology" may have been the projector and the teacher's netbook –or the one provided by the department– for example, for PowerPoint presentations (Spiegel, Rodríguez, Salviolo, Peña & Ferrarasi, 2013) or the use of pen-drives for the distribution of information, as the students pointed out in the interviews. In relation to faculty use of MT, students were asked also how teachers used MT for improving their classes, we show here some student expressions, which agrees with what was previously stated: *Showing us slides about topics dealt with in class…", "Projecting slides and videos…", "They used the projector…", "PowerPoint presentations…", "Showing us slides or videos…", "Through slide presentations…".*

Also, students were inquired about the use of mobile devices, for academic purposes, if it was by their own initiative or by requirement of teachers. Results are shown in table 3.

Table 3. Some questions about the use of MT at first year of university

Question	2012	2013
Have teachers asked you to use your computer outside the classroom?	36%	59%
Have you used your netbook or any computer outside the classroom for academic purposes?	42%	84%

It is interesting that, despite the lower percentage of 2012, by 2013 a small majority of students (59%) stated that their teachers asked them to use technological devices for learning purposes outside the classroom. From the data exposed, it can be seen that from one year to the other, teachers required their students an increasing use of MT.

Both in 2012 and 2013, the percentage of use of MT by students on their own initiative overcame the percentage of teachers' assignment. Even more, in 2012 it was overcome in a 6%, and in 2013 in a 25%.

Meanwhile, it arose from the interviews that as part of their academic tasks, an increasing number of students search and find in YouTube answers to many of the questions that arise in class. And they do so in their "dead time", for instance, when they are travelling, a frequent activity due to great distances between their workplaces or university and homes. In the same sense, some students listen to the lessons delivered at university that they have recorded for their own initiative; in fact, they expect their teachers to provide them with this type of material: audiovisual support portable on their MT that, according to the interviews carried out and some comments included in the surveys, is the way they choose to access knowledge.

Regarding the use of MT as a tool for communication between students and faculty, results are shown in Fig. 1. E-mail is a traditionally used tool, but here it can be seen that the use of Facebook has grown up since 2012.

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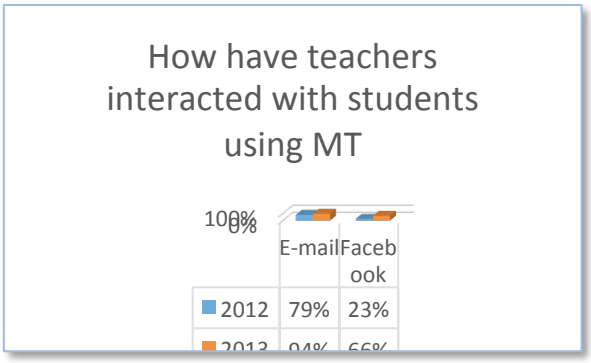


Fig. 1. The way that teachers interacted with students using MT.

While it was quite predictable that university teachers communicate with freshmen by e-mail, the increase turns out to be showy in the percentage of teachers who use Facebook to communicate with students between classes.

Dealing with English texts is a task that becomes a routine when studying engineering. This is the reason why English appears as a subject in every year of the curriculum. In Table 4, some opinions of the relevance of English at the university are presented. Also, some students expressions selected from the survey, about the relevance of the study of English, are shown here:

- *"...Because the most relevant information on the Internet is in English"*
- *"...Because many of the topics searched are shown in English, especially if they are worldwide known.*
- *"...Because English language is necessary to search information"*
- *"...Sometimes, there isn't enough information in Spanish, so we have to search in English. In other cases, I visit English pages because I know some that are better for the searching of certain information"*
- *"...English language competency is really helpful in our career because there are a lot of books that are in English"*

Table 4. The relevance of knowing English for academic activities at university

Question	Many	Some
English was important when you used MT for studying at university	42%	31%
English was important for searching information related to your career on the Internet.	34%	22%

More than 50% of students said they have found the information they need for their academic activities only in English. This fact becomes a trouble for many students that do not know this language. Therefore, we inquired about what students did in those situations. Results can be seen in Fig. 2.

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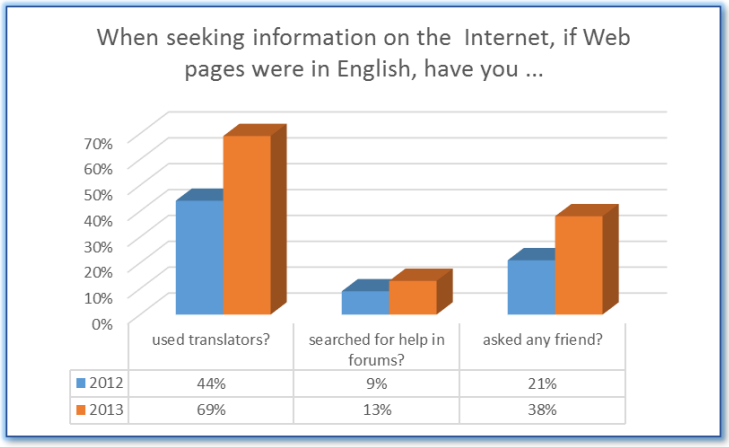


Fig. 2. Use of MT as a tool for English

Also students were asked about the use of engineering specific software. In particular, the engineering software used at first year of university are mathematical and cad software. Results are shown in table 5.

Table 5. Use of MT as a tool for Mathematics

	2012	2013
I have used engineering software, mostly for Mathematics	47%	59%

On the surveys, students expressed the purposes they had for using specific software with their MT, generally outside the classroom. We selected some remarkable ones: "*Math problems", "To verify results…", "Accomplishment of practical work…", "To draw complex functions, or for solving complicated equations,…", "Physics, Mathematics", "Analisys of mathematical graphics"*.

As we have seen, both in general terms and in particular in math and English, MT are present inside and outside the classrooms, as well, either by the teachers' indication or, much more for students' own initiative. Thus, MT accompany, but not completely yet, the students' academic activity through their own vital contexts.

4. Conclusions

As it can be seen from the data gathered, teachers at university are becoming aware of the possibilities offered by mobile technologies, which students have nowadays. On the other side, it seems that students make a more intensive use of their devices, and demand changes as regards the use of these devices to give better possibilities for learning in commuting time to and from university or work.

In this scenario, we can say that MT are already being used across different contexts. According to what we have deepened above, our data shows that there is a year-on-year increase on the use of MT, both from teachers' indication and for students' own initiative. These facts can also be seen from the communication that faculty and students keep, with the marked annual increase in the percentage of teachers who use Facebook to communicate with students between classes.

As regards MT for teaching at university, Math and English are widely known to be the two subjects that most include ICT in the teaching and learning processes. According to our investigation this is also true with respect to MT.

In our research we found that although MT are used across contexts, this use is still incipient and there is much remaining to take advantage of their potential. Learning across context could be an alternative to

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make the most of them, and to play down the problems alluded by Fried (2008). We will continue our research on the use of MT within the rest of the courses at university, focusing on the utilization and production of resources of video.

Meanwhile we are going to transfer the results and concrete proposals to strengthen strategies for learning across contexts already existing in college.

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Maximizing the effects of collaborative learning through ICT

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Abstract

This study investigated the effects of ICT facilities on collaborative learning (CL) in Imo State University (IMSU), Owerri in Nigeria. It adopted a descriptive survey design with a researcher-made questionnaire as the instrument. Sixty (60) lecturers selected from across the faculties served as the sample. The data collected were analyzed using mean scores. The study revealed the ICT facilities used in IMSU to enhance CL; ICT facilities enhance CL by helping to increase the level of participation of students, etc. The study also revealed some problems encountered in the use of ICT in CL. Some recommendations were also made.

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Keywords:- collaborative learning; ICT; students and social networking

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1. Introduction

Collaborative learning (CL) is an umbrella term used for a variety of educational approaches involving joint intellectual efforts by students or students and teachers together. Usually students are made to work in groups of two or more, mutually searching for understanding, solutions or meanings or creating a product. According to Dillenbourg (1999) CL is defined as "a situation in which two or more people learn or attempt to learn something together". It can be seen as social interactions that are targeted towards deeper knowing. CL refers to an instruction method in which students are responsible for one another's learning as well as their own. Thus, the success of one student helps other students to be successful.

Proponents of CL claim that the active exchange of ideas within small groups not only increases interest among the participants but also promotes critical thinking. According to Johnson & Johnson (1986), there is persuasive evidence that cooperative teams achieve at higher levels of thought and retain information longer than students who work quietly as individuals. The shared learning gives students an opportunity to engage in discussion, take responsibility for their own learning and thus become critical thinkers.

CL is a variation of cooperative learning which exists when students work together in groups to achieve common goals. Collaborative learning differs from cooperative learning in that it gives students more freedom to work independently from the instructor, within their group while still adhering to the principles of cooperative learning. In this paper, both terms will be used interchangeably to mean a situation where students work in groups.

CL encompasses the following processes: firstly, students encounter a phenomenon or are presented a problem or task. This can be referred to as the triggering event. In trying to resolve the problem, students discuss and agree on the theme of inquiry or the identified problem. This initial discussion helps to cultivate a sense

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of ownership to the problem among the groups of students. With the activity jointly established, students could then proceed towards further discussion. This will undoubtedly lead to idea improvement and argumentative knowledge construction.

Lehtinen (2003) as cited by Wang (2008) gave some more features of collaborative study. He noted that successful collaborative study models are characterized by equality and mutuality. Collaborative study allows learners to be treated equally and requires that they mutually respect each other. Though this requirement cannot be enforced, but it must be facilitated. Learners in such an instructional environment are more willing to study because their gains and efforts are shared and the sharing provides a fearless environment that is rarely attained in conventional school settings. It dissolves the stress in relationship among students, teachers and administrators.

1.1 Use of information and communication technology (ICT)

The use of ICT in CL will make it easy for people to collaborate easily with someone far away as they would with someone in the same room. E-collaboration technologies allow people to bring diverse skills on collective ventures that eliminate the barriers of time, distance and resources (Bessagnet, Schlenker, & Aiken, 2005). ICT is not designed to replace face-to-face interaction; it is designed to supplement it by allowing people to communicate anytime and anywhere. ICT as a collaborative technology offers functionalities for coordination of group work, tools for recording progress and giving feedback, libraries of solutions and best practices as well as meta-information (that is date, author and sequence of contributions).

According to the Australian Government Report (nd) on the benefits of collaboration in teaching and learning, the following technology tools can be used to support collaborative learning in all sectors of education.

Wikis: Collections of linked web pages editable by anyone, allowing collaborative content creations. Wikipedia is a good example.

Microblogs: Brief updates posted by users on any chosen topic for other users to see. Twitter is a good example of microblogging service.

Social Networking Services: Web services that allow users to interact in various ways including sharing photos, messaging publicly and privately, and sharing information about themselves on their profiles. Facebook is the largest social networking site in the world.

Virtual Worlds: Software applications that provide users with the experience of being agents in online environments with their "self" represented by an avatar or online persona.

Online Games: Games played with and against other users over the internet.

According to Farren & Tweedy (2002) videoconferencing can be used to enhance collaborative learning. Videoconferencing is one application of ICT that involves using appropriate hardware and software to enable two or more people in different locations to see and hear each other at the same time, sometimes even sharing computer applications for collaboration. The standardization and increasing adoption of these techno-

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logies has vastly affected the way people choose to communicate, learn and work. The internet and online tutorials offer a more expansive world to explore compared to traditional lectures. This gives students the freedom and flexibility to learn at their own pace and they may find it easier to concentrate and learn than following a teacher's thought process during a lecture (Anderson, 2004).

In summary, Becta (2008) gave some benefits of using ICT to support CL thus:

- *Students' engagement and participation is increased, particularly for quieter students who can work collaboratively online without anxiety of raising questions in front of the class. Students can also express themselves through less traditional avenues such as video.*
- *Social networking can encourage online discussion amongst students outside school hours.*
- *Tolls can be available anytime and anywhere, which encourages some students to extend their learning through further investigation into topics that interest them.*
- *Students feel a sense of ownership and engagement when they publish their work online and this can encourage attention to detail and improved quality of work overall. Some teachers use the publication of work to encourage peer assessment.*

2. Methodology

A descriptive survey design was adopted for this study. The target population was all the academic staff in Imo State University, Owerri Nigeria which totaled to1200 spread out in eleven faculties. Sixty (60) lecturers were randomly selected from across the faculties. A researcher-made questionnaire was used to collect data. This questionnaire had two sections A & B. section A was on demographic information. Section B solicited information on the ICT facilities used to enhance CL, the ICT facilities utilized in Imo State University for CL, ways these facilities enhance CL and the problems encountered in the use of these facilities. The data collected were analyzed using means.

2.1 Statement of the problem

To improve the academic performance of students, teachers should look out for better and more innovative methods of teaching that will involve the learners. As the teachers' role has been changed to that of a facilitator of learning, it behooves him/her to help the learners discover knowledge themselves. Knowledge discovered by the learners tends to be retained longer and applied in life. CL will help learners in the groups to fully participate in knowledge acquisition. The researcher wants to find out how application of ICT to CL will be of benefit.

2.2 Purpose of the study

The study investigated the ways the effects of CL can be enhanced using ICT. Specifically this study sought to find out:

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- *ICT facilities that can be used to enhance collaborative learning.*
- *The ICT facilities utilized in Imo State University for CL.*
- *Ways these facilities can enhance CL and*
- *The problems encountered in the use of these facilities.*

2.3 Research questions

To guide this study, the following research questions were used;

- *What are the ICT facilities used in CL?*
- *What ICT facilities are utilized in Imo State University to enhance CL?*
- *In what ways do these facilities enhance CL?*
- *What are the problems encountered in the use of these ICT facilities?.*

3.0 Findings

3.1 Research question 1

What are the ICT facilities that can be used in collaborative learning?

1: Responses Table on the ICT facilities that can be used in CL.

S/N	*Item*	*SA*	*A*	*D*	*SD*	$\bar{X}$
1	*Social networking services e.g. Facebook,2-2go, Twitter*	*24*	*35*	*1*	*-*	*3.4*
2	*Virtual worlds (software applications that provide users with the experience of being agents in online environments with their "self" represented by an avatar or online persona)*	*12*	*15*	*31*	*-*	*28*
3	*E-mail*	*26*	*34*	*-*	*-*	*34*
4	*Online Games*	*20*	*36*	*4*	*-*	*3.3*
5	*Newsgroup/blogs/mircoblogs*	*22*	*09*	*29*	*-*	*2.9*
6	*Wikis*	*23*	*31*	*06*	*-*	*3.3*
7	*Web CT*	*24*	*34*	*02*	*-*	*3.4*
8	*Videoconferencing*	*28*	*32*	*-*	*-*	*3.5*
9	*Audio Conferencing*	*15*	*17*	*28*	*-*	*2.8*
10	*Use Of GSM Phones*	*16*	*16*	*28*	*-*	*2.8*
11	*World Wide Web*	*24*	*36*	*-*	*-*	*3.4*

From the table above, items 1-11 have mean scores 3.4, 2.8, 3.4, 3.3, 2.9, 3.3, 3.4, 3.5, 2.8, 2.8 and 3.4 respectively. Since these items have mean scores above 2.5, it simply means that the following ICT facilities can be used for collaborative learning: social networking services, virtual worlds, e-mail, online games, newsgroup/blogs/microblogs, wikis, web CT, videoconferencing, audio conferencing, use of GSM phones and World Wide Web.

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3.2 Research question 2

What ICT facilities are utilized to enhance collaborative learning in Imo State University?

Table 2: Responses on the ICT facilities lecturers use to enhance collaborative learning.

S/N	Item	Yes	% Yes	No	% No
1	Social networking services	34	57%	26	43%
2	Virtual worlds	24	40%	36	60%
3	E-mail	40	67%	20	33%
4	Online games	21	35%	39	65%
5	Newsgroup/blogs/mircoblogs	21	35%	39	65%
6	Wikis	23	38%	37	62%
7	Web CT or any other chat facility	34	57%	26	43%
8	Videoconferencing	34	57%	26	43%
9	Audio conferencing	36	60%	24	40%
10	Use of GSM phones	60	100%	-	-
11	World Wide Web	39	65%	21	35%

From the table above, only social networking services (57%), e-mail (67%), web CT (57%), videoconferencing (57%) audio conferencing (60%), GSM phones (100%) and World Wide Web (65%) are the ICT facilities that the lecturers in Imo State University use to enhance collaborative learning. Virtual worlds, online games, newsgroup/blog/microblogs and wikis are not used by lecturers for collaborative learning.

3.3 Research question 3

In what ways do these ICT facilities enhance collaborative learning?

Table 3: Table showing ways ICT facilities enhance collaborative learning.

S/N	Item	SA	A	D	SD	$\bar{X}$
1	ICT facilities increase the level of participation of students in collaborative learning	35	23	2	-	3.6
2	They encourage online discussion amongst students outside school	32	28	-	-	3.5
3	They give students the freedom and flexibility to Learn at their own pace and time	22	38	-	-	3.4
4	They encourage students to extend investigation into topics that are of interest.	22	38	-	-	3.4
5	They enable students get ideas from subject specialists all over the world.	35	25	-	-	3.6
6	With ICT, collaborative learning is not limited by time or distance	36	24 -		-	3.6

From the table above, items 1-6 have mean scores of 3.6, 3.5, 3.4, 3.4, 3.6 and 3.6 respectively showing that ICT facilities increase the level of participation of students; encourage online discussion amongst students outside school hours; give students the freedom and flexibility to learn at their own pace and time; encourage students to extend their learning through further investigation into topics that are of interest; and enable students get ideas from subject specialists all over the world. Also with ICT, collaborative learning is not limited by time or distance.

3.4 Research question 4

What problems are encountered in the use of these facilities?

Table 4: Showing the problems encountered in the use of ICT facilities.

S/N	Item	SA	A	D	SD	$\bar{X}$

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	Problems that hinder the use of ICT facilities in collaborative learning					
1	*Inadequate supply of electricity*	*37*	*23*	*-*	*-*	*3.6*
2	*Limited access/poor communication infrastructure*	*36*	*24*	*-*	*-*	*3.6*
3	*Inadequate ICT skills by students*	*34*	*13*	*13*	*-*	*3.4*
4	*Inadequate ICT skills by lecturers*	*24*	*33*	*3*	*-*	*3.4*
5	*Over population of students*	*30*	*20*	*5*	*5*	*3.3*
6	*ICT phobia (fear of technology)*	*02*	*24*	*13*	*21*	*2.1*
7	*Lack of funds*	*31*	*24*	*4*	*1*	*3.4*

From the table above, items 1-5 and 7 have been scores of 3.6, 3.6, 3.4, 3.4, 3.3, and 3.4 showing that the problems that hinder the use of ICT facilities are inadequate supply of electricity; limited access/poor communication infrastructure; inadequate ICT skills by students; inadequate skills by lecturers; over population of students and lack of funds. Item 6 with a mean score of 2.1 shows that ICT phobia is not a problem militating against the use of ICT facilities in collaborative learning.

4. Discussion

The study revealed that the following are ICT facilities that can be used for collaborative learning: social networking services (e.g. Facebook, 2go, Twitter), virtual worlds, e-mail, online games, newsgroup/blog/microblogs, wikis, Web CT or any other chat facility, videoconferencing, audio conferencing, GSM phones and World Wide Web. This finding is in line with the Australian Government Report (nd) which listed wikis, microblogs, social networking services, virtual worlds and online games as technology tools that support CL in all sectors of education. In Imo State University, Owerri, Nigeria, only social networking services, e-mail, web CT, videoconferencing, audio conferencing, GSM and World Wide Web are used for collaborative learning.

This study also revealed ways ICT facilities enhance collaborative learning as increasing the level of student participation in CL; encouraging online discussion amongst students outside school; giving students the freedom and flexibility to learn at their own pace and time; encouraging students to extend their learning through further investigation, enabling students get ideas from subject specialists all over the world; and CL is not limited by time or distance when ICT facilities are used. Supporting this finding Bessagnet, Schlenker & Aiken (2005) opined that e-collaboration technologies eliminate the barriers of time, distance and resources. In line with the above, Becta (2008) opined that using ICT facilities in CL helps to increase students' engagement and participation. Furthermore, the fact that these tools can be available anytime and anywhere encourages students to extend their learning into topics that interest them.

The study further showed the problems encountered in the use of ICT for CL as inadequate supply of electricity, limited access/poor communication infrastructure; inadequate ICT skills by students and lecturers; over population of students and lack of funds. Nigeria being a developing country is still grappling with electricity problems. The above listed problems are responsible for the lack of use of many ICT facilities in CL in Imo State University, Owerri. Ezekoka (2010) listed the following as barriers to the use of ICT in Nigeria: lack of ICT skills, lack of motivation and confidence in teachers using ICT, lack of pedagogical teacher training, the absence and poor quality of ICT infrastructure, limited access to ICT equipment, lack of ICT main streaming into school strategies and epileptic power supply.

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5. Conclusion

This study has examined the benefits of using ICT facilities in CL. Any method of teaching that encourages students' engagement and participation as CL should be encouraged. When students are involved in finding knowledge or in problem solving they tend to retain any knowledge acquired for a longer period. The use of ICT in CL should be encouraged in schools. ICT enhances CL in many ways as it does not restrict learning to particular times or places. It also exposes the learners to subject specialists all over the world.

6. Recommendations

Based on the findings of this study, the following recommendations were made;

- *Lecturers should encourage the use of ICT for collaborative learning by giving assignments/projects that require ICT facilities.*
- *The government should provide online services in the institutions of higher learning and at cheap prices to encourage students to utilize them.*
- *Generators should be available to help power these online services as alternative source of power.*
- *Workshops and seminars should be organized from time to time for lecturers on the use of ICT facilities to enable them acquire the necessary ICT skills.*
- *Undergraduate students should be made to take their computer lessons in General studies very seriously. The instructors should make the lessons more practical to enable the students acquire the ICT skills needed for their studie*

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Measuring the level of algorithmic skills at the end of secondary education in Hungary

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Abstract

Students starting their tertiary studies in Informatics are found to have a low level of algorithmic skills and understanding of programming, which leads to the high number of drop out students and failed semesters during their studies. The students' low level of programming skills contrasts with their excellent results in the school leaving exams. To find out the reasons for this we have launched the TAaAS project (Testing Algorithmic and Application Skills), which focuses on the students' algorithmic skills and programming ability in traditional and non-traditional programming environments. Our analyses proved that school leaving exams are not able to measure these abilities of the students, and beyond that, are not able to distinguish between the different levels of the students. Students are accepted into the universities and start their studies based on the misleading results of the school leaving exams.

Keywords: level of digital thinking, algorithmic skills, school leaving exams in Informatics and Mathematics

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1. Introduction

As early as 1995 a new National Curriculum was introduced in Hungary including formal Computer Sciences/Informatics (CSI) education, which promised to deliver well-developed algorithmic skills. Since then digital competency and computational thinking is regarded as one of a child's key analytical abilities and is intended to be developed both in formal CSI studies and in traditional school subjects. To support this concept, the structure of the traditional subjects was changed, formal CSI studies were introduced, and the connections between this new subject and the others were clearly stated. In addition to these fundamental changes, in 2005 a new system of school leaving exams was launched with a double-purpose: serving both as the closing event of the primary and secondary studies and as the entrance exam to tertiary education.

Based on these changes in the education system in support of the development of computational thinking (Wing, 2006), the straightforward consequence would be that our students achieve a high level of algorithmic skills, especially those students who choose CSI as their major in tertiary education. However, the pattern is not this clear. Institutes in CSI tertiary studies are faced with the problem that the subjects and the level of the entrance exams are quite contradictory in terms of the requirements of CSI studies. The contradiction is further proved by the high number of drop out students and failed semesters.

To clear up this misunderstanding we have launched a project entitled Testing Algorithmic and Application Skills (TAaAS), which focuses on the students' algorithmic skills in comparison to their results in

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the school leaving exams (Biró & Csernoch, 2013a, 2013b, 2013c, 2014; Biró et al, 2014a, 2014b; Csernoch & Biró, 2013a, 2013b, 2013c, 2014a, 2014b, 2014c; Csernoch et al, 2014).

2. Sample

2.1. Participating students

The TAaAS project was launched in the 2011/2012 academic year, at the Faculty of Informatics at the University of Debrecen, Hungary, and has been running since then. In the following year the testing was repeated with students newly arrived at our faculty, while in the 2013/2014 academic year the project was widened, and three more Hungarian institutes joined (Eötvös Loránd University (ELTE, Budapest), Eszterházy Károly College (EKF, Eger), and the College of Nyíregyháza (NYF, Nyíregyháza) (Biró et al, 2014a, 2014b; Csernoch & Biró, 2013).

In the following three years at the University of Debrecen (DE) three majors of Informatics were tested including a total of 950 students: Software Engineering (SOE), System Engineering (SYE), and Business Information Management (BIM) (Table 1)

.

Table 1. The number of students at the Faculty of Informatics at the University of Debrecen, Hungary participating in the TAaAS project

	SOE	SYE	BIM	Sum
2011/2012	115	86	109	310
2012/2013	108	111	101	320
2013/2014	115	115	90	320
Sum	338	312	300	950

2.2. The structure of the school leaving exams

The school leaving exams (School leaving exams, 2014) serve both as the closing event of the primary and secondary studies and as the entrance exam for tertiary studies, and run at intermediate and advanced levels. There are four compulsory subjects – Mathematics, Hungarian, History, and a foreign language –, and at least one more, which is chosen by the students. It is the students' choice at which level(s) they take the exams; however, tertiary education institutes indicate the required subjects and their levels. In order to start a tertiary course in CSI the result of the compulsory Mathematics school leaving exam must be taken into consideration. However, it is not compulsory to take the school leaving exam in Informatics, and this can be substituted with Physics in SOE and SYE, and with other subjects in Sciences in BIM. Furthermore, even the results of exams in Hungarian, History, and foreign languages are considered when calculating the results of the entrance exams for CSI studies. The Informatics school leaving exam runs at both levels, and they consist of a computational and an oral session. At intermediate level in the computational session only application problems have to be solved, while at advanced level there are more complex application tasks and one programming task.

The following question naturally arises in this context: how well is this system of school leaving exams able to measure the students' algorithmic skills, their level of computational thinking, and their correct

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usage of terminology in CSI, all of which are requirements for tertiary CSI institutes? In sum, we can ask how well students are prepared for higher level studies in CSI.

2.3. The tasks of the TAaAS project

The TAaAS project was launched to test the students' algorithmic skills in traditional and non-traditional programming environments, to reveal how the students approach programming problems in the different environments, and how they would relate the computer related problems to algorithms (Soloway, 1993; Warren, 2004; Sestoft, 2010). We have selected three different environments to test the students' algorithmic skills, two of which are rather traditional (Tasks 1 and 2), while one is a new programming environment (Task 3).

2.3.1. Logical operators

Task 1 is a traditional program code of a multilevel IF structure to test the students' ability to recognize logical operators. The possible output of the program for the pairs of inputs is one of four whole numbers: 3, 2, 1 and 0. The source code is accompanied by a table of nine pairs of inputs and nine empty cells, where the selected output numbers have to be written. The presentation of the problem with the limited number of possible answers and the output table made the task quite easy (Fig. 1).

You draw two cards (X, Y) from two packs. In both packs you can find cards with the letter A, cards with the letter B and cards with the number zero. Give the points in the last column of the table according to the algorithm given below.

```
V:=X="A" or Y="A"
W:=X="B" or Y="B"
If V and W then Point:=3
else If V then Point:=2
else If W then Point:=1
else Point:=0
```

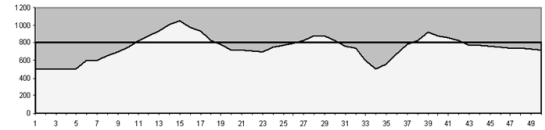
X	Y	Point
A	A	
A	B	
A	0	
B	A	
B	B	
B	0	
0	A	
0	B	
0	0	

Fig. 1. The text, the program code and the output table of Task 1.

2.3.2. Decoding pseudo codes

The other traditional programming task of the test (Task 2) contains three pseudo codes which the students have to decode, and the results should be presented in semantically correct natural language sentences. Compared to Task 1, these problems are a lot more demanding. However, we have to note here that both tasks are borrowed from the Nemes Tihamér Hungarian national programming contest for 5–8th graders (Nemes, 2013).

What do the following programs do? What is stored in variable DB and M?



N=50, measured values:
500,500,500,500,500,600,600,650,700,750,820,880,930,1010,1050,980,930,830,780,720,720,710,700,750,
770,790,820,880,880,820,760,740,600,500,560,670,770,770,760,750,740,740,730,720.

Task 2.1
```
DB:=0
Loop from i=1 to N
If X(i)>800 then DB:=DB+1
End loop
```
Task 2.2
```
DB:=0
Loop from i=2 to N−1
If X(i)<X(i−1) and X(i)<X(i+1) then DB:=DB+1
End loop
```
Task 2.3
```
M:=0
Loop from i=2 to N
If X(i)−X(i−1)>M then M:=X(i)−X(i-1)
End loop
```

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Fig. 2. The context and the pseudo codes of Task 2.

2.3.3. Programming in spreadsheet

Spreadsheet is not usually considered a programming environment, but a user-friendly interface which even computer illiterate end-users would be able to use. However, it has been proved that this is not so (Warren, 2004; Sestoft, 2010; Csernoch, 2012). The high number of spreadsheet documents carrying errors (Panko, 2010; Tort, Blondel & Bruillard, 2008) and the extremely long time required for the preparation of these documents (Van Deursen & Van Dijk, 2012) has proved that spreadsheet should be taken more seriously. Spreadsheet is a functional language, and this could serve as an introductory language due to its simplicity and the problems related to it. We chose these problems to reveal how students handle them, and beyond that they are closely related to the other two more traditional programming tasks, and so allow us to obtain comparable results. Tasks 3.1–3.3 should be answered with complete spreadsheet formulas. Task 3.4 is a decoding task with a double purpose: on the one hand, the results should be expressed in a natural language sentence, similar to Task 2; on the other hand, this complete formula would provide guidelines for solving Tasks 3.1–3.3. We wanted to see whether the students recognize the connection between these problems or not.

	A	B	C	D	E
1	**Country**	**Continent**	**Capital**	**Area**	**Population (thousand)**
2	Afghanistan	Asia	Kabul	647500	27756
3	Albania	Europe	Tirana	28748	3545
4	Algeria	Africa	Algiers	2381740	32278
5	American Samoa	Oceania	Pago Pago	199	69
6	Andorra	Europe	Andorra la Vella	468	68
7	Angola	Africa	Luanda	1246700	10593
8	Anguilla	America	The Valley	102	12
233	Yemen	Asia	Sanaa	527970	18701
234	Yugoslavia	Europe	Belgrade	102350	10657
235	Zambia	Africa	Lusaka	752614	9959
236	Zimbabwe	Africa	Harare	390580	11377

Task 3.1	How many African countries are in the table?
Task 3.2	What is the average population of those countries whose surface area is smaller than G1?
Task 3.3	How many countries have a surface area greater than G1?
Task 3.4	What is the result of the following formula? {=SUM(IF(B2:B236="Europe",IF(LEFT(A2:A236)="A",1))))}

Fig. 3. Presenting Task 3, with the context, the questions to answer with spreadsheet formulas, and the code for decoding.

2.4. The evaluation of the tasks of the TAaAS project

The correction of Task 1 was unambiguous; the number of the correct answers had to be counted. However, both Tasks 2 and 3 required more serious consideration. To find out how the students approach these tasks, and how their algorithmic skills are developed we adapted the categories of understanding of the SOLO taxonomy to both the traditional and the non-traditional programming tasks. Considering the special environment of the tasks and the preliminary corrections, the following five levels of understanding are included: Ignored (1), Prestructural (2), Unistructural (3), Multistructural (4), Relational (5) (Biggs & Collins, 1982; Lister et al, 2006, Clear et al, 2008, Sheard et al, 2008, Tan & Venables, 2010).

3. Hypotheses

H1: The students' selection of major indicates that their results are higher in the Informatics than in the Mathematics school leaving exams.

H2: There is a connection between the students' results in the test focusing on algorithmic skills and in their results in the school leaving exams.

4. Results

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4.1. The results of the school leaving exams

The comparison of the number of the participating students shows that most of the students take the Informatics school leaving exam, even though it is not compulsory (Table 2). The difference between the number of participating students and those who take the exam in Mathematics is due to students arriving from foreign countries and to uncompleted questionnaires (Table 1 and 2). However, the low number of the advanced level exams is remarkable, both in Mathematics and Informatics. The only exception is the SOE students' Informatics exam at advanced level.

Table 2. The number of students and their results in the school leaving exams in Informatics and Mathematics

	SOE	SYE	BIM	Average
school leaving exam (SLE) – intermediate level				
Informatics	84.1 (N=175)	82.2 (N=237)	80.8 (N=193)	82.3 (N=605)
Mathematics	74.1 (N=277)	71.4 (N=265)	74.4 (N=252)	73.3 (N=794)
school leaving exam (SLE) – advanced level				
Informatics	72.5 (N=127)	66.4 (N=37)	55.7 (N=16)	69.7 (N=180)
Mathematics	68.1 (N=22)	70.3 (N=17)	68.9 (N=24)	69.0 (N=63)

The comparison of the results of school leaving exams shows no significant differences between the majors, except in Informatics at advanced level. The comparisons of the pairs with the Kruskal-Wallis probes only found a difference between the results of the SOE and the BIM students in Informatics, at both levels. We can conclude that students start their tertiary CSI studies at the Faculty of Informatics with similar knowledge, both in Informatics and Mathematics, regardless of their majors.

The results of the school leaving exams at intermediate level in Informatics and Mathematics show significant differences (Wilcoxon signed rank test SOE, SYE, BIM: $V=1487$, $p<0.001$, $V=3386$, $p<0.001$, $V=3522$, $p<0.001$, respectively). Consequently, the results in Informatics are significantly higher than in Mathematics, which proves our H1 hypothesis. Based on the results of the school leaving exams only two clusters were distinguishable: C1SLE and C2SLE with 56.4% and 43.6% of the students, respectively. Their results in Informatics are 87.74% and 74.84%, in Mathematics 81.91% and 60.45%, respectively. Both the majors as categories and the clusters indicate that the school leaving exams are not able to distinguish between the students (Chi-square test: $\chi^2(2)=3.82$, $p=0.148$).

4.2. Knowledge-based clusters

Since the results of the school leaving exam do not show differences between the majors, we selected Task 1 to create knowledge-based clusters to see whether we could differentiate the students or not. With Task 1 we found four knowledge-based clusters: C1L–C4L, from the best group to the worst, respectively. With these clusters we can tell the students apart based on their results in the logical task (Fig. 4). The students who ignored or did not finish Task 1 belong to C4L, the best students to C1L, while C2L and C3L fall between these two. The question was how the clusters would differentiate between the students. The performance of C2L was found somewhat arbitrary; we could not find any characteristic feature for this cluster. However, C3L proved to have some limited knowledge. Those who belong to this cluster calculated the output almost as perfectly as those in C1L with A and B pairs of inputs; however, when one of the inputs was 0 they provided a 0 output, without considering the algorithm.

In Task 2 the high number of Level 1 results (Ignored) is remarkable; however there are significant differences between the clusters; with the increase in the number of the clusters the students' results are significantly lower (Jonckheere-Terpstra Test: $p<0.001$ in all the three codes). The Mann-Whitney test proved that in all the three pseudo codes the adjacent clusters differ significantly ($p<0.05$), with the exception of C2L and C3L in Task 2.1, but even in this case the direction of the difference is the same as with the other pairs. Further analyses of the clusters in Task 2 revealed a similar pattern as that found in Task 1. C4L achieved the lowest level; most of these students stop at Level 1. The most frequent result for C1L in

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Task 2.1 is Level 5. Even in this group, both in Task 2.2 and 2.3, the number of students ignoring the tasks is higher than in any of the other levels. However, in Task 2.2 the second most frequent level is 5, while in Task 2.3 it is 4. In C2L and C3L the second most frequent level is 3. However, in Tasks 2.1 and 2.2, which are the easier tasks, more C2L than C3L students reach Level 5, while in Task 2.3, which is the most difficult, the results of C2L decrease with the increasing level of understanding, and from Level 3 the frequency of C2L is below C3L. This result is a further proof of the limited knowledge of C2L.

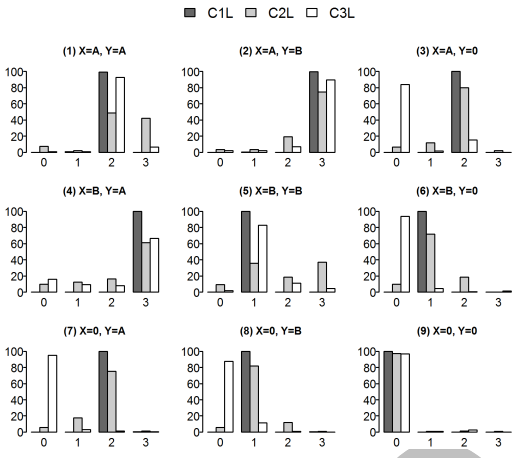


Fig. 4. The results of the clusters in Task 1.

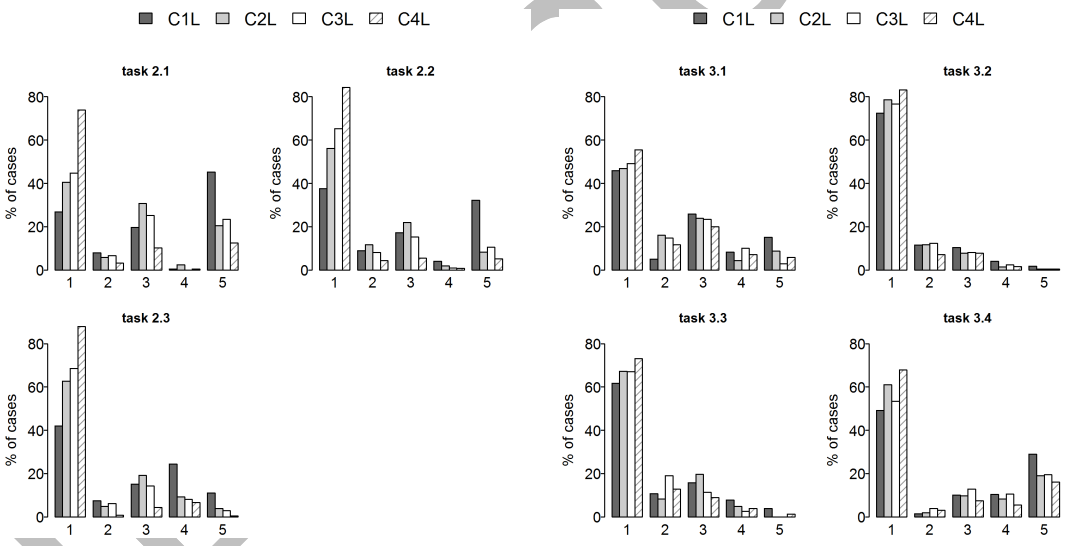


Fig. 5. The results of the clusters in Tasks 2 and 3.

In general, the result of Task 3 is the lowest among the three programming tasks. The high number of the ignored problems in this task is remarkable in all the clusters, especially for Tasks 3.2 and 3.3, which are the generalizations of Task 3.1. Significant differences between the clusters were only found in Tasks 3.1 and 3.4 (Kruskal-Wallis probes, Tasks 3.1, 3.2, 3.3 and 3.4: $\chi^2(3)=19.27$, $p<0.001$; $\chi^2(3)=8.67$, $p=0.034$; $\chi^2(3)=3.07$, $p=0.38$; $\chi^2(3)=25$, $p<0.001$). However, a comparison of the pairs show only differences in Task 3.1 between C1L and C3L-C4L, and in Task 3.4 between C1L and C4L. Level 5 is achieved with the highest frequency only in Task 3.4, which is the decoding problem. In this problem C1L performs better than the other clusters, while there are hardly any differences between the other clusters. In the other tasks the most frequent levels are 2 and 3, and C1L is slightly better in Task 3.1 than the others. We can conclude that even the knowledge based clusters which worked well in the traditional programming environment are not able to distinguish between the different weaknesses of the students in spreadsheet. Based on the comparison of the results in the school leaving exams and the test, we have found that while

our knowledge based clusters are able to distinguish the students' levels of algorithmic skills, the school leaving exams do not have this feature. Consequently, we have to reject our H2 hypothesis.

5. Conclusions

In the framework of the TAaAS (Testing Algorithmic and Application Skills) project we have tested the first year students of the Faculty of Informatics at the University of Debrecen, Hungary, focusing on the students' algorithmic skills, and their level of understanding in traditional and non-traditional programming environments. We have realized that the students arriving at our faculty do not match the requirements set by our majors, in spite of the students' high results in the school leaving exams. This contradiction leads to the high number of drop out students and failed semesters.

The present article focuses on a comparison of the first year students' results in the school leaving exams and in the TAaAS project. First of all, the low number of students taking the advanced level school leaving exams is remarkable (except with the SOE students in Informatics), consequently, we rely mainly on the results at intermediate level. The analysis proved that the results of the school leaving exams in Informatics are significantly higher than in Mathematics. This would explain the students' low results in the different subjects in Mathematics in tertiary CSI education. It was also found that the majors do not show significant differences in their results, either in Informatics or Mathematics. Consequently, based on the school leaving exams only two clusters are recognizable, i.e. the school leaving exams seem an unsatisfactory to distinguish between the different levels of the students. Furthermore, the good results in Informatics suggest that the students start their studies in tertiary education with a high level of computational thinking.

To find the sources of the contradiction between the entrance exam results of the students and their real performance in tertiary education we selected algorithm driven tasks in the TAaAS project. The students' results in these tasks revealed that they have a low level of algorithmic skills and understanding of programming.

The most successful task in the test, Task 1, was selected to create knowledge based clusters, and four well distinguishable clusters were recognizable; C1L–C4L, moving from the best to the worst. The best cluster is proved to be the best, while the worst is the worst in all the three tasks. Between them two clusters are also clearly distinguishable. C2L's results seem rather arbitrary, while C3L is found to have limited knowledge. The characteristic feature of this type of knowledge is that until they reach their limit they achieve similarly good results to C1L, while with more difficult tasks they perform at the lowest level of understanding.

Tasks focusing on the programming skills are able to distinguish the different levels of algorithmic skills and levels of understanding in programming. On the one hand, we can conclude that the system which relies heavily on the results of the school leaving exams when selecting students for Informatics courses does not serve its purpose. On the other hand, neither the Mathematics, and most unfortunately, nor the Informatics school leaving exam at intermediate level is able to measure the level of the students' algorithmic skills.

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Metacognition and sensorimotor components underlying the process of handwriting and keyboarding and their impact on learning. An analysis from the perspective of embodied psychology.

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Abstract

Digital writing devices such as the computer or the personal digital assistant are inundating the higher education classrooms around the globe. They have developed to indispensable learning tools and consequently the use of longhand in the education context is in continual detriment.
From the perspective of cognitive science the processes of typing and handwriting differ considerably. This paper firstly analyzes the highly complex nature of handwriting, further highlights the psycho neurological mechanisms involved in acquiring and practising this skill and points out the differences to typewriting. Finally, the author deliberates about how the use of the two different writing techniques may affect the learning outcome of students.

Keywords: learning efficiency; cognitive effort; handwriting; keyboarding; note taking; working memory.

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1. Introduction

For the millennial generation as well as for the digital immigrants daily use of information technology devices is a matter of course which does not require further reflection. The confidence in electronic instruments to register and store information, to communicate and to handle daily business is so deeply rooted in everyday life that rarely an alternative modus operandi is considered.

The widespread maxim "the more digitalized a process or instrument is, the more reliable and professional is its output " meets the current zeitgeist. In the framework of education, this belief affects the behavior of our students in the classroom and the way they are taught and learn.

This paper, firstly, analyzes one of the aspects which has been deeply influenced by the introduction of new technologies in education: the nature of writing. Oatley & Djikic (2008) postulate in an article the idea of "writing as thinking"; following the statement of Richards (1925) "a book is a machine to think with" Oatley et al. (2008) go further and predicate that "a pen is machine to think". Miró Juliá (1999) while exposing his teaching methodology in higher education makes the observation that "handwriting is a tool to learn reasoning". Taking into account statements like the previous mentioned it is worth to consider the impact of the ever-increasingly adoption of keyboarding as writing alternative among the students community. The new Common Core State Standard, the standardized education benchmark for USA public schools adopted by 45 U.S. states, does not require school districts to teach cursive writing and it omits it as a graduate requirement. This implies that the state does not check schools on covering handwriting in their programs; keyboarding skills, on the other hand, are specifically required. However, the acquisition

of the cursive writing skill has always been considered as a milestone of child development and a big step toward the intellectual maturity of human beings.

Secondly, this work examines the concept of metacognition and the different cognitive processes involved in handwriting and keyboarding with special focus on the activity of notes taking in the classroom. Even from the perspective of a neophyte in the writing topic it can be attested that the two writing modalities imply different sensorimotor processes. The impact of both writing modalities in the learning outcome is analyzed taking into account the principles of the embodied psychology. Additionally, an insight in the neuropsychological processes activated while practicing writing and their role in memorizing and comprehending learning material is offered.

Finally, a reflection about the future role of longhand in the context of education is given. The author, conform to the proposal of Mueller & Oppenheimer (2014), advocates for a combination of writing techniques by taking into consideration that they support and strengthen different skills, necessary firstly for cognition development, secondly for learning efficiently and lastly for successful performing in a progressively more digitalized workplace.

2. The nature of writing

In order to understand the interconnection between writing and other cognitive processes the relation between handwriting and letter cognition will be exposed as prior development skill for acquiring reading proficiency.

In an early experiment conducted by Hulme (1979) visual recognition was studied by comparing the memorization of abstract graphics with children who had to learn the forms just by looking at them or by tracing them with the index finger. The tracing modality entails a higher memorization of the abstract items than the activity of looking at them. Hence, consequently, it is legitimated to suppose that visual and motor information are allied. The great body of research devoted to analyze the role of handwriting in the categorization of letters conducted by James in cooperation with other researches offers as well sufficient evidence of how the sensorimotor experience during the process of acquiring writing and reading proficiency has developed in a complex neural network. In a study undertaken by James & Engelhardt (2011) preliterate five years old children were instructed in the visual motor task of printing by hand, tracing and typing in a keyboard different letters. Posteriorly, children underwent a functional imaging session (fMIR) and were instructed in a task of letter recognition. Results show that after a self-generated letter printing letter perception recruits brain areas involved in letter processing and reading system, concretely in the visual areas involved in letter processing and the motor areas engaged in letter production, in a higher degree than doing other kind of sensorimotor activities. The motor task involved in tracing and free printing may appear the same, but the prior and posterior processes underlying the motoric performance differ considerably. When writing by hand, stroke after stroke, children learn the different variations of a letter and consequently deal with an ambiguous and demanding task of categorizing, the free creation of letters allows children to understand the perceptual properties and the variations on shape from the prototype; in the process of tracing they are not confronted with such a challenge. The highly demanding process of categorization recruits brain areas involved also in letter identification, concretely the fusiform gyrus which is responsible for within-category identification and, at the same time, for letter recognition. Children who had undergone the printing practice by hand show a neural activity more enhanced and "mature -like" than those who were instructed just in looking at the letters.

Studies conducted with adults corroborate as well how both processes are strongly interconnected. Longcamp, Anton, Roth & Velay (2003) explored to what extend motor-perceptual brain areas may be activated while reading; subjects underwent the task of looking at letters and letter-like stimuli, pseudo-letters, and then copying the characters. Brain imaging shows an activation of the left premotor cortex while looking at the letters as well as when writing them, when dealing with pseudo-letters the passive exposure to them did not activate the premotor context. The authors conclude that there must be a relation between the subjacent processes of reading and writing, being the ability to write a support for reading. James & Gauhtier (2006) corroborated with some studies the results of Longcamp et al. (2003). Fur-

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ther James & Atwood (2009) aimed to find out how the specialized response pattern seen during letter perception may be caused partially by the experience in writing letters. Participants were trained to recognize pseudo-letters by writing, typing, or visual practice. The aim was to investigate whether or not different types of experience with letter-like stimuli ("pseudo-letters") led to functional specialization similar to that which exists for letters. Results suggested that only after writing practice did neural activation patterns to pseudo-letters coincide with the patterns observed for letters. That is, neural activation in the left fusiform and dorsal precentral gyrus was higher when participants observed pseudo-letters than other similar stimuli, but only after writing experience. Neural activation also increased after typing practice in the right fusiform and left precentral gyrus, suggesting that in some areas any motor experience may change visual processing.

In a study of Longcamp, Boucard, Gilhodes, Anton,Roth, Nazarian, & Velay (2008) adults had to learn unfamiliar letters. The modalities were two: handwriting and keyboarding. The group learning by handwriting performed better than the experimental group which was learning the new characters via typing. Brain imagines acknowledge, once again, that the test persons who learned by hand recruited motor function areas of the brain. The mere physical act of shaping letters activates the motor memory in the sensorimotor zones of the brain and reinforces the learning process.

Thus, this body of studies leads to consider the facilitator role which the handwriting experience plays in acquiring reading proficiency and the neural interconnection between handwriting and letter recognition. Learning cursive is an important tool for cognitive development, which enhances the functional specialization of the brain. The results of these experiments indicate a strong interaction between perceptual and motor systems during pseudo-letter and letter perception. The decreasing commitment of parents and educators in instructing longhand in favour of other writing modalities may generate disadvantages in the children´s development process like for instance slowing down the reading proficiency. The substitution of longhand by typing needs further exploration in order to determine the impact this course may have in our education systems.

3. Writing modalities

J. Willis, in a plea for handwriting, declares: *"when writing is embedded throughout the curriculum, it promotes the brain´s attentive focus to class and homework, boosts long-term memory, illuminates patters, gives the brain time for reflection, and when well guided is a source of conceptual development and stimulus of the brain´s highest cognition"* (Willis, 2011).

The majority of psychological studies of writing focuses on mental processes but, as Mangen & Velay (2010) depict, scarce research has been done about the bodily experience of writing, and writing by nature is a physical experience. Writing means using a technology to create a text, by switching technologies the bodily experience, and subsequently its interconnected cognitive processes, must necessarily suffer alterations. Hence, it is of capital importance to scrutinize how the changeover to a new writing technology may impact the embodied cognition experience.

3.1. Differences between handwriting and keyboarding from the perspective of embodied cognition

Based on the article published in advances in haptics "reflections on the haptics of writing" of Mangen et al. (2010), the first and more obvious aspect which differentiates between handwriting and the use of digitalized devices is the tool. While by longhand the pen, hand (as haptic input) and the written result (as output) are in the same visual field; in keyboarding the visual effort has to be divided between two physically separated fields: keypad and screen. This fact may diminish the quality/quantity of devoted attention.

Another evident difference is the involvement of hands. Whereas longhand implies the use of a single hand, keyboarding is bimanual. This fact carries several implications. The use of only one hand slows

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down the process of writing compared to keyboarding and hence has consequences in the information processing. Handwriting enables more time for reflection and gives the memory a greater chance to store the information which is writing down. Contrariwise, writing down information via keyboarding goes so rapidly that the required retention is minimal. Writing stimulates the reticular activating system (RAS) in the brain. The RAS operates as a filter for what should be processed; this may explain why the retention is higher by handwriting.

Research headed by Berninger (Berninger, Augsburger, & García, 2009) underlines the previous statement. Berninger and her team conducted a study to analyze children´s ability to write the alphabet, sentences and essays using the pen or the keyboard in the second, fourth and six school grades. While writing the alphabet, the keyboard went faster than the pen. On the other hand, children writing by hand wrote more and faster essays. With reference to sentences the results were ambiguous, although fourth and six graders wrote more complete sentences when using the pen. The aim of the study was to compare methods of transcription (cognitive process which allows translating thoughts into written language).The sequential character of finger movements activates regions involved in thinking, language and working memory; subsequently, it reinforces the short and long term memory. In this study even children with disabilities performed better with a pen. Nevertheless, a part of the scientific community dedicated to the study of cerebral lateralization supports the advantages which the bimanual nature of keyboarding may have in the neurological development (Gómez Guardado, 2013).

A further different aspect, according to Mangen et al. (2010), between writing technologies is linked to the production of characters. In handwriting each letter has to be graphomotorically formed, in typewriting there is not such a graphomotor component, the computer keys offer already formed letters and the writing action consists of deciding which key to press; evidently, the writing pace cannot be the same. Related to this idea, the inner voice in writing (subvocal articulatory rehearsal process) and its implications in the working memory differ in both modalities. Since handwriting is slower, pace of the inner voice allows more time for rehearsal and facilitates in a greater scale the retention (Chenoweth & Hayes, 2003).

The National Association of State Boards of Education in the USA (NASBE), which recently compiled evidence about the benefits of instruction in handwriting, listed the following facets stimulated by handwriting (Kysilko, 2012):

- Cognitive and motor skills development
- Literacy development
- Memory
- Written expression
- Learning disabilities improvement t point

The implications of the switchover, from book to image, from pen to keypad, have for some contemporary thinkers consequences far beyond the above exposed, but which exceed the boundaries of this paper. In terms of Kress (Kress, 2003) this phenomenon will have an impact not only in the cognition process, the education and the communication, but also in widest areas, from socio-cultural paradigm changes to shifts in term of power.

3.2. Note taking. Implications on learning

Even those who can afford greatly relying on memory may catch themselves taking notes with the most different purposes. From the banal act of writing the shopping-list to crucial issues, we need to remember, we use notes. Taking notes, apart from ensuring the possibility to remember information, allows us to concentrate, comprehend and reconsider information as well as to reorganize intentions and plans. Generally speaking, note taking is a complex activity which requires an effort; this effort, however, pays off in form of efficiency.

The process of note taking demands auditive, sensorimotor, visual and cognitive perceptive tasks (Piolat, Olive, & Kellogg, 2005) which additionally must be performed simultaneously and under time pressure. Piolat et al. (2005) argued that the act of selecting the relevant information from the incoming continuous flow (which implicates a process of decision making), retaining the information in the working

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memory long enough to be processed and comprehend it while interacting with already stored knowledge for finally transcription taxes the sensorimotor and cognitive capacity fairly high. In other words, it requires the principle proclaimed by the embodied cognition of learning since it implies comprehension (van Dijk & Klintsch, 1983) and written production (Daneman & Merikler,1996).

Empirical studies confirm the use of note taking as a highly effective way of learning in the educational context, and therefore it is important to consider if the switch of writing modalities may affect the learning process while note taking. Students take notes in order to record information they should posteriorly read and learn, however, the benefit goes beyond the initial intention; taking notes is per se and act of memorization which leads to the creation of an "internal" storage (Kiewra,1987), the act of taking notes intrinsically fosters learning. Note taking is a fundamental skill for exam performance, accounting higher than other predictors as verbal ability (Kiewra, Dubois, Christian, McShane, Meyerhoffer, & Roskelley, 1991). *"Taking notes involves active listening, as well as connecting and relating information to already available knowledge. It also involves seeking answers to questions that arise from the material "*(O'Hara, 2005). Moreover, the capabilities of the note taker, the student, influence decisively the learning achievement; aspects like the mastery of the language, the body of previous knowledge related to the subjects as well as the transcription speed affect the quality of the notes and consequently the learning efficiency (Peverly, 2006).

In a study carried out by Makany, Kemp, & Dror, (2008), the authors conducted a comparative analysis of two different note taking modalities: traditional linear and non-linear SmartWisdom; after the exposition to a lecture or a conference discussion, participants were measured in the following cognitive processes:

- Comprehension
- Accuracy
- Complexity
- Metacognition
- Memory

Students taking non-linear notes statistically outperformed in comprehension and metacognition. Although the central executive functions of the working memory are highly demanded by note taking and while some studies reported a correlation with learning efficiency, some experts, like the exposed above, plead that the academic excellence behind note taking is rather generated from an advance information management technique (restructuration of the information), able to deal with the continuous flow of information, than on the prominent short memory skills (Makany et al., 2008).

The quality of notes taken depends on the cognitive load which the students can handle in the process (Baddeley, Chincotta, & Adlam, 2001); following Titsworth (Titsworth, 2004) students record more details and organizational points when listening to lectures with strong organizational cues, therefore note taking techniques which stimulate the creation of organizational cues may as well reinforce academic performance by reducing the cognitive demand. However, future studies should analyze to what extent short memory skills are a fundamental prerequisite to manage the information and if it possible to outstandingly manage information without a firstly high performance of the working memory.

Metacognitive knowledge is often regarded as a strategy for efficient self- regulated learning (Sperling, Howard, Staley, & DuBois, 2004) and consequently as a key factor in academic performance (Hacker, Dunlosky, & Graesser, 1998);note takers need to be reflective and aware of their own abilities to registering and comprehending the written information. Besides, while taking notes students become firstly conscious of what they are learning, monitor the efficiency of their own taking notes competence and estimate their understanding by having to transcript thoughts into written words, "*learning to monitor the quality of one's thought and the products of one's effort is the hallmark of what is mean by cognition*"(White & Frederiksen,1998).

Once accepted the great benefits of note taking for students it seems worthwhile to consider how the replacement of paper and pen by digital devices may affect the sensorimotor and cognitive processes and the learning benefits underlying note taking.

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The findings of a set of research studies conducted by Mueller and at. (2014) evidence that note taking via laptop generates nearly verbatim records of the teaching material while longhand note takers record less information. 65 students were exposed to a lecture about an interesting but not common knowledge topic. Part of the students was asked to take notes by hand, part by laptop. One and a half hour after the presentation students were tested on the teaching material in factual records and in higher order conceptual learning. In factual records students scored very similar while in conceptual and inferences learning students taking notes with the computer performed poorer. In a further study students went under the same kind of probe, but were additionally tested one week later. Interestingly students who took notes handwriting performed significantly better in factual as well as in comprehension questions.

One of the plausible explanations for this result may be caused by the nature of writing. Students using keyboard registered a much higher verbatim overlap with the lecture, this modality of writing allows a higher speed production and therefore leads to "mindless transcription". The high amount of registered information inhibits its management by overloading the cognitive processes. On the other hand, students writing are using a slow and arduous method and are forced to select thoroughly the information to be recorded; consequently they become deeper engaged with the material, which enables additionally the storage of the new learning material in a deeper and more interconnected way with existing knowledge.

In consonance with the findings of Makany et al. (2008) it is tempting to explain the lower performance of keyboarding note taking in the study of Mueller et al. (2014) as an extreme form of a linear note taking technique; considering a continuum from the most efficient learning form of note taking to the poorest one which implicates just the ability to record the maximum amount of words , keyboarding will be positioned in the opposite extreme of non-linear techniques, concretely in the one which less enhance academic performance.

According to the revised taxonomy of Bloom (Anderson, Krathwohl, & Airasian, 2001) the necessary information filter given by the nature of handwriting involves a higher level in the Bloom' s proposed learning hierarchy, namely the levels of understanding , analyzing and evaluating the given information which facilitate a deep learning. Parallel, from the perspective of information sciences and the data-wisdom chain model, it can be assumed that note taking by keyboarding can be located in the scale of generation of information while handwriting implies a process and reframing of information which results in knowledge.

4. Conclusion

The dissimilar learning output of the two taking notes modalities should not conduct us to dismiss one in favor of the other. Even explaining to our students the benefit of handwriting is not likely they will refuse to use digital devices as a learning instrument. The amount of students making use of a laptop in the classroom is increasing and the trend is irreversible. According to Mueller at al. (2014), it is recommendable to try to combine both methods and to make students aware of the benefits of handwriting; for many, a quite unfashionable writing way.

The combination of methods could be the key to optimize academic performance while taking notes. Technology advances speedily and it may come the day when digital writing can include more of the idiosyncracy of longhand, including so many of the cognitive benefits implicated in it.

Trying to strengthen first the longhand practice in the higher education context will result in a lost cause. It is much earlier, in the elementary school, when children should be enhanced in handwriting proficiency and in the awareness of the importance to write and to have a personal and legible calligraphy and a good orthography.

There is an inherent joy in the human nature to create and to have an individual hallmark difficult to imitate. Handwriting implies a creative process and leaves a unique personal seal on paper. Children in the school are most eager to accept the challenge to learn to write dually and it is the environment, par-

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ents and school community, who may support children to develop the necessary skills for outstanding proficiency in both techniques without forcing them to prioritize or to choose one of the two methods.

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Methodology of theoretical physics in economics: examining price jerk

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Abstract

The introductory part of the work takes a look at methodologies of experimental and theoretical physics in relation to basic economic research. Factual research in bibliographic databases shows that representatives of the Czech School of Economics have taken a leading role in the methodological use of applied and theoretical physics in basic economic research, particularly in the latter half of the twentieth century. In the second part of the work, methodological approaches of theoretical physics are used to derive a linear deterministic motion equation for instantaneous commodity price without an inflexion point. The third part of the work uses the methodology of theoretical physics to derive a price jerk equation, which results from a non-linear motion equation for instantaneous commodity price.

Keywords: Depreciation; differential equation; econophysics; equation of motion; training appraisers.

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1. Introduction

The results of applying statistical mechanics in microeconomics suggest that the time is ripe for using the experimental, theoretical and mathematical methodologies of physics to model economic systems beyond the framework of traditional economic modeling. The question remains whether the import of concepts from physics to economics is merely an applied metaphor, or actually a modification of the analytical structure of economics. There are persuasive arguments that this involves more than applied metaphors (Wilson, 1998; Salzano & Kirman, 2005; Arecchi, 2005; Brock & Colander, 2005). If we are to find at least a partial answer to this question, we must compare the linear and non-linear analytical structure of physics with the analytical structure of economics. To enable such a comparison, work has begun on a principle of correspondence between economic variables and the physical variables used in one of the most highly developed disciplines of classical physics, classical non-relativistic mechanics. The final form of this principle of correspondence will to a certain degree be reflected in the methodological foundations used to teach economics itself, for example, in the training of appraisers at the university level.

The late nineteenth century is a period in which there was a synthesis of economic laws formulated by the previous generation of economists, and increased attempts to describe these laws using the language of physics and mathematics. Economic phenomena and processes at that time were described and analyzed using analogies between the evolution of physical systems and the evolution of economic systems. Biographical research has shown that one of the reasons for the successful application of theoretical physics in economics is that many economists had initially studied physical and mathematical sciences, or fields related to the physical or mathematical sciences (Zeithamer, 2012 a, 2012 b, 2013).The first half of the twentieth century witnessed a deepening integration of economics, mathematics and physics. The

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gradual spread of methods taken from experimental and theoretical physics and applied to economics during the 19th and especially the 20th century eventually led to the beginning of basic research, which in the 21st century consists of the systematically targeted application of experimental, theoretical and mathematical physics to economics (Zeithamer, 2012 a, 2013). A part of this basic research in economics has become known as econophysics.

At the Czech School of Economics during the 19th century, no reliable sources have yet been found indicating such an interdisciplinary approach or related original work. In the second half of the twentieth century however, we do find economists at the Czech School of Economics whose works represent applications of physics in economics, i.e. in econophysics in broader sense. Einstein's special theory of relativity was applied by professor Pavel Hrubý (*5. 5. 1914 - †25. 6. 1994) in order to use economic spacetime for more precise economic analysis and prognosis (Hrubý & Kálal, 1974). Another Czech economist, who represents the Czech School of Economics in econophysics in broader sense, is professor František Drozen (*30. 5. 1949), whose results were inspired by the work of German railway engineer August Wöhler (*22. 6. 1819 – †21. 3. 1914). František Drozen constructed an analogy between the process of fatigue crack growth in axles of railway wagons and the process of price reduction for goods. This approach to modeling the process of falling prices for goods can be found in its final form in several of Drozen´s works (Drozen, 2003, 2008).

The methodology of qualitative and quantitative physical research of any system strives to achieve one basic goal, namely that the signal to noise ratio be much greater than one. If it is possible to deliberately increase the output signal from an inanimate system above the background noise, this brings to the forefront the natural relations which are common to different systems investigated (Roehner, 2002, 2007; Štroner & Pospíšil, 2011). Of course there are other systems which do not permit the researcher to amplify the level of output. In such case, there is another way to increase the signal to noise ratio. Here, it is necessary to continually decrease the background noise to the lowest possible level. A classic current example requiring such noise reduction is the detection of gravitational waves, the existence of which was predicted by prof. A. Einstein in his work from 1916 (Einstein, 1916). Outside the solar system, the theory predicts a number of "stellar" sources of gravitational waves, which could be detected in the event they reached Earth. For the Sun, a typical class G main-spectrum star, it has not yet been possible to theoretically determine such mechanisms which would be responsible for detectable levels of gravitational radiation (Weinberg, 1972; Papini & Valluri, 1976; Křivský & Zeithamer, 1982; Karmakar & Borah, 2013). A situation similar to the physical research of inanimate systems arises in the physical research of economic systems. Efforts similar to the detection of gravitational waves can be seen in numerous other multidisciplinary fields, explored in publications such as: Physics of the Earth´s Magnetosphere (Zeithamer, 1986 a, b, 1987 a, b, c, 1988, 1989, 1990; Vörös, 1991; Kan, Potemra, Kokubun, & Iijima, 1991; Otto, 2005; Vasyliunas, 2012), Heliometeorology and Helioclimatology (Sulman, 1982 a, b; Baker, 2005; Pérez – Peraza & Libin, 2012), Biophysics of the Sun – Earth Relations (Tromp, 1980; Sulman 1982 a, b; Kiefer, 2005).

In economic systems, one of the main reasons that the signal to noise ratio is close to one is the high degree of self-organization and self-improvement.

Finding causal mechanisms which explain observed socio-physical phenomena on a gravitational, electromagnetic or nuclear level is a very difficult, long and costly task. The same applies to the behavior of experts in commodity price theory, thoroughly based on the knowledge of basic physical force interactions. The theoretical constructions presented in this work are intended to facilitate solving both tasks mentioned in a future modern commodity price theory. Specifically, there are linear and non-linear elementary kinematic equations which do not explain the phenomena observed in the socio-physical system with interactions of force, but merely describe the developing state of the socio-physical system. While not easy to solve, these kinematic equations lead to quantifiable mechanisms which explain observed developments in the state of the socio-physical system using analytical dynamics, i.e. force interactions. The analytical dynamics of socio-physical systems is not the subject of this work, however, it is one of the subjects of basic and applied economic and physical research conducted by the author of this article.

2. Linear motion equation of commodity state without inflexion

In this paper it is assumed that the market value of a commodity is quantifiably determined only by the market price *n* of the commodity. We now make the generalizing assumption that the instantaneous acceleration of reduction of the market value is directly proportional to the instantaneous rate of reduction of the market value (Zeithamer, 2010). Then the deterministic differential equation of price which expresses this model is

$$\frac{d^2n}{dt^2}(t) = -\mathrm{A}\frac{dn}{dt}(t), \tag{1}$$

where $A > 0$ is the proportionality constant, and a negative sign is used to indicate that ***n***, the market value of goods, i.e. a price, is decreasing and the acceleration of reduction of the market value increases over time. The initial conditions now are that over time $t = 0$ the market value is $n(0) = n_0$ and $\frac{dn}{dt}(0) = r_0 < 0$, where $[A] = s^{-1}$; s – designates the basic time unit, seconds.

3. Non-linear motion equation of commodity state with inflexion and jerk of price

In this section of our work, we again presume the following conditions to be met: (1) the commodity is on one of the markets of a model of market structure with perfect competition at initial time t_0; (2) at time t_0 the commodity is found in its initial state, which is uniquely determined by the magnitude of instantaneous commodity depreciation $w(t_0) = w_0$.

Let the acceleration of $\frac{d^2n}{dt^2}$ of the instantaneous commodity price be the sum of two components, i.e.

$$\frac{d^2n}{dt^2} = \left(\frac{d^2n}{dt^2}\right)_1 + \left(\frac{d^2n}{dt^2}\right)_2. \tag{2}$$

The first component of acceleration is a consequence of physical and chemical processes, which cause the first component of the instantaneous acceleration to increase in direct proportion to the magnitudes of rate of change of the instantaneous commodity price *n*, i.e.

$$\left(\frac{d^2n}{dt^2}(t)\right)_1 = B\frac{dn}{dt}(t), \tag{3}$$

where B is the proportionality constant, $B > 0$ and $t \in \langle t_0, +\infty)$. The second component of acceleration results from socio-psychological processes, which cause the second component of the instantaneous price acceleration to be directly proportional to the product of the magnitude of rate of change of the instantaneous price $\frac{dn}{dt}(t)$ and the magnitude of instantaneous price $n(t)$, while the proportionality constant is negative, thus

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$$\left(\frac{d^2n}{dt^2}(t)\right)_2 = -A\frac{dn}{dt}(t)\cdot n(t), \tag{4}$$

where $(-A)$ is the proportionality constant, $A>0$, $t\in\langle t_0,+\infty)$.

By substituting relations (3) and (4) into equation (2), we obtain the following motion equation for the acceleration of instantaneous commodity price *n*

$$\frac{d^2n}{dt^2}(t) = B\frac{dn}{dt}(t) - A\frac{dn}{dt}(t)\cdot n(t), \tag{5}$$

where $A>0$, $B>0$, $t\in\langle t_0,+\infty)$. A similar equation holds for commodity relative depreciation *RD* (Zeithamer, 2012 b, 2013)

$$\frac{d^2RD}{dt^2}(t) = B\frac{dRD}{dt}(t) - A\frac{dRD}{dt}(t)\cdot RD(t), \tag{6}$$

where $A>0$, $B>0$, $t\in\langle t_0,+\infty)$.

For the motion of a solid body through space in which the magnitude of the force *F* of resistance in that space against the movement of the body is directly proportional to the velocity v of the body, i.e. $F=-kv$ ($k>0$ is the constant of proportionality), the magnitude of jerk *j* is expressed by the following equation (Pospíšil, 2013),

$$j = \frac{d^3s}{dt^3}(t) = -\frac{k}{m}\frac{d^2s}{dt^2}(t), \tag{7}$$

where *s* is the path traveled by the body, *m* is the mass of the body, *t* is time, and *j* is the magnitude of jerk in units m/s^3. From the equation of motion for instantaneous price (Eq. 1) we get the following equation for the magnitude of price jerk j_p, e.g. in units of USD/s^3,

$$j_p = \frac{d^3n}{dt^3}(t) = -A\frac{d^2n}{dt^2}(t), \tag{8}$$

where $n(t)$ is the instantaneous price of the commodity and *t* is the physical time. Equations (7) and (8) are the first step in constructing a principle of correspondence between economic variables and physical variables of classical non-relativistic mechanics: the path *s* traveled by a solid body through space with a force of resistance against this movement is directly proportional to the velocity, which corresponds $(\leftrightarrow)$ to the instantaneous price *n* of a commodity in a market structure with perfect competition i.e. $s \leftrightarrow n$. Equations (7) and (8) are also a second step in deriving a complete principle of correspondence between economic variables and physical variables: for the motion of a solid body through space, where the force of resistance against this movement is directly proportional to the velocity v, jerk *j* corresponds $(\leftrightarrow)$ to price jerk j_p for a commodity in a market structure with perfect competition, i.e. $j \leftrightarrow j_p$.

The price jerk function $j_p(t)$ for a non-linear motion equation of commodity state with inflexion (5) may be derived in the following manner. By taking the derivative of equation (5) with time t and substituting

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into the right side of the resulting equation for $\frac{d^2n}{dt^2}(t)$ from equation (5), we get the price jerk equation in the form

$$\frac{d^3n}{dt^3}(t) = \left(A\, n(t) - B\right)^2 \frac{dn}{dt}(t) - A\left(\frac{dn}{dt}(t)\right)^2. \qquad (9)$$

The price jerk function $j_P(t)$ on the right side of equation (9) may be expressed by a derivative or function $G(t)$ with respect to time t in the form

$$j_P(t) = \left(A\, n(t) - B\right)^2 \frac{dn}{dt}(t) - A\left(\frac{dn}{dt}(t)\right)^2 = \frac{dG}{dt}(t), \qquad (10)$$

where

$$G(t) = \frac{1}{3A}(A\, n(t) - B)^3 + A\int_0^t \left(\frac{dn}{dt}(u)\right)^2 du + const., \qquad (11)$$

while constants of proportionality A and B from equation (5) are expressed in the following units $[A] = (c.u.)^{-1}\ s^{-1}$, $B = s^{-1}$; $c.u.$ – designates the basic currency unit, s – designates the basic time unit, seconds. Then the price jerk equation (9) acquires the form

$$\frac{d^3n}{dt^3}(t) = \frac{dG}{dt}(t). \qquad (12)$$

Equation (12) corresponds to the non-relativistic equation for mechanical jerk, following from Newton's second law of motion.

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4. Conclusion

Assuming that the market value of the commodity at time *t* is fully determined exclusively by the value of the instantaneous commodity price $n(t)$, methodological procedures taken from theoretical physics are used to construct motion equations for a commodity's instantaneous price $n(t)$ and instantaneous relative depreciation $RD(t)$. Motion equation (5) for instantaneous commodity price with inflexion is a non-linear differential equation of the second order with constant coefficients. This motion equation was derived for a sequence of markets with perfect competition. The conclusion of the work presents the first step for constructing a principle of correspondence between economic variables and kinematic variables of classical non-relativistic mechanics.

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M-learning in education: Omani Undergraduate students perspective

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Abstract

The purpose of this research is to analyze and evaluate students' knowledge and awareness about M-learning. This empirical study includes 56 university students from computer engineering and science departments in University of Sultan Qaboos. This study consists of two parts. The first part involved study overview presentation and students' discussion about M-learning. The second part included survey study that consists of three phases: General information, M-learning knowledge and M-learning perception. Based on the study survey questions regarding the knowledge, acceptance and use of M-learning, the students respond are analyzed and evaluated. The study initial findings indicated good M-learning awareness and acceptance level and show students positive attitude that reflect students interesting in the use of mobile devices as learning tools.

Keywords: Learning; E-learning; Mobile learning; M-learning ;

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1. Introduction

The traditional learning in short T-learning and education systems are normally made in the classrooms in which teachers are responsible for providing students with their study materials. The T-learning has three main components learners, teachers and study materials where all of them must be physically represented in the learning place. The T-learning has many drawbacks such as learning in specific location and the availability of learning material. Generally, T-learning is not suitable for different learning and education style such as online exams, discussion ports, collaboration, animation, video, listening and knowledge searching (Georgiev, & Smrikarov, 2004, Cavus, & Ibrahim, 2008). These T-learning drawbacks and limitations have led to find new educational and learning methods. The ICT and the use of electronic media in education have introduced the ***E-learning*** which allows the educators to learn at any time and in different locations. The E-learning refers to the use of technology in different learning activities and to help people to learn remotely. The E-learning concept covers different models such as web-based learning, virtual classrooms, computer-assisted learning and digital communication (Sarrab, Alalwan, Alzahrani, Elgamel, 2013).

Currently, most of education systems prohibit students using their mobile devices during school work and, students are very rarely allowed to use mobile devices web browser to find information during lessens or exercises. Other students may allow using their mobile devices as bilingual dictionary or using their mobile cameras to capture photograph of PowerPoint presentation (Sarrab, Elgamel, & Aldabbas, 2012). In fact, that realize of M-learning is impossible without the use of mobile devices. The very important and common abilities are their mobility, availability and easily wireless connecting. Using modern mobile technology integrated in M-learning, changes the way our students learn and educate to be more interest-

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ing, interactive, flexible and widely available and. M-learning is cost efficient technique that encourage students to learn and get knowledge without traditional education system restrictions (Douglas, Matt, & Michael, 2008, Alalwan, Alzahrani, & Sarrab, 2013). The reset of the paper is organized as follows the next four section 2 briefly introduce M-learning. Then, section 6 discusses the literature review and the next two sections present the study and its methodology. Thereafter study results and discussion are provided with a number of findings and implications. Finally, conclusion and limitation of this study and implication for future studies are discussed.

2. M-learning

M-Learning can be defined as E-learning using mobile devices (Uhlig, Neiger, Rodgers, Kagi, Leung, & Smith, 2005). In 2001 a Norwegian research group defined this new form of learning as a learning technique using mobile technologies because of the growing demand for flexible learning process and geographic spatial mobility (Perez, Doom, Sailer, IBM, & Watson, 2008). Chabra and Figueiredo in 2002 offered a new definition of M-Learning as learning or education process using a specific device, in anyplace and at any time (Subramanian, 2009). The concept of M-learning combines the advantage of network wireless technologies and mobility to be used in the education and learning processes (Farooq, Schafer, Rosson, & Caroll, 2002). Considering the learning availability anytime and anywhere lead to M-learning as a new model of learning technology.

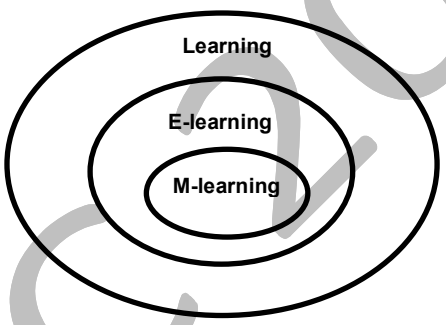


Fig. 1. M-learning as a subset of E-learning

In fact the use of M-learning is still not very popular. However, mobile devices technologies are becoming more capable of supporting communication services and managing learning contents. Thus, M-learning has the potential to become main stream in the foreseeable future (Tana, & Aib, 2011, Alzahrani, Alalwan, Sarrab, 2014).

3. Literature review

With the fast development of the wireless technology, students are exposed to a new educational and learning experience that is led to M-learning. Despite, long history and large amount of mobile technology development, still there is not comparable development with what can be seen in D-learning, E-learning and in internet innovations overall. Several researches and developments have been carried out on M-

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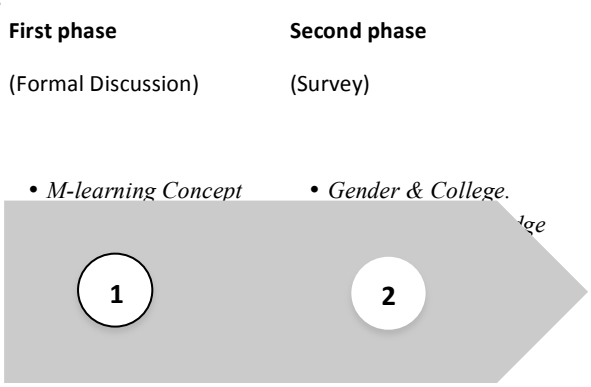
learning including requirements analyse (Oulasvirta, Wahlström, & Anders, 2011), architecture design (Haag, 2011), proposed models (David, Gary, Roure, & Victor, 2010), current and future trends (Minutoli, Fazio, Paone, & Puliafito, 2010). There are many M-learning applications in market today such as, Alykko which is an intelligent mobile tutoring application for instructors to manage their tutorial material using mobile and web technologies (Hofmann, Labs, & Woods, 2010). Active campus is another type of M-learning application used as a context-aware organizer to manage and support some learning activities (Mallikharjuna, Sasidhar, & Satyendra, 2010). MOODLE (Kasi, Kusuma, & Kumar, 2012). is a learning management system and POODLE (Uhlig, Neiger, Rodgers, Kagi, Leung, & Smith, 2005) is a form of MOODLE after redesigning to be compatible with wireless networks and suitable for hand-held devices. A group of Malaysian researchers proposed M-learning approach that uses mobile graph to trace students' performance and progress (Wasserman, 2010). Their proposed system is to complement and improve the Malaysian learning process. The M-learning is still in its infant age, thus, it has not standard developed similar to desktop or PC application development (Arno, 2011).

4. The study

Most of the M-learning mechanisms are concentrating on students of different higher education providers. The article reports an empirical research study about student's' M-learning knowledge that was conducted with the purpose of defining the meaning of M-learning and evaluates the student's acceptance of M-learning within university undergraduate students. This research study was conducted on undergraduate students in departments of computer engineering and computer science at Sultan Qaboos University, Oman. The main contribution of this article is the discussion of M-leaning concept, providing some examples of M-learning and empirically studying students' knowledge and perspective of M-learning and how students see Mobile tools incorporate into their study classes as M-learning tools.

5. Methodology

In order to accurately analyse and evaluate student's knowledge and perspective about mobile device as M-learning tools in the learning process this research was designed depending on the students' action (Brydon-Miller, Greenwood, & Maguire, 2003). The study methodology is consisting of two phases:



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Fig. 2. Exploratory Study steps

The first phase includes three parts, the first part involved introduction of M-learning and discussed this research study purposes and steps. On the time of this research study there were 29 female and 27 male students with the age range between 18 to 26 participated. The second part introduced the target of the study and showed the importance of this empirical experiment study. The third part is about the study procedure, in which, a set of methodology steps are explained to the participated students. The second phase is the survey study which includes five parts. The first part is the general information part. The second part is E-learning knowledge part. The third part is about E-learning perception and the fourth part is about student's' M-learning knowledge. Finally the fifth part is about M-learning perception.

6. Discussion

This research study discusses in details the student's knowledge and ability to move from D-learning and E-learning into M-learning by empirically study and evaluate the students level of knowledge about different learning processes and facilities. The following sections cover the discussion parts:

- M-learning knowledge

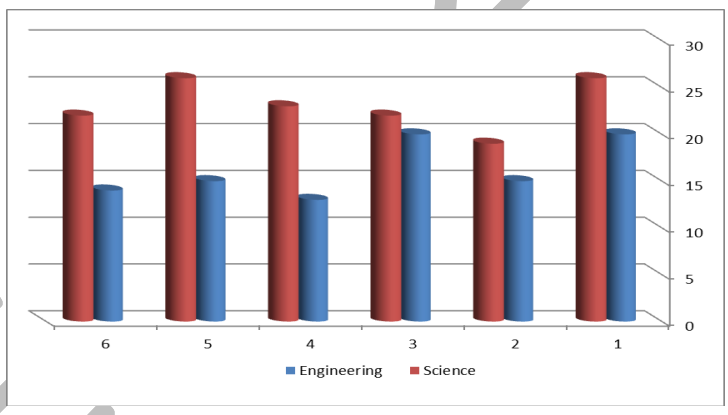


Fig. 3. M-learning Knowledge Students Response

As indicated in Figure 3 that, number 1 indicates the use of mobile device to access internet, 2 indicates the students ability to download mobile applications, 3 indicates the use mobile devices to send and receive emails, 4 reflects the use mobile device to translate sentences. 5 indicates the use of mobile devices to search word meaning and 6 the use of mobile device to access social networks. The majority of responded students use different mobile tools to access the Internet in different purposes. Moreover, 42 students claimed that they use different mobile tools for sending and receiving emails. However, a small number of engineering students answered that they use their mobile devices as translator tool to translate words and search for their meanings on the Internet. In addition to that, only 15 engineering students responded that they can download the needed mobile applications. In fact, in the all options of M-learning knowledge science students are much better than engineering students.

- M-learning perception

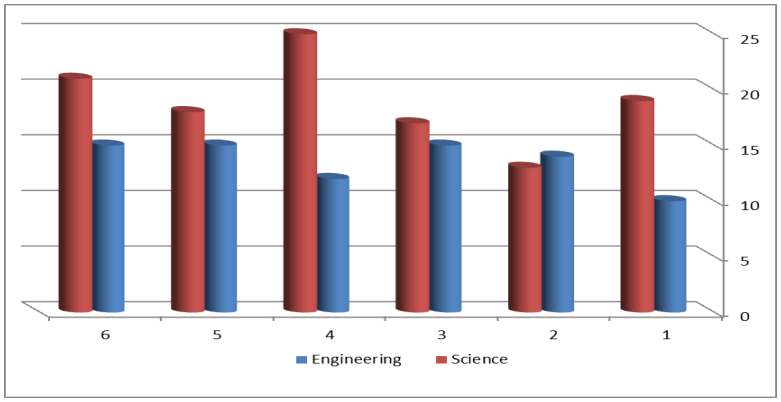


Fig. 4 M-learning Perception . Students Response

As shown in Figure 4 that, number 1 represents the students ability to text friends or classmates during class. number 2 indicates the students participation in discussion forums, 3 is the use of mobile devices to read an article or submit an assignment, 4 represents the use of mobile devices to take photos or record videos of the class slides or whiteboard, 5 indicate the student ability to access university LMS using mobile device and 6 represents the use of mobile devices to write note and set alarm as an assignment reminder. Whereas, more than 30 out of 56 students can read an article and submit their assignment using mobile device as learning tool, use mobile device to photograph or record their class presentation slides, Accessing the university learning management system using their mobile device and set alarm or write note as an assignment reminder on their mobile devices. However, less than 30 students were agree that they use their mobile devices to text a friend during class and participate in discussion forums.

7. Conclusion and future work

From this 6 months research study it can be concluded that M-learning can be used to solve the T-learning issues and difficulties and both learners or students and instructors or staff members require a proper M-learning system to facilitate and improve their learning process. The M-learning different mechanisms are not designed to replace T-learning different approaches but M-learning mechanisms can be used to overcome the limitations in the learning process of different learning providers. Although most of the participated students are interesting and familiar with the use of M-learning. The participators were claiming that the study policy of the higher education providers should encourage different M-learning intuitive to provide more interactive and flexible learning process. For future research, more empirical in depth research study needs to be conducted in all aspects of M-learning in Oman. The initial results of this M-learning research study encourage the researchers for more comprehensive study about the acceptance and adoption of M-learning including students from different departments, colleges and universities.

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New concept in e-learning materials based on practical projects

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"Univerzitni 22, 306 14 Pilsen, Czech Republic"

Abstract

The paper focuses on the application of new e-learning materials at the University of West Bohemia in Pilsen at the Faculty of Mechanical Engineering in the Department of Machine Design. These study materials are based on projects which were previously applied in practice and thus help students to master and become familiar with engineering issues from a practical viewpoint. E-learning materials are written in a structured and unified form in this sequence: introduction, active two-colour 3D models coloured according to function and machining technology, and overall drawing documentation.

Keywords: e-learning materials; 3DPDF, CAD models, Machine design

1. Introduction

The number of students graduating in engineering field has been declining in the Czech Republic for the last two decades. It has resulted in the insufficient number of engineering graduates in the labour market of the industrial branch in the Czech Republic.

Although industry is generally satisfied with the current quality of graduate engineers it regards the ability to apply theoretical knowledge to real industrial problems as the single most desirable attribute in new recruits (The Royal Academy of Engineering, 2007). Nowadays the employer has high demand of fresh graduates. He requires language knowledge, technical expertise and basic knowledge of CAD programs. Most of students deal only with the theory at school and they are not able to use their knowledge in practise at their first job so the employer has to spend considerable financial and time resources on the training of the new staff. This situation can cause financial problems to small and medium-sized companies and influence their competitiveness, too. Many authors have discussed how changes in the professional context of engineering have influenced demands of engineers and engineering education (Male, 2010). This problem is also described in the article (Vavrečková, 2009), which deals with the problem of educated specialists and their economic impact on the development of the state and describes the transition of developed countries into "The economy of knowledge type." (Vavrečková, 2009).

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For the future it is necessary to keep and deepen relationship between universities and industrial companies. This cooperation cannot be ignored, even if this activity is time-consuming and financially demanding in the short perspective of time and do not show benefits to both parties immediately. Managers see the greatest benefit of cooperation with universities as contact with potential employees (Bodmer, C., Leu, A., Mira, L. and Rütter, H., 2002). In the case of inactivity of mutual cooperation, the number of students involved in the practical projects could be reduced and students would not be able to gain valuable experience for their future practice. This issue is highlighted by the authors of the article „A makeover for engineering education"(Wulf, Fisher, 2002).

Working on real projects allows students to explore issues arising from practice. This increases the quality of graduates and their employability. The literature (Gibarti, 2006) talks about „Investice do lidského kapitálu jsou investice do vědy a vzdělání".

Over the last ten years the automotive industry has been on the increase in the Czech Republic. It caused the higher demand of the people with the machinery education especially those focused on the transportation technology. Many subcontractors, who produce a wide range of components for cars are dependent on the automotive industry. One of these branches is the manufacture and design of plastic injection moulds. Injection moulds produce decor, carrier, insulation and trim parts. It is a very extensive and sophisticated range of design and graduates have lack of experience in the issue. Based on the demand of graduates with broader experience which is still increasing at our Department of Machine design we decided to create a database of complex projects from the practice dealing with the design of injection moulds. It will help to improve the quality of teaching, which would systematically increase the level of practical knowledge of graduates at University of West Bohemia in Pilsen at Faculty of Mechanical Engineering, the Department of Machine design. The projects from the database will serve for studying and solving similar projects within Semester, Bachelor or Master Theses. This paper presents the new e-learning materials dealing with the design of injection moulds.

2. Description of the structure the study materials

For the new study materials the tool which is used for the production of the lid of the bin has been chosen as the example. This sample includes the description of the injection mould and its function. Next it describes the General Safety Rules with service, draft direction, 3D models in PDF format, drawings and datasheets of the produced components.

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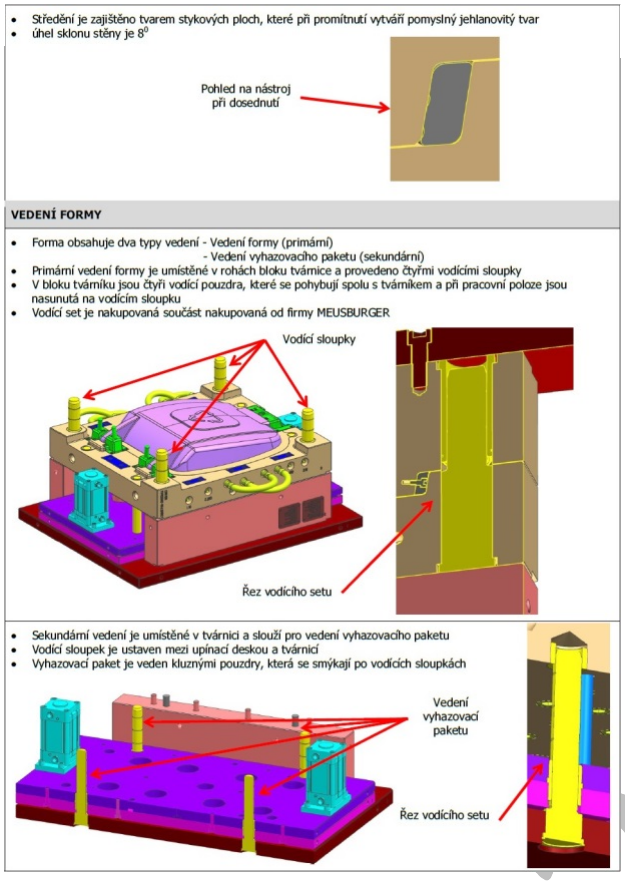
2.1 Information of mould and general safety rules with service

There has been a great emphasis on the logical order of the individual chapters. The first chapter begins with the basic description of the mould. The next chapters describe in details main components of assembly and subassembly. The upper part of Figure 1 (a) shows the main guide of the mould including the guide pillars, guide bushes and its function. This part is for better illustration provided with the picture where the guide pillars are marked with the red arrow. For better understanding one part of the machine has been shown in the working position where there is possible to see the whole guiding set. At the bottom part the leading of the guiding ejection system is described. The structure of the description is similar.

The picture (b) shows another part of the e-learning materials where General Safety Rules are listed. In case of the machine operation or shutdown the operator has to follow these rules. It contains the rules during the manipulation with lubricants or disassembly and transportation of the mould. This part also includes general maintenance of injection machine and its each component.

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a



b

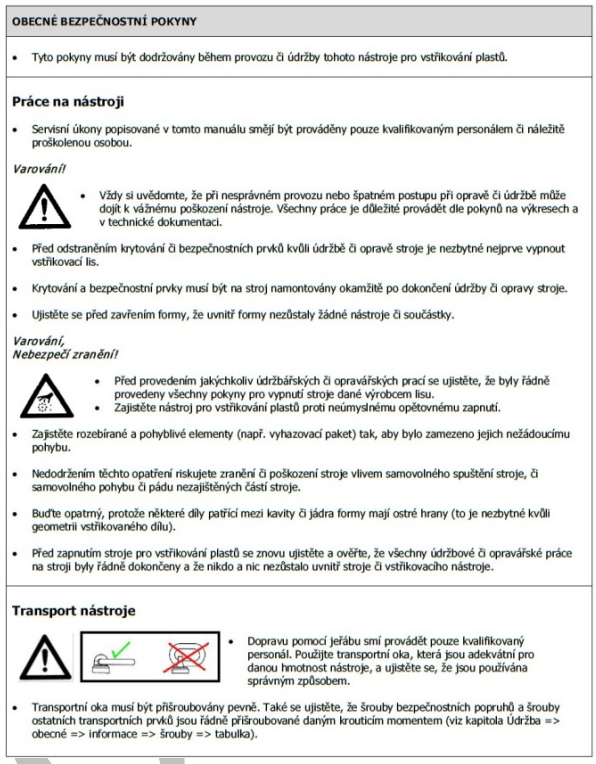


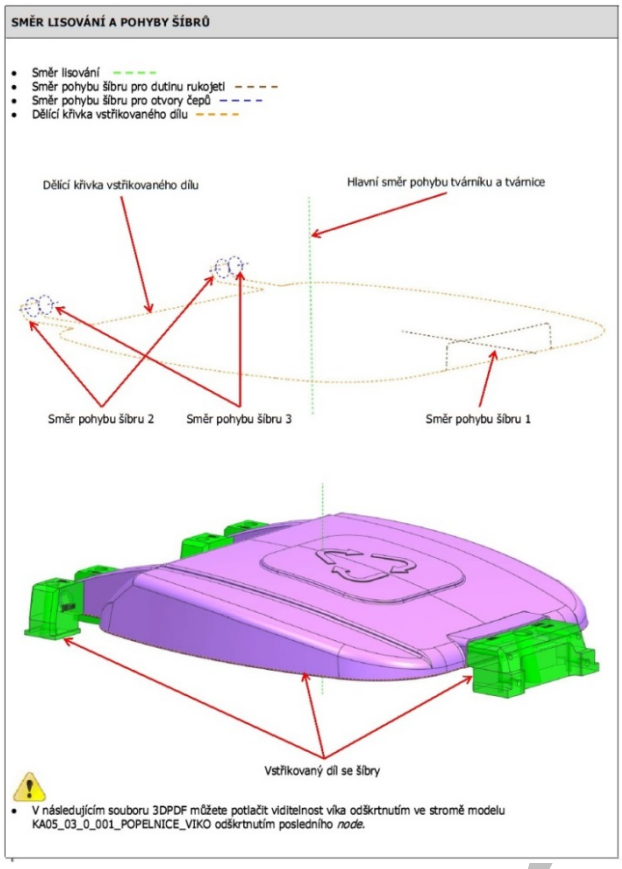
Fig. 15 (a) Description of mould (b) Safety rules

2.2 *Draft direction*

The next part of the study material deals with the draft direction and so called reference curve of the moulded part. It Is the first step when the design of the injection mould is made. First students become familiar with the different movements of the components that occur during the production process. Using pictures and simple explanations students can view what direction the components will move. In Figure 3 picture (a) you can see the main draft mould and moving of slides which allow the production of any undercuts. The main part is so called reference curve, which divides moulded part into the stationary and movable mould. For better illustration each trajectory is marked by different colours and arrows. The picture (b) allows viewing of the draft direction at interactive 3D Pdf file (see next chapter) view where each component is possible to see and suppressed. Students can also analyse all the components at various perspectives and distances

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a



b

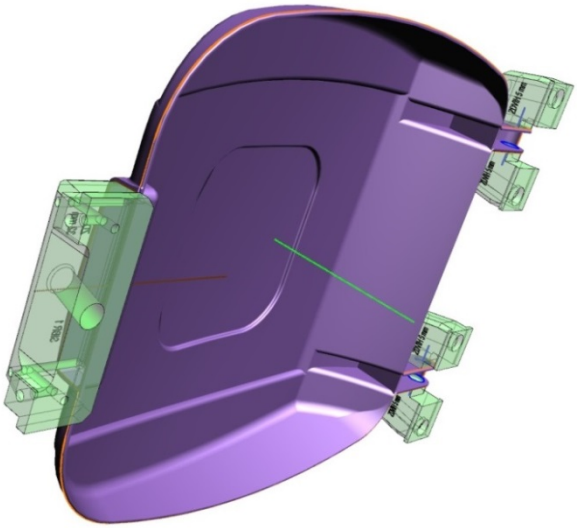


Fig. 16 (a) Description of draft direction, reference curve and slides move (b) 3D Pdf

2.3 CAD models

CAD models, which are the basis of the whole project, are a great source of knowledge for students of machine design. CAD models are created in various CAD programs for example Catia, Pro-Engineer, Siemens NX etc. It is not possible for students to own these softwares which are very expensive. For this reason all data from various CAD programs have been converted into 3D Pdf file. The biggest advantage is the ability to view the learning materials in PCs, laptops, tablets, etc. The only condition is to have software which is able to read Pdf files. It allows the program called Adobe reader, which is available with a freeware license.

In this file, students can interactively browse the selected parts based on the tools. CAD models are possible to turn around, zoom in, zoom out, create Sections and the parts can be suppressed or activated. Viewing the interactive CAD models at Pdf file is better than using the drawings because it is more effective and faster for the orientation. Especially beginner students who have little experience can get better overview of the study tools compared to problems they could have with the orientation of drawings.

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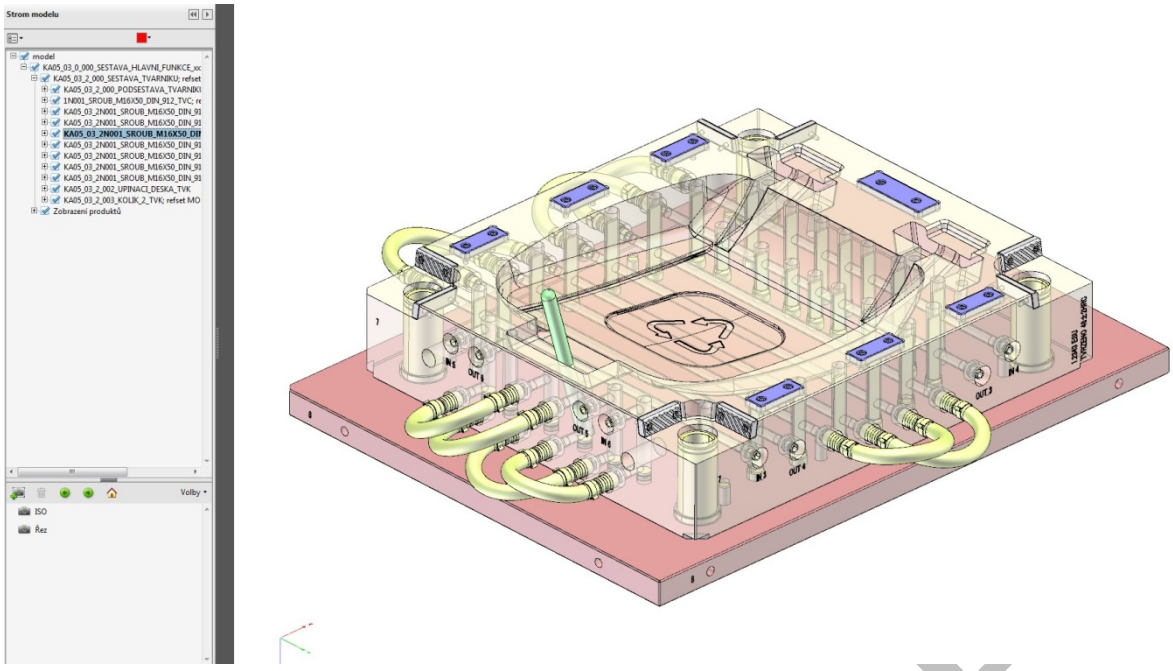


Fig. 17 Active subassembly in 3D Pdf file

2.4 *Colours of CAD models,*

CAD models are divided by colours into two groups. The first group is coloured according to the methods of the function parts and the second one according to the technology of manufacturing. The benefit is the simplified and faster detection of the function of each part. The first defined range of colours indicates the parts with the same function for example transporting, stopping or measuring elements. The second range of colours identifies the manufacturing technology. Each face is assigned by the colour that corresponds to the manufacturing technology for example drilling, milling, or cutting the parts etc.

Figure 4 shows the colours of the parts according to the machining technology. On the left side the technological operations on each part are described. In the right part of the figure the table with the labelled legends is illustrated. The table is divided into four columns. The first column displays the list of colours used in the work. The middle column defines colours according to the RGB colour model. The third column describes the function of the given colours. Thus students are able to recognize the manufacturing technology of the face or produced parts quickly and easy.

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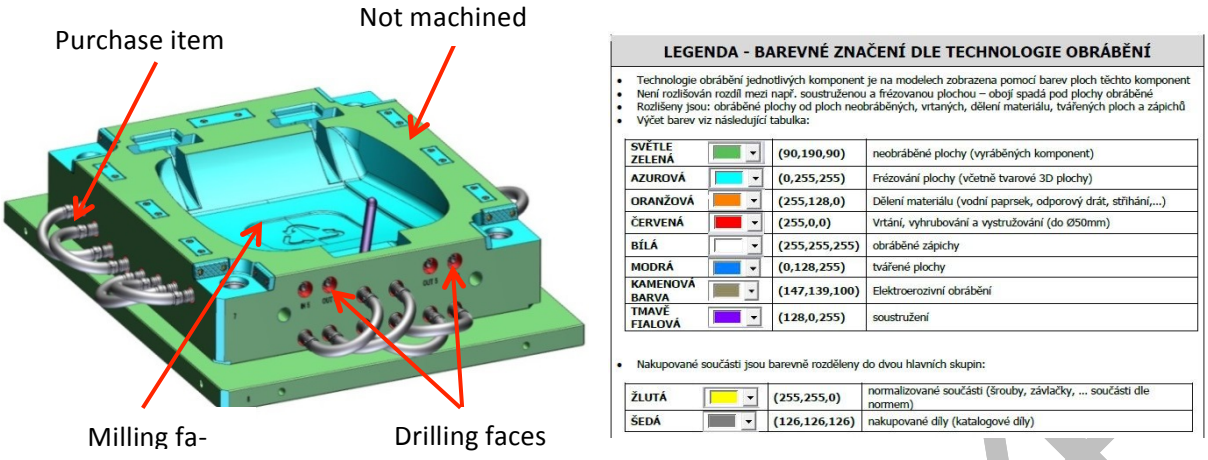


Fig. 18 Colour legend of the manufacturing technology

3. Contribution to students and academics

The main benefit of these new e-learning materials is the teaching innovation at FME at UWB. The e-learning materials provide the know-how of injection machine design and help to improve the quality of teaching. The main part of the study material is CAD models which help students to understand the problems of the study field faster and easier. Students can explore each CAD model in terms of relationships, its parts and technological operations. Thus students can use the e-learning materials for S emester, Bachelor and Diploma Theses.

Technical specifications of each design project can be easily modified. Students can explore the original design of a project and make modifications according to the new instructions. Then they create their own projects and designs and gain new experience in the field. Their designs approximate to real engineering projects in the practice.

The new e-learning materials will serve as a database of real design projects that will be available to all students and academics at FME at UWB. These design projects can be used in the framework of the teaching subjects. The teaching subjects will be enriched by the valuable know-how and academics will be able to explain the theoretical foundations on the projects in practice. Therefore they will be able to provide students with the importance and sense of the stated information.

4. Conclusion

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This article is focused on the new concept of e-learning materials that deal with the design of plastic injection moulds. These e-learning materials have been designed to help students to become familiar with common design issues. Students will gain valuable design experience during their studies, because the materials are based on real projects solved in practice. Especially they are drawings and designs of injection moulds. This way Faculty of Mechanical Engineering at UWB upgrades and expands the database of the study materials. These new e-learning materials are gradually introduced into individual subjects. The main goal of this article is to present this new concept. The study materials are made in the form of structured Pdf that contains basic information about injection moulds with CAD models, General Safety Rules, service and complete drawings. CAD models based on the specific formats of CAD software had to be converted into 3D Pdf file. This format allows students to browse the data without the installed CAD software where the mould was created. The file Pdf is readable with Adobe reader which is freeware for most PCs, tablets, smartphones etc.

These study materials will be included into the system of the quality teaching at the UWB. We are convinced that these study materials will be helpful for students and bring up more competent and capable engineers, who have their first contact with the practice during the period of their studies, and not until after the access to employment.

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Nigerian Undergraduate Students' Attitude to the Use and Integration of Interactive Whiteboard for Instruction

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Abstract

In most advanced countries classrooms, the interactive whiteboards have replaced the traditional whiteboards. However, the developing nations' classrooms across all levels are also catching up with this trend.

This study investigated undergraduate students' attitude to the use and integration of interactive whiteboard for teaching and learning , after a thirteen weeks exposure to a 200 level faculty based compulsory, two-unit course. One hundred and ninety nine (199) out of three hundred and twenty two (322) students who registered for the course at Northwest University, Kano, Nigeria were randomly selected for the study. In addition, two null hypotheses were formulated and tested for this study.The findings showed that there was no significant difference in male and female students' attitude, while a statistically significant difference was recorded for those that are young and the elderly. Young students developed more favourable positive attitude to the use and integration of interactive whiteboard for learning. Recommendations were made accordingly based on the findings.

Keywords: Attitude, Integration, interactive whiteboard, instruction

Introduction

"Necessity is the mother of invention". This maxim explains the dynamics of change in every area of life , including education. The globe is experiencing the advancement of technology, and its application in all spheres of life. Technology has made the whole world to be a global village.

Jukes (2008) pointed out that right from the early 1990s to early 2000s, the entire globe started experiencing a digital revolution which includes the pervasive use of the internet, cell phones , e-mail, video games and social networking tools. Consequently, the world became technologically super charged until this day.

The field of education, and instruction in particular had been having a great feel of these technologies. Some of the above mentioned technologies were aptly applied into instruction. Also, researches had been conducted , and is still being conducted on the effects of these technologies on teaching and learning. Educationists are greatly concerned on how these technologies could help in improving the teaching-learning process across the various levels of the educational system.

The problem

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In the higher institutions of learning, the lecture method is probably the oldest, well known and widely used method of imparting knowledge. The lecturer dominates the exercise with or without the learners' involvement (Ajelabi,2005). This method makes teaching to be teacher centred .As a result, students are usually passive, bored and probably, not motivated to learn. Students' commitment to learning is doubtful. Interactions with lecturer and peers are minimal. At times, these disengaged learners exhibit off task behaviours such as distracting other students, playing with their mobile phones, i-pads, tablets or even chatting with their peers. Consequently, this affects their attitude to learning, and this in turn automatically affects their academic achievement**.**

Need for the study

Since it has been discovered that lecturing makes students passive learners, and not engaged for a meaningful learning, there is a need to examine how we can modify the lecture method in higher institutions of learning with the application of modern technological devices, using the interactive board . This study is carried out to investigate how the use of technologies (interactive whiteboard) can help learners in tertiary institutions engage in a classroom lesson, receive significant attention ,commitment, as well as interact more with their lecturers, in spite of the teaching methodology, adopted by the lecturer.

There is a need to state at this juncture that though 'the first electronic interactive whiteboard was introduced in America in 1991' (Lopez and Diogo,2011), the higher institutions in Nigeria did not experience its installation into the lecture rooms until about 2005 and beyond. Northwest University in Nigeria commenced teaching activities in 2013 , and the lecture rooms were fitted with the interactive whiteboards same year, but ,they were under utilised. Since the researcher is trained on, and efficient with its utilisation , it was deemed fit to use it effectively in the delivery of a course during the semester.

This study therefore is carried out to examine the attitude of the students to the use and integration of the interactive whiteboard for teaching and learning at the end of a course of study.

Literature Review

Smart Technologies (2003) refers to interactive white boards or smart boards as 'a brand of interactive white boards (IWB) that displays image(s) from the computer monitor with the surface operating as a giant touch screen....and can be mobile or wall mounted.' For its operation, one may decide to control the computer from the board or, by touching the interactive board screen either directly with the finger or one of the incorporated electronic pens.

The interactive board performs a range of tasks much more than the chalkboard. The teacher can 'write on the interactive white board's large touch-sensitive surface with the electronic pen, drag and drop images or text, interact in many ways such as pressing icons to hear pre-recorded sounds ... engage with multi-media educational activities , watch simulations and view graphics , capture texts or areas of screen and annotate with the pen as well as save notes, drawings or annotations for future use' (Smart Technologies, 2004).

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Various individuals and groups in some advanced countries had carried out some researches on the application of the interactive white board for instruction. There is a need to mention that most of the researches were basically concerned with the utilisation of the equipment in teaching kindergarten, elementary and secondary school pupils. In addition, most of these works were interested in achievement , and not the attitude of learners to the technology. Also, there is a limited research carried out with the adult learners serving as subjects.

Oleksiw (2007) studied the effects of the introduction of an Interactive whiteboard on raising State test scores by enhancing motivation, attentiveness and comprehension in a grade three mathematics class. His findings were that there was statistically significant interactions between whiteboard use and grade levels. Also, the interactive board proved to be an effective tool that amplified motivation, stimulation and understanding in mathematics. Research on the use of interactive board is also extended to students with special needs. Zirkle (2003) carried out a study on the effects of the smartboard on high school students with special needs in a functional mathematics class. His key finding was that the interactive whiteboard was a positive tool for assisting in the maths achievement of special needs students in a functional math class.

Furthermore, Min and Siegel (2011) reported a study exploring the influence of interactive whiteboard on students engagement and perception of classroom activities. Students perception were measured via questionnaire. Observation results revealed that effective teaching without technology, can promote above average levels of students engagement.

Hypotheseses

Two null hypotheses were postulated for this study:

(a)There will be no statistical significant difference in the attitude of male and female students on the use and integration of the interactive whiteboard for instruction

(b) There will be no statistical significant difference in the attitude of the young and the elderly students on the use and integration of the interactive whiteboard for instruction.

Research Methodology

Subject

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This study was conducted in Northwest University, Kano. It is one of the newly established state owned universities in Northern part of Nigeria. The students' population was made up mostly of Northerners (North west geo-political zone) , and few from other parts of the country. All the level 200 students with a total population of three hundred and twenty two (174 males and 148 females) with ages ranging between seventeen and forty five years constituted the study. Out of this number, a total of one hundred and ninety nine students (110 males and 89 females) whose age range between eighteen and forty two , and, who enrolled for the 2-unit, level 200 compulsory faculty course titled Media and Methods constituted the sample for the study .The subjects were randomly selected.

Instrument

The major instrument constructed by the researcher, and which was used in this study for data collection was a questionnaire titled 'Students Attitude Towards the Use of Interactive whiteboard for Learning (SATIWB)' scale .It is made up of an 18- item likert type attitude questionnaire which varies from strongly agree to strongly disagree. Nine of the items connote positive attitudes, while the rest connote negative attitudes towards the use of the interactive board for learning the course EDU 2202 : Media and methods. The instrument was content validated. The reliability co-efficient was found to be 0.86.

Procedure

Prior to the resumption for the 2013/2014 academic session, the researcher organised a one-day intensive training on the use of the interactive whiteboard for all the thirty two academic members of staff. Furthermore, when it was few days to the commencement of lectures, the researcher met with four junior academic members of staff (who I do mentor) and carried out further intensive training on the use of the interactive whiteboard. After this training, the course outline of EDU212 was discussed with the rest of the team. All of them were briefed on the methodology of lesson delivery. The method adopted was basically learner-centered (a total departure from the conventional method, which was lecturing) .

The students were taught the course named above for a period of 13 weeks. The researcher and four other lecturers always meet few days before the week's lecture to harmonise the lesson delivery. Thereafter, the students were met once in a week for two hours interaction. The 322 students (average of 65 in a class) were distributed into five groups, with each lecturer rotated to teach across the groups. This was done in consideration of the mode of lesson delivery. The lectures were presented via the interactive white board, and the students were kept busy with different and varying activities, based on the content of each lesson. Some of the activities included quizzes, writing and/or typing of answers on the board,selecting pictures, drawings etc from the gallery, searching into lesson activity toolkit for enhancement of lessons, solving problems , watching videos and discussing them etc.

At the end of the 13- week lectures, the questionnaire was personally administered to the randomly selected subjects by the researcher with support from two members of the team.

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Results

The results regarding the first hypothesis which states that 'there will be no statistical significant difference in the attitude of male and female students on the use and integration of the interactive whiteboard for instruction', showed that there was no significant difference as shown in table 1

Table 1 : Means, Standard deviation and t-test analysis on male and female students' attitude on the use of interactive whiteboard for instruction

Students	N	X	S.D	T - value
Male	110	60	1.3	1.23
Female	89	59.4	1.5	

Df = 197 , t-calculated = 1.23 t critical at 0.05= 1.66

Since t calculated (1.23) is less than the t critical score (1.66) i.e 1.23< 1.66 , we conclude that there is no significant difference. Hence, the first null hypothesis is accepted.

Regarding the second null hypothesis which states that "there will be no statistical significant difference in the attitude of the young and the elderly students on the use and integration of the interactive whiteboard for instruction ", the results showed that a significant difference was recorded as shown in table 2.

Table 2 : Means, Standard deviation and t-test analysis on young and elderly students' attitude on the use of interactive whiteboard for instruction.

Students	N	X	S.D	T – value
Young	119	63.4	2.14	7.32
Elderly	80	52.1	2.06	

Df = 197 , t-calculated = 7.32 t critical at 0.05= 1.66

Since t- calculated (7.32) is greater than t-critical (1.66), it shows that there is a significant difference . Therefore, null hypothesis 2 is rejected.

Discussion

From the findings, we can see that there was no significant difference in the attitude of male and female students to the use of the interactive whiteboard for learning. This was revealed in table 1. The students developed lots of interest in using the interactive whiteboard for learning. They were quite happy to learn this course with the use of the interactive whiteboard. This was because during their first year of study, they were taught all courses by different lecturers who adopted lecture method, without the use of any form of technology. Also, this method of learning is rarely implemented in any of the courses that they were exposed to, even at level 200. The researcher observed that the students were always excited during lessons, and always look forward to subsequent classes. Consequently, 98% of the students responded positively to the item seeking their response on "I would like to receive all my lectures from lecturers who makes effective use of the interactive whiteboard". Another factor which must have made them to develop favourable attitude was the fact that they were always busy with different activities, interacted with

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the lecturer and their peers as well as the advantage of having opportunities to air their views and opinions on the topic being taught. This supported the view of Preston and Mowbray (2008) who said that the interactive board provides teachers and students with a whole new interactive learning environment to share ideas, information, images, animation and videos.

On the other hand, table 2 revealed a statistical significant difference in the attitude of the young and the elderly in the use of interactive whiteboard for learning. The younger students (18 – 29 years) showed more favourable positive attitude to learning via the use of the interactive whiteboard more than the elderly (30 – 42years). What must have been responsible for this? One of the main reasons responsible for this is that some elderly students have phobia for technologies , and are finding it difficult to embrace a technological revolution change. Also, few of this elderly students are teaching in primary schools, and they are used to utilising the chalkboard. In addition, some of them are just learning how to effectively use other modern technologies like the i-pad, i-phone, laptops and other gadgets. The researcher did observe that whenever few of these elderly students are called upon to come and do one activity or the other on the interactive whiteboard, they were always reluctant to do so. As a result, the researcher had to motivate and give them more support in this area. The younger ones exhibited a more positive attitude because we can refer to them as "the net generation" which started between early 1990s and 2000s, coinciding with when some of them were born and growing up. Small and Vorgan (2008) refers to them as 'digital natives', and the elderly as 'digital immigrants'. Right from a tender age, the younger ones had integrated technology into various aspects of their lives. Consequently, they tend to process information faster than the elderly.

Conclusion

This study examined the attitude of undergraduate students to the use of interactive whiteboard for instruction. The researcher analytically discuss the perception of the students. From the discussion, one can deduce that the students (male, female, young and elderly) do develop a much favourable positive attitude to learning one of their compulsory faculty based courses with the adoption of the interactive whiteboard.

The above notwithstanding, one needs to point out that this equipment is available in some lecture rooms in Nigeria, but it is not adequately and judiciously utilised based on some of these reasons : inadequate and lack of energy supply, lack of trained manpower to use it , laziness on the part of some lectures to prepare a quality, interactive lesson as well as lack of maintenance. Although, some Universities are yet to purchase it, some that had purchased it had turned them to whiteboard where they write on it, using permanent board markers, thereby destroying the surface.

Recommendations

Since this research had proved that Nigerian undergraduate students are keen on their lecturers utilisation of the interactive whiteboard for instruction , based on the students' favourable attitude, it is hereby recommended that lecturers should adopt the use of interactive whiteboards in the delivery of their lessons. Considering the advantages which are over and above the conventional method of lecturing, it would be of great benefit to our students if all lecturers adopt and incorporate its proper usage, as it would enhance teaching and learning. Probably, it would reduce the rate of failure in most courses.

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There is a need for change in the method of instruction , thereby breaking the monotony of lesson delivery. Since the students had indicated their willingness and interest to learn through the use of interactive whiteboard, lecturers and administrators should help to bring out the potentials in our students so as to fully maximise today's technologies

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Ninth Grade Student' Self-assessment in Science: A Rasch Analysis Approach

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Abstract

Based on the competency indicators of the nine-year compulsory curriculum in Taiwan, this study constructed a self-assessment scale suitable for use by junior high school students to evaluate their comprehension of science-related concepts. Using random strata sampling this study surveyed ninth grade students in Taiwan in 2012. A total of 1,326 questionnaires were distributed and 1,005 valid questionnaires were recovered. The Rasch model was employed to study the self-assessment results and analyze difficulties in learning science-related concepts as well as discrimination, reliability, validity, suitability, and data error detection. The three conclusions of this study are as follows: 1) Diagnostic tests for teaching evaluation should be based on Rasch measurement results. 2) A structure for diagnosing the item response of students should be constructed to replace conventional test analysis and to build a framework for diagnosing the response of students to test items. 3) The actual capabilities of students must be considered in the development and selection of teaching activities.

Keywords: self-assessment; Rasch; science concepts

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1. Introduction

Many nations have introduced successful educational reform programs in response to the tide of globalized education reforms and the demands of social and cultural change. The success of implementing new curriculum is strongly influenced by how schoolteachers explain and interpret these concepts (DeBoer, 2011). Previous experience in curriculum reform, such as the standards-based curriculum launched by the U.S, the attainment targets in the UK, the key competencies promoted in Australia, and the achievement objectives in New Zealand, has shown that competencies or standards that have not been examined and reviewed cannot be understood or identified by schoolteachers, much less implemented within a teaching environment (Burgess & Lowe, 2002; Petrosky & Delandshere, 2001). In Taiwan, the development of science curricula has largely been modeled after the experience of western nations, which emphasize a student-focused approach and an understanding of the nature of science (Tang, 2003). Since the "Nine-Year Compulsory Curriculum Outline" was published in 1998 by the Ministry of Education and implemented in 2001, the science curriculum has undergone multiple reforms. Currently, this reform process is set to enter its 12th year. This study examines whether the concept of reforming science education has been truly implemented in science instruction.

Many countries use transnational assessment tests such as Trends for International Mathematics and Science Study (TIMSS) and The Program for International Student Assessment (PISA) to understand the competitiveness of their populace (Chiu & Duit, 2011). Modern test theory has replaced classic test theory (CTT) with regard to the items on these tests. Item response theory (IRT) operates in accordance with the reaction of test takers to questions and has the characteristics of sample and item independence. IRT employs the maximum probability method and the Bayesian method to estimate parameters for test takers or test items to obtain the logit score (Wright & Linacrc, 1992). Rasch analysis is a type of one-

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parameter IRT logistic model that converts ordinal data into interval data to resolve sample dependence and non-equidistance limitations encountered in CTT (Rasch, 1960). Each latent trait is estimated using the linear probability relationship between test-taker competency and item difficulty for each item. From the distribution graph of test takers and test item coordinates on the same continuous band, any response abnormalities are analyzed using the distance relationships between test takers and test items (Fischer, 1987). The Rasch model represents the difficulty of IRT in an objective and equidistant manner. It is capable of proving content validity, structural validity, generalized validity, essential validity, interpretive validity and external validity. The Rasch model can also be used to replace the factor analysis of CTT and test for unidimensionality in the test paper. Because it is an equidistant and objective assessment, the Rasch model can improve on the insufficiencies of CTT (Rasch, 1960), such that testing truly fulfills the functions of scientific prediction and inference. The data provided by Rasch analysis on the response pattern of test takers can confirm whether the test takers are the optimal target population and assist in building an item bank and developing computerized adaptive testing.

Research on self-assessment scales has flourished with the autonomy and interactivity of learners emphasized in student-centered learning (Ross & Starling, 2005). The more closely self-assessment scales match teaching objectives, teaching materials and test content, the more effectively the scale results can predict the learning situation of students. Research has shown that by teaching students how to accurately conduct self-assessment and understand its purpose in the educational environment, teachers can enhance consistency between self-assessment and teacher assessment (Ross, Rolheiser, & Hogaboam-Gray, 1999; Sung, Chang, Chiou, & Hou, 2005). With regard to the differences between teacher assessment and student self-assessment, teachers can gain an understanding of the needs of students through dialogue in order to design suitable classroom activities.

This study explored the challenges encountered in the macroscopic context of globalized science curriculum reform. Conducting a questionnaire survey, we employed the Rasch model to analyze the learning situation of junior high school students with regard to scientific concepts and employed data processing to identify basic shared concepts.

2. Literature Review

2.1. International comparison of educational testing

The understanding of scientific concepts is extremely important to the learning of science. Since the 1970's, western countries have been conducting studies on the learning and understanding of specific science-related concepts. Since 1980, identifying the science-related concepts that students understand and determining how students comprehend scientific phenomena has become an important area in science education research. This work promoted a better understanding of how students learn and deeply influenced the progress of science education.

The most representative international science education tests are TIMSS and PISA. The TIMSS was first conducted in 1970 with a total of 19 participating nations. By the time the second TIMSS was proposed in 1980, the number of participating nations had increased to 24. In 1990 the International Association for the Evaluation of Education Achievement, (IEA) launched the third TIMSS with more than 40 participating nations (NTNU, 2013). Taiwan applied to join the IEA in 1992 and participated in the TIMSS REPEAT (TIMSS-R) launched by the IEA in 1999. The survey subjects were 8th grader students (13 year old age group). A total of 38 nations participated in TIMSS-R. In view of the emphasis placed on math and science education as well as the learning achievements of students, TIMSS was changed to an international test conducted once every four years. The subjects of TIMSS 2003, which surveyed knowledge, application, and inference with regard to math and science, comprised 4th grade students and 8th grade students. To expand the above cognitive domain, TIMSS 2007 integrated additional key content areas. The content of 4th grade science includes life sciences, natural sciences, and earth sciences, while 8th grade science comprises biology, chemistry, physics, and earth sciences.

Hosted by the Organization for Economic Cooperation and Development (OECD), PISA is a global student assessment program that compares the learning effectiveness of 15 year olds in relation to life skills and knowledge, analyzes the effectiveness of education in each nation, and defines national literacy from these results. The program also examines how school structure influences educational quality and equality, explores educational equality through variation ratios that can be explained through socioeconomic factors, and analyzes whether educational opportunities are equal and whether educational quality is consistent between public and private schools, urban and rural areas, and different ethnic groups. The design of PISA items focuses on application and situational mimicry rather than being restricted to curriculum content. Students taking the assessment must first comprehend the information and actively use their ability to process, evaluate and contemplate data in the formation of answers to the problem scenarios. The central point of the assessment is determining whether young people can apply the knowledge and skills they have acquired to real world problems, rather than simply mastering the school curriculum. The assessment covers the degree of competency in reading, math, and science. Conducted once every three years, the international assessment combines innovative literacy concepts with the principle of lifelong learning focusing on the key knowledge and skills required in adult life. The assessment outcomes provide food for thought as well as a basis for evaluating and monitoring performance in education sectors worldwide. Each assessment primarily tests one academic discipline, while conducting supplementary testing of two other disciplines. For example, in 2006, science was the main subject tested, supplemented by reading and math. In 2009, reading was the main subject tested, supplemented by science and math.

In 2001, Taiwan implemented the nine-year compulsory curriculum, and in 2002 hosted the first national science education conference. The conference concluded by emphasizing the goals of properly instructing each student, promoting lifelong learning, and achieving a consensus on popular science education. To provide more systemized information about science learning, the National Science Council of Taiwan has sponsored a task-oriented integrated research project, which commenced in 2000 and is conducted by a group of researchers in science education. The long term objectives are to enable the systemic research of student understanding of key science-related concepts, identify the factors that influence misconceptions, and develop teaching strategies to promote better understanding of science-related concepts. The study conducted cross-sectional sampling of 6^{th}, 8^{th}, 9^{th} and 11^{th} grader students with the aim of determining how well students comprehend concepts related to physics, chemistry, and biology. The research concepts related to physics include motion, force, torque, heat, light, sound, atmospheric pressure, earth movement, magnetism, and electricity. The concepts related to biology include taxonomy, reproduction, ecology, animals and plants, respiration, plant growth, evolution, genes, the nervous system, and the use of microscopes. The concepts related to chemistry include current, electrons, redox reaction, particle models, chemical equilibrium, acidity and alkalinity, classification of chemical elements, materials science, and organic compounds. The science education research team worked together through group meetings, workshops, discussions, and reports. Using concept maps and propositional statements, researchers sought to determine (through interviews) how well students comprehend science-related concepts. The alternative conceptions of students were compiled through interviews and these results were used to develop a two-stage diagnostic test. The first stage was designed to test the real knowledge of students, while the second stage confirmed the interpretation and reasoning of students. Test questions were developed from the pilot experimental results of each sub-study and the results were used to analyze and select the items more suitable for investigating the misconceptions of students (Treagust, 1988). Subsequently 10-15 questions were selected for each subject and further examined, discussed and filtered by domain experts. After pre-testing, analysis and modification, questions of higher quality were produced as a written test. From 2000 to 2004 the two-stage diagnostic test was used to assess the alternative conceptions of students. This not only provided science teachers with a reference for the improvement of teaching practices and the preparation of textbooks, but also served as an important foundation for research on science education.

2.2. Test theory

The development of classic test theory (CTT) has allowed psychological testing to more closely approach scientific assessment. Classic test theory is used to establish norms through stringent, standard-

ized control of test procedures, to eliminate subjectivity from psychological testing. This has contributed immensely to preserving the scientific basis of social sciences (Andersen, 1995).

The theoretical basis of the IRT (Item Response Theory) model assumes that the ability to be tested is a fixed potential property θ, therefore the ability of the nth test-taker is θ_n. Each item designed in the test must also be provided an objectively standardized difficulty, and the difficulty of item i is assumed to be b_i. The overall performance of test takers in this test has a fixed upper level d, which reflects the upper limit of the score obtainable by test takers. This variable can also be interpreted as the percentage of the total test score accounted for by the maximum score obtained after deducting for careless mistakes. There is also an upper level limit for the overall performance of test takers c, a value which reflects the lower limit of the score obtainable by test takers. This can also be seen the percentage as the total test score accounted for by the minimum test score obtainable from making correct guesses (Custer, Omar, & Pomplun, 2006). In this model, a_i is the discrimination level of the ith item, used to demonstrate the cumulative probability gap between different test items. Based on the theoretical assumptions described above, the theoretical model of CTT can be expressed as follows:

$$\boldsymbol{P}(\theta_{ni}) = c + \frac{d - c}{1 + e^{-a_i(\theta - b_i)}}$$

where the probability that the nth student answers the ith item correctly is $\boldsymbol{P}(\theta_{ni})$，. In addition to being affected by test-taker ability θ_n and item difficulty b_i, this probability value is also influenced by item discrimination a_i and the upper limit d and lower limit c of ability. The IRT is widely used in competency tests and computer adaptability tests. However, because the model explores a range of factors, most educational or psychological assessments employ a simplified IRT model, of which the Rasch model is the most popular. Danish mathematician G. Rasch (1901-1980) proposed a new measurement model to solve the issue of whether the original scores are intervals and whether they are scientifically objective. Later researchers have used this to build a completely new set of test theories that have lifted psychological testing to a truly scientific level.

By analyzing the item responses of test takers, the Rasch model (1960, 1980) places the estimated values for the ability of test takers and item difficulty into the same interval, represented in units of logit. The parameter of item difficulty is usually standardized to a mean of. In the common two- or three-parameter IRT models, the ability scale of test takers is usually standardized to score scale with a mean of 0 and a standard deviation of 1. Like other IRT models, through shared items the Rasch model can vertically scale the items designed in response to differences in ability among test takers of different ages. Test-taker competency and item difficulty are placed within the same scale which assists in long-term monitoring of the growth of capability.

The Rasch model is suitable for analyzing binary scored data. Logit conversion of test-taker ability （θ）and item difficulty（b）is used to obtain a mathematical formula for win (P) (the probability that the test-taker will answer the item correctly) to solve for the relationship between the two variables. The equation is shown below (Rasch, 1960).

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$$P_{ij} = \frac{e^{(\theta_j - b_i)}}{1 + e^{(\theta_j - b_i)}}$$

where θ_j indicates the ability of test-taker *j*, b_i is the difficulty of item *i*, and P_{ij} is the probability that the test-taker will answer an item correctly. In the Rasch model, all items are required to have a high degree of discrimination（a=1.0）and zero rate of guessing correct answers c= . The most important feature of this model is its strict requirements regarding item characteristics and the response of test takers. If these requirements are met, the computed ability will accurately reflect the actual competency of the test taker.

Regular IRT models are divided according to the different use of parameters, as follows: one-parameter logistic model, two-parameter logistic model, and three-parameter logistic model, as shown in Table 1.

Table 1. Comparison of different parameter models and corresponding mathematical equations

Model	Mathematical equation
One-parameter logistic model	$P_i(\grave{e}) = \frac{e^{D(\theta - b_i)}}{1 + e^{D(\theta - b_i)}}$
Two-parameter logistic model	$P_i(\grave{e}) = \frac{e^{D_{ai}(\theta - b_i)}}{1 + e^{D_{ai}(\theta - b_i)}}$
Three-parameter logistic model	$P_i(\grave{e}) = c_i + (1 - c_i)\frac{e^{D_{ai}(\theta - b_i)}}{1 + e^{D_{ai}(\theta - b_i)}}$

Data source: Hambleton & Swaminathan (1985, p. 49)
Note: In these equations, θ is the estimated potential ability of test takers and P_i（θ）is the probability that test takers with ability θ will correctly answer item *i*.

The properties of the Rasch model in scenarios with a binary scoring format (right or wrong) have been extensively researched. One additional feature of the Rasch model is that testing must be unidirectional. This is how the estimates of test-taker ability and item difficulty can be placed within the same potential property and their relative positions determined. Multi-directional test scores would render the comparison of test scores meaningless and apply the final inferences into question (Smith & Miao, 1994; Wright & Mok, 2004). Essentially, the ability to add and subtract test scores implies that the items are measuring the same entity and satisfies the requirement of unidirectionality. To verify unidirectionality requires the passing of specific tests, which can be accomplished using the Rasch model. The Rasch model also converts ordinal data into interval data, thereby solving the problems of test dependency, sample dependency, and non-interval original scores, which are commonly encountered in CTT. The Rasch model is based on a theory-oriented analysis method capable of examining the structure of test concepts to ensure that it complies with theoretical expectations. This approach should be able to prevent the problem of inconsistency among factors, which plagues exploratory factor analysis.

2.3. Self-assessment

Self-assessment refers to evaluating and determining the quality of one's own performance as well as identifying strengths and weaknesses in order to improve learning results (Klenowski (1995)). Through self-assessment, learners can examine their personal strengths and weaknesses in a particular subject. Based on the objectives, self-assessment can divided as follows: 1)Achievement-oriented self-assessment, in which assessment results are related to selection, identification, achievement, and diagnosis; and 2)Development-oriented self-assessment, which assesses the management of self-learning and the learning process (Bachman, 2000; Oscarson, 1989). Self-assessment is seen as an effective tool to help students gain a better understanding of assessment objectives and indicators (Orsmond, Merry, & Reiling,

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2000), which positively contributes to learning. Self-assessment can also aid students with poor grades to understand the cause of their struggles and reveal the source of their frustration (Taras, 2002). McDonald and Boud (2003) found that in many academic subjects, self-assessment positively influences the learning achievements of students. Evidence from most of the above studies shows that self-assessment can increase the motivation of students to achieve, thereby effectively improve their learning behavior. Nonetheless, the accuracy of self-assessment has often been questioned. Sullivan and Hall (1997) found that nearly 40% of students overestimate their performance, indicating that the subjective judgment of individuals can easily detract from the reliability and validity of self-assessment results. The stability of assessment validity is also influenced by differences in the individuals being assessed. Related studies have found that self-assessment results usually exceed the results of teacher assessment and the consistency of self-peer assessment is usually higher than that of self-teacher assessment (Bergee, 1997; Ross et al., 1999). Boud and Falchikov (1989) found that when self-assessment affects ranking within overall classroom scores, students tend to overestimate their abilities.

This study used the Rasch model in the self-assessment of students with regard to science related concepts. In contrast to CTT, the Rasch model considers both competency and item difficulty when testing comprehension. The Rasch model interprets two main types of outcomes based on the concept of ANOVA; therefore, the value of the competency parameter is unrelated to the value of the difficulty parameter and vice versa. The only area that the two parameters mutually influence is the rate of correct-incorrect answers on the left side of the equation. The above scenario indicates that when the Rasch ability value replaces the original score as the reported score, this value is entirely unrelated to the difficulty value and is not influenced by the test instrument. Put simply, the Rasch approach is an objective form of measurement.

3. Research Method

Taiwanese students in the ninth grade have undergone six years of elementary school and three years of junior high school in order to complete the nine-year compulsory curriculum. In order to understand the learning progress of students, this study used the BILOG-MG computer program to apply the Rasch 2PL model for analysis. This model was used for the self-assessment of ninth grade students with regard to science-related concepts in order to accurately estimate the competency of test takers in science.

The population for the questionnaire survey in this study comprised students currently employed in public junior high schools in the southern part of Taiwan, excluding special education students. Strata sampling was used to select test subjects. Kaohsiung City and Pingtung County were selected in the southern part of Taiwan as the first stratum according to the ratio of students, while the second stratum included schools categorized by size. The number of schools was summed and a fixed ratio was used to determine the number of schools for sampling.

A pilot sample was drawn from public junior high schools on the mainland of Taiwan. Five schools were sampled from ten junior high schools. The schools in the pilot sample were not categorized on the basis of size. Ten questionnaires were distributed in each school and 100 ninth grader students were selected as participants in the pilot test. The population of the official questionnaire survey was ninth grade students in public junior high schools in Taiwan. In accordance with the ratio of school size and number of students in each region, we used random strata sampling to select a total of 145 public junior high schools from which 1,326 students were sampled (approximately 1% of the total population of ninth grade students in Taiwan public junior high schools). The first stratum was based on the number of ninth grade students. Questionnaires were distributed to 1,326 students in 145 public junior high schools. The number of questionnaires recovered was 1,155, making an overall recovery rate of 87%. After eliminating those with incomplete personal data, omissions, and fixed responses, there remained 1,005 valid questionnaires, resulting in an approximate usability rate of 76%.

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4. Results

This study applied IRT to the learning of natural and life sciences, for the purpose of constructing a self-assessment scale capable of evaluating the comprehension of ninth grade students with regard to science-related concepts. Random strata sampling was used to sample ninth grade students in the southern of Taiwan. BILOG-MG computer programming was utilized for estimation and Rasch two-parameter logistic model (2PL) analysis was used to determine how well ninth grade students comprehended science-related concepts.

4.1. Parameter estimation of science concept items

This study used IRT parameter estimation software (BILOG-MG), to test the 219 test items and employed Rasch 2PL to analyze difficulty and discrimination. The first time that this study conducted parameter estimation, we were unable to estimate parameter values for Item 14 ("Is the Milky Way the only galaxy in the universe?"), Item 28 ("An iron cooking pot has become rusty, is this classified as a chemical change?"), Item 33 ("Are all organisms multi-cell?") and Item 42 ("Is the urinary system the only excretory system in the human body?"). This may be due to the low variance in the response patterns among test takers in answering these test questions. This study defined the four items above as unsuitable and re-estimated the results of the remaining 215 items. Based on the results estimated from each item, we conducted wide-ranging discussions on the concepts corresponding to the questions and used descriptive statistics to conduct situational analysis. The analysis results are as follows:

1). The degree of discrimination as estimated from the 215 items ranged between .31 and 2.34 (mean discrimination: 1.27). The mean discrimination level of concepts ranged from .68 to 1.78. Wang (1995) claimed that a regular degree of discrimination ranges from 0 to 2, such that items with a score of .8-1.25 are considered to have good discrimination. Of the questions designed in this study, 67 fell within the range of good discrimination and the remaining 115 had discrimination higher than 1.25. Among the 44 concepts, 16 fell within the range of good discrimination and 24 had levels of discrimination higher than 1.25, indicating that the questionnaire in this study is considered to be highly discriminative (as shown in Table2).

2). The difficulty values estimated for the 215 items ranged between -2.46 and 2.30（mean difficulty value: - .95）. The difficulty value of concepts ranged from -1.87 to - .07, indicating that the test questions designed in this study are moderately easy. The 15 items with higher difficulty are listed in order as follows: "materials", "creativity, design and manufacturing", "life diversity", "information and communications", "organic compounds", "food and biotechnology", "scientific ethics", "combustion, oxidation and reduction of substances", "transport", "reproduction, genetics and evolution", "development and utilization of energy", "conservation and utilization of resources", "relationship between man and nature", "acidity, alkali, salt" and "electrical and mechanical applications". Students performed more poorly on these 15 concepts, compared to other concepts.

Table 2. Overview of difficulty and discrimination parameters of science test questions

Subject	Concept	Discrimination					Difficulty				
		Question Numbers	Mini value	Max value	Mean	S. D.	Question Numbers	Mini value	Max value	Mean	S. D.
Physics	Temperature and heat	4	1.21	2.24	1.67	.45	4	-1.33	- .88	-1.13	.20
	Movement and force	14	.68	1.76	1.05	.29	14	-1.83	- .46	-1.12	.36
	Light, sound and waves	8	1.07	2.06	1.59	.36	8	-2.03	- .62	-1.26	.44
	Forms and conversion of	6	1.03	1.81	1.37	.32	6	-1.58	- .35	- .97	.47

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	energy											
	Electromagnetic effects	4	1.16	1.49	1.29	.14		4	-1.32	- .75	-1.06	.25
	Gravity	1	1.63	1.63	1.63	N/A		1	-1.04	-1.04	-1.04	N/A
Chemistry	Composition and function of substances	12	.36	1.36	.74	.27		12	-1.96	.13	- .89	.70
	Form and nature of substances	2	.42	1.41	.91	.70		2	-2.46	- .83	-1.64	1.15
	Chemical reactions	5	.73	2.03	1.25	.48		5	-1.41	- .25	- .88	.48
	Water and soluble solutions	2	1.59	1.86	1.72	.19		2	-1.23	- .78	-1.00	.32
	Combustion, oxidation and reduction of substances	9	.73	1.98	1.48	.37		9	- .82	- .18	- .52	.25
	Acid, alkali, salts	7	1.02	2.24	1.50	.41		7	-1.31	- .43	- .83	.29
	Organic compounds	3	1.05	1.37	1.27	.19		3	- .77	- .08	- .42	.35
Life sciences	Commonality of life	1	.72	.72	.72	N/A		1	-1.87	-1.87	-1.87	N/A
	Diversity of life	1	.80	.80	.80	N/A		1	- .31	- .31	- .31	N/A
	Foundational structure of organisms	2	1.19	1.38	1.28	.14		2	-1.83	-1.47	-1.65	.26
	Structure and function of plants	4	.55	1.79	1.06	.54		4	-1.77	- .64	-1.38	.52
	Structure and function of animals	4	.46	.85	.68	.16		4	-1.67	- .74	-1.36	.42
	Constancy and regulation in animal bodies	6	.88	1.76	1.47	.33		6	-1.17	- .53	- .90	.24
	Animal behaviour and the reaction of organisms to environmental stimulation	3	.82	1.46	1.19	.33		3	-1.98	-1.45	-1.71	.27
	Reproduction, genetics and evolution	7	1.34	2.03	1.69	.22		7	- .97	- .19	- .61	.30
	Food and biotechnology	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Organisms and the environment	5	1.01	1.84	1.42	.32		5	-1.32	- .68	- .97	.29
Earth sciences	Composition of the Earth	6	.31	1.83	1.15	.58		6	-2.27	2.30	- .96	1.69
	Earth and space	7	.34	1.10	.73	.34		7	-2.16	.25	-1.38	.83

	Variations in the surface and core of the Earth	4	.62	1.81	1.47	.56		4	-1.91	- .67	- .99	.61
	Weather and climate change	11	.86	2.22	1.41	.37		11	-1.86	- .50	-1.38	.41
	Day, night and the four seasons	3	1.07	1.44	1.20	.20		3	-1.68	-1.12	-1.36	.29
	Earth strata and fossils	4	1.28	1.56	1.39	.12		4	-1.32	- .74	-1.07	.24
Life Technologies	Scientific development and enlightenment	3	.84	1.25	1.06	.21		3	-1.52	- .37	-1.02	.59
	Creation, design, and manufacturing	2	.69	1.02	.85	.23		2	- .64	.42	- .11	.75
	Materials	5	1.08	1.41	1.22	.15		5	- .36	.18	- .07	.22
	Electrical and mechanical applications	4	.89	1.04	.96	.07		4	- .98	- .59	- .84	.17
	Information and communication	14	.57	1.77	1.13	.35		14	-1.99	.81	- .41	.72
	Residence	3	1.25	1.78	1.48	.27		3	-1.30	- .88	-1.05	.22
	Transport	2	1.17	1.89	1.53	.51		2	- .83	- .21	- .52	.44
	Food and biotechnology	4	.89	1.52	1.24	.28		4	-1.17	- .13	- .46	.48
Science ethics and environmental topics	Global change	7	1.01	2.34	1.59	.42		7	-1.73	-1.33	-1.48	.14
	Natural disasters and their prevention	5	.66	1.72	1.21	.40		5	-2.06	-1.06	-1.52	.38
	Environmental pollution and its prevention	4	1.12	1.91	1.63	.35		4	-1.20	- .79	-1.00	.18
	Organisms and the environment	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Relationship between man and nature	2	1.34	1.75	1.54	.29		2	- .82	- .69	- .75	.10
	Conservation Utilization of resources	4	1.46	2.09	1.78	.26		4	- .97	- .42	- .69	.28
	Development and utilization of energy	5	.84	1.89	1.39	.39		5	- .93	- .41	- .63	.19
	Scientific development	2	1.69	1.71	1.70	.01		2	-1.34	- .90	-1.12	.31
	Ethics in science	4	.33	1.43	1.13	.53		4	-1.34	1.41	- .50	1.29

Note：N/A indicates that standard deviation could not be calculated because there was only one question related to this concept

5. Conclusions

Taiwan referred to the curriculum reform in other advanced nations in the reform its nine-year compulsory curriculum. After identifying the orientation of a competency-based curriculum, Taiwan identified ten basic competencies and then proceeded to develop ability indicators for each field based on these competencies. Competency-oriented education is the current trend in curriculum reform in the U.S., UK, Australia, and New Zealand. The quality of competency indicators and teachers' understanding of these criteria are essential to implementing competency-oriented curricula.

5.1. Diagnostic tests for teaching evaluation should be based on Rasch measurement results

This study used the Rasch model to analyze the discrimination and difficulty levels of science-related concepts and basic science competencies in test questions. Our results indicate that the results of self-assessment and informal testing would be more valuable as reference data if they more accurately represented the scores of learners - in other words, if they had more predictive validity. Therefore, self-assessment tools for students must be empirically proven in order to build reliability, content validity and predictive validity. Only in this way can we facilitate more accurate diagnosis of learner capability.

5.2. A structure for diagnosing the item response of students should be constructed to replace conventional test analysis and to build a framework for diagnosing the response of students to test items

This study demonstrated that the first task in diagnostically interpreting test data is building a reference framework for diagnosing the response of students to test items. The strengths and weaknesses of this framework are determined by the quality of competency variables. The development of competency variables must be based on the theoretical basis of cognitive psychology. Effective diagnostic analysis can be achieved only by interpreting in the manner and extent to which students understand specific concepts when based on a theoretical framework. This study demonstrated that replacing conventional item analysis approach with Rasch analysis can overcome the problems of CTT to develop exams of superior quality. The capability afforded by the Rasch analysis method should be exploited to build a new set of theories for item analysis.

5.3. The actual capabilities of students must be considered in the development and selection of teaching activities

When designing teaching activities, teachers must use competency indicators as benchmarks and integrate them with teaching materials in order to convert them into lesson content. The vehicle of teacher presentation and classroom activities can then be used to achieve predetermined teaching objectives. However, after developing teaching activities, there is an even greater need for teaching evaluation capable of identifying the progress of students and determining whether students have acquired the basic competencies in each stage of learning. This could assist students to grasp their own strengths and weaknesses in learning and guide them in self-reflection and learning improvement.

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Novel educational assessment for building structures: Automatic evaluation of on-line graphics

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Abstract

This article presents a new automatic evaluation for on-line graphics, its application and the numerous advantages achieved applying this developed correcting method. The software application developed by the Innovation in Education Group "E4", from the Technical University of Madrid, is oriented for the online self-assessment of the graphic drawings that students carry out as continuous training. The adaptation to the European Higher Educational Area is an important opportunity to research about the possibilities of on-line education assessment. In this way, a new software tool has been developed for continuous self-testing by undergraduates. Using this software it is possible to evaluate the graphical answer of the students. Thus, the drawings made on-line by students are automatically corrected according to the geometry (straight lines, sloping lines or second order curves) and by sizes (depending on the specific values which define the graphics).

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Keywords: graphics evaluation; on-line questionnaires; e-learning; self-correction tool; continuous training.

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1. Introduction

The educational experience and the computer application developed described in this work were made in the subject of Structural Analysis (SA) of the Architecture Technical University of Madrid (UPM). Structural Analysis is a discipline with a large scientific and technical tradition. Its study comprises an evident technical component based on rational mechanic laws, and a second technical component equally important, because of the big economical and social responsibility that comes with its application to construction: not only a conceptual, but also a numerical error can be unacceptable due to the gross economical losses that can derive from it, but mainly because it could threaten people's life (West & Geschwindner, 2002).

SA needs of numerical precision. In this regard, the combination of practice with the theoretical part of the subject make the Information and Communications Technologies (ICT) a suitable complement for the traditional face-to-face teaching. In traditional education the monitoring of each member of a medium/big size student group with the level of detail allowed by the ICT, would take a huge amount of professor's time. This time limitation usually turns into a final desertion of the continuous assessment techniques.

Years ago, the continued work of the student was encouraged through weekly voluntary practices in SA subject. Those practices were made at the classroom after the theoretical explanation, as immediate application. During this second part of the class, in a distended atmosphere, both the teacher-student commu-

nication and communication between students were favored in order to solve the different possible doubts that could show up in the practical application of the previously exposed theoretical concepts. In the typical medium and big size students groups in SA subject, the later review of the students exercises by the professor had to be reduced to a limited number of students or to a limited number of answers from all students. In any case, the ratio between the time the professor spent on those evaluation tasks, and the benefits obtained were, at most, scant.

With the arrival of ICT the previously mentioned second part of the class was complemented with the virtual learning technique (e-learning), which encouraged both the continuous assessment and the individual monitoring of the student. Thus a blended learning method (b-learning) was implemented in SA, through which the virtues of the traditional education were potentiated with those of the e-learning tools in benefit of the learning process.

To incorporate the b-learning techniques to the educational system it was necessary to obtain a computer tool which could transmute the daily practice made in the classroom into electronic practices that could be remotely developed and self-assessed. It was necessary a tool that could incorporate the following capabilities:

- Auto-correction: it should allow the students to correct their all-year exercises.
- Automatic correction: the tool should automate the correction process given the large number of students and practices to be accomplished.
- Continual assessment: the tool should have the capability to include a very large number of practices due to the daily tests that the student has to complete.

There are many computer applications that satisfy those requirements. The implantation at an institutional level by the Technical University of Madrid of the Moodle platform eases its election between the different possible options.

As Moodle is an open platform it was possible to develop applications to improve its performance and to adapt it to the needs and particularities of the SA. First, an application that allowed the customization of each exercise, assigning different values to its variables, was developed. However it was not possible to use the generic Moodle techniques for that personalization as exercises of SA have an important graphic component, which was necessary to customize with the rest of data for each exercise. The purpose of personalization was focused to minimize the possible student scam that could be originated by the on-line resolution of a single exercise, and, at the same time, to compare the different results obtained by some students in the face-to-face lessons to provide some valuable knowledge about the variation of the final result in relation with the initial values of the problem. In order to acquire this last knowledge the rank value should be carefully calibrated, so that the values do not deviate from the real possible cases extracted from its technical approach and/or of the previous experience of the building structures construction.

From the first semester once the system was implemented, it was positively received by the students and a measurable improvement in the results of SA teaching was observed.

The great acceptance of the system turned into an extra motivation of the students, who, stimulated by the immediate answer of the system, increased considerably the time spent on the subject. A proof of this is the considerable number of attempts in solving the exercises that were made by the students. While some students just needed a few tries to solve correctly the exercise, others needed a large amount of them. A detailed explanation of this first experience can be found in (Aznar & Hernando, 2011) and (Aznar et al, 2012).

Once the success of the developed system and the adequacy of the e-leaning tools for evaluation were verified, we thought about the possible risk of losing the perspective of the whole picture of the structural behavior. In the Structural Analysis classic treatises the study of the graph of internal forces was imperative allowing the study of the behavior of the structure as a whole, opposite to the local and detailed description that is achieved by a pure numerical description. To take advantage of all benefits of the b-learning method it was necessary the evaluation and verification of the graphs geometry that represent the structure internal forces, and not just some (or many) numerical values. Unfortunately, as Moodle platform did not included such possibility, we had to develop the application described below.

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2. Development

In order to achieve the previous mentioned targets it was necessary to find again an e-learning platform where we could develop them. The choice of Moodle was the most suitable. The main reasons that made us opt for it was the more than two experience years we had with it, and the request of not losing the targets already achieved. Among others: a) the possibility of an automatic correction; b) the option of an immediate answer to the students; c) the possibility of answering the same question many times in case the answer is not correct; d) the freedom of schedules; e) the proven Moodle's capability of storing in an efficient way the huge amount of data necessary to elaborate SA practices. This subject involves a complexity technical part, including bibliography, regulations and technical documentation, and, mainly, graphical documentation (architectural plans, structure plans, structure detail plans, structural models, forces schemes, etc.), without which there is the risk of reducing the Structural Analysis to a simple academic entertainment. On the other hand it was neither found the wanted tool in any other computer application.

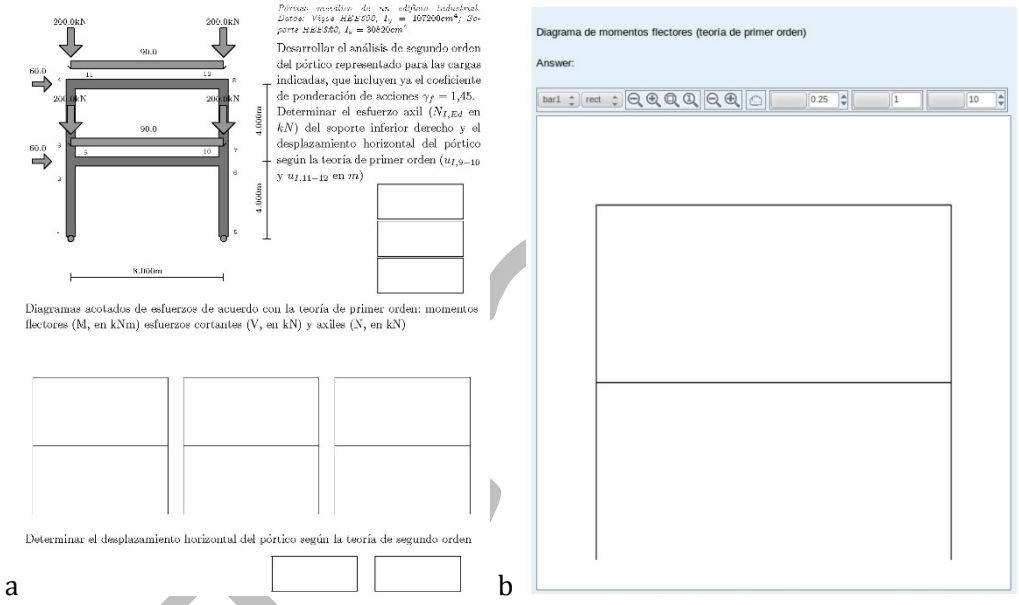


Figure 1. (a) Partial view of a SA practice. (b) Example of the developed question type.

Once the Moodle platform was selected, a study of its performance was made in order to find the most efficient way of achieving the pursued targets. It was decided to develop a new "question type", to be added to the ones already offered by Moodle. This new question type was named "graph of internal forces", "diagrams" in its short version.

Fig. 1 shows an example of the developed question type. In this example the students has to draw the graph of internal forces on the structural model.

It was sought that the professor, relying on Moodle capabilities, would be able to introduce question of the type "diagrams" in the course exercises in a quick and easy way. Likewise, the students should be able to answer, graphically, as any other question of the test. To develop "diagrams" and make it compatible with the platform and its usual use, a study of several standard Moodle question types was made.

3. Operation

In order to develop the new question type several basics requirements were specified:

3.1. Definition of the question wording

The questionnaires development should be quick and easy. It must be ease to the professor the introduction of the question formulation data, its solution, as well as the allowed error margins and other specific parameters of "diagrams", such as scale factors or sign criteria.

3.2. Student's answer.

The students should be able to answer in an easy and enjoyable way, and essentially by graphic means: drawing straight lines, parabolas or combinations of them.

3.3. Bidirectional communication with the database.

Moodle stores all the information about the questions, such as values, solution, error margins and other parameters from the question formulation, as all the answers (attempts) provide by the student, in a relational database. All Moodle question types allow a bidirectional communication with the database to implement the yearned automatic and continuous correction. It was obvious that "diagrams" should also have this property.

3.4. Feedback.

With data introduced by the professor in the definition of the question and answer given by the student, Moodle should be able to validate the student's answer. At the same time, attending to the parameters established by the professor, it should show the student the mark of its answer, its graphical correct answer, or to allow the student to continue searching for the right answer if he has not yet reached the highest mark, etc. All Moodle standard questions had these properties, and thus "diagrams" should inherit them.

3.5. Flexibility.

Because of the large tradition of the Structural Analysis, plenty of approximations coexists. Thus, flexibility was an imperative premise in "diagrams" as we would not want to limit its use just to SA and even, just to the particular vision of a SA professor.

4. Implementation

In order to experiment without the risk of causing collateral damages, a local version of Moodle 2.4 was installed in a network isolated computer. Once defined the basic requirements, pointed out in the previous

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section, and with the "safe" Moodle version available the development of the new Moodle question type was initiated.

The code for “diagrams” was written in *php* language, as it is the standard code for all the Moodle question types. Attending to the indications in the Moodle manual we started from the basic structure of the "short answer" standard question, which we modified up to transforming it into "diagrams". A portion of this code is represented in Fig. 2.

```
 * The diagrams answer question type.
 *
 * @copyright  2013 Jose Ignacio Hernando García, Miguel Martínez Pañeda
 * @license    http://www.gnu.org/copyleft/gpl.html GNU GPL v3 or later
 */
class qtype_diagrams extends question_type {
    public function extra_question_fields() {
      return array('question_diagrams', 'answers', 'topology', 'graphofinternalforces', 'width'
    }

    public function questionid_column_name() {
        return 'question';
    }

    public function move_files($questionid, $oldcontextid, $newcontextid) {
        parent::move_files($questionid, $oldcontextid, $newcontextid);
        $this->move_files_in_answers($questionid, $oldcontextid, $newcontextid);
        $this->move_files_in_hints($questionid, $oldcontextid, $newcontextid);
    }

    protected function delete_files($questionid, $contextid) {
        parent::delete_files($questionid, $contextid);
        $this->delete_files_in_answers($questionid, $contextid);
        $this->delete_files_in_hints($questionid, $contextid);
    }

    public function save_question_options($question) {
        global $DB;
        $result = new stdClass();

        $context = $question->context;

        $oldanswers = $DB->get_records('question_answers',
                array('question' => $question->id), 'id ASC');
```

Figure 2. Portion of the code of “diagrams” question type

Even though writing the code of the different *php* files (which form the structure of the question and their interaction with the database) had its difficulties, the biggest hurdle was encountered when creating the application that would allow the students to draw the answer. A *javascript* application was designed that accompanied the *php* files, and to which they refer. In the designed application the students can, through a command panel with different options, draw in a canvas the structural answer of the internal forces graph of the set out structure.

After many verifications the question type was finally installed in the Moodle of the Technical University of Madrid. After three semesters of an intensive use of "diagrams", in which it has been subjected to limit situations that had forced to improve some of its aspects, it is confirmed that the question type is fully operational.

5. Performance

The premise of making the new question type as simple as possible was adopted to develop the data entry by the professor and the introduction of the results by the student.

Fig. 3 shows an example of the professor form has to complete to elaborate one of these new question types.

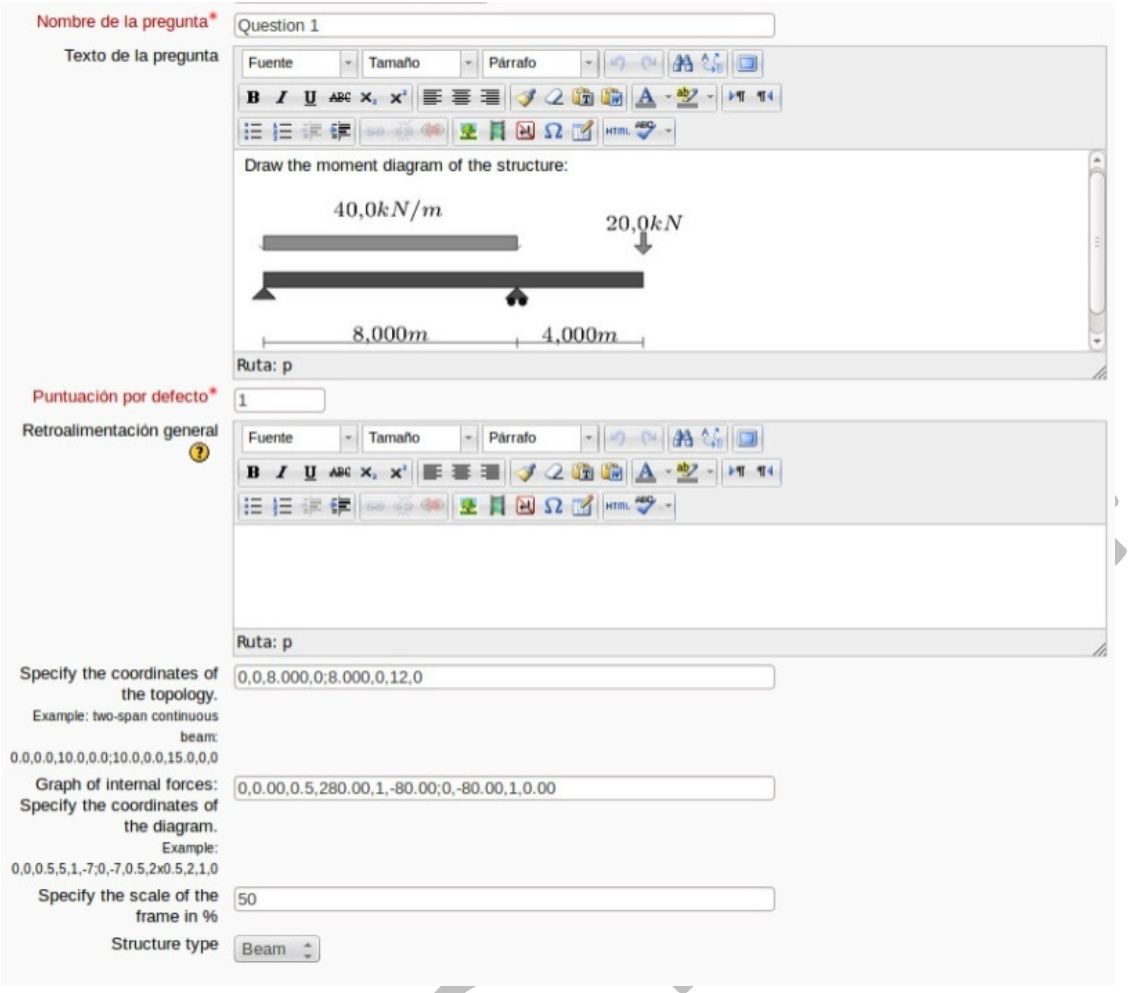


Figure 3.View of the professor´s form to complete a "diagrams" question type

Once installed the Moodle question type "diagrams"4 the professor can select it directly from the question type list that shows up when a new question is created in the "question bank". To the standard options that are shown to the professor when writing a new question like "name of the question", "text of the question", etc. the specific ones for "diagrams" are added. From the particular options of "diagrams" stand out, first, the input in which the geometry and the topology of the structural model must be defined, and on second place the input where the diagram of internal forces of each bar which form the structure is defined. The geometry and the topology is defined through the coordinates of the structural model bar ends, in a similar way as in any designing structural commercial program, so therefore it is supposed to be familiar for a SA professor. The definition of the diagram of internal forces is not difficult either, as, for the usual forces in buildings the diagram is formed by straight lines or quadratic polynomials. In the case of straight lines the professor has to define the value of the diagram in two points, in the second case he has to introduce the value of three random points. The diagram of a bar could be formed for several stretches (formed by straight lines and/or second order curves). The professor should define each of this different stretches separately as in the previous cases. Other offered parameters can be seen at Fig. 3.

Once concluded the data input, the professor can see the formulation of the question and the diagram of internal forces as shown in Fig. 4.

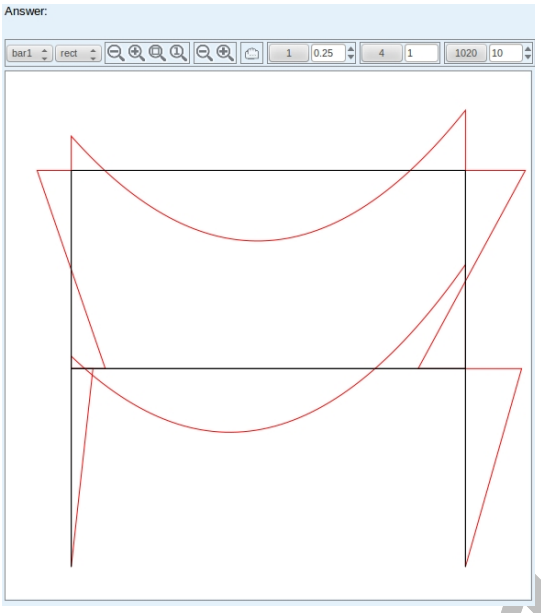


Figure 4. Preview of the question, just available to the professor

The "diagrams" question is shown to the student as another typical question inside the Moodle form. Next to the formulation of the question (that could include graphics, as any other Moodle question) it is displayed a small tool bar and a canvas where the drawing of the diagram of internal forces of the structure can be made just with the mouse. Its working is similar to a CAD application, so it does not suppose any difficulty for any student of architecture of the 21st century (Fig. 5).

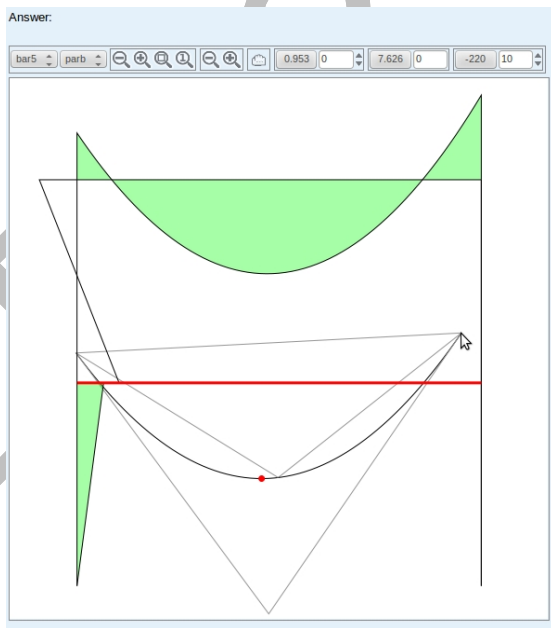


Figure 5. Student's answer snapshot.

Figure 5 shows the internal forces diagrams of bars already answered and validated by the application on green and diagrams already answered but not validated by the application on black. Also, the diagram that was being answered at the time the snapshot was taken is shown next to the cursor.

6. Results

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This work includes the methods developed for the incorporation of a new type of question in the Moodle platform. This new question type, which enriches the use of ICT, has been fully operational amongst the standard Moodle question types for three semesters in the network of the Technical University of Madrid. Since its implementation it has been used by the students of several structural subjects of the University of Architecture.

The operation of this new question type (figure 5) has not brought about any problem since its installation. It has been excellently welcomed by students, overflowing the most optimistic previsions, reaching almost an addictive use.

Thanks to this new application the drawing of the graph of internal forces of a structure is covered through the ITC, one of the targets of the SA subject, overcoming the limitations that the Moodle platform offered a priori. The benefits for the students are manifest, according to the enquiries made to the SA professors and to the success evidenced in the final tests results. These tests have proven a much more complete learning than before the implementation, with an evident settlement of concepts.

7. Conclusions

Students profit of all the benefits of the b-learning method through the developed computer application system of continuous automatic correction and an automatic evaluation system for the diagrams of internal forces. The development of this informatic questionnaire type offers new tools in contrast with the traditional student qualification characterized by very subjective component. Using this tool objective qualification of a major part of the subject, the diagrams of internal forces, is achieved together with other advantages as the professor is released from mechanical duties.

Thanks to it, this self-correcting application has improved considerably the learning of SA between the students proved in the evaluation results. Student motivation has also been increased, due to the graphic input of results and the quickness of the system feedback. This high motivation has resulted in an unattainable level of comprehension through other techniques. The tool makes also viable the correction of the daily practices in a time impossible without the ICT, which allows the professors to focus their efforts on others tasks as the direct attention to the students reflected in a much better exploitation of the learning process. The professors also turn out benefited as the work of evaluation and monitoring of students is considerably improved, with the additional advantage of having a number of qualifications formerly impossible at any time.

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On the problem of categorizing students based on their cognitive styles and teaching strategies

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Abstract

The research determines different types of students according to their dominant cognitive learning styles. We are focused on the students of Russian language at high school, acquiring statistical representation of various typological groups we cluster the students into to verify whether the development of metacognitive skills does improve the efficiency of learning foreign languages.

The research includes a survey based on the works by Howard Gardner and others. We categorize students according to their dominant cognitive learning styles and corresponding teaching strategies. Two hundred respondents were included in the survey. The paper also provides a historical background of the subject.

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Keywords:Howard Gardner; Multiple Intelligences; teaching strategies; cognitive learning styles

1. Introduction

Compulsory teaching of a second foreign language no later than from the 8th grade of school was introduced in the academic year 2013/2014. This step is a reflection of the EU policy of multilingualism and multiculturalism. In connection with this, an increase has been recorded in the number of schools that offer Russian as well as an increase in the number of students who choose this language apart from English language. In the center of our interest lies the classification of types of students who chose Russian as the second foreign language. If we take into account the fact that one of the basic approaches of modern pedagogy is paedocentrism, we can see possibilities of improving the efficiency of teaching the first foreign language as well as the second foreign language in the classification of students according to the type of learning (type of intellect) and subsequent individualization of teaching with regard to each of the types. In conducting our research, we depart from H. Gardner's theory.

2. Preceding methodology

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In the 1970s in the USA, psychiatrists John Grinder and Richard Bandler dealt with the issue of neurolinguistic programming. The scholars examined the behavior of very successful people and attempted to define basic elements in their communication and behavior that positively affect their success. This is the basis of the theory of multiple intelligences, a method which gives rise to numerous debates among scholars but which has found application in the curricula of many American educational institutions. This theory is based on the philosophy of language teaching according to which the intellect of man is composed of many different equivalent intellects, which we must first uncover, and only then it is possible to develop them in the process of teaching. This theory was developed by the American scholar Howard Gardner as a counterpoint to the classic IQ test, based on the idea of a compact innate and unchangeable human intellect. In Gardner's view, IQ tests only measure the linguistic and logical skills of a person, but teaching practice shows that people gain knowledge in different ways. The scholar further contends that language is not connected only with the linguistic abilities of an individual, but with all parts of human intellect. Besides, this theory also had its predecessors. As early as in 1904, the French scholar and psychologist Alfred Binet dealt, in a sense, with a variety of intelligence when he and Theodor Simon created, on the basis of their long-term examination of children in their natural environment, a so-called Binet–Simon scale, which was a scale of various skills, broken down by age of children, which was, according to the authors, typical for the mastery of these skills. This finding was the core of Binet's claim that it is not possible to generalize intelligence, that it is diverse; he also examined the approach of mentally disabled children to the mastery of these skills (Lojová & Vlčková, 2011; Gardner, 1993; Binet, 1907).

A pioneer in the field of examination of children in terms of their preferred intelligence was, without a doubt, Maria Montessori. In her profession as director of the school Casa dei Bambini (*Children's House*), she was fully aware of the peculiarities and differences of individual children, and therefore also promoted individual work with each child or their division into smaller groups according to the predominant style of learning.

In the 1970s, phenomenological psychology appeared, examining subjective human experience, on the basis of which the Swedish scholar and psychologist FerenceMarton, together with his British colleague Noel Entwistl, later introduced a qualitative research method, phenomenography (Lojová & Vlčková, 2011; Mareš, 1998).

In 1984, American theorist David Kolb focused on the natural preference of learning styles and, based on his so-called experiential learning psychology, defined four types of students: 1. diverging (sensitive students, able to look at a problem from different angles, they like observing), 2. assimilating (students requiring a clear logical explanation), 3. converging (students preferring practical experience over theory, they like solving problems), and 4. accommodating (students who like experimenting, during which they involve their excellent intuition and instincts) (Osland & Kolb & Rubin, 2006).

3. Theory of multiple intelligences

The theory of multiple intelligences was comprehensively described for the first time in Gardner's 1983 publication *"Frames of Mind: The Theory of Multiple Intelligences"*. Gardner sees intelligence as the ability to solve problems and to participate in the results that are important for a particular culture or community. In his book, the author formulates a number of criteria that define intelligence as a prerequisite of the ability to solve problems or difficulties fitted into cultural context and create one's judgment. The author defines the following eight types of intellect:

- Verbal or linguistic intelligence (*so-called "wordsmart" or "booksmart"*)
- Logical-mathematical intelligence (*so-called "numbersmart" or "reasoningsmart"*)

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- Visual-spatial intelligence (*so-called "picturesmart" or "art smart"*)
- Bodily-kinesthetic intelligence (*so-called "body smart" or "movementsmart"*)
- Musical or aural intelligence (*so-called "music smart" or "soundsmart"*)
- Interpersonal intelligence (*so-called "peoplesmart" or "groupsmart"*)
- Intra-personal intelligence (*so-called "selfsmart" or "introspectionsmart"*)
- Natural or naturalist intelligence (*so-called "naturesmart" or "environmentsmart"*)

The first two types of intelligence (verbal and logical-mathematical) are most apparent mainly in the process of education in schools, the other three (visual-spatial, bodily-kinesthetic and musical) are associated with artistic movements, and the remaining three types (interpersonal, intra-personal and natural) were described by Gardner as "personal intelligence" (Gardner, 1993). However, all types are interconnected, complementary, and rarely work alone. The basis of the theory of multiple intelligence is the fact that every individual has a unique set of intelligences that interconnect and cooperate in solving problems, which is the essence of the uniqueness of each individual (Lojová & Vlčková, 2011).

Academic psychologists viewed Gardner's theory of multiple intelligence with skepticism. By contrast, it was accepted by teachers very positively. Teachers and theorists of education did not hesitate to apply this theory in practice. One of the reasons of the positive acceptance of the theory in the school environment is the fact that it provides a conceptual framework for the organization of the educational process, for the building of a new approach to the arrangement of the lessons and the classrooms themselves, and it is focused on the specific needs of different types of students (Kornhaber &Fierros &Veenema, 2004).

Mindy Kornhaber, together with her colleagues from Harvard University, in the framework of the group's project "Project Zero", which has been carrying out its research since 1967, tested 41 educational institutions in the USA that use the theory of multiple intelligences in practice by using globally standardized entrance tests for U.S. universities – SAT (Scholastic Assessment Test). The research showed that the progress of students of these schools in three years of study was really substantial; one of the findings also was a decrease in the number of missed classes and an increase in the participation in leisure activities organized by the educational establishments (Gardner, 1993; Kornhaber &Fierros &Veenema, 2004).

4. Research and results

To conduct our psycho-didactic research, the method selected was a questionnaire drawn up on the basis of the literature studied and focused on five types of students according to their predominant intelligence. All items of the questionnaire were created in accordance with the characteristics of the individual, most commonly occurring, learning styles, with the manner of receiving information by students, their typical needs, behaviors, and prevailing intelligence.

In addition to H. Gardner's theory, in compiling the questionnaire, another theory taken into account was that of the prominent Czech scholar M. Sovák, who, in his publication "*Learning need not be torture*" (*Učení nemusí být mučení*), defined four basic types of students according to their most frequent needs in the learning process. These are: 1. aural-speech, 2. visual, 3. tactile and motional, and 4. verbally-conceptual (Sovák, 1990).

Furthermore, S.F.Reif's theory, working with seven types of intelligence, sometimes called learning styles, was taken into account. The author bases her classification of students on the type of intelligence the individual uses the most. The types of intelligence are: 1. verbal, 2. logical-mathematical, 3. spatial, 4. musical, 5. bodily-kinesthetical, 6. interpersonal and 7. intra-personal (Reifová, 2007).

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On the basis of the above theories, all respondents were, after the evaluation of the questionnaires, divided into five categories, which are further explored and analyzed in this paper. The types of students are: 1. aural-speech, 2. visual, 3. bodily-kinesthetic, 4. logical-mathematical, 5. verbal. The reason of the choice of these five categories was the mutual similarity and permeability of individual theories and types of classification of students according to the senses which the individual uses most frequently as well as according to the intelligence which is developed to the greatest extent in them. (See Gardner's and Rief's bodily-kinesthetic type and Sovák's tactile and motional one, logical-mathematical type by both Gardner and Rief and the verbally conceptual type by Sovák, musical and aural-speech one; and last but not least Sovák's visual type of a student, which corresponds with Rief's spatial intelligence and visually-spatial intelligence by Gardner, when a student has a high perception of drawings and sketches).

It can be easily proved using the above classification that every student has different ways of learning, different interests and motivation, and therefore different teaching activities are suitable for them. The teacher's task is thus to actively engage students in learning activities and stimulate the development of different types of intelligence and the various senses of the students.

A total of 200 students of the Russian language of different age groups from schools in the Hradec Králové region, the Pardubice region, and the Vysočina region were tested. The selection of educational institutions was significantly restricted by teaching of Russian, which unfortunately is not yet in place in all types of schools. Research was conducted in five secondary schools, and, for comparison a small sample of students of the University of Hradec Králové participated in the test too (these were students of the follow-up Master's program Teaching of Russian in lower and upper secondary school). The comparison of learning style preferences was crucial as they are changing with age because, from the perspective of ontogeny, time is an important factor influencing the development of human intelligence.

The respondents were subsequently divided into groups according to age in order to obtain an overview of their development over time (respondents aged 15 – 16 years; 17 years; 18 years; 20 – 22 years; 23 – 24 years).

In the questionnaire presented, the respondents gave their opinions on a total of 35 statements; always 7 statements were focused on each learning style of the student, his/her predominant senses and intelligence. The respondents were asked to assign a point value to each statement according to the following scale (0 = I don't agree with this statement at all, 1 = this statement describes me partially, 2 = I completely agree with this statement). Statements representing each type were not presented in blocks but were randomly mixed. In the evaluation of the questionnaires, the total number of points for each of the five types of intelligence was added up, which was subsequently verified by the sum of the number of zeros, one's and two's. The highest number of points obtained represented the biggest agreement of students with statements representing a specific type of intelligence, and therefore the greatest preference by students of this type. Summary results were recorded in charts according to the different age groups of respondents. A total of six charts were created in this research, the last of which, the sixth, is the final overview of the complex scoring of all of the surveyed respondents.

In the paper, we will only present the results and conclusions of the research conducted.

4.1. The group of students aged 15 to 16 years

The group of students aged 15 to 16 years contains a total of 58 respondents, whose score is shown in Fig. 1. In this group of respondents, two types of students are predominant: aural-speech (22.7%) and bodily-kinesthetic (22.5%). The visual (19.3%) and verbal (18.9%) types are very balanced and the logical-mathematical type has significantly fewer points (16.6%), which is generally repeated in all the surveyed groups, which also confirms the hypothesis of M. Sovák that the group of students of the logical-mathematical type is generally the least represented one.

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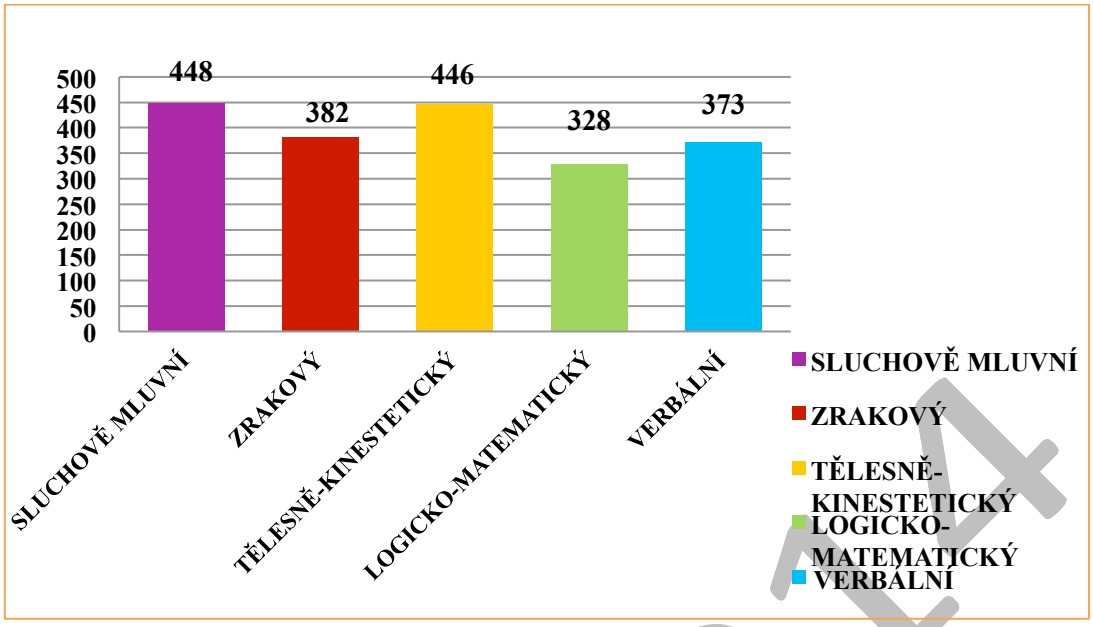
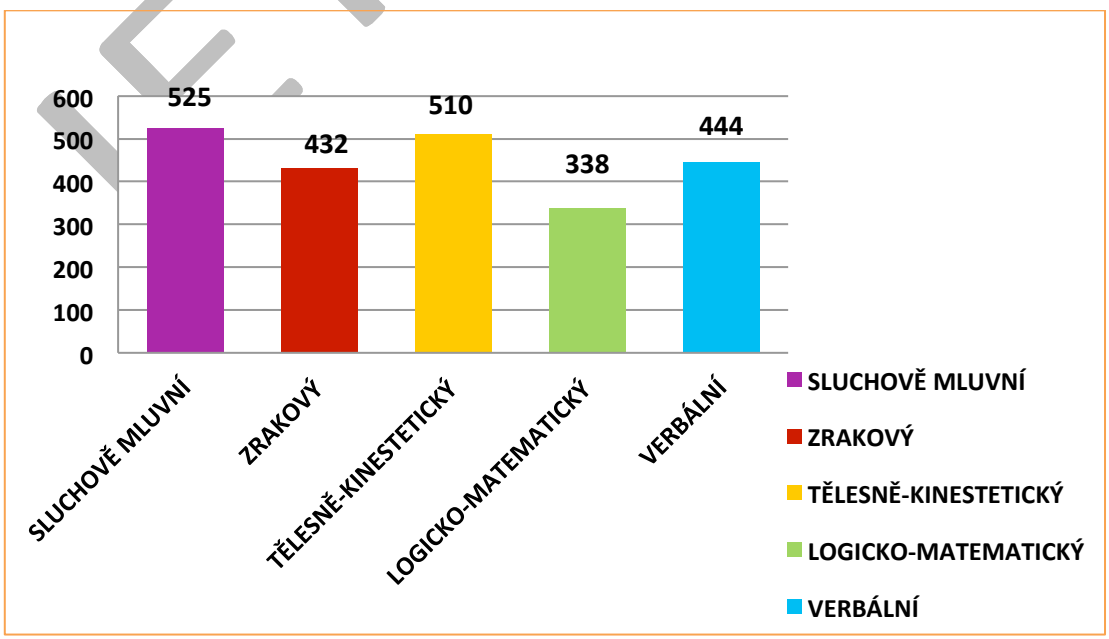


Fig. 1. Points scored – students aged 15 to 16 years.

4.2. The group of students at the age of 17 years

The group of students at the age of 17 years old had a total of 59 respondents (see Fig. 2.). Also in this sample, the aural-speech type of students is most represented (23.4%), followed by the bodily-kinesthetic type (22.7%). The third largest group of respondents in this sample are representatives of the verbal type of learning (19.7%), followed by representatives of the visual type (19.2%) and the logical-mathematical one (15%).



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Fig. 2. Points scored – students aged 17 years.

4.3.The group of students at the age of 18 years

Fig. 3.shows the distribution of students in a 12-member group of 18-year-olds. The dominant type is the aural-speech one (24.7%), followed by the bodily-kinesthetic type (21.5%) and the visual type (20.5%). 19.1% of students belong to the verbal type, and the least frequent is the logical-mathematical type (14.2%). These results basically copy the previous ones without a significant change in the positions of the individual types.

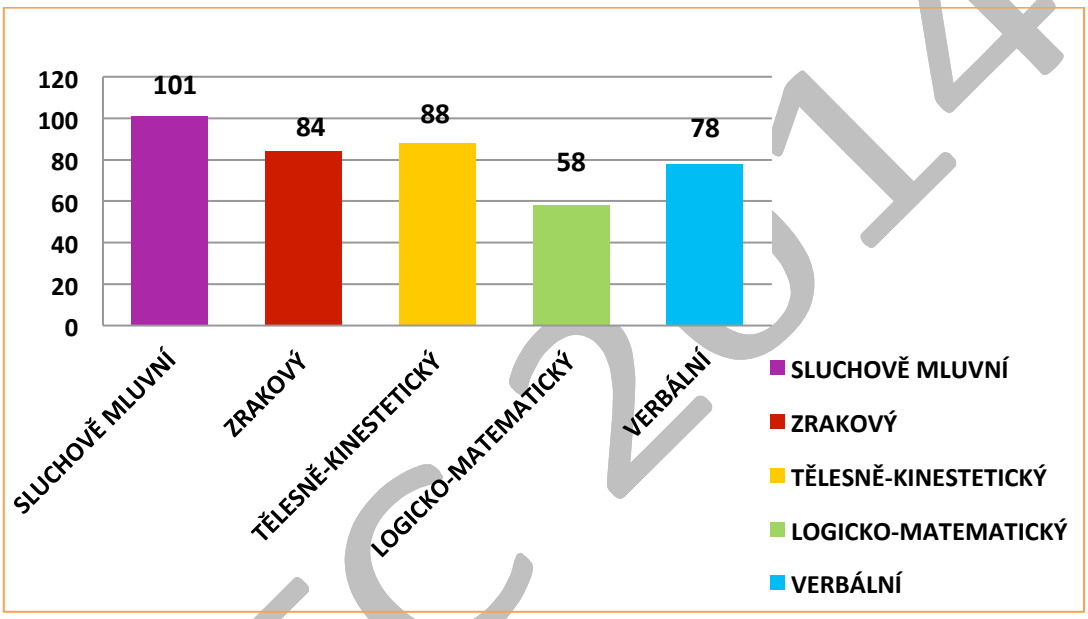


Fig. 3. Points scored – students aged 18 years.

4.4. The group of students aged 20 to 22 years

Fig. 4.shows answers of a total of 20 students aged 20 to 22 years. The sample of respondents is composed of individuals older than in the previous three groups. The fact that every year plays an important role in adolescence and forming of personality is also demonstrated by the results obtained – although the most represented type is the aural-speech one (22.9%) and the second largest group consists of representatives of the visual type (21.8%), which did not happen in any of the previous groups. The results obtained can be interpreted that at this age, students need, in addition to the teacher's verbal description also visual material. In foreign language teaching, it is therefore most suitable to include elements of audiovisual methods.

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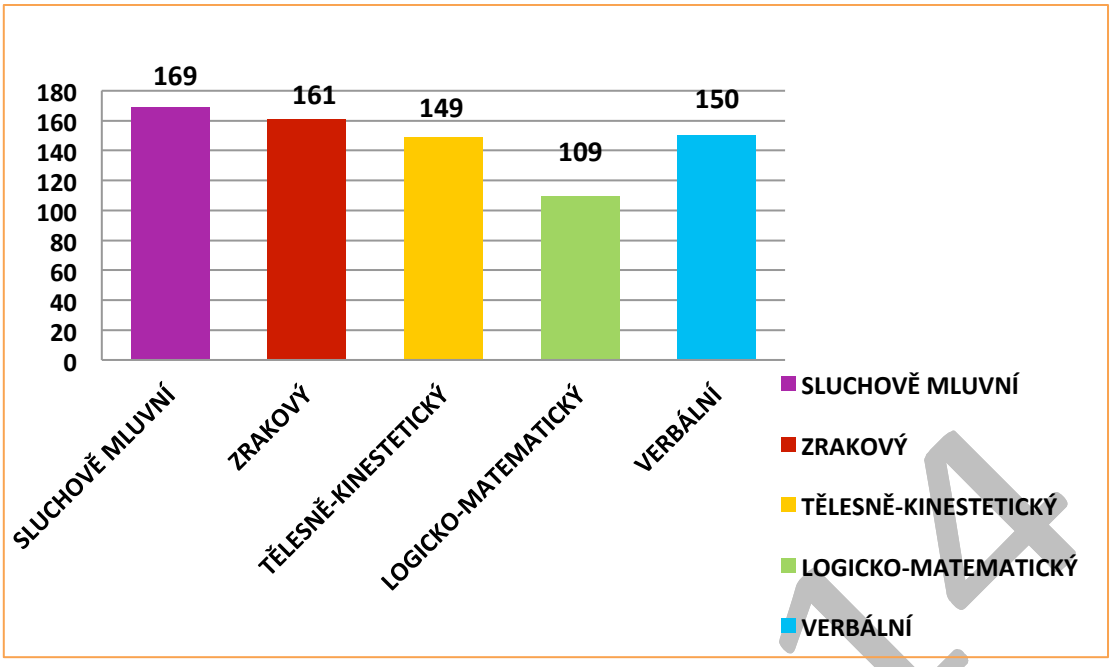


Fig. 4. Points scored – students aged 20 to 22 years.

4.5.The group of university students aged 23 to 24 years

The fifth chart presents the research results in a group of 13 respondents – university students aged 23 to 24 years (see Fig. 5.). The most numerous group in this sample are representatives of the verbal type of students (22.6%), followed by the bodily-kinesthetic type (22.4%) and the aural-speech type (20%). On the basis of the results one can conclude that the representatives of this age group are no longer dependent on the verbal description of the teacher and, on the contrary, prefer their own discussion with suggestions for solutions to problems or their own projects and their public presentation, which fully corresponds to the reality. The number of representatives of the visual type (17.4%) and the logical-mathematical type (17.6%) reflects the assumption that for older students there is usually no need for support in the form of visual images, diagrams or photos.

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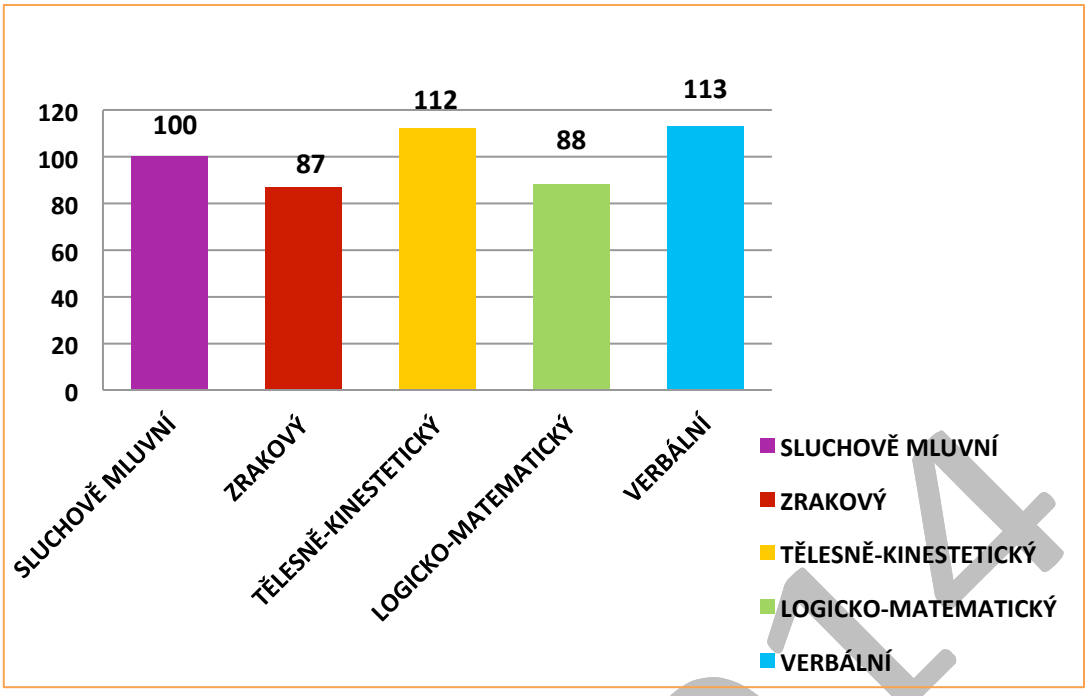


Fig. 5. Points scored – university students aged 23 to 24 years.

4.6. Summary

Last two charts present summary results of the research (see Fig. 6. and Fig. 7.). When sorting preferences of individual intelligence types in ascending order, the least frequent type of students is the logical-mathematical type (15.8%), which is confirmed by the partial results of our research as well as M. Sovák's claims.

The second least numerous group consists of representatives of the visual type (19.2%). At the beginning of the research, a hypothesis was formulated that due to the intense influence of mass media on shaping the personality of a child, the visual type of intellect will be predominant in the group of students. The results of the research did not confirm this assumption, on the contrary, it turned out that this type of students is among the least represented ones in the sample.

In third place is the verbal type of students (19.9%). All of the respondents were students of generally-oriented fields of studies or humanities disciplines; it can be noted that the result confirms the theory of H. Gardner, who claims that verbal types are mostly students of humanities, who like discussing problems.

The bodily-kinesthetic type of students (21.9%) is represented mainly by active students, who need motion and constant switching of activities in the course of one teaching unit. At the beginning of the research, we expected that the bodily-kinesthetic type of intellect would be represented in the research sample by only a small number of respondents, which would correspond to the decline in physical activity of children in contemporary society. Quite surprisingly, however, this type was in second place in the summary overview as to the number of points obtained, and it was significantly represented in all age categories.

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The absolutely most widespread type of student in general seems to be the aural-speech type (23.2%). These individuals prefer aural memory; in teaching, work with recordings and other audio materials should prevail, and the teacher must be prepared for the fact that their speech will be a model for the students, who will imitate them. For this reason, it should not be deformed by accents or defects.

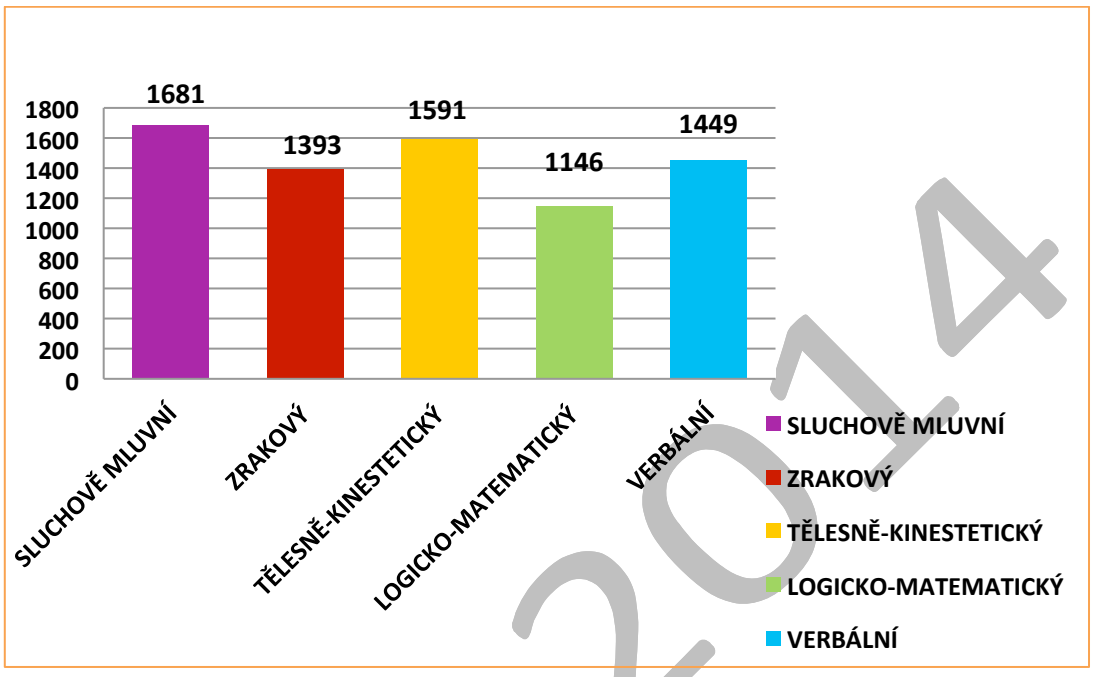


Fig. 6.Total points for different types of students.

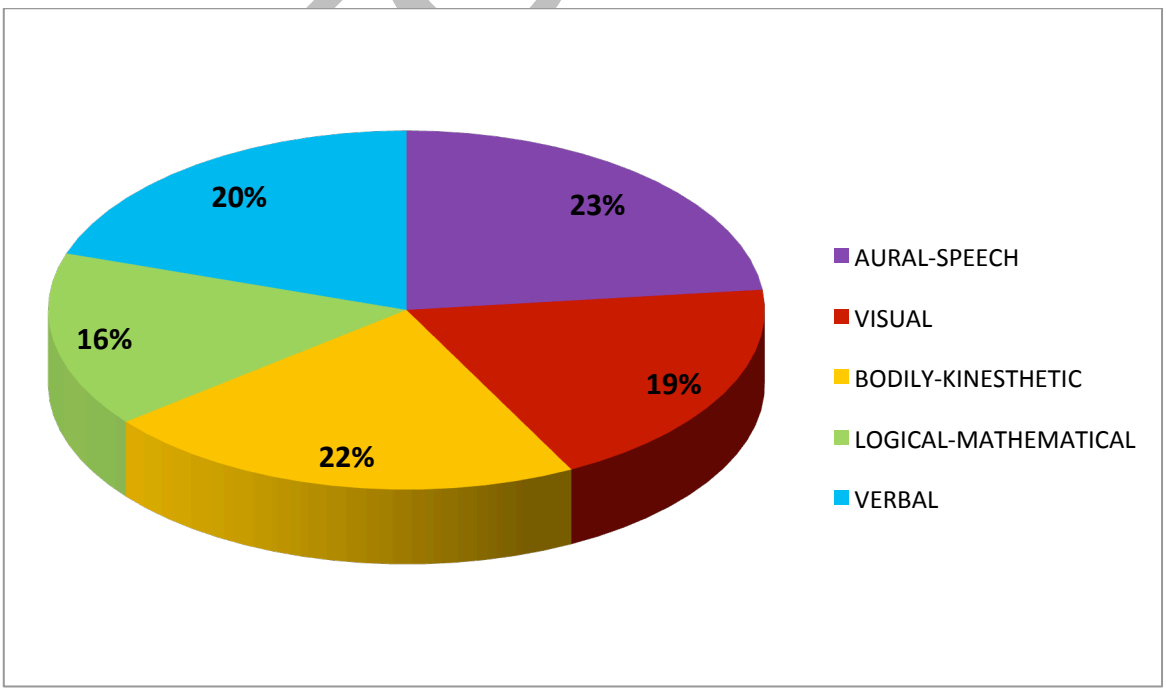


Fig. 7.Preferred intelligence type percentage of respondents.

5. Conclusion

This paper attempts to show that even though the children play videogames, watch TV and browse the internet in their free time nowadays, they still need to hear a new piece of information and to change activities during the lesson. In view of the fact that visual type of student is surprisingly not dominant as the questionnaire proved.

The charts also demonstrate that preferences of individual intelligence types change with age of students.

In conclusion, we express our agreement with the claim of J. Mareš that every child is a specific personality with individual learning styles that develop, and over time they permeate and change. It is then up to the teacher to respect students and try to understand their specificities at least to a certain extent. (Mareš, 1998).

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Optimising the Digital Age Health-wise: Utilisation of New/Social Media by Nigerian Teaching Hospitals

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Abstract

The nature of health communication is changing globally as more people are relying on the Internet for health information (Gallant, Irizarry, Boone & Kreps, 2011). These authors argue that web-based communication tool development that engages e-patients can better guide effective healthcare strategies and intervention and promote participatory medicine. However, In Nigeria, health communication is only evolving and it is not clear the extent to which it can be argued that hospitals are taking advantage of the Internet and its related platforms (e.g. Social Media) to influence health outcomes or impact on health promotion, disease prevention or health literacy generally. Paucity of information in this field of study would anchor largely on the fact that health communication researches in Nigeria seem not to have given some attention. This article therefore explores the ways in which Nigerian Teaching hospitals utilise the new and social media. Specifically, it investigates whether the new and social media are used as public relations tools (for enhancing their visibility, promoting their services and corporate image), educational tools (to provide health information, enlightenment and education for the purpose of preventing disease and promoting health), social tools (to deepen interactions and exchanges between healthcare providers and healthcare recipients). The study anchors on three theories: Social Relationships Theory, Social Exchange Theory, and the Extended Parallel Process Model. Inductive content analysis was used to examine the websites of twenty Nigerian teaching and specialist hospitals. Findings showed that the major uses to which Nigerian teaching hospitals put the new and social media are to get feedback from clients (100%), present their vision and mission statements (65%), post administrative and personnel structure information (65%), and give details of contracts (60%). These media are little used for health promotion (25%), financial transactions (10%) and interactive engagement with clients (0%). The content of Nigerian teaching hospital web pages can be categorised into three as follows: employee/public relations content (100%); in-patient and out-patient–specific content (30%), and public health promotion and education content (25%). It concludes that Nigerian teaching hospitals' recourse to the new and social media is for the purposes of publicity and propagation of self image (public relations). To change this trend, it was recommended among others that: teaching hospitals should increasingly use the new and social media to provide avenues for patients and relatives to tell their stories, and for health professionals to offer informed opinions on medical and health matters.

Keywords: Digital Age, New Media, Social Media, Nigeria, Teaching Hospitals

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1. Introduction

In the past, the predominant means of contact with a medical institution or health facility was face to face, reading from a book, magazine, or newspaper or through the electronic media such as a report on the

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radio or footage in film. Today, by means of new information and communication technology, we can learn a lot about health matters, health professionals, and health institutions. Indeed, in contemporary times, we hear of e-patients, telehealth, virtual surgery, and so on. All these have come to extend the meaning of living in the digital age.

Our interest in this article is to explore the ways in which hospitals utilise the new and social media to influence health outcomes or impact on health promotion, disease prevention or health literacy generally. However, the focus is on how and why new and social media are used by Nigerian teaching hospitals. Are they used for enhancing their visibility, promoting their services and corporate image – a public relations tool? Are they used to provide health information, enlightenment and education for the purpose of preventing disease and promoting health – an educational tool? Or are they used to deepen interactions and exchanges between healthcare providers and healthcare recipients – a social tool? In any case, a hospital can and should use all three tools. The question is: to what extent is each tool used or is one used at the detriment of the other? Health communication researches in Nigeria seem not to have given some attention. In any case, health communication is still developing in the country.

1.2 Objectives of the Study

a) To explore the concepts of digital citizenship, social media and new media.

b) Examine the theoretical framework which underpins the discourse on social networks, social support, social exchanges and use of social media for health promotion and disease prevention.

c) Evaluate a sample of web sites hosted by teaching hospitals in Nigeria for their use of social media to promote health and prevent disease.

d) Elaborate on ways in which the social media could be harnessed to promote health and prevent diseases in Nigeria as obtainable in other countries.

1.3 Research Questions

This study was based on the following research questions:

(1) What do the concepts of digital citizenship, social media, and new media mean?

(2) To what extent are the theories of social networks, social support, social exchanges relevant to the application of new and social media to health promotion and diseases prevention?

(3) How do teaching hospitals in Nigeria use the new and social media to promote health and prevent diseases among the public?

(4) In what ways may the new and social media be harnessed for the promotion of health and the prevention of diseases in Nigeria?

1.4 Statement of the Problem

There is no doubting the fact that the power of the media stems from the ubiquity of the media, the cumulation of media messages and the consonance among media practitioners (Dennis & Merrill, 1991). Not only are the media everywhere, with the development and increasing use of social media and the new media, human lives continue to be increasingly entangled with media technologies. Now, our lives appear inseparable from the new media and the social media. We use them to initiate conversation, friendship, dating, courtship, coitus. We use them to commiserate, mourn, or even honour ourselves. Furthermore, we use them to annoy, taunt, insult, abuse. These are in addition to the uses and gratifications that we are

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more familiar with – information, education, entertainment, advertising, ethicisation, integration, and narcotisation.

What these mean is that the social and new media do actually expand the scope of social networks, they extend the frontiers of social exchanges, they add depth to social interactions, transactions and relationships, and they redefine the character of the social support systems available to humans. It is true that as humans form networks, engage in interactions, exchange social ties, forge social bonds; certain social problems are bound to arise. Friends for instance, initiate and encourage those in their circle of friendship to form alcohol drinking habits. Peers also pressurise fellows to smoke tobacco or abuse narcotic drugs. As members of the opposite sex forge relationships, sexual activities may be engaged in unsafe ways. All these have health implications.

It is instructive to note that just as the new media and the social media are utilised to forge social relationships that sometimes lead to deleterious health consequences, they may equally be used to promote social relationships that pay significant attention to health promotion and disease prevention. However, it is also true that the new and social media may be used in ways that are damaging to the health of users.

One of the social institutions in society that preoccupies itself with the health of the citizenry is hospitals. Specifically, teaching hospitals are tertiary centres of learning and research. Apart from studying the social determinants of health, they concern themselves with the investigation and treatment of diseases. They likewise concentrate on efforts that promote health and prevent diseases. Gold *et al*. (2012) state as follows concerning developing health promotion intervention on social networking sites:

Very little has been published about how social networking sites might be exploited for health promotion interventions. A recent review of the use of social media for social marketing identified just four examples, none of which used the most common social networking sites listed earlier. Some health organisations have begun extending their presence into social networking sites; however, this has often been used as an additional form of marketing to promote services rather than for intervention delivery.

The questions which this study faces are therefore as follows: to what extent do Nigerian teaching hospitals use the social and new media to strengthen interactions between them and the population? In what ways have Nigerian teaching hospitals utilised the social and new media to promote health and prevent diseases? How best may Nigerian teaching hospitals harness the social and new media for health promotion and disease prevention?

2. Conceptual Framework

To fully understand the discourse at hand, the following concepts need definition and clarification:

Digital Age: When we say we live in a "digital age," or that we are "digital citizens" (netizens), what do we mean? This can be understood when reviewed from the point of view of Al Gore's 1994 speech as captured by Leslie (2012, p. 81).

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In order to preserve freedom and democracy, telecommunications development must be encouraged in every nation. In this way, citizens will think of themselves as members of the human family…interconnectness, will bring about robust and sustainable economic progress, strong democracies, better solutions to global and local environmental challenges, improve health care, and – ultimately – a greater sense of shared stewardship of our small planet.

So the essence of the digital age is to connect people, regardless of boundaries. And digital citizens according to Mossberger*et al.* (2011) are those who use the Internet regularly and effectively. Digital citizenship involves nine elements: digital access, digital commerce, digital communication, and digital literacy. Others include digital etiquette, digital law, digital rights and responsibilities, digital health and wellness, and digital security. In sum, the digital age allows the citizen to utilise the Internet via computers, mobile phones, and web-enabled tools to participate, engage, or get involved in society, politics, and government.

Social support: According to Cohen (2004, p. 679), social support, "refers to a social network's provision of psychological and material resources intended to benefit an individual's ability to cope with stress." There are three types of social support:

(a) Instrumental support such as material aid or financial assistance, or a helping hand.

(b) Informational support such as tips, advice, or guidance.

(c) Emotional support such as care, reassurance, trust, sympathy, empathy.

A fourth type is Appraisal support which involves making available information that is necessary for self evaluation purposes. This includes constructive feedback, affirmation, and social comparison. Social relationships have a great influence on health education and health behaviour. Significantly, the health components of social relationships include social integration, social network, and social support. Cohen (2004) explains social integration as participation in wide range of social relationships – a multi dimensional system with a behavioural aspect – active involvement in various social activities or relationships – and a cognitive aspect – one's ability to commune and identify ones social roles.

Apart from providing emotional, informational and material support, social networks as Cohen further states, regulate behaviour, and give room for social engagement. Besides and very importantly, social networks deliver means of contact to spread disease and the conditions for conflict, exploitation, stress transmission, misguided attempts to help and feelings of loss and loneliness.

These points must be noted because though Cohen is mostly referring to natural social support, networks, and integration, it is true that digital social networks often reinforce natural ones and we should increasingly seek ways of using our digital relationships to widen the network, offer social support, foster social integration and particularly promote health and prevent socially instigated problems such as tobacco, drug, and alcohol abuse and unsafe sex practices.

2.1 Social Media, New Media

Social media or new media according to Kita and Thesanvitz (2010) are Internet tools that permit users to participate and produce content. They are regarded as digital appendages of interpersonal means of promotion and the narrowing of broadcast type communication. They make co-operation, exchanges, interactions, transactions possible among different kinds of people irrespective of where they live. People use the Internet for a variety of purposes: Creation and retrieval of information, banking, payment of bills,

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ticket broking, purchase of goods or services, voting, posting of comments and images, blogging and chatting.

Examples of social media include *Facebook, Orkut, YouTube, Myspace, Linkedln, Live Journal* and *Twitter*. Dube (2007) identifies five major characteristics of social media or networks as follows:

(a) Social media are user-based. Social media or online social networks are built on content generated and updated by users themselves. The contents are chats, discussions, pictures, movies, conceived and posted by users who get responses from other users and in that way the network expands and the content assumes a direction of its own. Without these contents the forums, applications and chat rooms would be devoid of messages.

(b) Social media are interactive. The social media allow people to connect with others and to engage in activities online in a give and take sort of way. The absence of linear modes of message transmission and the presence of transactional means of communication is a cardinal attraction of the social media.

(c) Social media are community–driven. The social media make it possible for people to form online communities based on shared interests such as sports, education, health, faith, sexual orientation, ethnicity, etc.

(d) Social media thrive on relationships. The social media are built on the basis of social networks which are hinged on relationship – friendship, family ties, ethnic ties, professional bonds, shared hobbies, etc. The larger the network, the greater the propensity of wider reach for content posted online.

(e) Social media are emotionally charged. Since social media are made up of network of people who are socially related, the emotional component of such relationships makes it possible to rely on members of the network for support in the form of love, sympathy, empathy, encouragement, solidarity, and to fight off feelings of rejection, loneliness, depression, etc.

Again, Kita and Thesanvitz (2010) emphasise that a network is made up of people, groups, organisations and relationships, flows, transaction that create connections online. It brings together people who bridge and bond by strengthening the social connection, usually through people who act as a connector, and very importantly, social networks are a great influence on behaviour. A few social media tools include:

i) RSS (Really Simple Syndication) – a newsfeed technology that allows subscribers to tell when a website has added new information.

ii) Social network websites (e.g. *Facebook, Linkedln, MySpace, Ning*) allow users to create a profile description, select other users as friends, contacts, and share their contacts' contacts as well.

iii) Wikis – a place where multiple people can collaborate.

iv) A forum – a website that centresaround discussion between users, organised by topic.

v) Video sharing (e.g. *You Tube, blip tv, qik.com*) services host and display files for others to watch, comment on, and share.

vi) Podcasts (mp3 or other audio formats) are audio files listened to on a computer or mobile music player (e.g. Ipod).

2.2 Theoretical Framework

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Man is a social being. Fiske (2010) states that the most striking feature of humans is their sociality and that social relationships permeate all facets of human life in the most extensive, complex and diverse of ways. To Fiske, social relationships occur where two or more persons transact with each other in such a manner that their behaviour, emotion, judgment, or thought complement each other. In other words, Fiske means that social relationships occur when someone, "acts under the implicit assumption that they are interacting with reference to imputably shared meanings" (p.1).

Furthermore, according to Fiske, people often employ four basic models to coordinate many features of sociality around the world. These models which have come to be known as the relational models theory are as follows:

(a) Communal Sharing: This is a relationship where persons in a group relationship take themselves as equivalent or undifferentiated within the social domain.

(b) Authority Ranking: In this relationship, people assume unequal postures where subordinates respect and obey while superiors give orders and offer care and protection.

(c) Equality Matching: In this relationship, people strive not to upset the balance among participants and convey the notion of taking turns, equal share distribution, or one person-one-vote.

(d) Market pricing relationships which does not necessarily involve money describes a relationship that embraces socially meaningful ratios or rates namely salaries, rents, interests, etc.

It is good to keep in mind that as humans interact whether physically or digitally as occur over the social media or new media, these models are in the words of Fiske (2010, p . 2) used, "to construct, coordinate, and contest social action, as well as to interpret, plan, and remember."

Another key communication theory that situates well within our discourse is the social exchange theory. Explained and initiated by Thibault and Kelley (1952), the theory is hinged on the exchange of rewards and costs to quantify the values of outcomes from different situations for a person. What the theory means is that individuals work to reduce costs and increase benefits and use what they judge as possible rewards to decide or regulate their relationship with others.

The value of the social exchange theory is that it is based on the principle of reciprocity. When we communicate in the social setting, the message we send out is likely to be responded to in terms of what it is worth and what the receiver perceives as the gain or loss in the message. This principle works for face to face relationship as well as relationships over the social media or the new media. If health tips are communicated over the social or new media, what does the source stand to gain and what does the receiver stand to gain? If the receiver is required to take action or give up a behaviour, what is the value of the action or the cost of given up behaviour?

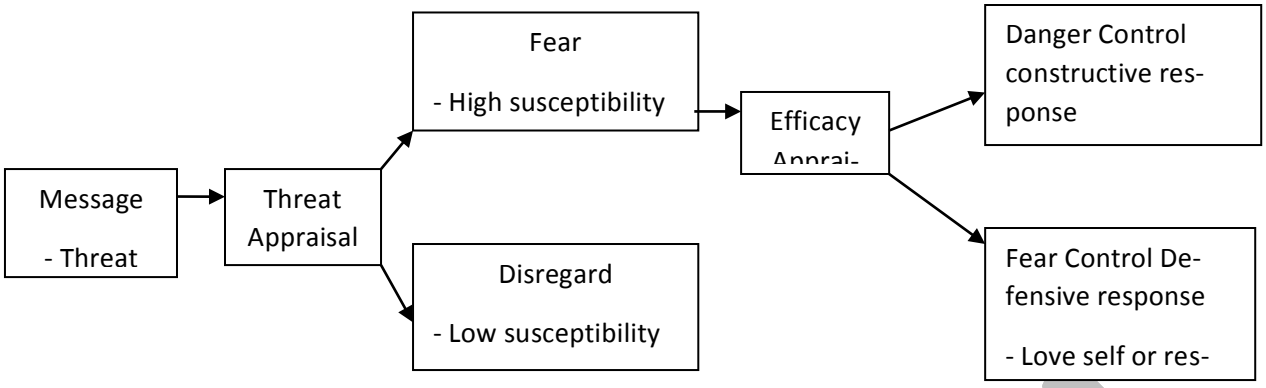
Lastly, the Extended Parallel Process Model (EPPM) is relevant to our discussion. Witte (1992) originated this theory and Hipper (2011) explains that, the theory is based on two main ingredients namely: threat and efficacy. Threat is said to comprise of susceptibility and severity whereas efficacy is made up of self efficacy and response efficacy. What this means is that if the desired response is to come from an audience, the message must have (a) Enough high levels of both threat and efficacy; and (b) Higher levels of efficacy. It is necessary to note that, messages with enough levels of susceptibility or severity are difficult to discountenance. Also, messages with some level of threat but low level of efficacy result in denial or avoidance as the audience manages to control the fear.

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Happily, messages with high threat and high efficacy levels stimulate the audience to switch into danger control by engaging in salutary behaviour to minimise the threat. This theory, adapted from Witte (1992) by Hipper is represented thus:

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Figure 1: Diagram of the Extended Parallels Process Model (EPPM)



Adapted from Witte (1992); Source: Hipper (2011) new media @ hhs.gov.

As we can see, using models and theories does help us understand health communication whether we are dealing with the traditional (mass) communication, the new media or social media. Hipper (2011) concludes that a theory such as this gives us the template for our message or intervention, telling us the features we need to know about our target audience and the variable that are prone to influencing their actions. It equally permits us to assess the efficacy of our intervention and thereafter repeat our success or better our poor performance, benefits that come when we employ social media.

2.3 Review of Related Studies

This review of very recent and related studies is based on the following three works:

(1) Gold, J. *et.al.* (2012). Developing Health Promotion Intervention on Social Networking Sites: Recommendations from the Facespace project. *Journal of Medical Internet Research*, 14 (1): e30.

This study was predicated on the fact that the Internet has significantly altered the way people obtain information and communicate. It noted that social networking sites permit people to maintain, develop, and view their social networks. They also offer additional functions such as public and private messaging and photo, video and other content sharing and that *Facebook, Twitter, Linkedln* and *Myspace* were the most popular social networking sites in the world with *Facebook* having in 2012, 500 million active users.

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The authors lamented the paucity of published works on the utilisation of the social media for health promotion interventions. This they say makes it difficult for others to reasonably consider if and how they might approach developing interventions in the spaces. Also, the absence of evidence for assessing such interventions makes it tough to say if health promotion interventions using social networking sites yield fruits.

This provided the rationale for the Facespace project in 2009 and 2010 – a novel health promotion intervention utilising social networking sites. The project involved the delivery of sexual health promotion through social networking sites to two main at–risk groups – youths of between 16 and 29 years and gay men. In the project, public health researchers, specialists in user interaction with information technologies, a creative production firm, and a community – based group were brought together.

The concept of the project involved using fictional characters to post video content and to interact on sites such as *Facebook, YouTube, Twitter* and *Flicker* with sexual health promotion messages embedded within some postings and interactions. On completion of the project, the report made the following observations/recommendations:

(a) Health interventions on social networking sites need extra multidisciplinary specialists in social media and knowledge of how end users interact and engage in online milieu.

(b) The new and challenging setting of social networking sites should be considered in project timeliness because applying and obtaining ethical, legal, and organisational permits may take a longer time.

(c) Since the online environment in suffused with copious content; being usually appealing is not enough to attract attention. An established base of end users when the site is opened and the use of online advertisements and photo tagging may help attract end users.

(d) To guard against the loss of participants over time within an online intervention, it pays to boost or maintain engagement by offering the intervention over a shorter period, zeroing in on one core message, making all posts as standalone messages as well as giving end users more room to generate and juggle content on their own.

(e) It is important to ensure that health interventions get to the target group. The high point occurs when sufficient members are largely interested in a post to share it with friends, who share it with their friends continually. To make this happen, it pays to structure the campaign appropriately, comply with ethics, and imbue the message with fun and imagination and make it accessible and involving. Another way is to get people with huge social connections to spread the message.

(f) The definition of a successful programme and the means of measuring it is critical.

The conclusion of the authors of this study is that, as the communications media continue to metamorphose, if health organisations do not embrace the social/new media they risk being isolated.

2. Gallant, L. M. *et. al.* (2011).Promoting Participatory Medicine with Social Media: New Media Applications on Hospital Websites that enhance Health Education and E-patients Voices.*Journal of participatory medicine*, 3:e49.

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In this study, Gallant *et. al.* note that the nature of health communication is changing as more people rely on the Internet for health information. They state that understanding web-based communication tool development that engages e-patients can better guide effective healthcare strategies and intervention and promote participatory medicine.

The problem that necessitated this study was that whereas hospitals are the pivot of public health information and health education, the extent to which hospital websites help in the achievement of those important health goals was unknown. The aim of the study was therefore to examine how hospitals utilise their websites to realise their healthcare mission using the various media and content delivery schemes.

The study made use of an inductive content analysis to examine the websites of 14 top-ranked United States hospitals. The authors identified different types of online media formats used by each hospital e.g. blogs, instant-messaging, audio clips, and video clips, etc. Thereafter, patient health information content such as disease information, symptom checkers, and health education was identified within each media format. The analysis conducted between January 5, 2011 and February 28, 2011 showed the following six categories of new media applications:

(i) Social media applications: social media allow one group of people to connect with another. In hospitals, they allow e-patients to receive health communication messages. A high number of hospitals analysed used *Facebook*, hospital-sponsored *YouTube* videos and *Twitter* to communicate with e-patients. Health information on the social media sites included patients' stories, medical expert opinion, details of procedures or tests, and health tips on diet, pediatric care, or cancer prevention.

(ii) Blogs: These are text-based web messages. The study showed that the hospital websites contained health communication messages scripted by medical experts as well testimonials from patients. However, the study observed very little additional engagement between e-patients and blogging health providers.

(iii) Web-based Broadcasting: The study found that the hospitals broadcast media formats include online videos, podcasts, and webinars directly on their websites instead of using *You Tube* and *Facebook* to present various forms of health information from the hospital for e-patients and in the case of webinars, medical and support staff training in half the cases.

iv) Web-enabled e-patient communication tools. These make it possible for care providers and e-patients to interact. The study identified tools such as email, online chat, text messaging, and online support groups.

(v) Mobile applications: These are utilised to support health information through wireless means available in smart phones, and ipad. The applications include walking exercises, symptom checkers and meditation exercises. Five of the hospitals had mobile applications.

(vi) Online health tools: These permit e-patients to learn and educate themselves about their individual health needs. Examples of these tools are health dictionaries, health topic guides, event calendars, body mass index calculators, etc. The study showed that 11 hospital websites had patient portals through personalised accounts involving administrative tasks, accessing personalised medical information and interacting with health professionals. E- Patients could use these portals to make appointments, request referrals and prescriptions refills, pay bills, update contact information or insurance information and pre-register and fill forms for appointments.

The conclusion of the study is that it provides insights into how hospitals and other health-based websites can employ online media for future health advocacy. The merits of using online media are that they boost e-patients' involvement in health information and reinforce the objectives of healthcare agencies in the provision of healthcare resources to better health results.

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3) Carroll, J. A. & Kirkpatrick, R. L. (2011). Impact of social media on adolescent behavioural health. Oakland, CA: California Adolescent Health Collaborative.

Carroll and Kirkpatrick observe that teenagers in the United States often use the Internet, cell phones, and video games to gather information and communicate with one other. The social media afford them this opportunity because of their special capacity to engender interaction and offer strong, fresh ways for youths to create and explore the social milieu. As youths' recourse to the social media, they are at the same time nurturing their identity, sexuality, physique and morality.

The study bears data to the effect that more than 70 percent of youths have cell phones and use them for text messaging. It also shows that more than 70 percent of teens have used social networking sites such as *Facebook* and *Myspace*. Also, it indicates that more than 60 percent of online teens watch online videos through online video sites such as *YouTube.com* and that 61 percent of online teens have commented on a blog.

For teens from California's urban, suburban, and rural communities, the following benefits of social media on adolescent health have been documented:

- Extensions of friendships developed earlier from school, religious organisations, sports and other local activities as well as experience of connectedness and avenues to learn from one another.
- Provision of a supportive environment to explore romance, friendship, and social status and opportunity to share and discuss taste in music, film, video, games and teen culture generally.
- Filling of void for support that is absent in traditional relationships especially for teens with different sexual orientation, the socially withdrawn or those who feel they are unattractive.
- A major source of information and advice particularly on health matters regarding diet, drug use, sexual health, and physical fitness.
- A feeling of independence and freedom that comes with staying in touch, communicating with others, and seeking out social support from parents, siblings, relatives, and friends.

Regarding the protective aspects of what teens do online, the study shows that:

Teens join an online community or a "group" on *Facebook* or *Myspace* in support of a cause (54%), They post creative writing or artwork (53%). Post or share video or music they have created (50%). They organise or invite others to an event using social media (45%). They volunteer for a campaign, nonprofit group or charity (34%), and participate in online study groups (26%).

On the negative side, they use of social media among teens also goes with some risks. These include negative effects on mental health (depression and negative self-views), cyber bulling, texting/sexting, dangers of sexual solicitation, and exposure to problematic and illegal content and privacy violations.

The study cites examples of social media use for improving adolescent health outcomes. Three of them are: **Hook up:** a statewide text messaging source which provides basic facts about reproductive health and relationships. **Teensource** is a website resource for youths who seek information on healthy and

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responsible sexual lifestyles while **Tune** is an interactive health and wellness programme that helps teens make positive choices and healthier lives through music. In its conclusion, the study held that a multi-pronged approach that employs several social media platforms, and in-person contact possess the capability to reach young people with correct health information, resources and support.

There are other studies which relate to the use of social media in healthcare. Posing the question for the United States audience, on who will drive the social media in healthcare, Rauscher (2011) carves out a big chunk of role for physicians, the pharmaceutical industry and the Federal Government. He sees the Health and Human Services as a social media champion, an authoritative source of health information that uses the social media to promote education, collaborate and engage patients and clinicians on a wide range of health issues.

Similarly, in a study of how US hospitals use social media, Thaker, Nowacki, and Mehta, Sandlin (2011) reports that only (21%) of hospitals use social media and these are large, urban, health-system-based, non profit, non-governmental organisation–run ones engaged in graduate medical training or in pediatric care. Very significantly, the hospitals were using the social media to target a general audience (97%), provide content about the hospital (93%) announce news and events, promote health and further public relations (89%).

However, Sandlin states that it is worrisome that the hospitals did not use the media in social ways because their mode of communication was linear not transactional. Rather than use the social media to send out one-way messages to the masses, they should give patients the opportunity to respond and engage.

To this end, Howard (2010) has suggested five ways in which social media help promote good health. These include online communities and connections, Twitter Telemedicine and Hello Health, socialising community health data, healthcare wikis, and open source and connecting health care communities.

Lastly, in Lumba's (2012), "Ten ways to use the social media to promote wellness," the ten tips for using social media to boost engagement include; getting early adopters involved, rewarding successes publicly, bringing people together, paying attention to small details, and making it fun. Others are, owning the conversation, integrating real experiences, starting open threads for learning, being generous with health tips and making it challenging.

3. Method

This study made use of inductive content analysis to examine the websites of twenty Nigerian teaching and specialist hospitals. According to Gallant, Irizarry, Boone and Kreps (2011), this method is now more employed to study Internet content and that the paucity of empirical work on hospital website content, the virtual lack of research on hospital websites and online multimedia formats make the use of inductive analysis appropriate.

The 20 hospitals which formed the population and sample of the study included: (1) University College Hospital, Ibadan. (2) Lagos University Teaching Hospital.(3) Lagos State University Teaching Hospital. (4) ObafemiAwolowo Teaching Hospital, Ile Ife. (5) OlabisiOnabanjo Teaching Hospital. (6) National Ortho-

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paedic Hospital, Lagos. (7) University of Illorin Teaching Hospital. (8) University of Benin Teaching Hospital. (9) University of Nigeria Teaching Hospital. (10) NnamdiAzikiwe University Teaching Hospital.(11) University of Calabar Teaching Hospital. (12) University of Uyo Teaching Hospital. (13) University of Abuja Teaching Hospital. (14) University of Jos Teaching Hospital. (15) University of Maiduguri Teaching Hospital. (16) Bayero University Kano Teaching Hospital.(17) Ahmadu Bello University Teaching Hospital, Zaria.(18) Othman Dan Fodio University Teaching Hospital, Sokoto.(19) University of Port Harcourt Teaching Hospital. (20) National Hospital, Abuja.

These hospitals were elected for study because they are research centres, referral hospitals and are referred to as centres of excellence in training, personnel, technology, and innovation. If any health institutions are to utilise the new and social media for health purposes, then these should be teaching and specialist hospitals.

The content categories examined were: public health/education and promotion content, employee and public relations content and in-patient/out-patient-specific content. The unit of analysis was made up of text, images, menus contained in the hospital web pages. A total of 160 web pages were analysed with each hospital having an average of eight pages. This study was carried out between September 10 and October 14, 2012.

4. Findings and Discussion

The results of the study are presented as follows:

Table I: Utilisation of New/Social Media

Type of Media	Number of Hospitals	Percentages
Website	13	65
Linkedln	5	25
You Tube	0	0
Twitter	2	10
Facebook	15	75

Table 1 above shows that of the twenty hospitals studied, 13 (65%) had their own websites. Moreover, five hospitals (25%) were also on *Linkedln*, none (0%) on *YouTube*, 2 (10%) on *Twitter* and 15 (75%) on *Facebook* social media channels. The Lagos University Teaching Hospital had the strongest social media presence. Besides hosting its website, it was also on *Linkedln, Twitter* and *Facebook*. Similarily, the University of Ilorin Teaching Hospital is on all three social media. However, teaching hospitals in Uyo, Jos, Kano, Maiduguri, Sokoto, Nnewi, and Lagos State had no websites. The study shows that while the majority (65%) of the hospitals hosts a website, more of them (75%) were on *Facebook*. It was observed that the hospitals use of *Linkedln* was particularly to post the profiles of the medical personnel, their specialties and careers. On the other hand, their *Facebook* pages mainly contained postings of satisfied patients or their relatives. Health and medical questions and issues were not raised there.

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Table 2: Purposes of Utilising New/Social Media

Purposes of Media use	Number of Hospitals	Percentages
Presentation of vision/mission	13	65
Provision of content for clients	12	60
Posting of admin/personnel information	13	65
For recruitment, contacts, tenders	12	60
Public health/medical information	5	25
Receiving feedback from patients	20	100
For financial information/bill settlement	2	10
Interaction/engagement with patients	0	0

Data in Table 2 indicate that the teaching hospitals in Nigeria use the new and social media for a variety of reasons. Going by the analysis of their websites and web pages, the chief purpose is that of receiving feedback from people (100%). Other reasons were to present their vision and mission statements (65%), and provide details through which they can be contacted through telephone numbers, email address, web mails, street address or the social media channels (60%). The hospitals also use the new media to give information about their administrative structures and personnel (65%) and about recruitments, deployment, tenders, and contacts (60%).

However, the table also shows that only (10%) of the hospitals use the new media for financial dealings with their clients. That means, little provision is made for online payments and electronic booking or referral of patients. Very significantly, the data show that the hospitals are using the new social media to offer the public health and medical information only at the level of 25 percent and not at all (0%) to engage the public (patients and relatives) in a two-way communication.

Table 3: Content of hospital web pages

Content	Number of Hospitals	Percentages
Public health and education content	5	25
Employee and public relations content	20	100
In-patient/out-patient-specific content	6	30

Table 3 shows that five or 25 percent of the hospitals use the new and social media to post health and medical information which could be of use to the public. However, all 20 hospitals whose websites were anlaysed used the new media and social media for content that could be described as serving public, community, or employee relations. These include information on employment opportunities, posting of staff, bidding for contacts, etc. Also, the data indicate that only six of the hospitals or 30 percent have content that are specific to or generated by in-patients, out-patients, or their relatives. Such information borders on online booking, bill settlement and referrals.

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The findings of this study can be summarised as follows:

(a) Sixty-five percent of Nigerian teaching hospitals have websites while (75%) are on *Facebook*. Teaching hospitals presence on *Linkedln* and *Twitter* is between 10 and 25 percent. There is no presence on *YouTube*. While seven hospitals have no websites, two of the hospitals are on three social media channels.

(b) The major uses to which Nigerian teaching hospitals put the new and social media are to get feedback from clients (100%), present their vision and mission statements (65%), post administrative and personnel structure information (65%), and give details of contracts (60%). These media are little used for health promotion (25%), financial transactions (10%) and interactive engagement with clients (0%).

(c) The content of Nigerian teaching hospital web pages can be categorised into three as follows: employee/public relations content (100%); in-patient and out-patient–specific content (30%), and public health promotion and education content (25%).

The implications which findings from this study have for theory and practice are as follows:

(i) Fiske's theory of relationships which holds that human behaviour affects and is affected by others, and suggests that relationships are very important in health and disease situations; infers that teaching hospitals and indeed hospitals in Nigeria are not taking enough advantage of 'relationships' by not engaging more with the public on an interactive basis or by not offering enough health promotion and disease prevention messages to people who can further influence others. Also, by taking advantage of the extended parallel process model, care would be taken to design effective messages.

(ii) By not using the new and social media to engage more with the public in significantly interactive ways, teaching and specialist hospitals in Nigeria are failing to exploit the merits of social exchanges to influence health outcomes.

5. Conclusion

Social and new media have gained prominence in human affairs. They are also becoming increasingly significant in health and medical matters. In this study, we have shown that Nigerian teaching hospitals are only beginning to harness the power of the new media for health purposes. The conclusion of this study is that the Nigerian teaching hospitals' recourse to the new and social media is for the purposes of publicity and propagation of self image. To change this we make the following suggestions:

6. Recommendations

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(1) Since teaching hospitals are centres of research and innovation, their websites should be powered to contribute to health literacy among the public. People who visit hospital websites should receive health tips, education and explanations of medical and surgical procedures. These may help them prevent disease and promote health.

(2) In this era of participatory medicine, teaching hospitals should increasingly use the new and social media to provide avenues for patients and relatives to tell their stories, and for health professionals to offer informed opinions on medical and health matters.

(3) Health professionals should establish blogs where they comment on health issues to which patients and relatives contribute to expand health care givers/client transaction.

(4) To help build a community of e-patient, hospitals should host online videos, podcasts and websites for the presentation of various bits of health information if their budget permits them to do so.

(5) Establishing patient portals on hospital websites can also make things easy for e-patients. With this, they can arrange for appointments, request for referrals, pay hospital bills, and update their records.

(6) As centres of innovation, teaching hospitals should invest in online health tools such as body mass index (BMI), health indices calculators, and health dictionaries as features of their websites to capture young, upwardly mobile ICT users as a way of gingering their interest in health matters.

As Kita and Thesenvitz (2010) have noted, social media can educate, entertain, empower and provide information, education, inspiration and innovation, as well as stimulate knowledge transfer to many by many, it is hoped that if these suggestions are taken, Nigerian teaching hospitals would contribute more effectively to the utilisation of new and social media to promote health.

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"Will the internet ever replace colleges and universities as we know it today?" An Internet discussion about the future of higher education.

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Abstract

This paper explores a nearly 400-comment online discussion regarding higher education and the impact technology and the Internet has or will likely have on its future. From "I predict only 200 research brick and mortar universities will be alive and provide online programs" to "online education is growing, but the early research shows that blended learning is the best for students", the diversity of comments provides a varied spectrum of thought concerning the future of higher education. The results of the discussion of over 50 professionals on a Linkedin discussion group of higher education professionals suggests that technology will play a major in higher education role but traditional institutions will continue to be around for the foreseeable future.

Keywords: Type your keywords here, separated by semicolons ; American Higher Education; Technology; Policy; Issues; Internet; MOOC

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Introduction

Matt Saccaro's blog, "*When will the Internet replace college?"* recently spawned an online discussion of a Linkedin group interested in higher education. The nearly 400-comment online discussion covered a two-month period and raised many of the same issues facing higher education scholars, administrators and faculty. In his blog, Saccaro (2014) addresses issues facing American colleges and universities as well as graduates from those institutions including: high student debt and delinquency rates; poor job market and high unemployment facing recent graduates, poor student performance and students academically adrift, employer claims mediocre job of performance by recent college graduates; and concerns about removing less profitable academic departments. He suggests that overall, the "American post-secondary system is in the toilet" but suggests that while "the Internet has not bested the post-secondary education system, … there is hope."

Of course Saccaro is not alone in his criticism of American higher education. Richard Vedder, Director for the Center of College Affordability & Productivity (2014) and author of *Going broke by degrees* (2004), an emeritus economics professor from Ohio University is a regular critic of the rising costs of higher education, student financial aid policy, educational inefficiencies, and the resulting impact on student debt. In *Academically adrift*, Arum and Roksa (2011) discuss the limited learning that occurs on college campuses, the lack of academic rigor and the uneasy agreement between faculty and students that allows both parties to pursue their own interests. Sperber (2000) suggests big-time sports and college drinking have 'crippled' undergraduate education. Archibald and Feldman (2011), cite the perception of a dysfunctional system of higher education caused by "prestige games and gold plating" (p. 93), eventually leading

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to higher costs which lead to higher tuition. Taylor (2010) suggests, "The quality of higher education is declining: colleges and universities are not adequately preparing students for life in a rapidly changing and increasingly competitive world" (p. 3).

College presidents seem to understand the issues although there is limited evidence they will take steps to address the issue. In a recent study conducted by the *Chronicle of Higher Education* (2014) and sponsored by the learning management system (LMS) company Blackboard®, 68% of college presidents surveyed disagreed that higher education would be similar to the way it is today in 10 years, however, 60% felt that U.S. higher education was moving in the "right direction" to address these changes (Selingo, 2014). .

Two recent documentaries, *Declining by degrees* (Merrow, 2005) and *Ivory tower* (Rossi, 2014) address the issue. Through a series of interviews and video clips, *Declining by Degrees* suggests some of the problems with higher education include low retention and graduation rates, students drifting through school, and the fact that too many students do not have the skills to be productive employees. Merrow (2005) suggests some possible causes for poor college performance include high rates of student drinking, excessive work loads for some students, high incidence of part-time teachers, classes that are too large, underprepared students for college work. He suggests that grade inflation is a result of the desire to mitigate poor retention rates and provide an inaccurate picture of student performance. The result is that college produces students without the skills necessary to produce productive employees. Almost 10 years later, *Ivory Tower* (Rossi, 2014) reiterates similar themes and presents a radical view of the result of inaction is a 'time bomb of student debt and suggesting the value of higher education may not be worth the investment.

The purpose of this study was to investigate the perspectives of the participants involved in an online discussion about higher education and the impact technology and the Internet has or will likely have on its future. Many participants addressed the aforementioned issues in their comments either directly or indirectly.

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Methods

The primary data for this study were generated from comments collected over a two-month period of an online discussion in a Linkedin Group focused on higher education. The study used naturalistic inquiry, a qualitative research technique that "takes place in real-world settings …and the phenomenon of interest unfolds naturally in that it has no predetermined course established by and for the researcher" (p. 32) and empathic neutrality and mindfulness a technique that sees the researcher as someone who "seeks vicarious understanding without judgment (neutrality) by showing openness, sensitivity, respect, awareness, and responsiveness (mindfulness)" (Patton, 2001; p. 40). Demographic data and themes were generated from thematic analysis of the comments made during the online discussion period. Thematic analysis, the "encoding qualitative information" (p. vii.) by developing 'codes' that serve as data labels for sections of data (Boyatzis (1998), was conducted by generating a spreadsheet using the topics of author, type of work, themes, location or origin of the comment, and author's credentials.

Care was taken to ensure participant anonymity. With the exception of those made by the author, comments taken from the discussion were not attributed to any individual, organization or group. The intent to collect, analyze and publish the data was made evident through a comment made by the author

and posted on the discussion. The comment received one "like" from one participant. No other comments were made suggesting approval or disapproval of the intent to publish.

Limitations of the Study and Discussion

This study was intended to record the observations of an online discussion of members of a Linkedin group to determine what themes might inform research associated with technology use in higher education and to explore the views of participants as to whether technology would replace colleges as we know them today. The results should not be considered generalizable and should be viewed in the context of an informal online discussion. Other than a personalized "handle" there was no way to determine credentials or experience of participants engaging in the conversation. An attempt was made to differentiate participants based on the limited information provided and the results were used in the demographic section and in grouping based on perspectives.

Two primary contextual limitations of the study became evident during the analysis of the data. The first was the lack of a common view of the purpose of college specifically or higher education as a whole. The second was the lack of a common definition of college enrollment and the differing needs of traditional and nontraditional students. These limitations will be addressed in the discussion section of the paper.

Findings

The question *Will the Internet ever replace colleges and universities as we know the today?,* generated 376 comments from 53 participants working or engaging with both academic and non-academic organizations Forty (n=40; 75%) participants identified themselves as a tenured or contingent faculty member, including twenty (n=20) international, thirteen (n=13) US and seven (n=7) faculty from an unknown origin. Eleven (n=11) participants were identified as working in businesses as a consultant and/or entrepreneur. It was not possible to project the work status of two (n=2) participants. The majority (n=31; 58.5%) of participants made one or two comments while the majority of the conversation was generated by a minority of participants (n=7; 13.2%) who produced a majority (n=249; 66.2%) of the comments. One participant, an international business entrepreneur made 21.5% (n=81) of the comments. The next most active participant was a U.S. adjunct professor in higher education and the author who made 13% (n=49) of the comments.

The conversation covered more than the present or future impact technology has or will have on higher education. The broad based discussion included topics including teaching and learning, institutional quality, organizational efficiency and effectiveness, educational quality, globalization in higher education, the declining economy and its impact on hiring students, diploma mills, and issues relating to overbuilding on campus, student drinking and athletics.

In general, the tone of the comments was respectful but difficult for some participants. There was a good use of data to support positions but the discussion suffered from an overuse of unsupported views, hyperbole and an overreliance on personal experience. One participant conducted an early analysis of

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comments stating, "Lot's of people, from many different places (including different countries) participated; for the most part, all participants were respectful of each other's point of view; participants often presented data or links to data published in reputable (but not necessarily scientific) sources; everyone had the choice to be active participants. Some were more active than others, but no one seemed to be keeping score; all comments were recorded and you could go back to re-read what others had said; participants were free to leave the conversation at any time and re-enter at any time; some people were better (or had more time) at this; participants seemed more relaxed; some participants in this discussion are engaged in other discussions as well; you can reply to a comment in public or only for the commenter. I have never had a better faculty discussion, since I started teaching in 1969" (Unnamed participant).

The analysis of the discussion comments revealed the majority (n=37; 69.8%) of the participants did not feel that technology would replace higher education, as we know it today. The remainder of opinion ranged from a definite yes (n=6; 11.3%) to maybe (n=3; 5.6%). Several participants (n=7; 13.2%) discussed the topic without offering an opinion on the original question. A common theme for participants indicating that technology would not replace traditional colleges in the near future was that technology can help students with a diverse learning styles but that it should be used as a tool in a balanced and blended approach to education. Other views suggested the need for extracurricular or co-curricular engagement to support learning indicating the student experience could not be replaced by technology. Others indicated the need for deeper interpersonal connection between faculty and students. Some comments reflected a concern for the potential for barriers to education through technology including the difficulty with interpersonal communication. Finally, several comments suggested that technology did not address the varying purposes of college and was limited to knowledge collection and transmission. One comment reflected the thoughts of the majority opinion of the group in saying "online (learning) will earn more space in higher education worldwide, but (will) always will be supplemented with classroom or lab education for the development of experimental work and research." In addressing the need for interpersonal connection one participant offered, ""the interaction, and participation with humankind are very important."

Participants indicating technology has or will replace higher education in the near future cited the existence and growth of online courses, the development of Massive Open Online Courses (MOOCs), worldwide open universities, and disruptive innovations will result in change. The most radical point of view saw the closure of thousands of institutions suggesting. "I predict only 200 research brick and mortar universities will be alive and provide online programs." Another summarized this view with, " all new innovations disrupt something already being used. Electrical car disrupts the profits of gas companies. Therefore it has been stopped for many years, and… is still being blocked. (Similarly), excellent online degree programs from elite universities will be blocked by existing beneficiaries, those…existing colleges and faculties" (which are privileged by the status quo.) A caveat of sorts by some participants with this view was the need to ensure quality of the online product. One comment, obviously emphatic about his view, indicated, "(the) important point is WHO IS DELIVERING THE KNOWLEDGE IS IT A VALUABLE KNOWLEDGE…MIT, Harvard and elite universities (have now) come to picture. … If they provide degrees and charge only $ 100-200 per course WHO do you think … would go to other schools… (The) QUALITY OF THE KNOWLEDGE MATTERS. ELITE UNIVERSITIES HAVE PROVED THEMSELVES GOOD FOR CENTURİES TO BE GOOD. One participant was very simplistic in his answer indicating, "it (technology) already has" (replaced colleges and universities). Another participant suggested taking a more long-term view with " I do not see the Internet replacing universities or colleges any time soon, but continued changes enabled by the dynamism of the technology are imminent.

Discussion

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The findings of the discussion seem straight forward and to the point. The majority of the participants felt technology had a place in higher education but would not replace colleges and universities, as they are known today. In reflecting on the discussion one wonders can the question, '*will the Internet ever replace colleges and universities as we know it today?*' be answered without an understanding the role and function of both the Internet and of college? In order to reinforce the views of the participants, clarification of the role and function of both technology and higher education is undertaken.

It seems appropriate to use resources developed from the Internet to help us define the Internet. Wikipedia, The Free Encyclopedia, an editable, online encyclopedia indicates "the internet is a global system of interconnected computer networks that use the standard internet protocol suite (TCP/IP) to link several billion devices world wide. Webopedia (2014) an online tech dictionary for IT professional indicates, "The Internet is a massive network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet. Webopedia differentiates between the Internet and World Wide Web (WWW) suggesting the "Web is a way of accessing information over the medium of the Internet. It is an information-sharing model that is built on top of the Internet. In short, the Internet is a relatively young system of networks that support the World Wide Web and other tools in the transfer of knowledge.

Defining American colleges and universities is a bit more cumbersome than the simplistic definition of the Internet or the World Wide Web. Since the founding of Harvard College in 1634, American higher education has evolved to become, according to many, the world's 'global gold standard' and envy of the world. The complexity of American higher education is obvious when reviewing the Carnegie Foundation for the Advancement of Teaching classification of institutions (Carnegie Foundation, 2010). Using a highly complex series of flow charts, the Carnegie Foundation clarifies role and function of America's (n=4,633) degree granting institutions of higher education in a variety of ways. The first divides the institutions by undergraduate and graduate experience. Within the undergraduate instructional program schools (n=3601), there are those institutions that are associates (n=1714), associates dominant (n=240), and baccalaureate dominant (n=1647). When divided to produce an undergraduate profile institutions with undergraduates increases (n=3741 and is divided by four-year institutions (n=1920) and two-year institutions (n=1821). Within the graduate instructional programs (n=1361), there are institutions that are post-baccalaureate (non-doctorate institutions) (n=912) and doctoral institutions (n=449). Carnegie goes on to offer a basic classification for all four-year institutions (n=2713) as doctorate granting institutions (n=294), masters' institutions (n=728), baccalaureate institutions (n=808), special focus institutions (n=851) and tribal colleges (n=32).

The United States Department of Education identifies postsecondary institutions as public (n=2008) and private (n=5,389), and nonprofit (n=1,892) and for-profit (n=3,497). The total institutions (n=7,236) identified the National Center for Education Statistics, the research arm of the Department of Education includes institutions (n=2,045) offering programs that do not offer degree programs (Ginder et al., 2014).

Enrollment in these institutions reflects the diversity of population and the differing reasons for attending colleges. The total enrollment for American higher education (n=28,305,025 includes institutions with undergraduate and diploma programs ((n=24,524,988; 77%) and graduates ((n=3,780,037; 13%), (Ginder et al., 2014). Degree seeking undergraduate enrollment in the United States has increased 48% since 1990 and is expected to hit 20.2 million students by 2023 (NCES, 2014). Student enrollment is heavily weighted towards women in both undergraduates (n=16,179,594; 57%) and graduate students (n=2,262,755; n=59%). The majority of aforementioned growth in enrollments is expected to be with women students, 18% vice 8% for males (NCES, 2014).

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Many of the flaws associated with American higher education such as heavy student drinking and excessive partying, floating through school and academically adrift (Arum et al., 2011), poor post graduate employment rates, and dissatisfaction with employment preparedness present a picture of traditional age college students, those young adults entering post-secondary education right after high school, at roughly 18-19 years old (NCES, 2014). While traditional age college students make up the majority of full-time undergraduates at public (88%), private nonprofit (86%) and public 2-year (71%) schools, the majority of full-time students at 4-year private for-profit (71%) and 2-year private for-profit (52%) were over the age of 25 and are considered nontraditional students. Nontraditional students are 24 or older and have usually taken time away from school to work, serve in the military or engage in some other life experience. The impact of nontraditional students on enrollments is even more pronounced for part-time students. Other than at the 4-year (50%) and 2-year (52%) public institutions, the majority of part-time students at all other institutional types were nontraditional students over the age of 25. Nontraditional students make up the majority (60.3%) of all part-time students. A significant percentage of these students (47.5%) were 35 and older (NCES, 2014).

In addition to the complexity suggested by the Carnegie Foundation and the U.S. Department of Education, institutional diversity of purpose clouds the understanding of American higher education. In *Higher Education in America* (2013), Derek Bok suggests, "American colleges and universities do not have a single goal…(and) have not had a single unifying purpose for well over one hundred years (p. 28).

"The American college was conceived of as a social investment" (Thelin, 2004 p. 58) but as evolved over time. Clearly, early federal legislation such as the Morrill Land-grant acts of the mid 19th century, and 20th century laws associated with educating returning veterans from World War II, the National Education Defense Act of 1958, and the Higher Education Act of 1965 and its subsequent reauthorizations speak to the importance of higher education as a the need to support societal interests.

In *Uses of the University* (2001), Kerr wrote "the basic reality, for the university, is the widespread recognition that new knowledge is the most important factor in economic and social growth. We are just now perceiving that the university's invisible product, knowledge, may be the most powerful single element in our culture, affecting the rise and fall of professions and even social classes, of regions and even nations" (pg. xii). Kerr suggests the modern "multiversity" is a confluence of the purposes of universities of the past. From Cardinal Newman, the 19th century founder of the University of Dublin, the purpose of the university is "the high protecting power of all knowledge and science, of fact and principle of inquiry and discovery, of experiment and speculation; it maps out the territory of the intellect and sees that…there is neither encroachment nor surrender on any side" (pg. 1). Newman's view of 'liberal knowledge', which is related to all walks of life, lay in stark contrast to other scholars of his day who sought to limit the purpose of a university to only scientific related knowledge. "University training, said Newman, 'aims at raising the intellectual tone of society, at cultivating the public mind, at purifying the national taste, at supplying true principles to popular enthusiasm and fixed aims to popular aspirations, at giving enlargement and sobriety to the ideas of the age, at facilitating the exercise of political powers, and refining the intercourse of private life" (Kerr, 2001; p.2).

In, *Our under achieving colleges* (2006), Bok, raises the issues of "how much students learn" and suggests the discussion of performance must begin with a shared understanding of the role and purpose of higher education. He indicates the key outcomes of a college education should include "the ability to communicate, critical thinking, moral reasoning, preparing citizens, living with diversity, living in a more global society, possessing a 'breadth of interests' and preparing for work. This litany of purposes is not universal and there are a number of critics suggesting one or more of these ideals has little or no place in higher education. Hacker and Dreifus support the view of preparing students for work, particularly in the high-tech world is important but suggest, "that the purpose of college is not to make students into better citizens" (p. 5).

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In discussing the *Great American University*, Cole (2009) suggests several things make a modern American university excellent including: faculty research productivity; quality and impact of research; grant and contract support; honorific awards; access to highly qualified students; excellence in teaching; physical facilities and advanced information technologies; large endowments and plentiful resources; large academic departments; free inquiry and academic freedom; location; contributions to the public good and excellent leadership. The paradox facing the American colleges and universities is that some of the things that make a great institution are the very things that create some of the issues reflected in *Will the internet ever replace colleges and universities as we know it today?* and within the comments made during the discussion.

Online education, in its many forms has been part of higher education on increasing levels since the development of the Internet (ARPANET) by the United States Department of Defense in 1969. The use of learning management systems (LMS), the ubiquitous presence and engagement of online and blended courses, and the digitization and mass distribution of library resources provide evidence that technology has changed forever how higher education distributes knowledge to its students. William Bowen (2013), President emeritus of the Andrew W. Melton Foundation and Princeton University, suggests "far greater access to the internet, improvements in internet speed, reductions in storage costs, the proliferation of increasingly sophisticated mobile devices, and other advances have combined with changing mindsets to suggest that online learning, in many of its manifestations can lead to at least comparable learning outcomes relative to face-to-face instruction at a lower cost" (p. 45).

There is some thought that online education in any form should be considered a disruptive innovation, "a process by which a product or service takes root initially in simple applications at a the bottom of a market and then relentlessly moves up market, eventually displacing established competitors (Christiansen, 2014). In a cautionary statement Christiansen and Eyring offer, "The downfall of many successful and seemingly invincible companies has been precipitated by a disruptive innovation-that is, an innovation that makes a complicated and expensive product simpler and cheaper, and therefore attracts a new set of customers" (Christensen, and Eyring, 2011, p. 47). Adoption of a total technology solution suggests that higher education move from a position focused on the education of students by developing them holistically, towards the view of students solely as customers, which may be at odds with the many of the aforementioned purposes.

Conclusion

"Education is not the learning of facts, but the training of the mind to think." Albert Einstein.

The purpose of this study was to investigate the perspectives of the participants involved in an online discussion about higher education and the impact technology and the Internet has or will likely have on its future. In reviewing and disaggregating the 376 comments to develop themes used in the analysis it became clear there was no consensus for a clear definition of what a college education was, who the students were, and what role technology plays, or could play in the educational process. This lack of understanding was compounded by the personal, and often limited views of the participants. Other than the author, there were no self-declared higher education scholars or researchers in the group, although faculty and administrators working in higher education made many of the comments. Many of the comments made by faculty and administrators reflected upon practices limited to experiences with online courses and massive open online courses (MOOCs) and not the diversity of role and function of higher education.

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The aforementioned data suggest the importance of understanding the different types of students, traditional and non-traditional, and the diversity of needs and pressures these students place on the higher education system. Student needs, including those associated with remediation due to lack of preparation, knowledge and skill development for work and life in society, work-force retraining for displaced workers and veterans should be investigated in a holistic way before replacing an existing system of higher education with a technological solution.

Although the lack of understanding of the complexities facing American higher education was a limiting factor, a majority of the participants (n=37; 69.8%) felt that technology would not replace colleges and universities, as we know them today. In a recent interview with *Inside Higher Education*, Hilary Clinton, former U.S. Senator and U.S. Secretary of State, offers a prospective that would likely be accepted by the majority of participants in this discussion; "Online education can 'open doors' for many students, and may offer as high quality an education as anything in some fields or for some students. But technology is a tool, not a teacher. It cannot replace laboratory-based experiments" (Jaschik, 2014).

The discussion raises the need for more research associated with the various aspects of and problems facing higher education. More research is needed to address issues related to the rising costs of higher education and the subsequent impact on student debt known collectively as college affordability. Additional research should focus on the role technology can play in addressing institutional efficiency and effectiveness in delivering education to all of America's higher education students. Finally, understanding the different roles and functions of colleges and universities as well as the diversity of student needs and how technology could be used to support the educational process and transform American higher education should be explored.

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"Will the internet ever replace colleges and universities as we know it today?" An Internet discussion about the future of higher education.

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Abstract

This paper explores a nearly 400-comment online discussion regarding higher education and the impact technology and the Internet has or will likely have on its future. From "I predict only 200 research brick and mortar universities will be alive and provide online programs" to "online education is growing, but the early research shows that blended learning is the best for students", the diversity of comments provides a varied spectrum of thought concerning the future of higher education. The results of the discussion of over 50 professionals on a Linkedin discussion group of higher education professionals suggests that technology will play a major in higher education role but traditional institutions will continue to be around for the foreseeable future.

Keywords: Type your keywords here, separated by semicolons ; American Higher Education; Technology; Policy; Issues; Internet; MOOC

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Introduction

Matt Saccaro's blog, "*When will the Internet replace college?*" recently spawned an online discussion of a Linkedin group interested in higher education. The nearly 400-comment online discussion covered a two-month period and raised many of the same issues facing higher education scholars, administrators and faculty. In his blog, Saccaro (2014) addresses issues facing American colleges and universities as well as graduates from those institutions including: high student debt and delinquency rates; poor job market and high unemployment facing recent graduates, poor student performance and students academically adrift, employer claims mediocre job of performance by recent college graduates; and concerns about removing less profitable academic departments. He suggests that overall, the "American post-secondary system is in the toilet" but suggests that while "the Internet has not bested the post-secondary education system, … there is hope."

Of course Saccaro is not alone in his criticism of American higher education. Richard Vedder, Director for the Center of College Affordability & Productivity (2014) and author of *Going broke by degrees* (2004), an emeritus economics professor from Ohio University is a regular critic of the rising costs of higher education, student financial aid policy, educational inefficiencies, and the resulting impact on student debt. In *Academically adrift*, Arum and Roksa (2011) discuss the limited learning that occurs on college campuses, the lack of academic rigor and the uneasy agreement between faculty and students that allows both parties to pursue their own interests. Sperber (2000) suggests big-time sports and college drinking have 'crippled' undergraduate education. Archibald and Feldman (2011), cite the perception of a dysfunctional system of higher education caused by "prestige games and gold plating" (p. 93), eventually leading

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to higher costs which lead to higher tuition. Taylor (2010) suggests, "The quality of higher education is declining: colleges and universities are not adequately preparing students for life in a rapidly changing and increasingly competitive world" (p. 3).

College presidents seem to understand the issues although there is limited evidence they will take steps to address the issue. In a recent study conducted by the *Chronicle of Higher Education* (2014) and sponsored by the learning management system (LMS) company Blackboard®, 68% of college presidents surveyed disagreed that higher education would be similar to the way it is today in 10 years, however, 60% felt that U.S. higher education was moving in the "right direction" to address these changes (Selingo, 2014). .

Two recent documentaries, *Declining by degrees* (Merrow, 2005) and *Ivory tower* (Rossi, 2014) address the issue. Through a series of interviews and video clips, *Declining by Degrees* suggests some of the problems with higher education include low retention and graduation rates, students drifting through school, and the fact that too many students do not have the skills to be productive employees. Merrow (2005) suggests some possible causes for poor college performance include high rates of student drinking, excessive work loads for some students, high incidence of part-time teachers, classes that are too large, underprepared students for college work. He suggests that grade inflation is a result of the desire to mitigate poor retention rates and provide an inaccurate picture of student performance. The result is that college produces students without the skills necessary to produce productive employees. Almost 10 years later, *Ivory Tower* (Rossi, 2014) reiterates similar themes and presents a radical view of the result of inaction is a 'time bomb of student debt and suggesting the value of higher education may not be worth the investment.

The purpose of this study was to investigate the perspectives of the participants involved in an online discussion about higher education and the impact technology and the Internet has or will likely have on its future. Many participants addressed the aforementioned issues in their comments either directly or indirectly.

Methods

The primary data for this study were generated from comments collected over a two-month period of an online discussion in a Linkedin Group focused on higher education. The study used naturalistic inquiry, a qualitative research technique that "takes place in real-world settings …and the phenomenon of interest unfolds naturally in that it has no predetermined course established by and for the researcher" (p. 32) and empathic neutrality and mindfulness a technique that sees the researcher as someone who "seeks vicarious understanding without judgment (neutrality) by showing openness, sensitivity, respect, awareness, and responsiveness (mindfulness)" (Patton, 2001; p. 40). Demographic data and themes were generated from thematic analysis of the comments made during the online discussion period. Thematic analysis, the "encoding qualitative information" (p. vii.) by developing 'codes' that serve as data labels for sections of data (Boyatzis (1998), was conducted by generating a spreadsheet using the topics of author, type of work, themes, location or origin of the comment, and author's credentials.

Care was taken to ensure participant anonymity. With the exception of those made by the author, comments taken from the discussion were not attributed to any individual, organization or group. The intent to collect, analyze and publish the data was made evident through a comment made by the author and posted on the discussion. The comment received one "like" from one participant. No other comments were made suggesting approval or disapproval of the intent to publish.

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Limitations of the Study and Discussion

This study was intended to record the observations of an online discussion of members of a Linkedin group to determine what themes might inform research associated with technology use in higher education and to explore the views of participants as to whether technology would replace colleges as we know them today. The results should not be considered generalizable and should be viewed in the context of an informal online discussion. Other than a personalized "handle" there was no way to determine credentials or experience of participants engaging in the conversation. An attempt was made to differentiate participants based on the limited information provided and the results were used in the demographic section and in grouping based on perspectives.

Two primary contextual limitations of the study became evident during the analysis of the data. The first was the lack of a common view of the purpose of college specifically or higher education as a whole. The second was the lack of a common definition of college enrollment and the differing needs of traditional and nontraditional students. These limitations will be addressed in the discussion section of the paper.

Findings

The question *Will the Internet ever replace colleges and universities as we know the today?,* generated 376 comments from 53 participants working or engaging with both academic and non-academic organizations Forty (n=40; 75%) participants identified themselves as a tenured or contingent faculty member, including twenty (n=20) international, thirteen (n=13) US and seven (n=7) faculty from an unknown origin. Eleven (n=11) participants were identified as working in businesses as a consultant and/or entrepreneur. It was not possible to project the work status of two (n=2) participants. The majority (n=31; 58.5%) of participants made one or two comments while the majority of the conversation was generated by a minority of participants (n=7; 13.2%) who produced a majority (n=249; 66.2%) of the comments. One participant, an international business entrepreneur made 21.5% (n=81) of the comments. The next most active participant was a U.S. adjunct professor in higher education and the author who made 13% (n=49) of the comments.

The conversation covered more than the present or future impact technology has or will have on higher education. The broad based discussion included topics including teaching and learning, institutional quality, organizational efficiency and effectiveness, educational quality, globalization in higher education, the declining economy and its impact on hiring students, diploma mills, and issues relating to overbuilding on campus, student drinking and athletics.

In general, the tone of the comments was respectful but difficult for some participants. There was a good use of data to support positions but the discussion suffered from an overuse of unsupported views, hyperbole and an overreliance on personal experience. One participant conducted an early analysis of comments stating, "Lot's of people, from many different places (including different countries) participated; for the most part, all participants were respectful of each other's point of view; participants often presented data or links to data published in reputable (but not necessarily scientific) sources; everyone had the choice to be active participants. Some were more active than others, but no one seemed to be kee-

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ping score; all comments were recorded and you could go back to re-read what others had said; participants were free to leave the conversation at any time and re-enter at any time; some people were better (or had more time) at this; participants seemed more relaxed; some participants in this discussion are engaged in other discussions as well; you can reply to a comment in public or only for the commenter. I have never had a better faculty discussion, since I started teaching in 1969" (Unnamed participant).

The analysis of the discussion comments revealed the majority (n=37; 69.8%) of the participants did not feel that technology would replace higher education, as we know it today. The remainder of opinion ranged from a definite yes (n=6; 11.3%) to maybe (n=3; 5.6%). Several participants (n=7; 13.2%) discussed the topic without offering an opinion on the original question. A common theme for participants indicating that technology would not replace traditional colleges in the near future was that technology can help students with a diverse learning styles but that it should be used as a tool in a balanced and blended approach to education. Other views suggested the need for extracurricular or co-curricular engagement to support learning indicating the student experience could not be replaced by technology. Others indicated the need for deeper interpersonal connection between faculty and students. Some comments reflected a concern for the potential for barriers to education through technology including the difficulty with interpersonal communication. Finally, several comments suggested that technology did not address the varying purposes of college and was limited to knowledge collection and transmission. One comment reflected the thoughts of the majority opinion of the group in saying "online (learning) will earn more space in higher education worldwide, but (will) always will be supplemented with classroom or lab education for the development of experimental work and research." In addressing the need for interpersonal connection one participant offered, ""the interaction, and participation with humankind are very important."

Participants indicating technology has or will replace higher education in the near future cited the existence and growth of online courses, the development of Massive Open Online Courses (MOOCs), worldwide open universities, and disruptive innovations will result in change. The most radical point of view saw the closure of thousands of institutions suggesting. "I predict only 200 research brick and mortar universities will be alive and provide online programs." Another summarized this view with, " all new innovations disrupt something already being used. Electrical car disrupts the profits of gas companies. Therefore it has been stopped for many years, and… is still being blocked. (Similarly), excellent online degree programs from elite universities will be blocked by existing beneficiaries, those…existing colleges and faculties" (which are privileged by the status quo.) A caveat of sorts by some participants with this view was the need to ensure quality of the online product. One comment, obviously emphatic about his view, indicated, "(the) important point is WHO IS DELIVERING THE KNOWLEDGE IS IT A VALUABLE KNOWLEDGE…MIT, Harvard and elite universities (have now) come to picture. … If they provide degrees and charge only $ 100-200 per course WHO do you think … would go to other schools… (The) QUALITY OF THE KNOWLEDGE MATTERS. ELITE UNIVERSITIES HAVE PROVED THEMSELVES GOOD FOR CENTURİES TO BE GOOD. One participant was very simplistic in his answer indicating, "it (technology) already has" (replaced colleges and universities). Another participant suggested taking a more long-term view with " I do not see the Internet replacing universities or colleges any time soon, but continued changes enabled by the dynamism of the technology are imminent.

Discussion

The findings of the discussion seem straight forward and to the point. The majority of the participants felt technology had a place in higher education but would not replace colleges and universities, as they are known today. In reflecting on the discussion one wonders can the question, '*will the Internet ever replace colleges and universities as we know it today?*' be answered without an understanding the role and

function of both the Internet and of college? In order to reinforce the views of the participants, clarification of the role and function of both technology and higher education is undertaken.

It seems appropriate to use resources developed from the Internet to help us define the Internet. Wikipedia, The Free Encyclopedia, an editable, online encyclopedia indicates "the internet is a global system of interconnected computer networks that use the standard internet protocol suite (TCP/IP) to link several billion devices world wide. Webopedia (2014) an online tech dictionary for IT professional indicates, "The Internet is a massive network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet. Webopedia differentiates between the Internet and World Wide Web (WWW) suggesting the "Web is a way of accessing information over the medium of the Internet. It is an information-sharing model that is built on top of the Internet. In short, the Internet is a relatively young system of networks that support the World Wide Web and other tools in the transfer of knowledge.

Defining American colleges and universities is a bit more cumbersome than the simplistic definition of the Internet or the World Wide Web. Since the founding of Harvard College in 1634, American higher education has evolved to become, according to many, the world's 'global gold standard' and envy of the world. The complexity of American higher education is obvious when reviewing the Carnegie Foundation for the Advancement of Teaching classification of institutions (Carnegie Foundation, 2010). Using a highly complex series of flow charts, the Carnegie Foundation clarifies role and function of America's (n=4,633) degree granting institutions of higher education in a variety of ways. The first divides the institutions by undergraduate and graduate experience. Within the undergraduate instructional program schools (n=3601), there are those institutions that are associates (n=1714), associates dominant (n=240), and baccalaureate dominant (n=1647). When divided to produce an undergraduate profile institutions with undergraduates increases (n=3741 and is divided by four-year institutions (n=1920) and two-year institutions (n=1821). Within the graduate instructional programs (n=1361), there are institutions that are post-baccalaureate (non-doctorate institutions) (n=912) and doctoral institutions (n=449). Carnegie goes on to offer a basic classification for all four-year institutions (n=2713) as doctorate granting institutions (n=294), masters' institutions (n=728), baccalaureate institutions (n=808), special focus institutions (n=851) and tribal colleges (n=32).

The United States Department of Education identifies postsecondary institutions as public (n=2008) and private (n=5,389), and nonprofit (n=1,892) and for-profit (n=3,497). The total institutions (n=7,236) identified the National Center for Education Statistics, the research arm of the Department of Education includes institutions (n=2,045) offering programs that do not offer degree programs (Ginder et al., 2014).

Enrollment in these institutions reflects the diversity of population and the differing reasons for attending colleges. The total enrollment for American higher education (n=28,305,025 includes institutions with undergraduate and diploma programs ((n=24,524,988; 77%) and graduates ((n=3,780,037; 13%), (Ginder et al., 2014). Degree seeking undergraduate enrollment in the United States has increased 48% since 1990 and is expected to hit 20.2 million students by 2023 (NCES, 2014). Student enrollment is heavily weighted towards women in both undergraduates (n=16,179,594; 57%) and graduate students (n=2,262,755; n=59%). The majority of aforementioned growth in enrollments is expected to be with women students, 18% vice 8% for males (NCES, 2014).

Many of the flaws associated with American higher education such as heavy student drinking and excessive partying, floating through school and academically adrift (Arum et al., 2011), poor post graduate employment rates, and dissatisfaction with employment preparedness present a picture of traditional age college students, those young adults entering post-secondary education right after high school, at roughly 18-19 years old (NCES, 2014). While traditional age college students make up the majority of full-time

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undergraduates at public (88%), private nonprofit (86%) and public 2-year (71%) schools, the majority of full-time students at 4-year private for-profit (71%) and 2-year private for-profit (52%) were over the age of 25 and are considered nontraditional students. Nontraditional students are 24 or older and have usually taken time away from school to work, serve in the military or engage in some other life experience. The impact of nontraditional students on enrollments is even more pronounced for part-time students. Other than at the 4-year (50%) and 2-year (52%) public institutions, the majority of part-time students at all other institutional types were nontraditional students over the age of 25. Nontraditional students make up the majority (60.3%) of all part-time students. A significant percentage of these students (47.5%) were 35 and older (NCES, 2014).

In addition to the complexity suggested by the Carnegie Foundation and the U.S. Department of Education, institutional diversity of purpose clouds the understanding of American higher education. In *Higher Education in America* (2013), Derek Bok suggests, "American colleges and universities do not have a single goal…(and) have not had a single unifying purpose for well over one hundred years (p. 28).

"The American college was conceived of as a social investment" (Thelin, 2004 p. 58) but as evolved over time. Clearly, early federal legislation such as the Morrill Land-grant acts of the mid 19th century, and 20th century laws associated with educating returning veterans from World War II, the National Education Defense Act of 1958, and the Higher Education Act of 1965 and its subsequent reauthorizations speak to the importance of higher education as a the need to support societal interests.

In *Uses of the University* (2001), Kerr wrote "the basic reality, for the university, is the widespread recognition that new knowledge is the most important factor in economic and social growth. We are just now perceiving that the university's invisible product, knowledge, may be the most powerful single element in our culture, affecting the rise and fall of professions and even social classes, of regions and even nations" (pg. xii). Kerr suggests the modern "multiversity" is a confluence of the purposes of universities of the past. From Cardinal Newman, the 19th century founder of the University of Dublin, the purpose of the university is "the high protecting power of all knowledge and science, of fact and principle of inquiry and discovery, of experiment and speculation; it maps out the territory of the intellect and sees that…there is neither encroachment nor surrender on any side" (pg. 1). Newman's view of 'liberal knowledge', which is related to all walks of life, lay in stark contrast to other scholars of his day who sought to limit the purpose of a university to only scientific related knowledge. "University training, said Newman, 'aims at raising the intellectual tone of society, at cultivating the public mind, at purifying the national taste, at supplying true principles to popular enthusiasm and fixed aims to popular aspirations, at giving enlargement and sobriety to the ideas of the age, at facilitating the exercise of political powers, and refining the intercourse of private life" (Kerr, 2001; p.2).

In, *Our under achieving colleges* (2006), Bok, raises the issues of "how much students learn" and suggests the discussion of performance must begin with a shared understanding of the role and purpose of higher education. He indicates the key outcomes of a college education should include "the ability to communicate, critical thinking, moral reasoning, preparing citizens, living with diversity, living in a more global society, possessing a 'breadth of interests' and preparing for work. This litany of purposes is not universal and there are a number of critics suggesting one or more of these ideals has little or no place in higher education. Hacker and Dreifus support the view of preparing students for work, particularly in the high-tech world is important but suggest, "that the purpose of college is not to make students into better citizens" (p. 5).

In discussing the *Great American University*, Cole (2009) suggests several things make a modern American university excellent including: faculty research productivity; quality and impact of research; grant and contract support; honorific awards; access to highly qualified students; excellence in teaching; physical facilities and advanced information technologies; large endowments and plentiful resources; large academic departments; free inquiry and academic freedom; location; contributions to the public good and

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excellent leadership. The paradox facing the American colleges and universities is that some of the things that make a great institution are the very things that create some of the issues reflected in *Will the internet ever replace colleges and universities as we know it today?* and within the comments made during the discussion.

Online education, in its many forms has been part of higher education on increasing levels since the development of the Internet (ARPANET) by the United States Department of Defense in 1969. The use of learning management systems (LMS), the ubiquitous presence and engagement of online and blended courses, and the digitization and mass distribution of library resources provide evidence that technology has changed forever how higher education distributes knowledge to its students. William Bowen (2013), President emeritus of the Andrew W. Melton Foundation and Princeton University, suggests "far greater access to the internet, improvements in internet speed, reductions in storage costs, the proliferation of increasingly sophisticated mobile devices, and other advances have combined with changing mindsets to suggest that online learning, in many of its manifestations can lead to at least comparable learning outcomes relative to face-to-face instruction at a lower cost" (p. 45).

There is some thought that online education in any form should be considered a disruptive innovation, "a process by which a product or service takes root initially in simple applications at a the bottom of a market and then relentlessly moves up market, eventually displacing established competitors (Christiansen, 2014). In a cautionary statement Christiansen and Eyring offer, "The downfall of many successful and seemingly invincible companies has been precipitated by a disruptive innovation-that is, an innovation that makes a complicated and expensive product simpler and cheaper, and therefore attracts a new set of customers" (Christensen, and Eyring, 2011, p. 47). Adoption of a total technology solution suggests that higher education move from a position focused on the education of students by developing them holistically, towards the view of students solely as customers, which may be at odds with the many of the aforementioned purposes.

Conclusion

"Education is not the learning of facts, but the training of the mind to think." Albert Einstein.

The purpose of this study was to investigate the perspectives of the participants involved in an online discussion about higher education and the impact technology and the Internet has or will likely have on its future. In reviewing and disaggregating the 376 comments to develop themes used in the analysis it became clear there was no consensus for a clear definition of what a college education was, who the students were, and what role technology plays, or could play in the educational process. This lack of understanding was compounded by the personal, and often limited views of the participants. Other than the author, there were no self-declared higher education scholars or researchers in the group, although faculty and administrators working in higher education made many of the comments. Many of the comments made by faculty and administrators reflected upon practices limited to experiences with online courses and massive open online courses (MOOCs) and not the diversity of role and function of higher education.

The aforementioned data suggest the importance of understanding the different types of students, traditional and non-traditional, and the diversity of needs and pressures these students place on the higher education system. Student needs, including those associated with remediation due to lack of preparation, knowledge and skill development for work and life in society, work-force retraining for displa-

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ced workers and veterans should be investigated in a holistic way before replacing an existing system of higher education with a technological solution.

Although the lack of understanding of the complexities facing American higher education was a limiting factor, a majority of the participants (n=37; 69.8%) felt that technology would not replace colleges and universities, as we know them today. In a recent interview with *Inside Higher Education*, Hilary Clinton, former U.S. Senator and U.S. Secretary of State, offers a prospective that would likely be accepted by the majority of participants in this discussion; "Online education can 'open doors' for many students, and may offer as high quality an education as anything in some fields or for some students. But technology is a tool, not a teacher. It cannot replace laboratory-based experiments" (Jaschik, 2014).

The discussion raises the need for more research associated with the various aspects of and problems facing higher education. More research is needed to address issues related to the rising costs of higher education and the subsequent impact on student debt known collectively as college affordability. Additional research should focus on the role technology can play in addressing institutional efficiency and effectiveness in delivering education to all of America's higher education students. Finally, understanding the different roles and functions of colleges and universities as well as the diversity of student needs and how technology could be used to support the educational process and transform American higher education should be explored.

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"Will the internet ever replace colleges and universities as we know it today?" An Internet discussion about the future of higher education.

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Abstract

This paper explores a nearly 400-comment online discussion regarding higher education and the impact technology and the Internet has or will likely have on its future. From "I predict only 200 research brick and mortar universities will be alive and provide online programs" to "online education is growing, but the early research shows that blended learning is the best for students", the diversity of comments provides a varied spectrum of thought concerning the future of higher education. The results of the discussion of over 50 professionals on a Linkedin discussion group of higher education professionals suggests that technology will play a major in higher education role but traditional institutions will continue to be around for the foreseeable future.

Keywords: Type your keywords here, separated by semicolons ; American Higher Education; Technology; Policy; Issues; Internet; MOOC

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Introduction

Matt Saccaro's blog, *"When will the Internet replace college?"* recently spawned an online discussion of a Linkedin group interested in higher education. The nearly 400-comment online discussion covered a two-month period and raised many of the same issues facing higher education scholars, administrators and faculty. In his blog, Saccaro (2014) addresses issues facing American colleges and universities as well as graduates from those institutions including: high student debt and delinquency rates; poor job market and high unemployment facing recent graduates, poor student performance and students academically adrift, employer claims mediocre job of performance by recent college graduates; and concerns about removing less profitable academic departments. He suggests that overall, the "American post-secondary system is in the toilet" but suggests that while "the Internet has not bested the post-secondary education system, … there is hope."

Of course Saccaro is not alone in his criticism of American higher education. Richard Vedder, Director for the Center of College Affordability & Productivity (2014) and author of *Going broke by degrees* (2004), an emeritus economics professor from Ohio University is a regular critic of the rising costs of higher education, student financial aid policy, educational inefficiencies, and the resulting impact on student debt. In *Academically adrift*, Arum and Roksa (2011) discuss the limited learning that occurs on college campuses, the lack of academic rigor and the uneasy agreement between faculty and students that allows both parties to pursue their own interests. Sperber (2000) suggests big-time sports and college drinking have 'crippled' undergraduate education. Archibald and Feldman (2011), cite the perception of a dysfunctional system of higher education caused by "prestige games and gold plating" (p. 93), eventually leading to higher costs which lead to higher tuition. Taylor (2010) suggests, "The quality of higher education is

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declining: colleges and universities are not adequately preparing students for life in a rapidly changing and increasingly competitive world" (p. 3).

College presidents seem to understand the issues although there is limited evidence they will take steps to address the issue. In a recent study conducted by the *Chronicle of Higher Education* (2014) and sponsored by the learning management system (LMS) company Blackboard®, 68% of college presidents surveyed disagreed that higher education would be similar to the way it is today in 10 years, however, 60% felt that U.S. higher education was moving in the "right direction" to address these changes (Selingo, 2014). .

Two recent documentaries, *Declining by degrees* (Merrow, 2005) and *Ivory tower* (Rossi, 2014) address the issue. Through a series of interviews and video clips, *Declining by Degrees* suggests some of the problems with higher education include low retention and graduation rates, students drifting through school, and the fact that too many students do not have the skills to be productive employees. Merrow (2005) suggests some possible causes for poor college performance include high rates of student drinking, excessive work loads for some students, high incidence of part-time teachers, classes that are too large, underprepared students for college work. He suggests that grade inflation is a result of the desire to mitigate poor retention rates and provide an inaccurate picture of student performance. The result is that college produces students without the skills necessary to produce productive employees. Almost 10 years later, *Ivory Tower* (Rossi, 2014) reiterates similar themes and presents a radical view of the result of inaction is a 'time bomb of student debt and suggesting the value of higher education may not be worth the investment.

The purpose of this study was to investigate the perspectives of the participants involved in an online discussion about higher education and the impact technology and the Internet has or will likely have on its future. Many participants addressed the aforementioned issues in their comments either directly or indirectly.

Methods

The primary data for this study were generated from comments collected over a two-month period of an online discussion in a Linkedin Group focused on higher education. The study used naturalistic inquiry, a qualitative research technique that "takes place in real-world settings …and the phenomenon of interest unfolds naturally in that it has no predetermined course established by and for the researcher" (p. 32) and empathic neutrality and mindfulness a technique that sees the researcher as someone who "seeks vicarious understanding without judgment (neutrality) by showing openness, sensitivity, respect, awareness, and responsiveness (mindfulness)" (Patton, 2001; p. 40). Demographic data and themes were generated from thematic analysis of the comments made during the online discussion period. Thematic analysis, the "encoding qualitative information" (p. vii.) by developing 'codes' that serve as data labels for sections of data (Boyatzis (1998), was conducted by generating a spreadsheet using the topics of author, type of work, themes, location or origin of the comment, and author's credentials.

Care was taken to ensure participant anonymity. With the exception of those made by the author, comments taken from the discussion were not attributed to any individual, organization or group. The intent to collect, analyze and publish the data was made evident through a comment made by the author and posted on the discussion. The comment received one "like" from one participant. No other comments were made suggesting approval or disapproval of the intent to publish.

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Limitations of the Study and Discussion

This study was intended to record the observations of an online discussion of members of a Linkedin group to determine what themes might inform research associated with technology use in higher education and to explore the views of participants as to whether technology would replace colleges as we know them today. The results should not be considered generalizable and should be viewed in the context of an informal online discussion. Other than a personalized "handle" there was no way to determine credentials or experience of participants engaging in the conversation. An attempt was made to differentiate participants based on the limited information provided and the results were used in the demographic section and in grouping based on perspectives.

Two primary contextual limitations of the study became evident during the analysis of the data. The first was the lack of a common view of the purpose of college specifically or higher education as a whole. The second was the lack of a common definition of college enrollment and the differing needs of traditional and nontraditional students. These limitations will be addressed in the discussion section of the paper.

Findings

The question *Will the Internet ever replace colleges and universities as we know the today?,* generated 376 comments from 53 participants working or engaging with both academic and non-academic organizations Forty (n=40; 75%) participants identified themselves as a tenured or contingent faculty member, including twenty (n=20) international, thirteen (n=13) US and seven (n=7) faculty from an unknown origin. Eleven (n=11) participants were identified as working in businesses as a consultant and/or entrepreneur. It was not possible to project the work status of two (n=2) participants. The majority (n=31; 58.5%) of participants made one or two comments while the majority of the conversation was generated by a minority of participants (n=7; 13.2%) who produced a majority (n=249; 66.2%) of the comments. One participant, an international business entrepreneur made 21.5% (n=81) of the comments. The next most active participant was a U.S. adjunct professor in higher education and the author who made 13% (n=49) of the comments.

The conversation covered more than the present or future impact technology has or will have on higher education. The broad based discussion included topics including teaching and learning, institutional quality, organizational efficiency and effectiveness, educational quality, globalization in higher education, the declining economy and its impact on hiring students, diploma mills, and issues relating to overbuilding on campus, student drinking and athletics.

In general, the tone of the comments was respectful but difficult for some participants. There was a good use of data to support positions but the discussion suffered from an overuse of unsupported views, hyperbole and an overreliance on personal experience. One participant conducted an early analysis of comments stating, "Lot's of people, from many different places (including different countries) participated; for the most part, all participants were respectful of each other's point of view; participants often presented data or links to data published in reputable (but not necessarily scientific) sources; everyone

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had the choice to be active participants. Some were more active than others, but no one seemed to be keeping score; all comments were recorded and you could go back to re-read what others had said; participants were free to leave the conversation at any time and re-enter at any time; some people were better (or had more time) at this; participants seemed more relaxed; some participants in this discussion are engaged in other discussions as well; you can reply to a comment in public or only for the commenter. I have never had a better faculty discussion, since I started teaching in 1969" (Unnamed participant).

The analysis of the discussion comments revealed the majority (n=37; 69.8%) of the participants did not feel that technology would replace higher education, as we know it today. The remainder of opinion ranged from a definite yes (n=6; 11.3%) to maybe (n=3; 5.6%). Several participants (n=7; 13.2%) discussed the topic without offering an opinion on the original question. A common theme for participants indicating that technology would not replace traditional colleges in the near future was that technology can help students with a diverse learning styles but that it should be used as a tool in a balanced and blended approach to education. Other views suggested the need for extracurricular or co-curricular engagement to support learning indicating the student experience could not be replaced by technology. Others indicated the need for deeper interpersonal connection between faculty and students. Some comments reflected a concern for the potential for barriers to education through technology including the difficulty with interpersonal communication. Finally, several comments suggested that technology did not address the varying purposes of college and was limited to knowledge collection and transmission. One comment reflected the thoughts of the majority opinion of the group in saying "online (learning) will earn more space in higher education worldwide, but (will) always will be supplemented with classroom or lab education for the development of experimental work and research." In addressing the need for interpersonal connection one participant offered, ""the interaction, and participation with humankind are very important."

Participants indicating technology has or will replace higher education in the near future cited the existence and growth of online courses, the development of Massive Open Online Courses (MOOCs), worldwide open universities, and disruptive innovations will result in change. The most radical point of view saw the closure of thousands of institutions suggesting. "I predict only 200 research brick and mortar universities will be alive and provide online programs." Another summarized this view with, " all new innovations disrupt something already being used. Electrical car disrupts the profits of gas companies. Therefore it has been stopped for many years, and… is still being blocked. (Similarly), excellent online degree programs from elite universities will be blocked by existing beneficiaries, those…existing colleges and faculties" (which are privileged by the status quo.) A caveat of sorts by some participants with this view was the need to ensure quality of the online product. One comment, obviously emphatic about his view, indicated, "(the) important point is WHO IS DELIVERING THE KNOWLEDGE IS IT A VALUABLE KNOWLEDGE…MIT, Harvard and elite universities (have now) come to picture. … If they provide degrees and charge only $ 100-200 per course WHO do you think … would go to other schools… (The) QUALITY OF THE KNOWLEDGE MATTERS. ELITE UNIVERSITIES HAVE PROVED THEMSELVES GOOD FOR CENTURİES TO BE GOOD. One participant was very simplistic in his answer indicating, "it (technology) already has" (replaced colleges and universities). Another participant suggested taking a more long-term view with " I do not see the Internet replacing universities or colleges any time soon, but continued changes enabled by the dynamism of the technology are imminent.

Discussion

The findings of the discussion seem straight forward and to the point. The majority of the participants felt technology had a place in higher education but would not replace colleges and universities, as they are known today. In reflecting on the discussion one wonders can the question, '*will the Internet ever replace colleges and universities as we know it today?*' be answered without an understanding the role and

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function of both the Internet and of college? In order to reinforce the views of the participants, clarification of the role and function of both technology and higher education is undertaken.

It seems appropriate to use resources developed from the Internet to help us define the Internet. Wikipedia, The Free Encyclopedia, an editable, online encyclopedia indicates "the internet is a global system of interconnected computer networks that use the standard internet protocol suite (TCP/IP) to link several billion devices world wide. Webopedia (2014) an online tech dictionary for IT professional indicates, "The Internet is a massive network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet. Webopedia differentiates between the Internet and World Wide Web (WWW) suggesting the "Web is a way of accessing information over the medium of the Internet. It is an information-sharing model that is built on top of the Internet. In short, the Internet is a relatively young system of networks that support the World Wide Web and other tools in the transfer of knowledge.

Defining American colleges and universities is a bit more cumbersome than the simplistic definition of the Internet or the World Wide Web. Since the founding of Harvard College in 1634, American higher education has evolved to become, according to many, the world's 'global gold standard' and envy of the world. The complexity of American higher education is obvious when reviewing the Carnegie Foundation for the Advancement of Teaching classification of institutions (Carnegie Foundation, 2010). Using a highly complex series of flow charts, the Carnegie Foundation clarifies role and function of America's (n=4,633) degree granting institutions of higher education in a variety of ways. The first divides the institutions by undergraduate and graduate experience. Within the undergraduate instructional program schools (n=3601), there are those institutions that are associates (n=1714), associates dominant (n=240), and baccalaureate dominant (n=1647). When divided to produce an undergraduate profile institutions with undergraduates increases (n=3741 and is divided by four-year institutions (n=1920) and two-year institutions (n=1821). Within the graduate instructional programs (n=1361), there are institutions that are post-baccalaureate (non-doctorate institutions) (n=912) and doctoral institutions (n=449). Carnegie goes on to offer a basic classification for all four-year institutions (n=2713) as doctorate granting institutions (n=294), masters' institutions (n=728), baccalaureate institutions (n=808), special focus institutions (n=851) and tribal colleges (n=32).

The United States Department of Education identifies postsecondary institutions as public (n=2008) and private (n=5,389), and nonprofit (n=1,892) and for-profit (n=3,497). The total institutions (n=7,236) identified the National Center for Education Statistics, the research arm of the Department of Education includes institutions (n=2,045) offering programs that do not offer degree programs (Ginder et al., 2014).

Enrollment in these institutions reflects the diversity of population and the differing reasons for attending colleges. The total enrollment for American higher education (n=28,305,025 includes institutions with undergraduate and diploma programs ((n=24,524,988; 77%) and graduates ((n=3,780,037; 13%), (Ginder et al., 2014). Degree seeking undergraduate enrollment in the United States has increased 48% since 1990 and is expected to hit 20.2 million students by 2023 (NCES, 2014). Student enrollment is heavily weighted towards women in both undergraduates (n=16,179,594; 57%) and graduate students (n=2,262,755; n=59%). The majority of aforementioned growth in enrollments is expected to be with women students, 18% vice 8% for males (NCES, 2014).

Many of the flaws associated with American higher education such as heavy student drinking and excessive partying, floating through school and academically adrift (Arum et al., 2011), poor post graduate employment rates, and dissatisfaction with employment preparedness present a picture of traditional age college students, those young adults entering post-secondary education right after high school, at roughly 18-19 years old (NCES, 2014). While traditional age college students make up the majority of full-time

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undergraduates at public (88%), private nonprofit (86%) and public 2-year (71%) schools, the majority of full-time students at 4-year private for-profit (71%) and 2-year private for-profit (52%) were over the age of 25 and are considered nontraditional students. Nontraditional students are 24 or older and have usually taken time away from school to work, serve in the military or engage in some other life experience. The impact of nontraditional students on enrollments is even more pronounced for part-time students. Other than at the 4-year (50%) and 2-year (52%) public institutions, the majority of part-time students at all other institutional types were nontraditional students over the age of 25. Nontraditional students make up the majority (60.3%) of all part-time students. A significant percentage of these students (47.5%) were 35 and older (NCES, 2014).

In addition to the complexity suggested by the Carnegie Foundation and the U.S. Department of Education, institutional diversity of purpose clouds the understanding of American higher education. In *Higher Education in America* (2013), Derek Bok suggests, "American colleges and universities do not have a single goal…(and) have not had a single unifying purpose for well over one hundred years (p. 28).

"The American college was conceived of as a social investment" (Thelin, 2004 p. 58) but as evolved over time. Clearly, early federal legislation such as the Morrill Land-grant acts of the mid 19th century, and 20th century laws associated with educating returning veterans from World War II, the National Education Defense Act of 1958, and the Higher Education Act of 1965 and its subsequent reauthorizations speak to the importance of higher education as a the need to support societal interests.

In *Uses of the University* (2001), Kerr wrote "the basic reality, for the university, is the widespread recognition that new knowledge is the most important factor in economic and social growth. We are just now perceiving that the university's invisible product, knowledge, may be the most powerful single element in our culture, affecting the rise and fall of professions and even social classes, of regions and even nations" (pg. xii). Kerr suggests the modern "multiversity" is a confluence of the purposes of universities of the past. From Cardinal Newman, the 19th century founder of the University of Dublin, the purpose of the university is "the high protecting power of all knowledge and science, of fact and principle of inquiry and discovery, of experiment and speculation; it maps out the territory of the intellect and sees that…there is neither encroachment nor surrender on any side" (pg. 1). Newman's view of 'liberal knowledge', which is related to all walks of life, lay in stark contrast to other scholars of his day who sought to limit the purpose of a university to only scientific related knowledge. "University training, said Newman, 'aims at raising the intellectual tone of society, at cultivating the public mind, at purifying the national taste, at supplying true principles to popular enthusiasm and fixed aims to popular aspirations, at giving enlargement and sobriety to the ideas of the age, at facilitating the exercise of political powers, and refining the intercourse of private life" (Kerr, 2001; p.2).

In, *Our under achieving colleges* (2006), Bok, raises the issues of "how much students learn" and suggests the discussion of performance must begin with a shared understanding of the role and purpose of higher education. He indicates the key outcomes of a college education should include "the ability to communicate, critical thinking, moral reasoning, preparing citizens, living with diversity, living in a more global society, possessing a 'breadth of interests' and preparing for work. This litany of purposes is not universal and there are a number of critics suggesting one or more of these ideals has little or no place in higher education. Hacker and Dreifus support the view of preparing students for work, particularly in the high-tech world is important but suggest, "that the purpose of college is not to make students into better citizens" (p. 5).

In discussing the *Great American University*, Cole (2009) suggests several things make a modern American university excellent including: faculty research productivity; quality and impact of research; grant and contract support; honorific awards; access to highly qualified students; excellence in teaching; physical facilities and advanced information technologies; large endowments and plentiful resources; large academic departments; free inquiry and academic freedom; location; contributions to the public good and

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excellent leadership. The paradox facing the American colleges and universities is that some of the things that make a great institution are the very things that create some of the issues reflected in *Will the internet ever replace colleges and universities as we know it today?* and within the comments made during the discussion.

Online education, in its many forms has been part of higher education on increasing levels since the development of the Internet (ARPANET) by the United States Department of Defense in 1969. The use of learning management systems (LMS), the ubiquitous presence and engagement of online and blended courses, and the digitization and mass distribution of library resources provide evidence that technology has changed forever how higher education distributes knowledge to its students. William Bowen (2013), President emeritus of the Andrew W. Melton Foundation and Princeton University, suggests "far greater access to the internet, improvements in internet speed, reductions in storage costs, the proliferation of increasingly sophisticated mobile devices, and other advances have combined with changing mindsets to suggest that online learning, in many of its manifestations can lead to at least comparable learning outcomes relative to face-to-face instruction at a lower cost" (p. 45).

There is some thought that online education in any form should be considered a disruptive innovation, "a process by which a product or service takes root initially in simple applications at a the bottom of a market and then relentlessly moves up market, eventually displacing established competitors (Christiansen, 2014). In a cautionary statement Christiansen and Eyring offer, "The downfall of many successful and seemingly invincible companies has been precipitated by a disruptive innovation-that is, an innovation that makes a complicated and expensive product simpler and cheaper, and therefore attracts a new set of customers" (Christensen, and Eyring, 2011, p. 47). Adoption of a total technology solution suggests that higher education move from a position focused on the education of students by developing them holistically, towards the view of students solely as customers, which may be at odds with the many of the aforementioned purposes.

Conclusion

"Education is not the learning of facts, but the training of the mind to think." Albert Einstein.

The purpose of this study was to investigate the perspectives of the participants involved in an online discussion about higher education and the impact technology and the Internet has or will likely have on its future. In reviewing and disaggregating the 376 comments to develop themes used in the analysis it became clear there was no consensus for a clear definition of what a college education was, who the students were, and what role technology plays, or could play in the educational process. This lack of understanding was compounded by the personal, and often limited views of the participants. Other than the author, there were no self-declared higher education scholars or researchers in the group, although faculty and administrators working in higher education made many of the comments. Many of the comments made by faculty and administrators reflected upon practices limited to experiences with online courses and massive open online courses (MOOCs) and not the diversity of role and function of higher education.

The aforementioned data suggest the importance of understanding the different types of students, traditional and non-traditional, and the diversity of needs and pressures these students place on the higher education system. Student needs, including those associated with remediation due to lack of preparation, knowledge and skill development for work and life in society, work-force retraining for displa-

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ced workers and veterans should be investigated in a holistic way before replacing an existing system of higher education with a technological solution.

Although the lack of understanding of the complexities facing American higher education was a limiting factor, a majority of the participants (n=37; 69.8%) felt that technology would not replace colleges and universities, as we know them today. In a recent interview with *Inside Higher Education*, Hilary Clinton, former U.S. Senator and U.S. Secretary of State, offers a prospective that would likely be accepted by the majority of participants in this discussion; "Online education can 'open doors' for many students, and may offer as high quality an education as anything in some fields or for some students. But technology is a tool, not a teacher. It cannot replace laboratory-based experiments" (Jaschik, 2014).

The discussion raises the need for more research associated with the various aspects of and problems facing higher education. More research is needed to address issues related to the rising costs of higher education and the subsequent impact on student debt known collectively as college affordability. Additional research should focus on the role technology can play in addressing institutional efficiency and effectiveness in delivering education to all of America's higher education students. Finally, understanding the different roles and functions of colleges and universities as well as the diversity of student needs and how technology could be used to support the educational process and transform American higher education should be explored.

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Özel Gereksinimli Çocuk Ailelerinin Bilişim Okuryazarlığı ve e-abdep kullanımları*

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ÖZET

e-abdep, zihin yetersizliği olan çocuğa sahip anne babalara yönelik hazırlanmış, çevrimiçi aile bilgi ve destek eğitim programıdır. Ailelerin e-abdep kullanımı öncesindeki bilişim okuryazarlığı durumları bilişim okuryazarlığı anketiyle; katılımcıların e-abdep'i tamamladıktan sonraki e-abdep kullanımına ilişkin görüşleri ise "Katılımcıların E-ABDEP eğitim ortamının kullanımına ilişkin görüşleri anketi" aracılığıyla toplanmıştır. Sonuçlar zihin yetersizliği olan çocuğa sahip ebeveynlerin de bilgisayar ve internet teknolojileri kullanarak bilgiye erişebileceklerini göstermiştir. Ayrıca Katılımcılar ile yapılan görüşmelerde katılımcıların tümü programa yönelik olumlu ve memnuniyet içeren görüşler bildirmiştir. Katılımcılar olumlu görüşlerinin yanı sıra E-ABDEP'in daha da iyi olabilmesi yönünde öneri odaklı görüşlerini de bildirmişlerdir.

***Anahtar Sözcükler**: Özel gereksinimi olan çocuklar, aile eğitimi, e-öğrenme*

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The Computer Literacy of The Families with The Children With Special Needsand Their Use of e-FISEP*

e-FISEP is an online family information and support education program that prepared for the parents who have children with intellectual disability. The computer literacy of the families before their use of e-FISEP was identified with Computer Literacy Questionnaire. The families' views about the use of e-FISEP were identified with "The Questionnaire of Participants' Views About Use of e-FISEP Learning Environment" after they completed e-FISEP. Results showed that the families with children with intellectual disability could reach the information by using computer and Internet technologies. Participants presented positive opinions about the program in the interviews. Besides, they also gave suggestions for that e-FISEP could be better.

Keywords: Children with special needs, family education, e-learning

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Participatory framework for Bologna process in Slovak Universities

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Abstract

Higher education institutions (HEI) in Slovakia have undergone the serious transformation (the adaptation to free market economy, Bologna process, etc.); however the participation of broad academic and student community on the transformation was not always assured. One of the promising approaches to change the existing situation was to introduce participatory electronic framework in the selected Universities for discussing the problems of educational policies in HEI in the framework of Bologna processes, which may have the potential impact on HEI, as well as, on broader society. Although e-participation methods have showed the promising potential for acceleration of changes related to solving educational problems and Bologna processes by better use of intellectual potential of universities, they also revealed the new problems that are briefly discussed.

Keywords: e-participation, e-demokracy, Bologna process, higher education institutions;

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1. Introduction

The economic transformation of Slovak economy was based on market principles since 1989. Supply, demand, public transparent competition is increasingly applied to education and research as well. While the business transformation was largely successful, the education and research suffered from the lack of financial resources, higher age structure of the academics, and often from complex legislation. This has hampered the organization learning at the Universities. It is thus believed that further strengthening the participation of all HEI stakeholders may help to accelerate the learning process and may also enable to attain better quality of results from on-going Bologna process.

The Slovak Republic is the only EU country that spends less on education than four per cent of GDP. The best results reported in this criterion Denmark (7.83 percent), Cyprus (6.93 percent) and Sweden (6.69 percent), "said Andrej Kralik of the European Commission Representation in Slovakia. Also, Commissioner for Education, Culture, Multilingualism and youth Androulla Vassiliou urged Member States not to cut appropriations for education, in spite of the difficult situation, in which they find themselves in crisis.

In spite of these difficulties Slovakia is one of the signatories of a unified system of higher education - the Bologna Declaration. The Bologna Declaration committed its signatories (at present 47 countries) to meet six primary objectives:

1. adoption of the system easily understandable and comparable diplomas,
2. adoption of a system based on two cycles of study (currently has a three-stage)
3. adoption of the credit system (ECTS),

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4. improvement of the mobility,
5. improvement of European cooperation in quality assurance and
6. strengthening the European dimension in higher education

2. Theoretical facts – purpose of study

One of the key aspects towards the success of the Bologna Process is the close cooperation and interaction between governments, higher education institutions, students, staff, employers and quality assurance agencies. Our team addresses this problem though e-participation platform developed in the framework of MyUniversity project

"MyUniversity" is a project conceived by the European Commission, whose aim is to bring together in close cooperation all university members (students, staff etc.) and university stakeholders, by the means of a transparent and user friendly e-participation (and e-democracy as well) platform. Through the use of this platform, the participating universities will be able to engage their members and stakeholders on multiple issues, to get their feedback in both local and European level.

The concept of e-democracy represents the support of democracy by ICT (information and communication technologies). It includes any electronic communication tools, enabling /empowering citizens in their efforts to establish the responsibility of ruling politicians for their works in public affairs. (Peart, 2007)

For the purposes of this study we will use definition of e-Participation by Macintosh, who describes tools for it as the use of information and communication technologies in order to support "information retrieval, top-down engagement or bottom-up empowerment". Suggested tools for these activities are often exemplified by webcasts, blogs, chat interviews, discussion boards, quick polls, surveys and petitions; in some cases also decision-making games. (Macintosh, 2004)

Although the information about Bologna process is widespread on websites, however the detailed knowledge necessary for the effective e-participation in this process is not common among the stakeholders. The information on Bologna, process is provided in many official documents, that are not very interesting for reading, and sometimes written by high level language.

As an example of reality can give a short survey (obtained through the discussion module MyUniversity portal) among the ordinary students of the University of Presov, where the question: "What associations do you have when hearing the word "BOLOGNA? The most common answers were:

a) „The first thing my mind is spaghetti and Italy. And it is also the last"
b) „Firstly football team in this city, but spaghetti too and the old university"
c) „Nothing"
...

Analysis of the information available from other European countries, reveal the certain administrative and implementation problems when applying the Bologna principles into national education systems.

Such is for instance the Portuguese experience, where the policy implementation of Bologna process tends to present favorable progress and convergence of results, yet in spite of favorable picture of policy outcomes, the reform is far from being achieved in substance. So far, not all the constituencies of HEIs (e.g. academics) are involved and share the same guiding principles. (Veiga et al. 2008)

Often the Bologna process is oriented on new degree courses and the principal innovations (credits, modules, new types of dissertations) supervised by the "political" heads (deans of faculty) and by the few collaborators (Moscati, 2006). Thus much broader participation (including the e-participation) of academics and students may help to overcome this problem not only in South Europe, but also in other countries where the problems are often quite similar.

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While there is the growing volume of literature concerning the theory and practice citizen e-participation and e-democracy, the literature on e-participation of the university stakeholders is practically absent, and the experience in this field is most probably absent or quite rare.

3. Methods

MyUniversity project equips the universities with a cutting edge e-Participation platform, which provides them the means to reach out all their members and stakeholders, informing them of the issues under debate and providing them with innovative interactive tools so they can actively participate in the process. Thus providing the higher education decision making process with valuable input towards future polices and legislation.

MyUniversity is the European Union Seventh framework project which is being tested by universities in Bulgaria, Lithuania, Spain, Slovakia and Sweden. Potentially the project has 400,000 users at these universities, although only the small fraction uses the platform at this moment.

The project engages the university members and stakeholders in the higher education decision making process and gathers their opinions on specific policy issues, action plans, strategies, student mobilization and university life in general.

MyUniversity platform has been developed on Gov2DemOSS - the open source, informative and collaborative civic engagement platform that provides an efficient channel for governments and, alternately community groups, to keep their constituents informed, manage their information repositories, enable transactions and gauge public opinion. In addition, it is also important to mention that MyUniversity platform is an open source solution, offered under a GPL/GNU license.

These participation methods (modules) are implemented in MyUniversity platform and have been used for attaining the results of this research.

ePetitions allow users to address a petition signed by multiple citizens (i.e., website users) to a local official. This module provides valuable input for the decision making processes as it helps to identify the issues that are important to their citizens (students, academics).

Forums are very powerful tools in a participation environment, if used correctly. It allows the user to engage the students, academics, teachers on issues that are important to them and receive a wide range of opinions that can be taken into account when deciding on local – university policies.

Newsletter – The platform allows sending newsletters to all registered users on their e-mail address. Additionally, these newsletters can also available on MyUniversity websites for the broad public.

Processes – A Participation process is in fact a pseudo-module as it combines a variety of other module's functionalities (e.g., surveys, online documents, forums…) in order to allow the students, academics, teachers to interact with each other and carry out on-line participation processes related to local - university issues. In the consultant's experience, these on-line participation processes can either run alongside traditional participation, as an additional channel, to reach more users or purely on their own, with the same effectiveness.

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4. Discussion of the results

The applied methods enabled the authors to test the participatory electronic framework for discussing the problems of educational policies in HEI in the framework of Bologna processes, which may have the potential impact on HEI, as well as, on broader society. The illustrative scheme (mechanism) is shown on the figure 1.



Figure 1. Scheme of the MyUniversity e-participation mechanism

The e-participation discussions related to Bologna process have not been so far very fruitful. Probable reason for that is the fact that predominant approach to implementation of Bologna process was top-down. Slovak Ministry of education and Accreditation committee has defined the guidelines that have to be followed by the universities, providing them the limited time for their implementation. Usually the management of the faculties demanded the staff to quickly implement partial solution, while they often have not been aware of the "full picture", which rather the domain of members of the narrow expert groups and few managers. Naturally such approach provided the limited space for the broad participation of the stakeholders.

Norwegian researchers correctly point out that the Internet (and e-participation methods) largely serves to activate people who are already politically active. (Saglie, J , Signy, I. 2009) It is thus quite difficult to activate the academics and students that did not actively participate in Bologna process discussions before. The problem of our so far realized research was that we have concentrated our effort on the use of „ready to go techniques", and only later we realized the complexity and broad scope of the activities that are going on in HEI. Furthermore the e-participation in Bologna process may be more successful when we will better understand the real needs and preferences of the participants and the stakeholders. According to (Øystein S. et al., 2011) the stakeholders are often treated as the homogenous entities often resulting in oversight of key interests. There is also the question of activation of the student parliaments

Serious problem of the Slovak Universities are the low wages of the University teachers. Although the living costs are not very different from the Western Europe, the wage of full time professor is around € 1000 net. As a result of it in the majority in the University staff prevail the older conservative teachers that in addition have additional jobs, in order to be able to pay the pay their family expenses. The uncompetitive wages make it difficult to retain the younger staff. The existing staff tends to keep the high level of their expertise, however they have less time to take care of quality of pedagogy, the participation aspects of the decision making process, etc. The innovation in the orientation of the Universities toward Bologna process is mostly top-down driven by obligatory guidelines, which however do not enable to understand the Bologna process as the whole, but they are rather oriented on the technical aspects of its implementation. The administrative university staff is even less paid, and less motivated and slimmed down. That means that some administrative more complex tasks have to be done by the university educators, which reduces their available time for other tasks. Moreover the administrative staff is often unable to effectively help the students with the mobilities to other countries. Role of the universities in Slovakia for the development of the society is verbally praised, but de facto neglected.

5. Conclusions:

When designing e-participation structure with the goal of discussing the problematic issues of the implementation of Bologna process in Slovak Universities. First of all it is necessary to provide the participants clear and "digestible" information about the Bologna process. Although there are many web pages that inform about it, their reading is not always easy, and they often do not address the needs of readers. Only informed and motivated participants would be able to discuss the implementation problems of Bologna process at the universities and propose the solutions, so that the results of the discussion may help the decision makers at the University level (already overburdened by the variety of other administrative tasks), or may provide the interesting insights for the National Bologna group. E-participation should be understood in the broader framework of the participation of the students and teachers in the University life. At present both categories have the representation in the faculty and University senates, however the discussion Bologna process is not the priority there. In order to achieve higher participation of the students, we think that, they should be provided by the additional training that would enable them to understand the complexities of the Bologna process, which are at present not understood by many teachers as well.

Moreover there is the problem. MyUniversity is just one portal among others, where the people can discuss the problems. There is the strong competitions from social media, such as the e.g. Facebook, where the student feel more at ease to explain their views. We think that the questions of the computer literacy nowadays represent the smaller problem. There is another problem for the e-participation, however, that is usually not reflected in the literature. It seems to us that there is the growing number of professionals, who spend a long hours writing the mails and papers, and they are not willing to take the active part at e-participation initiatives, social media etc., since they are already overburdened by the cyberspace.

Thus in the last year of the MyUniversity project we will have to focus much stronger attention especially on solution of these issues.

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Perception of undergraduates on the adoption of mobile technologies for learning in selected universities in Kwara state, Nigeria

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Abstract

This study investigated the perception of undergraduates on the adoption of mobile technologies for learning. The respondents included 182 randomly selected undergraduates from three universities in Kwara State. The data collected through a researcher-designed questionnaire were analyzed using percentages, means, standard deviation and the t-test statistics. The results revealed among others that no significant difference existed in the undergraduates' perception on the adoption of mobile technologies for learning based on gender. It was recommended that stakeholders in the education sector should encourage undergraduates by procuring, providing or subsidizing mobile technologies that can be adopted for learning.

*Keywords:*Mobile Technologies, Adoption, Perception, Learning, Kwara State, Nigeria

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1. Introduction

Learning with mobile technology is an emerging educational phenomenon resulting from the integration of electronic learning and mobile technologies. Mobile learning has transitioned from a subordinate method of electronic learning into its own educational area and it has become a new field of research globally (Pollara & Broussard, 2011). The increasing use of mobile technology for learning is creating a paradigm shift for electronic learning. Mobile learning provides significant learning prospects for students who regularly use mobile devices like personal digital assistance, android, smart phones, and so on (Gedik, Hanci-Karademirci, Kursun & Caglitay, 2012).

Mobile technology is defined as handheld information technology devices or artifacts that encompass hardware (devices), software (interface and applications), and communication (network services) (Pamela, 2011). Hashemi, Azizinezhad, Najafi and Nesari (2011) defined mobile learning as the use of technological devices or technologies, which include mobile phones, androids, smart phones, iPad, and so on, to extend the reach of teaching and learning to occur across multiple locations. Mobile learning is the wireless delivery of learning content to students through handheld mobile technologies anytime and anywhere (Pamela, 2011).

The prevalence of these technologies among students is transforming the educational system in Nigeria which is regarded as one of the third world countries. The continued growth of mobile technology as an educational tool is as a result of its flexibility and pervasiveness (Iqbal & Qureshi, 2012). The ease of use, portability and relatively cheap procurement make the mobile technologies ready tools that can be used by students generally.

El-Hussein and Cronje (2010) opined that the use of mobile devices for learning can enlarge the scope of tertiary education and allow it to better reach students. The use of these technologies for learning is equally capable of providing a more interactive and effective type of learning to meet individuals' learners needs. Mobile technology can be beneficial for higher education due to its ubiquitous nature and ability to shape information processes (Schepman, Rodway, Beattie & Lambert, 2012). Mobile technology offers the ability to engage in learning activities such as communication and content material sharing between students and lecturers, students and subject experts, and among students and their environments.

In addition, mobile technologies have the ability to bridge pedagogically designed learning contexts, facilitate learners' generated contexts and content (both personal and collaborative) while providing personalization and ubiquitous social connectedness which makes it to be different from the traditional learning environment (Cochrane & Bateman, 2009). This is why mobile technology can be referred to as social technology which provides social learning environment for learners.

In the general computer literature, there is evidence that students, who are competent computer users, are more likely to perceive new technology positively and is more ready to adopt new technology (Shih, Munoz & Sanchez, 2006). Lu and Viehland (2008) found no support for the notion that past e-learning experience influenced mobile learning adoption. Research on the adoption of technology among educators and students may reveal some of the factors that may be paramount in the introduction of mobile learning and this insight may be too general to be useful to institutional decision-makers considering learning with mobile devices.

Meanwhile, pilots and small scale trials have been undertaken on mobile learning adoption (Uzunboylu & Ozdamli, 2011; Williams, 2009; Akour, 2009). The small scale and pilot studies lack the broadness to give substantial confidence in the results. Also, there are no conclusive studies on the influence of gender in the adoption of technological devices (Adegbija & Bola, 2013).

Therefore this study investigated the perception of undergraduates on the adoption of mobile technologies for learning in selected universities in Kwara State, Nigeria. This is very necessary because of the ailing educational sector in Nigeria. The use of mobile technologies in learning could contribute to the effectiveness of instruction and increase availability of education to the thousands of the youths waiting and yarning for global information or knowledge lacking in higher institutions in Nigeria.

2. Purpose of the study

The main purpose of the study was to investigate the perception of undergraduates on the adoption of mobile technologies for learning in selected Universities in Ilorin, Kwara State, Nigeria. Specifically the study investigated the:

5. Perception of undergraduates on the availability of mobile technologies that can be adopted for learning in Universities in Kwara State, Nigeria
6. Perception of undergraduates on the adoption of mobile technologies for learning in selected Universities in Kwara State, Nigeria
7. Influence of gender on undergraduates' perception on the adoption of mobile technologies for learning in selected Universities in Kwara State, Nigeria.

Hypothesis: The hypothesis tested was:

There is no significant difference in the undergraduates' perception on the adoption of mobile technologies for learning in selected Universities in Kwara State, Nigeria.

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3. Methodology

This research is a descriptive research of the survey type. The survey involved the use of a researcher-designed questionnaire used to collect data from randomly selected undergraduates from the three purposively selected Universities (University of Ilorin, Kwara State University and Al-Hikmah University) in Kwara State, Nigeria. A total of 182 undergraduates from the three Universities responded to the researcher-designed questionnaire. The instrument used to collect the data was validated by ten undergraduates and three lecturers from Kwara State College of Education, Ilorin, Nigeria.

The data obtained were subjected to both descriptive and inferential statistics. Frequency counts, percentages and mean score were used to answer the research questions. The data collected from the hypothesis generated were analyzed using the t-test statistics.

4. Data analysis and results

Research question 1: The question was asked in order to find out the perception of undergraduates on the availability of mobile technologies that can be adopted for learning in selected Universities in Kwara State, Nigeria.

Table 1: Perception of Undergraduates on the availability of mobile technologies that can be adopted for learning in selected Universities in Kwara State, Nigeria

S/N	Items	Personal Access	Access through the library	No access	Access through peers	Access through parents
1	Cell phone	162 (89%)	4 (2.2%)	7 (3.8%)	1 (0.5%)	8 (4.4%)
2	Android	132 (72.5%)	7 (3.8%)	21 (11.5%)	15 (8.2%)	7 (3.8%)
3	Smart phones	129 (70.9%)	9 (4.9%)	22 (12.1%)	17 (9.3%)	5 (2.7%)
4	Personal digital assistant	42 (23.1%)	32 (17.6%)	74 (40.7%)	19 (10.4%)	15 (8.2%)
5	Apple's iPad	56 (30.8%)	12 (6.6%)	54 (29.7%)	46 (25.3%)	14 (7.7%)
6	Mp3 players	105 (57.7%)	13 (7.1%)	23 (12.6%)	38 (20.9%)	3 (1.6%)
7	E-book reader	68 (37.4%)	54 (29.7%)	28 (15.4%)	23 (12.6%)	9 (4.9%)
8	Laptop	128 (70.3%)	9 (4.9%)	9 (4.9%)	18 (9.9%)	18 (9.9%)
9	Tablet PC	63 (34.6%)	9 (4.9%)	36 (19.8%)	38 (20.9%)	36 (19.8%)
10	iPod touch	53 (29.1%)	14 (7.7%)	54 (29.7%)	33 (18.1%)	8 (15.4%)

The results in table 1 suggest that out of 182 respondents, 162 (89%), 132 (72.5%), 129(70.9%), 105(57.7%), 128(70.3%) have personal access to cell phone, android, smart phones, Mp3 players and laptop respectively. Availability and accessibility of other devices by the respondents have low percentages on, access through the library, no access, access through peers, and access through parents.

Research question 2: The question was asked in order to find out the perception of undergraduates on the adoption of mobile technologies for learning in the selected Universities in Kwara State, Nigeria. Thus, the researchers analyzed the responses from the items on the questionnaire and the results are as shown in table 2.

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Table 2: Perception of undergraduates on the adoption of mobile technologies for learning in the selected Universities in Kwara State, Nigeria

S/N	Statements	Agree	Disagree	Mean	Rank
1	Mobile technologies will enhance learning better than other technologies when adopted	165(90.7)	17(9.3)	3.3802	2nd
2	I am interested in knowing what resources are available if mobile technologies are adopted	166(91.2)	16(8.8)	3.4011	1st
3	I am ready to adopt mobile technologies if introduced for learning	156(85.7)	26(14.3)	3.2323	6th
4	Adoption of mobile technologies for learning will reduce workload on students	152(83.6)	30(16.4)	3.1918	8th
5	I am interested in the adoption of mobile technologies for learning	155(85.2)	27(14.8)	3.2018	7th
6	I intend to adopt mobile technologies for learning in future	157(86.3)	25(13.7)	3.2663	5th
7	I intend to purchase mobile technology for learning because I do not have now	158(86.8)	24(13.2)	3.2737	4th
8	I intend to advise my colleagues to adopt mobile technologies to access internet for reading lecture notes online	159(87.4)	23(12.6)	3.2837	3rd
9	Adoption of mobile learning will reduce work load for lecturers	148(81.4)	34(18.6)	3.1429	9th

Note: Strongly agree and agree were merged to indicate agree, while disagree and strongly disagree were merged as disagree for convenience in this study.

Results in table 2 reveal that statement 2 was ranked first with a total number of 166 (91.2%) respondents which agreed to the statement that, I am interested in knowing what resources are available if mobile technologies are adopted; while a total number of 16 (8.8%) respondents disagreed. Ranked second was statement 1 with a total number of 165 (90.7%) respondents that agreed that mobile technologies will enhance learning better than other technologies when adopted while 16 (8.8%) respondents disagreed. Statement 4 was ranked 8th with a total number of 152 (83.6%) respondents that agreed to the statement that adoption of mobile technologies will reduce workload on students. Lastly, statement 9 was ranked 9th with a total number of 148 (81.4%) respondents which agreed that adoption of mobile learning will reduce work load for lecturers.

Table 3: Influence of gender on undergraduates' perception of the adoption of mobile technologies for learning in the three Universities in Kwara State, Nigeria

Sex	N	Mean	Std. Deviation	Df	t	Decision
Male	114	29.7544	3.35657			
				180	2.87	
Female	68	28.1912	3.86047			
Total	182					

From table 3, it can be deduced that the t-cal value of t(180), = 2.87 which is greater than 0.05 is not significant because the probability value 0.226 is higher than the alpha value of 0.05. This indicates that no significant difference exists in the extent to which male and female undergraduates perceived the adoption of mobile technologies for learning in the three universities in Kwara State.

Therefore, the hypothesis which states that there is no significant difference in the extent to which male and female undergraduates perceived the adoption of mobile technologies for learning in the three universities in Kwara State is accepted. This means that students' gender does not influence the perception of undergraduates in the adoption of mobile technologies for learning in the three universities in Kwara state, Nigeria.

5. Conclusion and recommendations

The findings of this study showed that the undergraduates have personal access to cell phone, Android, Smart phones, Mp3 players and laptops in the study area and they are favorably disposed to the adoption of mobile technologies for learning. The undergraduates also showed their willingness to procure their own mobile technology devices if they are introduced for learning. The findings of the study further showed that there is no significant difference in the extent to which male and female undergraduates perceived the adoption of mobile technologies for learning in the three Universities in Kwara State, Nigeria.

It is recommended based on the findings of this research that government should motivate and encourage both students and their lecturers to incorporate the use of mobile technologies for learning in Universities as a whole. Gender should not be considered in the adoption of mobile technology, instead both male and female undergraduates should be given equal exposure and opportunity in the use of mobile technologies when they are eventually adopted for learning.

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Perceptions of tourism students on thermal tourism in Afyonkarahisar

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Abstract

This study aims to analyze the strengths, weaknesses, opportunities and threats of thermal tourism through the opinions of tourism students. Students getting tourism education is the population of this study. A questionnaire was used as the data collection instrument, and 1135 students in various levels of tourism departments participated in this study. According to the results, students see the existence of a university as the strength and non-existence of an airport as the weakness of Afyonkarahisar. Besides, they think that thermal tourism's being done during the year is the opportunity and construction problems' negative effects on tourism are the threats.

Keywords: *Thermal tourism; tourism students, health tourism, SWOT analysis, Afyonkarahisar-Turkey*

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1. Introduction

Turkey is among the top six countries in terms of tourist destinations, and among the top twelve countries in tourism income. (UNWTO, 2013). This shows the importance of tourism as a sector in Turkey. The importance of tourism takes place in government policies and strategic plans related to tourism. Using tourism sources efficiently, getting more shares from tourism market and increasing the economic support of tourism are among the strategic targets of Turkey tourism. Another one of these targets is to improve alternative tourism opportunities. Thermal tourism is a type of tourism which can be improved as an alternative to sea-sun-sand tourism, the traditional Turkey tourism, and can be done during 365 days of the year. Providing the expected benefits from thermal tourism is only possible by making situation analysis, managing the current situation and planning the future of this sector carefully. One of the ways to achieve this is to conduct regional SWOT analysis which identifies the strengths, weaknesses, opportunities and threats regarding tourism (Emir, 2011). It can be said that SWOT analysis is a subjective evaluation achieved by listing the data that are helpful in understanding, discussing and decision making process in a logical order (Gürlek, 2002). SWOT, which is an important method used to analyze weak sides of the rivals and form defending strategies against their strengths, is also a type of analysis helping managements to evaluate inner and outsider environment by determining the strengths, weaknesses, opportuni-

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ties and threats (Kotler et al., 1999; Cebecioğlu, 2006; Akgemici, 2007; Kreiner and Wall; Haines, 2009: 154).

When the literature is examined, it can be seen that there are numerous studies on thermal tourism. It can also be seen that these studies mainly focus on the reasons why the destination is visited by tourists or determining the tourists' satisfaction levels regarding the tourism services and touristic managements in the region. In their study which tried to determine the thermal tourism potential of Kızlıcahamam Sey thermals, Göyün and Akpınar (2003) focused on the fact that the socio-economic development of local people can be ensured by enhancing the current tourism facilities and promoting them. In their study investigating the determining features of destination image, İlban et. al. (2008) found that Gönen is a clean and modern destination with a high quality of life; transportation is convenient and prices are cheap there; recreation activities and information about them are enough; its people are kind and friendly; it has got some superior features in terms of dishes and handcraft compared to other regions. In the study conducted by Tunçsiper and Kaşlı (2008) on thermal tourism of Gönen, it was stated that tourism has a significant effect on transportation, entertainment, beverage retailers, dairies, petrol stations etc.. Besides, in their study which aimed to identify the factors influencing the improvement of tourism, İlban and Kaşlı (2009) determined that marketing, recreational facilities, entrepreneur of private sector, planning, tourism variety and educated work power are the factors that may prevent the improvement of tourism in Gönen. Another study to identify the image of thermal tourism was carried out by Emir and Durmaz (2009) in Afyonkarahisar. The results of their study showed that Afyonkarahisar was evaluated as a good destination and it was trendy to join thermal activities in the region. On the other hand, the participants stated that the region was not safe and marketing services were not enough. In the study conducted by Serpen et. al. (2009), it was emphasized that a big geothermal pipeline was being planned to carry hot water to the hotels in Afyonkarahisar and this city would have the most important balneology facilities of Central Anatolia.

Taş (2012) investigated how Afyonkarahisar developed in terms of thermal tourism and thermal sources of the city. Sandıkçı and Özgen (2013) conducted the tourism SWOT analysis of Afyonkarahisar through the opinions of staff working in hotels with tourism management document. According to this, the thermal tourism image of the region and the existence of rich natural sources regarding health tourism were found to be the strengths of Afyonkarahisar. However, the weaknesses of Afyonkarahisar were found to be as not benefiting from government incentives enough and travel agents' ineffectiveness in performing their duties. On the other hand, the results showed that the airport founded near the region and thermal tourism's being done during the whole year were found to be the opportunities, and customers' increasing bargain power and new thermal destination investments for this market were found to be the threats. In the study conducted by Çiçek et. al. (2013) to identify the places of inner Anatolian thermals waters and thermal services in Turkish health tourism, it was found that the hotels in the region were for domestic market but they were insufficient for foreign markets.

2. Method

In this part, there will be a brief mention on data collection, participants, data analysis and results.

2.1. Data collection

A questionnaire was used as the data collection method. The questionnaire developed by the researcher by examining previous studies (Crouch and Brent Ritchie 1999; Mueller and Kaufmann, 2000; Tabak, 2003; Gökçe, 2006; Durgun, 2006; Durgun, 2007; Çelik and Murat, 2008; İlban et. al., 2008; Çelik, 2009; Wickramashinghe and Takano, 2009; Subramoniam et al., 2010; Türksoy and Türksoy, 2010) on this topic has two parts. The first part has four questions including several demographic features of the participants. The second part consists of 60 items regarding the identification of strengths, weaknesses, opportunities

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and threats of Afyonkarahisar. According to this, there were 19 items regarding strengths, 20 items regarding weaknesses, 12 items for opportunities and 9 items for threats in the questionnaire. The items in the questionnaire were 5-point Likert scale ranging from "strongly disagree=1" to "strongly agree=5".

2.2. Participants

Students getting tourism education in Afyonkarahisar is the population of this study. Due to the big amount of population, time limitation, costs etc., sampling from 1453 students 350 from high schools, 759 from vocational schools, 344 bachelors was employed. After excluding the incomplete and erroneous questionnaires, 190 students from high schools, 682 from vocational schools and 263 from university department were included in the study.

2.3. Data analysis

The obtained data were analyzed through SPSS program and individual features of the participants are presented with percentages and frequencies. Besides, the opinions of the participants regarding the SWOT of Afyonkarahisar were given with the mean and standard deviation scores for each item and factor. In addition to this, independent sample t-test was used for the groups (gender, internship) having two variables, and one way ANOVA for the groups (age, school) with three or more variables. At the end of the variance analysis, Tukey test was used for the comparison of groups with significant differences.

2.4. Results

The t-test and ANOVA results regarding the comparison of students' evaluation of the SWOT analysis according to demographic features are presented in Tables 1 and 2. When Table 1 is examined, it is seen that the evaluation of students regarding the weaknesses and threats does not differ significantly according to the gender ($p>0.05$), whereas there is a significant difference between the evaluations regarding strengths and opportunities in terms of gender ($p<0.05$). According to the mean scores, it can be seen that female students have more negative evaluations regarding the strengths and opportunities of thermal tourism in Afyonkarahisar. It is also seen in Table 1 that the evaluations regarding strengths, weaknesses and opportunities differ significantly according to students having done internship or not. The mean scores show that students who haven't done an internship have more negative evaluations on the strengths and opportunities of thermal tourism in Afyonkarahisar while they have more positive opinions on weaknesses compared to the students who have done their internship.

Table 1

The Comparison of Students' Evaluation Regarding the SWOT Analysis in terms of Gender and Internship

Variables	Groups	STRENGTH		WEAKNESS		OPPORTUNITY		THREAT	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Gender	Male	3,30	0,70	3,40	0,78	3,18	0,72	3,17	0,77
	Female	3,15	0,66	3,34	0,79	3,00	0,71	3,13	0,77
	p (sig.)	**0,000*****		0,244		**0,000*****		0,356	
Internship	Yes	3,31	0,65	3,42	0,75	3,17	0,71	3,20	0,72

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	No	3,17	0,72	3,32	0,82	3,04	0,73	3,11	0,82
	p (sig.)	**0,002****		**0,028***		**0,003****		**0,066**	

*p< 0,05; **p< 0,01; ***p< 0,001

According to the results of variance analysis in Table 2, there is a significant difference among the ages of students in terms of their evaluation regarding strengths, opportunities and threats of Afyonkarahisar in terms of thermal tourism. The mean scores of "19 and under" regarding the strengths of Afyonkarahisar are more significant than the ones belonging to the other groups. However, it is seen that their mean scores on opportunities are positive, and they had negative evaluations on threats. According to the results in Table 2, it is seen that students' opinions regarding the strengths, weaknesses, opportunities and threats do not change significantly according to their school of education. Based on this, it can be said that high school students' regarding the strengths and opportunities of Afyonkarahisar are more positive than other students. Briefly, it is clear that high school students paid more attention to the strengths and opportunities of Afyokarahisar. Besides, it was revealed that university students' opinions on the weaknesses and threats of thermal tourism in Afyonkarahisar were more negative than the opinions of high school and vocational school students. This finding shows that the perception levels of university students regarding the weaknesses and strengths of thermal tourism in Afyonkarahisar are very high.

Table 2

The Comparison of Students' Evaluation Regarding the SWOT Analysis in terms of Age and School of Education

Variables	**Groups**	**STRENGTH**		**WEAKNESS**		**OPPORTUNITY**		**THREAT**	
		Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Age	19 and under	3,38 a	0,66	3,44	0,75	3,29 a	0,72	3,32 a	0,67
	20-21	3,21 b	0,70	3,33	0,79	3,08 b	0,72	3,10 b	0,79
	22-23	3,20 b	0,67	3,46	0,78	3,08 b	0,71	3,24 ab	0,74
	24 and over	3,28 b	0,53	3,31	0,77	2,99 b	0,61	2,92 c	0,70
	p (sig.)	**0,016***		0,130		**0,002****		**0,000*****	
School	High school	3,62 a	0,62	3,20 a	0,72	3,55 a	0,59	3,07 a	0,78
	Vocational School	3,16 b	0,69	3,25 a	0,77	3,04 b	0,75	3,20 b	0,71
	University	3,18 b	0,61	3,82 b	0,69	2,98 b	0,63	3,35 c	0,73
	p (sig.)	**0,000*****		**0,000*****		**0,000*****		**0,000*****	

*p<0,05; **p<0,01; ***p<0,001 ^{a,b,c} *denote difference in the groups.*

3. Conclusions and discussions

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The most important feature of this study is that it makes the SWOT of thermal tourism in Afyonkarahisar through the opinions of students getting tourism education. It is a distinct advantage for Afyonkarahisar to have variety of schools (high, vocational, university) giving tourism education. Especially, the existence of a university in the city was stated the strongest side of Afyonkarahisar in providing the required qualified staff. This situation is an important opportunity in the development of the cooperation of universities and the sector. The development of university-sector cooperation and benefiting from health experts from universities in cure treatment was also emphasized in Sandıkçı et.al. (2013). Besides, it was highlighted in Akbulut (2010) that related departments at universities, non-governmental organizations and local administrations should increase their studies in thermal tourism. Especially the inclusion of tourism schools in the studies related to the tourism planning and marketing of the region will affect the decisions positively. According to the participants of the study, the increasing popularity of the city and Afyonkarahisar's natural sources for health tourism are the most important strengths of the city. In the SWOT analysis of thermal tourism in Afyonkarahisar conducted by Sandıkçı and Özgen (2013), rich natural sources of the city, the image of it and the increasing popularity of Afyonkarahisar were found as the strengths of the city. It is emphasized in Taş (2012) that the features and the abundance of thermal water sources is not enough for the development of tourism on their own. In addition to this, it was expressed that available transportation facilities, promotion and marketing of thermal areas efficiently and the existence recreation activities supporting thermal tourism are also necessary. In recent years, Afyonkarahisar has been an important market in the region with the public incentives provided for tourism investments. There has been considerable increase in the bed capacity of the city with these incentives. This situation attracted the attention of travel agencies to the region and increased the popularity of the city more. Besides, it is understood that strength of thermal tourism in Afyonkarahisar is the existence of rich natural sources appropriate for health tourism. The factors which were received the least scores by students in terms of the strengths were the rich cuisine of Afyonkarahisar, its being the junction point of Turkey in terms of transportation and Turkey's nomination of European Union. Afyonkarahisar's being a junction point in terms of tourism should be used more efficiently.

There is a significant difference between the gender of students in terms of their evaluation regarding the strengths and opportunities of thermal tourism in Afyonkarahisar. It is seen that female students had more negative opinions than males regarding the strengths and opportunities. In addition to this, it is revealed that students' opinions on strengths, weaknesses and opportunities differ significantly according to their internship. While students who haven't done their internship have more negative opinions on the strengths and opportunities of thermal tourism in Afyonkarahisar, the ones who have done an internship have more positive opinions on the weaknesses of the city. This situation can be explained through students' perception of tourism in their mind. It can be said that 3S (sea, sand, sun) is still effective in the minds of students. Besides, the inexperience of students without an internship in the field and the possibility that they may compare Afyonkarahisar with more popular destinations would be other reasons.

As the results and findings of this study suggest, the existence of schools giving tourism education in Afyonkarahisar is a distinct advantage for the city. It is possible to meet the any level of staff needed by hotel managements from these schools. In addition to this, since Afyonkarahisar is a junction point of Turkey, the completion of high-speed train projects will contribute to the attractiveness of the city. On the other hand, there is not an airport in Afyonkarahisar, Zafer airport, 60km to Afyonkarahisar, can be used more efficiently in transportation. Another important topic is that the current thermal sources should be used in a more balanced way which will not affect the life quality of future generations. Moreover, it would be beneficial tourism shareholders to form a mutual strategy for the promotion and marketing of the region. Especially, national mass media should be used, and public and private shareholders should benefit from social networks for the promotion marketing of the city. Recreational activities that would enrich thermal tourism services should be increased and especially cure treatments should be supported with diets. Although an average cure treatment lasts 21 days, it is seen that the staying period in the hotels of Afyonkarahisar is 2.2 days when the accommodation statistics are examined. The study conducted by Kervankıran and Özdemir (2013) shows that the staying periods of tourists in the hotels of Afyonkarahisar is below the standards of thermal centers. This situation may stem from the fact that the visitors of hotel managements in Afyonkarahisar include people who have less visiting periods with the purpose of relaxing, work or meeting but not cure treatment. For this reason, thermal hotel managements should

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develop their services on cure treatments and direct themselves to customers who need such treatments.

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Preservice Teachers' Views about e-book and their Levels of Use of E-Books

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Abstract

The purpose of this study was to determine the views of preservice teacher about e-books and the level of their general knowledge about these kinds of technological tools. The subjects in this study consisted of 543 (310 females and 233 males) students. In line with the purpose of this study, both qualitative and quantitative methods were applied. The results demonstrated that the use of e-books increased in accordance with the students' levels. It was found out that the general knowledge levels of the social sciences students about e-books were lower when compared to the students from the departments of Science, Mathematics and Foreign Languages. It was seen that 19,15% of the students did not make any preference between e-books and conventional printed books while 54,88% of them preferred printed books and 25,97% them e-books.

Keywords: e-books, reading books, digital printing, e-book readers;

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1. Introduction

Widespread use of computers and the Internet has also given rise to software development. Parallel to this, transferring books into the digital environment resulted in the birth of e-books. However, so far, there have been various responses to such questions as what e-book is and what the elements of e-books are. In a study evaluating e–book and digital broadcasting throughout the world, Önder (2010) defined e-book "as a digitalized form of some or all printed books or as one produced completely in the digital environment, which can be viewed and accessed on any portable device like computers or specially designed e-book readers". Furthermore, it is a software-based electronic form with its rich text features (including bookmarker, highlighting, focusing and so on) that allow all the functions of conventional book reading. In a different definition, it is stated that e-books are a combination of software and hardware allowing texts to be designed in electronic environments or texts in the formats of doc, txt and pdf, which can be viewed with other devices besides computers (Morgan, 1999: 36; Cliff & Dearnley 2003; Vidana 2003; Lam & Ark., 2009). As the early e-books were beyond meeting the needs of e-book readers, current devices are now more user-friendly, which has led to the spread of these devices with the developments in technology. Companies interested in these products have integrated the features of e-book devices and those of computers and initiated the production of tablet computers. These kinds of initiations facilitated the use of e-books on portable devices like mobile phones, PDA and tablet computers (Wilson, 2003; Moore, 2009).

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2.1. E-book Development and Its Advantages and Disadvantages

Books are defined as written texts used by humans for centuries (Bağtuş, 2007). These written texts first were carved on stones, then on animal leathers, later on paper made of wood, and now in digital environments. In this way, printing environments have developed in accordance with technological improvements. Technological improvements and an investigation of e-books and its future issues were first discussed by Alan Key's book "Dynabook" (Rukancı & Anameriç, 2003). In the following years, e-books created based on projects to maintain and preserve the books in libraries have increased its popularity since they are easily accessible and portable, which has also eliminated storage problems as well (Barnard, 1999; Morgen 1999). The first website to sell e-books on the internet was "BiblinBytes", which started to serve in 1993 (Anameriç & Rukancı, 2003). Parallel to these developments, the e-book titled "The Best Laid Plans" published by Publishing sold more than 6000 in 1999 (Hawkins, 2000: p.25). Despite this rapid development, it was seen that e-book readers were on the markets only after the year 1998. Many texts prepared in digital environment can be read on specially designed devices. Sony Company dominated the e-book reader market by producing its first reader "eInk" in 2006, later the "Kindle", and "Kindle 2" in 2009 (Yıldırım et.al., 2011).

This technology, which could change traditional reading habits radically, should be supported and improved. In the project supported by the Ministry of Education in Turkey, the goal is to make both students and teachers use this technology. Teachers' knowledge level and approach to e-book devices may influence transferring knowledge to their students regarding the use of e-books. Unfortunately, most teachers who experience difficulties and adaptation problems with technological devices get acquainted with them in the schools they are employed rather than during their school years at university (Yalman, 2013; Yalman ve Tunga, 2013). Therefore, it is important to determine the degree to which this technology is adopted and used by preservice teachers.

2. Method

Qualitative and quantitative research methods were applied in this study. To collect the qualitative data, the students were given a survey on e-books. In order to gather the quantitative data, the responses to the survey were evaluated, and the students were interviewed based on their responses.

3.1. Research Model

In order to determine the views of preservice teachers about e-books, a descriptive relational survey model was used in the study. The purpose of the present study was to determine students' level of knowledge about e-books, their preferences of traditional printed books and e-books and their views about e-books and to examine the related correlations based on the results with respect certain variables. After evaluating the survey results, in each part of the study, seven students who continued their education were interviewed, and their views were involved in the research results.

3.2. Sample

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This study was carried out with university students who attended different departments such as Science Teaching, Mathematics Teaching, Pre-school Teaching, English Language Teaching, French Language Teaching and Teaching Religious and Ethical Issues in the Fall and Spring Terms of the academic year of 2012-2013. In the study, the method of "Simple Random Sampling", one of probability sampling methods, was used. In simple random sampling method, each member of a group has an equal possibility to be selected. The research sample to be included in the study was selected on random basis from a list (Çepni, 2010: 46). The research sample consisted of 543 students from different departments of the education faculty. Table 1 below presents information about the departments, classes and genders of the preservice teachers who participated in this study and responded to the questions in the survey.

Table 1. Demographical Backgrounds of the Participants

Variable	Property	f	%
Sex	Female	310	57,09
	Male	233	42,91
Class	Freshmen	333	61,33
	Sophomore	150	27,62
	Junior	57	10,50
	Senior	3	0,55
Department	Primary School Teaching	170	31,31
	Science Teaching	92	16,95
	Pre-school Teaching	52	9,58
	French Language Teaching	32	5,89
	English Language Teaching	68	12,52
	Primary School Mathematics Teaching	73	13,44
	Teaching Religious and Ethical Issues	56	10,31
Total		543	100,0

As can be seen in Table 1, 57,09 % of the participants were female, and 42,91% of them were male. With respect to their class distribution, 333 participants were freshmen (61,33%), 150 were sophomore (27,62%), 57 were junior (10, 50%), and three of them were senior students (0,55%). The distribution of the students in terms of their department was as follows: 31,31% of the participants were from Primary School Teaching department; 16,95% from Science Teaching; 9,58% from Pre-school Teaching; 5,89% from French Language Teaching, 12,52% from English Language Teaching; 13,44% from Primary School Mathematics Teaching; and 10,31% from Teaching Religious and Ethical Issues.

3.3. Data Collection Tools

The demographical backgrounds and general knowledge levels of the students were determined via a survey. The survey was made up of two parts. In the first part, there were three items regarding their personal characteristics, and the second part included eight items questioning their views about e-book. The survey questions were prepared under the supervision of experts and piloted on 68 university students. The questions with an irrelevant and confusing content were excluded. After analyzing the data obtained, 49 students were interviewed in relation to their responses to the questions to determine their views about e-books. Different from scales, it is not possible at all to talk about a total score for surveys. Thus, from a technical point of view, it is not possible to discuss about the reliability and validity as in scales. Since the measurement tool used in the present study was a survey, reliability analysis was not performed.

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3.4. Data Analysis

After administering the survey, the data collected were transferred into computer software. Percentage (%) and frequency (f) techniques were used to describe the data obtained.

3. FINDINGS

The data obtained in this study, which aimed at determining the students' general knowledge and views about e-books at the education faculty, are illustrated in tables below. Table 2 presents the data regarding whether the students made use of e-books for their lessons with respect to the variable of class-grade.

Table 2. Percentage and frequency distribution of the preservice teachers' use of e-books via the internet

Class	E-book benefit		E-books do not benefit		Total
	f	%	F	%	
Freshmen	53	15,92	280	84,08	333
Sophomore	30	20,00	120	80,00	150
Junior	17	29,82	40	70,18	57
Senior	2	66,67	1	33,33	3

As can be seen in Table 2, 15,92 % of freshmen, 20% of sophomores, 29% of junior, and 66,67% of the senior students made use of e-books. The students' responses to the question of "What is e-book?" are given in Table 3 below with respect to their departments.

Table 3.Percentage and frequency distribution of the students' responses

to the question of "What is e-book?" with respect to their departments

Departments	Correct Answers		Wrong Answers	
	F	%	F	%
Primary School Teaching	89	20,51	81	74,31
Science Teaching	88	20,28	4	3,67
Pre-school Teaching	44	10,14	8	7,34
French Language Teaching	30	6,91	2	1,83
English Language Teaching	64	14,75	4	3,67
Primary School Mathematics Teaching	67	15,44	6	5,50
Teaching Religious and Ethical Issues	52	11,98	4	3,67
Total	434	100	109	100,0

As can be seen from Table 3 above, 434 students answered the question correctly, whereas 109 students gave wrong answers. With respect to the students' departments, their correct answers were as follows: 20, 51% (89 students) for Primary School Teaching; 20,28% (88 students) for Science Teaching; 10,14% (44 students) for Pre-school Teaching; 6,91 (30 students) for French Language Teaching; 14,75% (64 students) for English Language Teaching; 15,44% (67 students) for Primary School Mathematics Teaching; and 11,98% (52 Students) for Teaching Religious and Ethical Issues. Likewise, the distribution of the wrong answers in terms of the students' departments was as follows: 74,31% (81 students) for Primary School Teaching; 3,67% (4 students) for Science Teaching; 7,34% (8 students) for Pre-school

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Teaching; 1,83 (2 students) for French Language Teaching; 3,67% (4 students) for English Language Teaching; 5,50% (6 students) for Primary School Mathematics Teaching; and 3,67% (4 Students) for Teaching Religious and Ethical Issues.

Table 4. Frequency and Percentage Distribution of the students' responses to the question of "What is e-book?"

What is e-book?	n	%
I don't know	138	25,41
Electronic book	100	18,42
A book written and read on a computer	121	22,28
Virtual book	29	5,34
Books on the Internet	137	25,23
Touchscreen book	3	0,55
Technological, electronic tool	7	1,29
Portable device with screen	3	0,55
Devices for studying	5	0,92
TOTAL	543	100

The results obtained via the preservice teachers' responses analyzed in categories revealed that 25,41% of the students did not know what e-book is; 18,42% reported it to be a book written in an electronic environment; 22,28% considered it to be a book written and read on a computer; 5,43% regarded it as a virtual book; 25,23% said it is a book composed of texts on the Internet; 0,55% referred to it as a digitally designed book with touchscreen; 1,29% said it is a technological and electronic tool; 0,55% thought it is a portable tool with a screen; and 0,92% defined it as a tool for studying.

Table 5. Frequency and Percentage Distribution of the students' responses to the question of "Where can you buy e-book from?"

Where can you buy e-book from?	n	%
I don't know	213	39,23
Via the computer	19	3,50
Via the Internet and web stores	250	46,04
Technology Stores	21	3,87
Provided by Ministry of National Education and Government	21	3,87
Bookstores	7	1,29
Download Websites	9	1,66
Schools	3	0,55
TOTAL	543	100

As can be seen in Table 5 above, 39,23% of the students did not know where to buy e-books from; 3,50% think they could buy it via the computer; 46,04% said they could buy it via the internet and web stores; 3,87% reported that they could find it in technology stores; 3,87% stated that the Ministry of National Education provided e-books; 1,29% said e-books were available in bookstores; 1,66% stated they could reach e-books from download websites; and 0,55% said that school administration could provide e-books.

Table 6. Frequency and Percentage Distribution of the students' responses to the question of "What are the formats of e-books?"

What are the formats of e-books?	n	%

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I don't know	387	71,27
Pdf	84	15,47
doc, xls, ppt	57	10,50
Computer and webpages	6	1,10
html, mp3	3	0,55
Google and Mozilla	3	0,55
Facebook and Internet	3	0,55
TOTAL	543	100

The results obtained revealed that 71,27 % of the students did not know anything about e-book formats; 15,47% of them said pdf; 10,50 % said doc, xls, and ppt; 1,10 % of them said computer and webpage formats; 0,55% of them said html and mp3 formats; 0,55 % of them said Google and Mozilla file formats; and 0,55% of them said the file formats avilabile on Facebook and Internet.

Table 7. Frequency and Percentage Distribution of the Students' Preferences of Traditional Printed books and E-books

Preferences	F	%
E-Book	141	25,97
Traditional Printed Books	298	54,88
No preference	104	19,15
TOTAL	543	100

As can be seen in Table 7, 54,88% of the students preferred traditional printed books; 25,97% of them favored e-books; and 19,15% of them did not express any preference because of being indecisive. The results obtained via the data collected from the preservice teachers' reasons for their preferences are presented in Tables 8 and 9 below.

Table 8. Frequency and Percentage Distribution of the Students' Reasons for Their Preference of E-book

Why E-book?	n	%
I don't know; I never thought about it	35	24,82
Easy, practical and fast	18	12,77
Fast and rapid access	25	17,73
Technological and up-to-date	14	9,93
Detailed, more choices, and it includes summaries	18	12,77
User friendly, visual and touch-operated	18	12,77
Useful and no waste of paper	2	1,42
Easy to carry (portable)	10	7,09
Cheaper	1	0,71
TOTAL	141	100,00

The analysis of the students' responses regarding the reasons for their preference of e-book revealed that 24,82% of the students did not know the reason or think about it; 12,77% said it was practical and easy to use; 17,73% reported it was easy to access the desired e-book on the Internet; 9,93% expressed that it was a new technological tool and easy to update; 12,77% said it not only included summaries but also provided details various options; and 12,77% said that it was user-friendly and visually more attractive and that they liked its touchscreen feature. In addition, 9,09% of the students stated that it was easier

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to carry compared to printed books; 1,42% said it was more useful as it helps avoid paper consumption; and 0,71% preferred e-books because of its low cost.

Table 9. Frequency and Percentage Distribution of the responses to the question of whether to prefer e-books or printed books with respect to the variable of gender

	Females		Males	
	f	%	f	%
e-book	86	33,73	55	29,73
Printed books	169	66,27	130	70,27
TOTAL	255	100	185	100

Regarding the variable of gender, 33,73% of the female students preferred e-books, while 66,27% preferred printed books. Likewise, 29,73% of the male students chose e-books, and 70,27% preferred printed books. In this study, about 82,26% of the females and 79,40% of the males made a preference.

Table 10. Frequency and Percentage Distribution of the responses to the question of "What are the cost-ranges of e-book devices?"

Group	n	%
I don't know	152	27,99
Cheap	46	8,47
Reasonable	206	37,94
Expensive	110	20,26
Very expensive	29	5,34
TOTAL	543	100

The responses of the preservice teachers to the question related to prices of e-book devices revealed that 27,99% did not have any idea; 8,47% said they were cheap; 37,94% said the prices were reasonable; 20,26% stated that they were expensive; and 5,34% believed that e-book devices were very expensive.

4. Discussion

In this study, which aimed at determining the knowledge levels and views of preservice teachers about e-book technologies, 57,09% of the participants were female (310) and 42,91% of them were male (233). Similar responses to the survey were categorized. Thus, it was found out that 25,41% of the students did not have any idea about e-books. Regarding the categories generated depending on the responses, it was found out that the preservice teachers did not have a realistic and signicative idea/knowledge about e-books. After completing and analyzing the survey, the interviews held with students who defined e-books as books designed and written in an electronic environment revealed that the number of the students who defined electronic environment was not higher than ten and that they described all the written materials on the Internet as e-books.

It was also found out that use of e-books changed and increased depending on the class-grades of the students (Table 2). The interviews held with the students demonstrated that they downloaded e-books from the Internet and used them as supplementary materials for their lessons.

Table 3 below presents the results regarding the responses to the question of "What is e-book?" with respect to the departments of the participants. In general, the number of the students who answered the question correctly was 434, while 109 students neither made any comments nor gave answers. In general, the preservice teachers defined e-book as "a book which could be found on a virtual platform or on the

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Internet and which is designed and written in an electronic environment that could be read on a computer."

It was found out in the present study that the participants did not have a clear idea about where to buy e-books from. Also, it was revealed that 71,27% of the preservice teachers stated they did not have any opinion about e-book formats. However, the percentage of the students who gave acceptable responses like "pdf, doc, xls, and ppt," was 25,97%.

According to the responses regarding the students' preferences between e-books and printed books, it was found out that 25,97% of the students preferred e-books and that 54,88% of them preferred printed books. The rate of the students who did not want to express any preference was 19,15%. The interviews held with these students demonstrated that they did not have any idea about e-books and therefore they did not make any preference.

When the students were asked to state their reasons for choosing e-books, it was seen that 24,82% of them said they did not know the reason or thought about it and that the rest gave responses like "easy, practical and fast, easy to obtain, up-to-date and technological, detailed and offers more options and includes summaries." Of all the students, only 7,09% of them stated that it was portable and it allowed storing hundreds of books thanks to its high memory feature (Mallet, 2010). Besides, only two students reported that it prevented paper consumption (Marshall& Ruotolo, 2002). Depending on the responses of the students, it could be concluded that the students were not properly introduced to environments like e-books. Furthermore, it found out that none of the students mentioned the multi-language support (Nathaniel, 2010) feature of e-books in their responses.

According to the variable of gender, it was seen that the rates were almost equal between males and females in terms of their preference of e-books and printed books. It was found out that 66,27% of females and 70,27% of males preferred printed books rather than e-books. The students' views about the prices of e-book devices were examined with a single question in the survey. It was seen that 27,99% did not express any view about the prices of e-book devices; that 37,94% of the participants thought that the prices were reasonable; and that 25,60% of them believed that the prices were very high. During the interview, one of the participants who defined the Internet as an environment to purchase e-books from said "I, actually, don't know where to buy an e-book device. I came across with some e-books while I was searching for the books on the Internet I could find in bookstores. But, since they were written in a foreign language, they didn't attract my attention. I saw that the prices of these books are in dollars and high. I don't think that e-books have Turkish language support or I haven't come across one yet."

5. Results And Implications

It was seen in the present study that use of e-books among the participants did not go beyond using written digital materials and documents on the Internet. It was also found out that although the students knew that they were supposed to use e-books and related tools in future, they did not make any efforts to improve themselves or overcome their deficiencies. The students tended to use technological devices only when they had to and as much as they needed them. In addition, it was revealed that more than the half of the participants still preferred printed books. During the interviews held with the participants who did not make any preference and with those who chose printed books, it was found out that the reason for their choice was lack of knowledge about e-books.

Knowing about the deficiencies of students regarding the use of the Internet and computer, which provides great opportunities for seeking and processing information and knowledge, would be helpful to cope with related issues. Considering the fact that preservice teachers who will be employed in future at a school where they will have to use tablet computers and e-books, which is a project executed by the Ministry of education, it seems of great importance to determine their views as well as their levels of knowledge about this subject. Students' deficiencies determined could be overcome with lessons to be included in the curricula of university programs.

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In order to overcome the deficiencies of students, a project could be prepared in which students are required to obtain e-books and e-book devices. The use of e-books can be supported by establishing e-libraries at universities. In this way, students may have the opportunity to obtain and use multiple resources.

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Reasons and results of nonapplicability of education technology in vocational and technical schools in Turkey

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Abstract

Education and technology are two basic elements in order to obtain skilled labor. Education provides a continuous improvement with willing and permanent changes in the abilities and behaviors of an individual. Technology is a discipline that provides the link between science and practice and occurs in a certain aim and order that are target - driven.

Modern education gives an education based on the practice that makes the students active by using new technologies. The productivity of improving the workforce based on the skilled and sectoral expectations also depends on this.

To use education technology provides a permanent education because the person first teaches and after he/she obtains the ability of practice in the effective and permanent learning. For this reason, to learn something by making and living is the most effective method. Infrastructure, lack of technological equipment, the level of instructors can cause to fall behind the technological development in the service and production sector of vocational and technical schools in Turkey.

Vocational and technical schools cannot achieve their education objectives based on the practice, because they cannot use the education technology properly. As a result of this, the loss of skilled labor that has the ability of using the information technologies that is important for the development of a country can occur.

Keywords: Vocational and technical schools, technological development, modern education;

1. Introduction

Information and communication technologies that have been developing rapidly in the current century cause obligatory and radical changes in educational field as well as every field. It is inevitable that developments in information and communication technologies has to be with technological equipment which will meet expectations of the sector together with progressing in coordination with educational programs

in order to not fall behind the contemporary education level. Computer forming the basis of these technologies has been started to use in education and teaching environments through internet and social network.

In our day, there is an intense competition in global market. It's gaining more and more importance to grow man power has the quality to meet expectations of business world in this competition. If education system will fail at growing qualified man power, the price for this failure shall be paid either by enterprises thereby training their available employees with a very high cost, or by society thereby standing for purchasing of goods and services of poor quality (Dahil, Karabulut, 2013).

Educational technology is evaluated as a whole systems that put data of different sciences into practice within large educational fields such as special purpose, method, instruments, measurement and evaluation, and ensure that manpower will be used in proper situations in the best way, problems of education will be solved, quality and productivity will be increased (Gürgün, 2014).

By means of information technologies, country borders have removed by globalizing and free circulation of qualified labor force has come into existence. As a result of this, institutions have had difficulty in graduating qualified individuals, who have proper knowledge, from academies which give vocational and technical education. Raising students who has these qualities in accordance with expectations of the sector depends on use new information and communication technologies efficiently and productively by the educational personnel in these institutions.

As is the case with every education field, it is very important to use computer and internet technologies in preparing students for life, according to today's conditions and technological development and with information and skills for expectations of the production sector, in academies that give professional and technical education. In the period where computer and internet technologies are used as learning and teaching instruments, demand and thoughts of students for using information technologies have an important place in evaluating reflections of technology on education.

Academies with vocational and technical education have undertaken a mission to raise qualified manpower for production sector that has served locomotive purpose in country improvement. However, there are many factors which hinder the current mission undertaken by these institutions. Expectations of the market are changed by the reasons related to technology and cultural life, employees seek to new things according to the origin of information source they are fed. Therefore, it has become difficult to say that an expectation that was applied in the past can be applied today. Education institutions have improved slowly in terms of understanding these new situations and at acting point.

Another important thing is business continuity. It is known that technological and global affects has threatened continuity in business life. When global affect is described in terms of country economy and employees, developmental level and geographical position of the country should be taken into consideration. As the members of OECD, Turkey has focused on liberalization of product markets, social security systems, policies of active labor market, and new developments in education system as primary structural reforms. This struggle has an additional importance in terms of ensuring that the problems related to education system will be solved, teenagers will be prepared for life and demands of labor markets in this new period (Tübitak, 2005). In spite of that, employment rate stays behind OECD countries. As one of the reasons for this, an important part of our country's population is formed by young people. Therefore, it is likely that teenagers, who has attended in several education activities but cannot be employed, will be pessimistic in terms of future expectations. In addition, it should be remembered that these teenagers will create a threat for country, in economic sense, because they cannot attend in a good life of individuals who are raised in social manner and invested. The reason is that working life creates confidence and respect feelings for individuals, and supports the feeling of belonging to a society (Dereli, Kabataş, 2009). Improvement in employment life of youngsters has a great importance in this respect.

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2. Periodical improvement of education technology

Objects supporting the education have been found according to current conditions as the education has become necessary in early periods of the life. In 1950's, education technology fell behind the industrial technology because important needs were met in that period (1st period). Afterwards, developments, innovations that were accompanied by 2nd World War made progress in comparison with the previous period (2nd period). In that period, dilemmas appeared in education, the 1st one is the traditional education that has come until today and the 2nd one is education conducted by technological instruments. Expenses of the 2nd education are high but its educational contribution is more. The 1st education doesn't meet the need due to developing technology (3rd period). As for this period, it can be said that it is a period ensuring efficient learning by combining two different teaching methods coming from 3 periods (4th period). As for this period, it is to place combined education technology in the educational content. In other words, purpose is to create a technological structure for education by an educational system in which not only a part of visual and auditory instruments but also whole instruments work (http://melek2552.wordpress.com). According in Table 1. shows to years of education technology the periodic changes.

Table 1. Development in Educational Technology (Information and Communication Technologies)

In terms of learning concept

Phase Name	Function	Product
1960-1970 Behaviorist Learning Concept	Algorithmic Regulating Of Information	Programmed Education
1970-1980 Cognitive Learning Concept	Restructuring Trying In Learning In Mental Process	Learning Process Design
1980-1990 Constructivist Leaning Concept	Unifying New Information With Previous One	Structuring The Meaning By Student

(http://kisi.deu.edu.tr)

3. Essential principles in educational technology

Educational technology, achieving goals application methods, in terms of content and functionality is based on certain basic principles. Main purpose in the application of educational technology, learning is the realization of a fully trained individuals. Adaptation of technology in education, provide development based on scientific principles is one of the basic principles. The target of the methods and techniques used in the application of science and technology, based on research involving holistic view has to do. For the success of the training program, increasing the effectiveness of teachers and students mutually technology supported in this activity is necessary to ensure continuity. Technological methods applied in training the individual level, the lack of success in the past and the future success of eliminating the negative impact on the success of the new applications that increase must be enabled in functional ways.

One of the most basic principles of teaching, the student has taken training as a result he desired to be given by the specified destination at a sufficient level of knowledge and skills are to be permanent. The most important way of making this happens, learning by doing and experiencing is the use of performing all possible senses. The material and information technologies used in the learning environment to student learning that learning can be made permanent will contribute very important when traditional educational applications based on information technology in student-centered educational applications taken

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a requirement have become inevitable. Effective learning and teaching in the context of educational technology is shown in Figure 1.

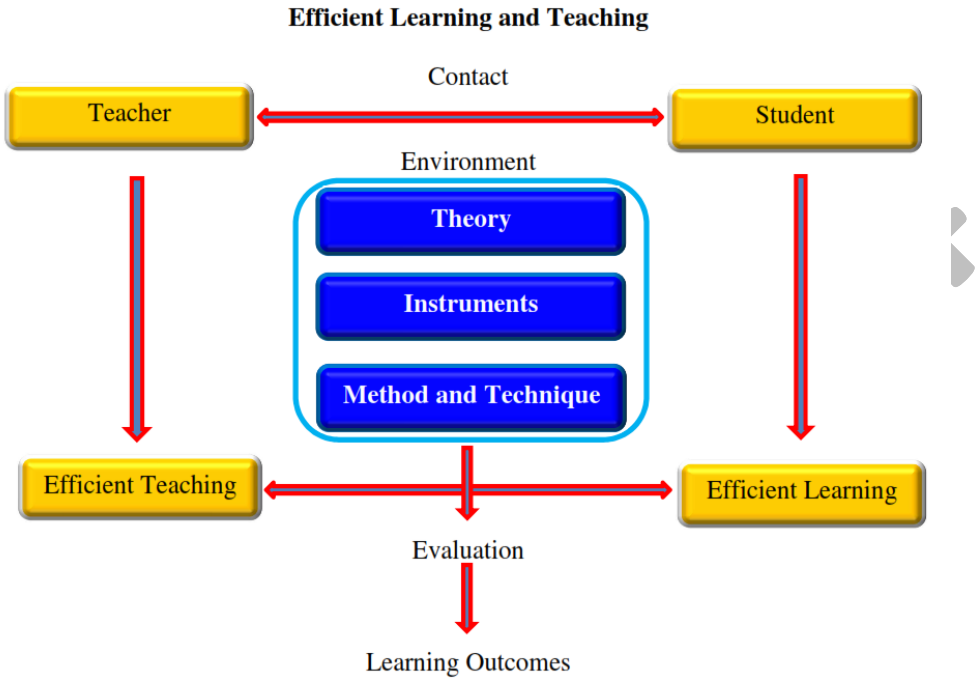


Fig.1. Scope of Educational Technology (It is collected from data of Higher Education Committee. April 2014)

4. Information technology for higher education

Economic, social and cultural changes have caused important changes in education all around the world (Downey et.al, 2005). To find skilled and qualified labor has become an important problem by increased globalizing. As for solution for this problem, it is possible by means of raising individuals with an efficient education system. Nowadays, knowledge workers are the individual who create essential value in economy, provide benefit, and trigger and maintain economic development (Turan, Çolakoğlu, 2008). Nowadays, countries don't think that education is an expense factor, rather treats as an important instrument in order to gain a competitive advantage. Success of a country depends on existence of educated and qualified labor, in an increasing way. An important result of globalizing is geographical borders have been removed; goods and services and also qualified labor can circulate more freely than the previous periods. This free movement of educated individuals has made international accreditation and validity of university diplomas a current issue (Akduman et.al, 2001). In European Union (EU) countries, there are decisions and initiatives in order to make traditional education and teaching environments flexible, compatible and integrated. Nowadays, traditional teaching methods should be more clear and flexible. In this way, education and teaching activities can be maintained in direction of individual need and choices in parallel with individual learning needs (Martinez-Torres et.al, 2006).

Use of information technologies in education and teaching lead to important results not only for students but also lead to significant results for instructors and other educators. Information and communication technologies increase productivity of instructors and educators and allow them to obtain more qualified output and result by making less effort in a shorter period (Turan, Çolakoğlu, 2008). Use of new technologies is not at the desired level in the higher education in Turkey.

Main reasons are that financial incapability, desired education and teaching level has been not reached in higher education, academicians working in the universities are lack of information and practice infrastructure, value of information technologies couldn't be understood completely by managers, academicians and students are not open to new ideas in cultural sense in our country, and also incapability with technical infrastructure (Gökdaş, 2005).

Table 2. Higher education, quantities of student (2013-2014 academic years)

Education Level	Primary Teaching	Secondary Education	Open Education	Distance Education	Total
Vocational	540.607	253.788	935.750	19.988	1.750.133
Undergraduate	1.344,492	400.371	1.609.528	16.297	3.370.688
Graduate	321.205	0	0	7.935	329.140
Total	2.206.304	654.159	2.545.278	44.220	5.449.961

(It is collected from data of Higher Education Committee. April 2014)

When we analyze distributions of current students according to different teaching methods and education levels, for the entire student, 41 percent studies in daytime education, 12 percent studies evening education, 47 percent studies in the Open University, and 1 percent studies in distance education. As for the students in two-year degree programs, 31 studies in daytime education, 15 percent studies evening education, 54 percent studies in the Open University, and 1,1 percent studies in distance education.

According to data dated April of 2014 from higher education Committee, quantities of students in the two-year degree programs has exceeded 1.750.000. 540.607 students study in daytime education, 253.788 students study evening education, 935.750 students study in the Open University, and 19.988 students study in distance education (Table 3).

Table 3. According to higher education type and teaching method total quantity of students in two-year education.

Education Level	Primary Teaching	Secondary Education	Open Education	Distance Education	Total
Public Universities	489.749	239.134	935.750	18.411	1.683.044
Private Universities	43.704	13.075	0	639	57.418
Foundation Vocational	7.154	1.579	0	938	9.671
Total	540.607	253.788	935.750	19.988	1.750.133

(It is collected from data of Higher Education Committee. April 2014)

5. Reasons obstacle use of educational technology

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Demonstrations for academies that give professional and technical education cannot be given according to today's conditions.

Vocational schools have insisted on an education approach based on distant theory rather than hands-on training which is the most important purpose they have had.

Investments are insufficient because of the influence of developing technology on the expenses.

Profile is too low in terms of student who gets professional and technical education.

There is open admission from vocational secondary education to vocational schools.

Technology investment requires a long-term and high-cost infrastructure.

Inspection is insufficient and not serious for foundation vocational schools.

Institutions that give vocational and technical education are far away from meeting expectations of the sector.

There aren't enough instructors with sufficient equipment in vocational schools.

Students, who will get vocational and technical education, haven't got numeral skills which are required for use of technology.

Vocational schools don't have a structure in order to raise their own instructors in a way they will be in accord with market and at an academic level.

Price policy that has been applied to instructors falls behind the market.

Foundation Universities have been working in an unaware, uncontrolled and unplanned way of the expectation of production sector.

Students, who have had vocational and technical education, are more interested in social networks than vocational field from information technologies.

Hands- on training periods are insufficient in terms of raising qualified manpower.

Students attending in vocational schools are children of the families with social-economic problems.

Students, who have had vocational and technical education, don't have sufficient knowledge for working life because their relations with sector are not strong.

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As there are no trainings apart from the vocational program in which education is given by flexible education models, it has become an obligatory to go towards certificate programs after graduation.

Negative effect of successful role models is high on individual in terms of gaining vocational roles supporting personal qualities in accordance with their interests and skills.

Hands-on training cannot be in parallel with advanced technology.

Student profiles that are self-confident and have had lifelong learning skills don't choose the vocational schools.

In formal and foundation vocational schools, theoretical education is given instead of hands-on training as there is no sufficient equipment and technological infrastructure.

Instructors, who will be implementer of technologic integration, have many severe difficulties in using technology because average of age of these instructors is high and they haven't sufficient equipment in academic field.

There is no lesson about technology integration according to branches in the schools that give vocational and technical.

Innovations in the education cannot be integrated to education programs instead of new ideas, changes.

In the institutions that give vocational and technical education, rate of the instructors who are interested in technologies and want to improve themselves is at a very low level such as 10%-15% according to statistics.

A large part for need of instructors cannot be met by the sector.

In order that computer technology can be used efficiently in education system, there are inconsistencies of the individuals in terms of perspectives on technology and attitudes against technological instruments.

Unemployment rate is more than, with a rate 9.4%, developed counties.

Districts and towns come into prominence by the amount of students in Vocational schools rather than raising strong vocational-technical instructors which our country needs mostly.

Businesses, where advanced technology is used, are far from the purpose to meet qualified labor.

There is an educational understanding that falls behind the use of technology which will realize community development.

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There are problems in order to reach qualified labor because demand of family and environmental factors are determiner for professional choices rather than abilities of individual.

There isn't any conscious professional guidance due to current exam system and lack of guidance service.

There is no compliance between education programs applied in the schools with vocational and technical education, skilled and technical labor reached by these programs, and needs of the market in terms of quality and quantity.

Profession standards cannot be determined in vocational education and there is traditional methods used in forming curriculum programs independently of working life.

Students with low profiles prefer vocational and technical schools.

To try to realize educational purposes by means of old technologies,

From the year of 2001, individuals without ability and tendency to use information technologies have to get vocational and technical education because of open admission from secondary school to vocational schools.

It is predicted that schools giving vocational and technical education should benefit from environmental foundations in accordance with law numbered 2809, but they remain incapable of this subject.

Candidates, who took very low points from YGS (the transition to higher education examination), choose the schools with vocational and technical education, and a student who want to get this education will most likely fail in an education in parallel with advanced technology.

Education conducted with lessons applied by 64 credits in vocational schools is quite insufficient in terms of following and applying new technologies.

In the schools with vocational and technical education, there are workplace apprenticeship applications in semester and summer holidays between 240 and 480 hours, hands-on training is conducted, and so these institutions have difficulty in meeting the expectation of sector.

There is no sufficient infrastructure education and application in the vocational and technical institutions which apply evening education.

In direction with cooperation of Industry-University, there is no regulation related to bring the experts, who have worked in industry, in the university.

There is a limitation in the salaries given to instructors for hands-on training.

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It hasn't been made a decision on which model will be applied in vocational and technical education system in our country. While vocational technical secondary schools apply Dual system which is applied in Germany, vocational schools carry out education – teaching according to American system.

According to European Qualifications Framework, Vocational Schools that give a 5th level education admit students by central placement instead of skill examination.

Instructors and student have no time and place freedom.

In the institutions with vocational and technical education, project assist is little if any.

6. Conclusion

Compliance between knowledge, skill and abilities of individual and properties required by the job is a serious factor that has influence on motivation of individual for job and the success in working life. Professional attitude will be correct if individual knows the qualities required by job by means of his interests and abilities. However, vocational schools have stayed behind in terms of raising individuals in accordance with technological developments in order to reach vocational and economic satisfaction on the basis of sector expectations in qualified labor market. After the reasons mentioned above, it isn't not likely to obtain an improvement depending on production sector in the country. Vocational schools in which there is misunderstanding both vocational and technical education policy and technical education based on technology and final an educational understanding that will meet the expectations of the sector, keep youngsters busy in daytime education for 2 years in the our country where we have a young population as 20 percent. Besides, amount of the student registered in open university is higher than those who attend in daytime education and rate of the student graduated from vocational schools has remained at 26, 2 percent level. These situations are important losses which should be solved immediately for production sector that has advanced technology integration based on practice. In addition, expectations of students of vocational school and instructors and product sector don't accord so it stays as an important problem in applying advanced technology to vocational and technical education.

As vocational and technical schools are without hands-on training based on physical infrastructure and renewable technological software which are necessary to use information technologies, an economy based on production, which is the most important principle, cannot be realized. Therefore, education and teaching efficiency cannot occur with increased participation, communication and interaction suggesting use of technology in education. When the influences of information technologies are analyzed more closely, it will be seen that instructors of higher education are lack of sufficient knowledge to give hands-on training and are unaware of abilities to follow technology closely and apply advanced technology.

Use of internet and other information technologies should be used in order to increase quality in education instead of accelerate the education. Vocational and technical education parallel with advanced technology should be planned and regulated according to purposes and goals. However, in today's vocational schools, there is theoretical education that doesn't force instructors and students instead of hands-on training that follows technology. As a result of this, graduated student is an unqualified intermediate staff for qualified labor market.

New technologies and computer-managed instruction have remained as a supplementary of traditional education and teaching methods.

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Redesigning for collaborative learning environment: study on students' perception and interaction in web 2.0 tools

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Abstract

In this study, Gagne's instructional events were incorporated into Jonassen's model for designing constructivist learning environment (CLE) to enable collaborative learning, which mediated by web 2.0 tools. By factor analysing the survey response from 182 students in previous study, 'peer interaction' component was identified, and therefore used as the coding category for the content analysis, to study students' comments and posts in web 2.0 tools. It was found that peer interaction can be further elaborated into different aspects, such as forming cross-checking and expressing personal thoughts. The next study will focus on other identified components in collaborative learning environment.

Keywords: Gagne's instructional events; Jonassen's model for designing CLE; web 2.0 tools; collaborative learning; peer interaction

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1. Introduction

In this digital age with modern technologies, studies show that learning approach should move away from merely producing correct outcomes or memorizing the facts for avoiding mistake. While the job market are seeking for 21st-centery-skills-ready fresh graduate, engaging university students in group learning and problem-solving project will bring the new role for the students to be active and responsible in collaborating and discussing the group work with their peers (Cecez-Kecmanovic & Webb, 2000; Chiong & Jovanovic, 2012). *"...in previous semester, my lecturer did not teach me about this, so I do not know how to do this..."* This is a typical example faced by the first author of students relying on the teacher to transmit the knowledge. By redesigning the learning environment for transforming students into independent learners, it can eventually reduce teacher dependency in students' learning process, especially when they gain new experience in meaningful learning process which relating to their prior knowledge, and building relevant new knowledge.

As determined by the situation, social interaction is the approach that makes learning more effective for overcoming the insufficiency in rote learning, and differentiates the constructivist learning from the traditional learning approach. On other hand, the advancement of ICTs has provided more opportunities for students to explore, interact, and work with the peers in process of making new meaning which serves the fundamental to constructivist learning approach (Vygotsky, 1978; McLoughlin & Lee, 2010). The literatures also show that collaborative learning is an instructional approach evolved from constructivist learning, however, with the technological support and network facilities, collaborative learning can be further diversified and enhanced to build students' skills in critical thinking, problem solving, and

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knowledge construction (Cecez-Kecmanovic & Webb, 2000; Chiong & Jovanovic, 2012). In this study, collaborative learning is employed as the main instructional approach to enable students gaining new learning experience in constructivist approach where the process was mediated by web 2.0 tools, so that student learning is neither restricted by limited class time nor just constraint to face-to-face interaction.

Web 2.0 was defined as the second generation of web, and the term was created in a conference brainstorming session in year 2004 by O'Reilly Media and MediaLive International. With its concept of 'web as platform', it changed the dynamics of content creation, and embracing user contributions (O'Reilly & Battelle, 2009). According to O'Reilly (2005), the software in web 2.0 era have some characteristics that firstly bring the fundamental changes in the business model. As inspired by these changes in transforming the business model, in this study, it described the changes brought by the same characteristics of web 2.0 era, to university classroom environment for enhancing collaborative learning in the constructivist approach. These changes include: shifting the focus from learning outcome to learning process, and treating students as co-contributors (see Table 1).

Table 1. Reflecting the changes into University learning environment based on the characteristics of web 2.0

Changes in University Learning Environment added by the Characteristics of Web 2.0
Shifting the focus from learning outcome to learning process, instead of just evaluating the outcome, engaging students in the project development and problem-solving, to emphasize on the learning process which require students to identify the scope, constantly update, respond to tasks at various stages. Therefore dynamically influencing the results, the quality of work, and student motivation.
Treating students as co-contributors, in the knowledge construction process, students are encouraged to contribute share experience, and conduct discussion in the learning environment. The instructor can monitor student performance, class situation and motivation level to adjust the learning activities and re-plan the strategies. Guidance can be provided to support students as part of the content-contributors.

1.1. Jonassen's (1999) model for designing constructivist learning environment (CLE)

According to Duffy & Jonassen (1991), 'all interpretations are not equal; it cannot be presumed that there is only one correct interpretation'. This explained that many perspectives can be used to address a concept based on different individual experiences. As knowledge cannot be transmitted in constructivism, Jonassen (1999) proposed a model for designing constructivist learning environments (CLE), for facilitating knowledge construction and meaning making. This model houses six essential components: 1-Problem / Project; 2-Related Case; 3-Information Resources; 4-Cognitive Tools; 5-Conversation / Collaboration Tools; 6-Social Contextual Support (see Fig. 1). This model was considered as a complementary design tool to enhance traditional teaching approach, and many studies had found that it can be applied in different contexts.

Jonassen (1991) also described that there are three stages of knowledge acquisition. Student learning usually begins at the stage of initial knowledge acquisition, which can be best supported by more objectivistic approaches, before transmitting to constructivist approach with ill-structured domain for acquiring more advanced knowledge (Jonassen, Mayes & McAleese, 1993).

1.2. Gagne's (1985) model of nine instructional events

Gagne described instructional design as 'analysing the desired learning outcomes in terms of their prerequisite skills', and believed that when the instruction is properly designed around the instructional events, student learning will have the most efficient and effective support. Hence, the model of nine instructional events was created for classifying types of learning and conditions for learning (Gagne et al., 1988; Wager, n.d). These instructional events include: 1-Gain Attention; 2-Inform Objectives; 3-Recall Prior Knowledge; 4-Present Content; 5-Provide Guidance 6-Elicit Performance; 7-Provide Feedback; 8-Assess Performance; 8-Enhance Retention and Transfer (see Fig. 1). Gagne's instructional events were

also considered as external events as it consists of well-organized instruction that facilitate the information processing and help students to learn (Gagne, 1985).

2. Research design

In this study, it mainly employed the content analysis on student's posts and comments in web 2.0 tools, to identify student perception and their interaction in web 2.0 tools. The results of this study serve as one of the important discussions in formulating the answer of the research question at the latter stage, 'How effective is the learning environment on student learning process?' The following sub-sections include the discussion on the study samples, design of learning activities, instruments used for data collection.

2.1. Samples

In this study, the research sample consists of 182 participating students who enrolled in IT classes which were taught by the researcher at INTI International University. The data collection started from year 2012 to year 2014, and spanned across five academic semesters. The class environment was set at the lecture classes at INTI International University, and student learning was centered at problem-solving project throughout the whole semester, to encourage student collaboration, social interaction, development of software skills. The student learning process was also mediated by multimedia contents and web 2.0 tools to enhance communication and students' understanding. Based on the demographics, these 182 participating students came from seven different IT courses. There were 74.2% of Malaysian students and 25.8% of international students; 79.7% of male students and 23.3% of female students.

2.2. Design of collaborative learning environment

In this study, as for providing objectivistic approaches to support the stage of initial knowledge acquisition, Gagne's instructional events were used and by dividing into three parts: engaging, enriching, and enhancing, to be incorporated into Jonassen's model to support the design of CLE, especially in the first stage in knowledge acquisition. As presented in Fig. 1, Jonassen's (1999) model and Gagne's (1985) were mapped into class environment for designing the collaborative learning, which mediated by multimedia contents and web 2.0 tools. In order to engage students, the event of gaining attention, informing objectives, and recalling prior knowledge were incorporated when introducing the project to the students and in the process of describing the related cases, so that they gain more interest and define the scope appropriately. As for enriching the student learning, the event of presenting content and providing guidance were embedded to encourage students to share and organize the resources, to build better understanding and stimulate their thoughts with cognitive tools, such as mind-map tool, wiki site or prototyping tool. Lastly, in enhancing student learning, the cognitive tool, conversation tool or collaboration tool can be used particularly in the event of giving feedback, eliciting and assessing performance, to encourage more discussion, enable more practice and development for strengthening the newly learned knowledge. In enhancing the retention, student learning can be continued with the contextual support, such as developing following courses or projects which require students to use their prior knowledge as the foundation for solving another complex problem, or for achieving more requirements in higher level of study.

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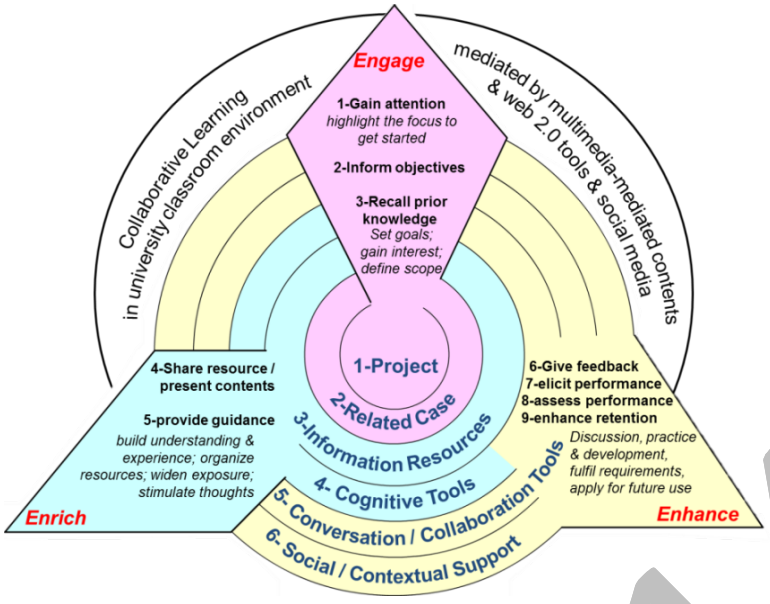


Fig.1. Diagram of incorporating Gagne's nine instructional events into Jonassen's model for designing CLE

The breakdown structure below (see Fig. 2) presents the mapping of Gagne's (1985) model and Jonassen's (1999) model into class environment for collaborative learning.

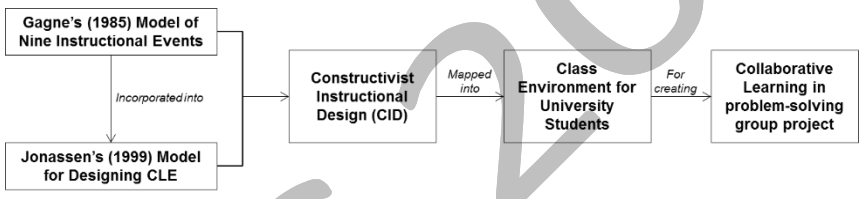


Fig.2. Breakdown structure for the design of collaborative learning environment

2.3. Instruments

As encouraged by the instructor, students can use the web 2.0 tools with their preference, for sharing resources, extending the discussion to online platform, exchanging opinions, and forming learner community. Content analysis is one of the main techniques for analysing qualitative data (Fraenkel, Wallen & Hyun, 2012), and in this study, it was used to investigate students' communications in web 2.0 tools, focusing on how they interact in posts and comments. Web 2.0 tools that used by those participating students were Facebook closed group; web-based or mobile-based chat apps, such as LINE app, Whatsapp, Facebook Messenger, WeChat app; cloud-based storage software, such as DropBox or Google Drive. Besides, open-ended questions were used to collect students' opinion from different perspectives, and support the analysis on students' posts and comments in web 2.0 tools.

4. Data analysis

In this section, the data analysis was based on the qualitative data collected from students' interaction in the posts and comments in the web 2.0 tools. The analysis method used was content analysis, and its coding categories were based on the components obtained from the factor analysis in previous study. However, in this paper, only one category was discussed, named 'Peer Interaction'. In addition, responses from open-ended questions were also used to further explain the students' posts and comments in web 2.0 tools. In analyzing students' peer interaction (see Fig. 3), some posts and comments in the web 2.0

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tools were extracted from different student groups. It can be noticed that in discussing the content for achieving an outcome, different groups of students interact and react differently with their group members.

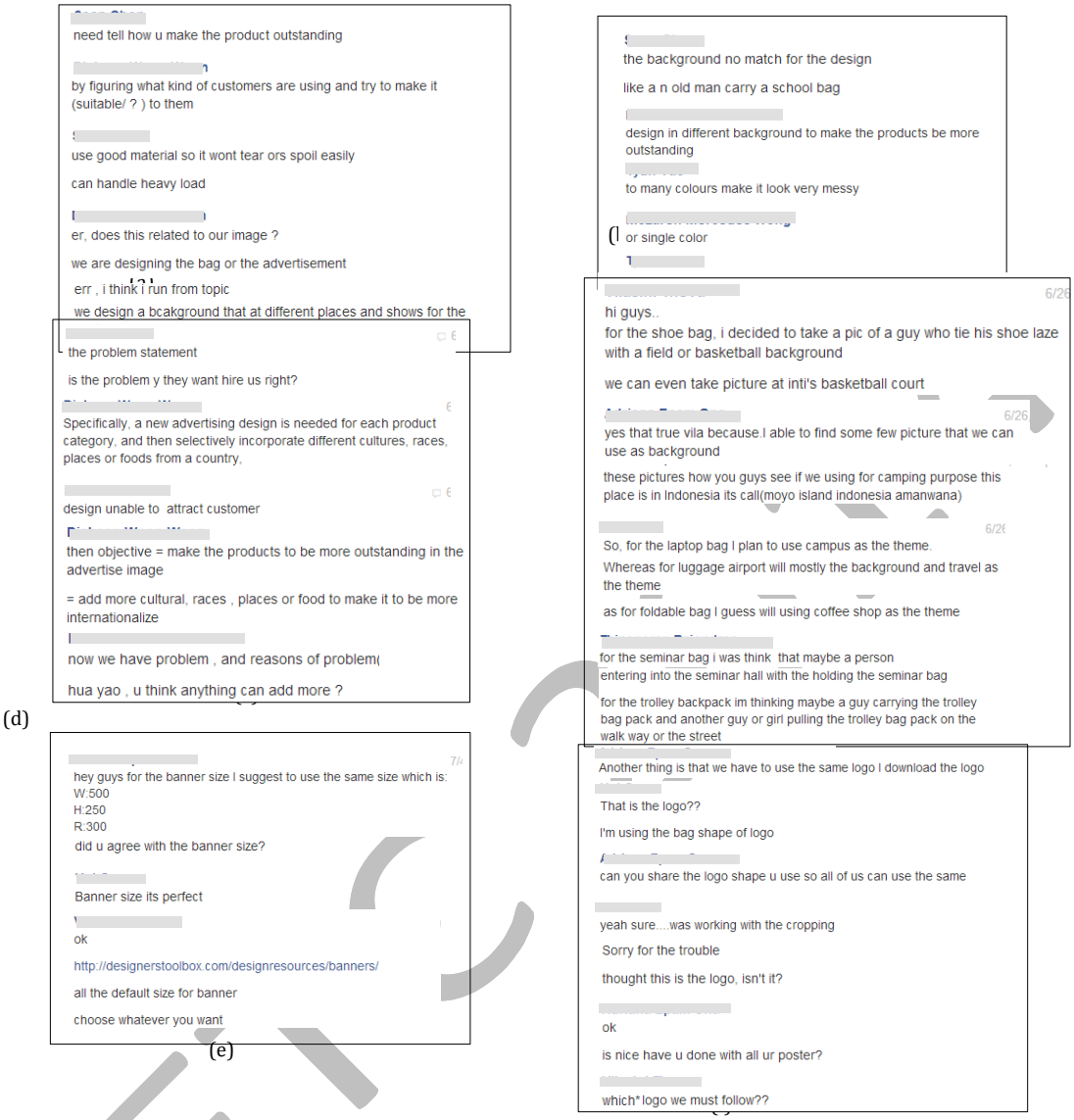


Fig.3. The collection of students' interaction and comments in web 2.0 tools

By referring to Fig. 3(a), during the discussion process, a member's misunderstanding was corrected immediately by another group member when he gave his own idea, so this discussion has helped him to avoid making further mistake, and by re-justifying the needs, it again highlighted the key points for keeping on the right track. Similarly, another student group managed to solve problem of standardizing the logo when two members used two different logos in a single project, another student was confused and ask *"which logo we must follow??"* (see Fig. 3(f)). At the end, they decided to use a more attractive logo which voted by all members. These can be considered as the important gains in peer interaction as students were exposed to possible conflicts, misunderstanding or mistakes in the project development process, therefore they learned to identify, quarantine, and fix them at the group level, before it leads to any worse situation where the main focus of development were shifted into a wrong direction or caused unnecessary waste of effort and time.

As seen in Fig. 3(b), students interacted by commenting about the artwork designed by a member with his personal opinion and impression *'like an old man carrying a school bag'*, which shows that he tried to explain why the design was not suitable and not matched. Hence, it stimulated another round of discussion with regards to the use of background images and color selection. This can be considered as an op-

portunity for students to learn to express their thoughts in a way that can be understood by others while not being offensive, as well as learning to accept the difference among the group members.

It can be noticed that students started to brainstorm at the beginning of the project development as they discussed about each of their understanding on the problem and tasks given (see Fig. 3(c)). By using the web 2.0 tools, students' interaction was at real-time when they brainstormed and exchanged understandings as well as constructed the project objectives with the peers without further delay, as one student told his group members "*now we have problem, and reasons for problem, u think anything can add more?*" It is believed that the students' retention and motivation can be increased as they get connected online for real-time communication and synchronization of their ideas and project works in a single shared web-based document. Furthermore, as each of the comments can be seen clearly in the chat box, students could take turn to provide suggestions and ideas to added onto the parts which has not been mentioned by other group members (see Fig. 3(d)). As filling the gap, it made the collaborative process more efficient and meaningful for students to realize that they were one of the contributors and play a role in enhancing the values of the project.

When students were encouraged to use web 2.0 tools to extend their communication and interaction, it was found that students learned to use the Internet resources conveniently to find more reference for expanding their existing knowledge, such as in Fig. 3(e), a student proposed some image resolutions as selecting a banner size was given as a task in the project work. Therefore, in supporting her suggestions, another group member pasted a web URL when introducing a webpage, and mentioned that '*all the default size for banner, choose whatever you want*'. Indirectly, it was found that by encouraging students to use web 2.0 tools, it has get students to stay closer to vast collection of resources on the Internet, and be flexible and anticipative in upgrading and updating their existing knowledge.

5. Discussion

As mentioned by Vygotsky (1978), no one can be detached from social life as human communication helps to construct the ideas and enable collaborative learning and skills development, which eventually form an individual's cognitive system (Chiong & Jovanovic, 2012; Tiantong & Siksen, 2013). In this paper, it presents one of the components, 'Peer Interaction' which was obtained from the factor analysis in previous study. Through the content analysis on students' posts and comments in web 2.0 tools, it elaborated and revealed more facts which were meaningful to students and related to the peer interaction process. Therefore, there were several points to be highlighted with pertaining to the peer interaction in collaborative learning environment:

1. **Peer interaction has formed cross-checking and peer evaluation in avoiding misunderstanding and reducing mistake** which might cause a waste of effort and time. As students commented in open-ended question: *'If there are any parts which doesn't look nice, others will change…'* '*We tend to make mistake and another one always corrected the things for us*', '*if not [1 member], we not understand about the requirement about the project, so we can't do what lecturer needed…*' '*it is essential to share the information to avoid misunderstanding*'. These feedbacks show that students appreciated and willing to interact with others as it can produce better quality of work compared to working alone and being isolated. It is consistent with other studies that when students were exposed to checking for mistake or fixing the misunderstanding, it nurtures their confidence and critical thinking skills which can improve students' understanding on the subject topics (Brindley, Walti, & Blaschke, 2009; Chiong & Jovanovic, 2012).

2. **Peer interaction has provided opportunities for students to express personal thoughts for suggestion and improvement**. The students mentioned that *'I feel happy as I get to voice my opinion…and satisfied when my group members accept my idea', '…search for information and then told other group member about what we found…', 'I'm not doing the animation part, but my group members will give me a best explanation on animation*'. It can be noticed that being able to share and contribute to the group project is important as it increases the student motivation in the learning process when they felt proud as one of the contributors and new ideas can be accepted by the group member. This is consistent with the study that students will gain the sense of enjoyment and new motivation when working collaboratively with differ-

ent perspectives which help them to achieve greater academic achievement (Chiong & Jovanovic, 2012).

3. **Peer interaction has indicated the need to accept difference among group members**. From student feedback, some comments reflected that '*many argument appeared due to bias on task allocation, in order to solve this, we hear the problem from another, and redistribute the works*…', '*a person keep scolding me about my part but he doesn't know how hard my part is, so we talk to him and he apologise because he was no experience*…'. This can be supported by the literature that, in acculturating students into a learning community, collaborative learning is an approach to accept and value diversity through negotiation and argument, so that different learning styles, cultures or conflicts can be solved or accommodated before establishing trust among themselves (Palloff & Pratt, 2005; Finegold & Cooke, 2006).

4. **Peer interaction has enabled students to perform brainstorm during real-time online discussion and work synchronization**. The student comments revealed that '…*we start with brainstorming, then construct our page layout, after that we compile everything in one time straight*…', '*we communicate with each other through Facebook… settle everything is on the spot, fast and efficient*', '*most of the time they respond actively…interact in Facebook…do meeting and complete in there*…'. This shows that with the use of web 2.0 tools has enabled online discussion and provided synchronized workplace for multiple users, to generate the outputs as each member takes turn to provide details, fill up the gap, and making final decisions. This is found to be consistent with the recent literature studies that with the availability of web technologies and students' IT literacy, the curricula in higher educational institutions can be re-designed to embrace collaboration in learning among the university students, from teacher-centered setting to discussion-based learning process, and from assessing individual achievement to the value of learning together (Chiong & Jovanovic, 2012; Pun, 2012).

5. **Peer interaction has stimulated students to actively use internet resources** as reference to expand, upgrade and update existing knowledge. When answering the open-ended questions, students said that '*we mostly found information from the Internet, also got a few photo sample from the Internet…*', '*we acquire information from the Internet such as About Us information that we would like to put in the project*…', '*we do some research on the Internet for the ideas of our product and the design of the application*…', '…*search for video tutorial and learn it*…'. These feedbacks show that using internet resources has been a very common and helpful practice among the students. As it can be noticed that Internet resources were used for many different purposes, such searching for ideas, work samples, guidance, or related information which were needed in different stages of the project development. This trend has reflected that the students who were raised in this information-rich generation are interested and capable to use digital media and Internet resources for learning, socializing, and working on tasks (Chisanu, Sumalee, Issara & Charuni, 2012). Hence, this pedagogical change has moved towards cultivating active learning to construct new knowledge with experiences of using different resources (McLoughlin & Lee, 2010; Chisanu et al, 2012).

6. Conclusion

As a conclusion, this study mainly focuses on incorporating Gagne's instructional events into Jonassen's model for designing CLE, in order to map into the class environment for collaborative learning in project group. It aims at enriching students' learning experience and knowledge construction process. In discussing the component of 'peer interaction' which were identified from the factor analysis in previous study, with the use of content analysis method in assessing students' feedback and their interaction in web 2.0 tools, several aspects on peer interaction were further elaborated and discussed. Therefore, this study has suggested that each of the components identified from this collaborative learning environment should be further studied and investigated with all forms of students' interaction in the web 2.0 tools. The next study will focus on different components of collaborative learning environment, including work organization and skills development.

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Re-envisioning libraries for training and literacy development

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Abstract

As technology continues to develop at a rapid pace, libraries need to embrace a more engaged role in the active training of patrons to meet the diverse range of literacy requirements they are increasingly likely to face in their daily, academic, and professional lives. This paper contends that the promotion of educational opportunities should run throughout all aspects of libraries and embody the ethos of the librarians that work within them. If libraries are going to truly meet the needs of their patrons going forward, innovative information literacy training must be re-envisioned as a service priority in all library functions.

Keywords: literacy; libraries; computer literacy; technological fluency; information literacy

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1. Introduction

Libraries have long been considered primarily as places where books, journals, and other forms of paper-based sources of information are stored, indexed, and made available to meet the specific information needs of their patrons as they might arise. While the scope of these collections naturally varies within the different library contexts (public, school, academic, special) and even among the many subdivisions within each of these contexts, the notion that libraries are mainly for making paper-based reading materials accessible is one that has existed as long libraries have existed themselves. In recent decades, however, as technological capabilities have progressed dramatically, so has the capacity of libraries to incorporate an ever-increasing amount of text-based digital formats (electronic journals, magazines, newspapers, e-books) as well an array of multimedia formats (audio, audiobooks, video, video games) in their collections. Although the inclusion of such formats in library collections has served to greatly expand library access to a growing range of information and entertainment sources, it seems that in many ways the focus has managed to remain chiefly centered around that of providing access itself. Though this approach harkens back to the concept of libraries as information repositories carried over from the paper-based age, it is imperative to reconsider if this area of service is all that libraries can and should be concerned with.

In an age when access to information of all kinds is becoming increasingly easy due to the Internet, a library focused on providing access alone is clearly not meeting all of the varied needs of its patrons including a range of literacy needs. Indeed, along with the technological developments that have allowed libraries the opportunity to provide greater access to an expanding range of formats, the current skill set

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required of people in the 21st century seems to have changed as well. No longer is basic literacy, the ability to read and write, all that is required to thrive and succeed. Today, people must also increasingly be able to use technology effectively; they must have computer literacy. Even beyond basic and computer literacy, people must be able to conduct and manage their own information-seeking processes. Identifying information needs, exploring search options, and evaluating the sources that they do find are all now essential elements of information literacy required of many in the Internet-based, information-rich world of today. While the importance of these literacies has long been recognized within the field of library and information science and many, if not most, libraries do attend to them to some degree, this area of library service remains in a secondary role to that of providing access. If librarianship is going to truly meet the needs of patrons today, innovative information literacy training must be made a service priority in all library functions.

2. Literacies old and new

While the term literacy once referred almost exclusively to the basic ability to read and write, the concept of literacy today has come to mean a great deal more. *Basic literacy*, however, remains a critical first step that must be reached before computer and information literacy can be fully addressed. Fortunately, in many parts of the world, the development of functional basic literacy is almost taken for granted, as it is traditionally cultivated in required primary schooling. For those who may not have achieved basic literacy through schooling, both school and public libraries in the U.S. often still provide some degree of support (Brey-Casiano, 2006). In conjunction with other community-based organizations, these and other programs such as English as a Second Language (ESL) instruction remain small but important areas of service provided by libraries.

As technology has become a more and more ubiquitous part of daily life for many people, the ability to use computers effectively has become another critical skill in the 21st century. While the term *computer literacy* is often used to denote some degree of mastery of an overall set of computing skills or abilities in relation to the computer such as being able to use word processing or spreadsheet software, perhaps a more thorough and nuanced understanding is to think of this realm of literacy as *technological fluency* instead (Snyder et al., 1999). Indeed, the word fluency seems to better characterize both the range and fluid nature of technological abilities. While someone may be proficient at using the current version of Microsoft Word, that doesn't necessarily ensure that they would be able to effectively use other types of word processing software or even the next iteration of Word. Most notably promoted in the National Academy of Sciences' Committee on Information Technology Literacy's 1999 report, the concept of technological fluency not only takes into account the disparities in a computer user's skills between different applications, it also encapsulates the need "to plan to adapt to changes in the technology" (Snyder et al., 1999, p. 2), an aspect that is critically important given the rapid pace of technological change. Overall, the Committee noted that three kinds of knowledge were essential to technological fluency: contemporary skills (being able to use current applications effectively), foundational concepts (having an understanding of how the technology works), and intellectual capabilities (being able to reflect on and apply the use of technology to suit changing needs) (Snyder et al., 1999). While more and more people have now grown up accustomed to using computers in many different capacities, there regrettably remains a substantial 'digital divide' between people who have unfettered access to computers and the Internet in their home, school, and work environments and those that simply can not afford such access. For these people, much like those who may not have achieved basic literacy, public libraries may offer one of the only options available for improving this area of fluency (Celano & Neuman, 2010; Krebeck, 2010). By providing access to public use computers and training sessions geared around specific applications, libraries are now increasingly at the forefront of technological fluency development.

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While it is clear that libraries have some role to play in fostering both basic literacy and technological fluency, perhaps their greatest role should be seen in terms of supporting information literacy. *Information literacy*, probably most authoritatively defined by the American Library Association (ALA) in their 1989 report, is generally considered to be the set of abilities required "to recognize when information is needed and the ability to locate, evaluate, and use effectively the needed information" (para. 3). These abilities, therefore, can be thought of as taking people throughout the entirety of the research process: from the initial impetus which sparks a recognition of the need for information, to the search process itself and the evaluation of sources, all the way through to the proper and ethical use of any information found. While obviously of great importance in academia where the ability to conduct independent research and incorporate any relevant background information found is a hallmark of the educational endeavors typically undertaken by students, information literacy extends well beyond coursework and into the daily lives of all of us. Summarizing the widespread importance of information literacy, the ALA (1989) put it this way: "To promote economic independence and quality of existence, there is a lifelong need for being informed and up-to-date" (para. 2).

Although the ALA's 1989 overview of information literacy remains highly relevant and often cited, more recent literature has attempted to recalibrate information literacy to take into account new literacies that are still emerging, especially since many aspects of technological fluency have now become so intertwined with these latest skill sets. Some such as *digital literacy* simply seek to extend the central concepts of information literacy more specifically and directly to the vast number of new information and communication options now available online (Adeyemon, 2009; Borawski, 2009). Another concept gaining notoriety in the literature, *metaliteracy*, expands on the definition of information literacy somewhat by highlighting the growing degree of participatory opportunities now available, as Mackey & Jacobson (2011) note, "to actively produce and share content through social media and online communities" (p. 76). Finally, another conceptualization seen recently, *transliteracy*, focuses on the importance of the interaction now possible between all of the different types of text and multimedia formats, as they are increasingly likely to be used in conjunction with one another rather than in isolation (Ipri, 2010). While such novel frameworks have yet to be fully embraced by the library and information science community as broadly as information literacy has been, the distinctions they raise serve as excellent opportunities to reconsider the further blurring of the line between technological fluency and information literacy.

3. Rethinking the priorities of libraries

While it's clear that the importance given to information literacy in the field of library and information science has grown alongside greater access to information and heightened demand for technological fluency, both in the literature on the subject and in the parallel increase in instruction done in libraries in recent years (Grassian & Kaplowitz, 2009), it's even more clear that this function still remains subordinate to the traditional view of libraries as collections of materials (Jankowska & Marcum, 2010). Though some have called for a dramatic realignment of library priorities to place the central emphasis on instruction, particularly in academic contexts (see Loesch, 2010, and Palmer, 2011), these voices currently remain few and far between. While many have recognized the critical crossroads that libraries find themselves at today and have expressed a range of possible scenarios leading either more towards the margins or the mainstream (see Sennyey, Ross, & Mills, 2009), it seems that the library's potentially preeminent role as a provider of both information and the training required to utilize it effectively is often overlooked.

Given both the noted misalignment of libraries' current priorities retaining their focus foremost on providing access to a traditional collection and the demonstrated need for fostering information literacy skills outlined previously, it is my view that libraries must embrace a greater role for integrated training

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and instruction in concert with a more innovative approach to the materials they offer. However, beyond offering isolated information instruction sessions, re-envisioned libraries should build instructional opportunities into everything they do and the materials that they offer. Reference transactions should be thought of as training sessions in their own right and carried out as such as much as possible. Furthermore, the growing potential of digital convergence should be leveraged so that materials themselves can optionally serve as their own interactive training materials combining text with all kinds of multimedia formats. For instance, imagine the potential of downloadable e-books embedded with accompanying audio, video, interactive games, and social networking options. The unique possibilities offered by advanced cloud-based computing systems could also provide entire web-based and on-demand planned learning programs consisting of such multimedia-rich, electronic training materials. These programs could be set up to recognize users' knowledge states and previously viewed content and automatically tailor subsequent materials precisely to the level, interests, and identified needs of the users at that moment. Although the traditional focus of libraries was on ensuring access to carefully selected collections, the re-envisioned focus that I am proposing should be centered on ensuring access to engaging educational materials that foster information literacy and technological fluency in addition to mastery of the content itself.

While it is a liberating intellectual activity to completely re-envision libraries from the ground up, a more measured, incremental progression from a collection focus to a training focus would ultimately likely be required given the realities faced by most libraries. Budget concerns and their impact on limiting how many electronic subscription services could be brought online are obviously one of the largest obstacles to be addressed. An even more important initial concern is gauging the preferences and opinions of any library's user base before any major reprioritization of library goals is enacted. In the end, a library's primary mission must align with providing its constituency with the services that they desire and demonstrate a proclivity toward using. If interactive, electronic multimedia geared toward providing individualized content and training did not match well with the particular library and information needs and preferences of a given library community, such services, no matter how innovative, would likely not be used. Furthermore, as Godwin (2009) notes, the great majority of library faculty and staff are not currently prepared "to employ more engaging and active methods to reach their patrons" (p. 4), as would be required to meet the goals of the re-envisioned library outlined above.

4. Conclusion

Although the future of libraries remains uncertain, it is clear that a significant shift from the overarching priority given to collection of paper-based materials to include a much wider array of electronic formats and Internet resources is already well underway. While most of the field has been content to simply expand the focus on maintaining access to an indexed collection of both paper-based and electronic materials, this paper argues that a much more substantive reconsideration of the primary roles that libraries should be engaged in is required due to both the information and computer literacy needs increasingly required in the Information Age and the new affordances that technology can increasingly offer. Libraries today need to embrace a more engaged role in the active training of patrons to meet the requirements they are more and more likely to face in their daily, academic, and professional lives. The promotion of educational opportunities should run throughout all aspects of libraries and should embody the ethos of the librarians that work within them. While such a drastic realignment is sure to face challenges and resistance from those who do not believe such services can or should fall within the purview of libraries, the realities of the information needs of patrons today demands this type of innovation in strategic planning.

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Reflections about the use of information and communication technologies in accounting education

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Abstract

The teaching of accounting sciences requires innovative alternative methodologies that allow a greater dynamism in students' learning processes, encouraging their autonomy in order to foster greater understanding and ownership of accounting topics covered in class. In that sense, the use of ICT for educational purposes has been positioned as a dynamic and interactive alternative that allows the application of knowledge and encourages the feedback in the learning process.
This paper aims to reflect on the use of ICT in accounting education as a strategy to improve teaching and learning processes in students of the Department of Finance of Metropolitan Institute of Technology of Medellin. It is proposed a teaching method with a learning virtual object through a virtual mediator of accounting formulations. It has a pedagogical purpose of providing students with a conceptual and practical tool to interpret and analyze accounting and financial topics at the enterprise level.
It is observed that the interaction between accounting graph logic and logic of dynamic perception facilitates the processes of teaching and learning in the disciplines of accounting and finance. It is reflected in greater motivation and understanding of mathematical equations in financial area that will carry out to experimentation of knowledge learned in the classroom.

Keywords: ICT; accounting sciences; teaching; learning

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1. Introduction

In the world and particularly in Colombia, there are different forms of communicative interaction between people with varied economic exchanges adapted from each epoch and every context of accounting development. Thus, humans have developed the tools to set the knowledge associated with modernity in the accounting area: dynamic variables, rules, resources, techniques and technologies. This has influenced the ways of thinking and practice of accounting education in the world. In a country as Colombia, it has a number of studies and knowledge associated with generating best practices of accounting education in university contexts.

Currently, the accounting discipline requires best practices in teaching and learning in various educational contexts, and in different processes and professional activities. There, it can use better perspectives and methodological approaches such as the social and educational constructivism, and philosophical and epistemological pragmatism of accounting. It can be implemented with accounting teachers to be better teachers and make significant teaching with the use other non-traditional forms of education.

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In the hands of currently society and the information and knowledge economy, accounting education and its teaching processes now have a key technological emphasis to the information and pedagogical economy based on technological and active guidance. These perspectives are based on key aspects of the information economy that works on networks and as a global economy (Castells, 2000). To ensure that accounting be part of the social and the economic in the world, it is required better and more effective methods of teaching and learning besides the only pragmatic accounting.

These aspects belong to different disciplines which seek to organize the academic training from the general to the particular knowledge. Future accountants put this knowledge at the service of society to solve problems and provide systems of information from public and private companies. Generally, accounting students in Colombia learn about areas such as accounting, finance, budgets and costs in a rote-linear manner without take into account their applicability. Students have greater cognitive clarity of understanding the financial, political and economic aspects when they know the applications of these areas. It allows them to be the architect of their own destiny and provide a proactive way to solve problems associated with the contexts in their country.

Knowing and practicing different forms, methods and techniques help to accounting teachers and their students to have a meaningful and fluid teaching-learning process. In this way, the aim of this paper is to investigate how teachers can be more innovative teaching accounting through technological resources. So the question that guides this discussion is: How do you teach accounting formulations through technological pedagogical mediator with Virtual Learning Objects and accounting analysis?

A teaching method with a Virtual Learning Object is proposed through a virtual mediator of accounting formulations with the pedagogical purpose to provide better teaching for students and a conceptual and practical tool to interpret and analyze corporate accounting and financial aspects. In this case, it gives an articulated vision between practicality and mathematical precision and between the equation and the financial problem. The teacher in the process of social, cognitive and academic training should define methods of teaching-learning where theory and practice are combined and accounting with other disciplines too.

2. Accounting education from a theoretical perspective of pedagogy

Pedagogy as a science of education has a fundamental influence on the practical learning process of specific variables and metrics to financial accounting. Pedagogy applied to the teaching of accounting education is considered from epistemological aspects according to the technical reason of for being social as a committed accountant with the society since practical aspects of how to use better methods, formulas and mathematical algorithms, and how to be more precise in making financial, economic and business decisions.

Accounting education is understood as the process of teaching and learning of "the accountant" which is self reflection of the activity of accounting in a society, economy and business. Education can approach the formulations of this knowledge and its impact on the social analysis as key aspects in the technique of financial process for all types of people in higher educational settings.

Currently, accounting education is a transmitter and disintegrated education with technological aspects. In this sense, it is proposed pedagogical mediations to improve part of this situation with a better analysis of the teaching process and alternatives based on technology and systemic understanding of financial process, using visualization, graphing and its analysis.

The instructional model seeks “to achieve learning by information transmission”. In this model of education, student learns by repetition, copying or imitating, because he learns mechanically as a receptor without creativity. Thus, it is necessary a new school based on the model of learning by practice, it means, learning occurs by "discovery" (De Zubiría, 1997).

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3. The importance of ICT on academic accounting programs

Information and Communication Technology (ICT) can be defined as a set of information, electronics and telematics technologies, using modern microelectronics, telecommunications and computing to develop all kinds of devices, techniques and processes that impact different areas of human life. So, ICTs can be based on computational and informatics tools that process, store, summarize, recover and provide information in order to transmit, share and socialize knowledge.

In businesses, financial and economic decisions are "a human construction and a form of culture that is characterized by the ability to understand, predict and control phenomena which surround the human being; technology is in culture" (Mejía, 2004).

The advance of new technologies and social changes that occur in the current accounting education requires ICT to support the student learning development. Therefore, it is necessary to stimulate new interdisciplinary tools that teachers and students understand in the accounting area with the implementation of ICT within the classroom and in their processes of accounting education. So as suggested by the IFAC (International Federation of Accountants) through IES 2, Content of Professional Accounting training programs (IFAC, 2008, pp. 39):

The component of information technology should include the following topics and competences: (a) general knowledge of information technology, (b) knowledge of the control of information technology; (c) competences of control information technology, (d) user competences of information technology; and (e) one or a mixture of the corresponding competences to managerial roles, evaluation and design of information systems.

In the dynamic scenario of accounting education from educational spaces of higher education, there are difficult aspects on its teaching (Strajman, 2013). For example: the lack of expertise, inadequate training received from teachers, unwanted changes in your own role and logistical problems associated with their integration into the classroom for the better and greater use of technology tools associated with the teaching-learning process.

It might mean that accounting education in Colombia with the inclusion of ICT should be part of pedagogical and didactic scenarios where expert teachers in these areas are required. Moreover, it shows the need for combining different disciplines as a support (computers, mathematics, graphic and audiovisual design, economy, communications, sociology, psychology, etc.) and new educational policies that enable an interaction of accounting education with ICT.

ICTs are a valid tool to improve the educational process to change the way in which students learn and teachers teach. Also, it helps to modify the instrumental character that should be secondary in the educational aspect. In the field of implementation of these technologies, the teacher cannot get them as a "fashion". He should know about them and be very clear about the purpose of their implementation. Furthermore, teaching-learning process of accountant must to preserve in his formation the social scientific training that aims to solve social problems by Virtual Learning Objects (VLO). They are educational mediators that have been intentionally designed for a learning purpose a technological nature which serves members of the process to explain-demonstrate some model or technique in a field of knowledge.

A VLO has content, learning activities, context elements and metadata. This metadata are data descriptors that are included in the document for easy storage, identification and recovery, which makes it different from a computing object (Ramirez, 2013). Its content its learning activities and its context elements should be designed by the teacher as an organized structure to guide a group of students in multiple paths to confront their ideas with a scientific and critical sense toward a virtual learning community. The student is interacting and solving multiple tasks in diverse situations that raise the understanding and practice of interactive objects. They are generally knowledge objects associated with a teaching-learning process in an active methodology.

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Applying a VLO in accounting is currently very important. It goes from own computing applications of accounting and technic process to graphics and financial variables for their models to decision-making and financial, legal and accounting responsibilities. However, the relation between accounting education and Virtual Learning Objects needs to be redefined. It is a new field in terms of methodology and research without a clear structure. Additionally there are several pragmatic clashes between people who are studying this research field and those who presume it still too registrar.

The purpose of working VLO is to build and demonstrate a logical proposal of interaction between accounting education and technological practice of a pedagogical virtual mediator, which increases the ability to display a proposal behind the financial problem in terms of a technological vision from a business perspective to the didactics of dynamic image and mathematical function analysis.

In this case, present a new method of accounting education is the key to the process of interaction between accounting education and understanding of the learner, who is a virtual mediator in the teaching-learning process from accounting formulas using a technological tool integrated by accounting and arithmetic. This method proposal as a VLO enables a visualization of integrated and holistic formulas, graphs and analysis through a complex and complete process to teaching financial variables that allows have greater precision and technical and technological objectivity.

Teaching accounting formulations through a virtual educational mediator type OVA is an accurate alternative to integrate current technology with a logical teaching-learning process, being didactic, comprehensive and oriented to image viewing with a sense of active and proposed construction of the financial learning process logic. This is achieved by the intrinsic motivation of the person, manifested by the precision of the formula through the algorithm and the attention of the dynamics of the image with the perception of the sense of financial problem.

In that time, it has been taken into account conceptual elements of understanding and reflective praxis such as the notion of cognitive interaction between the dynamic image and perception of understanding of the accounting procedure. They are correlated with a perspective of constructive interaction of teaching and accounting for development of the virtual mediator. Then for math graphing, it was proposed an improved theoretical perspective of financial mathematical calculus in one and several variables to improve the precision of the formulation and mathematical deduction. Finally, an objective application of the dynamic graphical of accounting formulations is accomplished in different scenarios and examples.

In this case, the interaction between the graphic and explicit discursive logic of a financial function promotes constructive interaction of learning from the questions and meanings of people interacting with the tool. This action facilitates the interaction between technology, pedagogy and accounting communication, which interacts in meaningful perception of people to approach the tool as a function of learning and simulation of the actual process they want to teach.

The virtual mediation facilitates the decision making process in the virtual learning mediation. It is conceived as a practical pedagogical application process of computer technology VLO in the teaching-learning process. In the traditional method, a problem-based learning is guided. However, the interactive part is not visible, and there is no dynamic ingredient where graphics changes and movements are made and the student observes, analyzes, and concludes. In the traditional method, but also it can guide a learning based on problems, the interactive part. The analysis done is synthesized in Table 1 through a comparison between traditional and VLO models.

Table 1. Comparison between traditional and VLO model.

	Traditional Model	VLO Model
Subject of learning	Reproductive Static (Chalk and board)	Productive Dynamic (Dynamic Software free)
Learning by	Slow understanding (observation data, data analysis, conclusion, data feedback and calculations)	Fast understanding (observation data and graphics, data analysis and graphics, conclusion, feedback introducing data

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		and dynamic graphics)
Evaluation	Summative, based on trial and error (written and rigid evaluation)	Formative, constructive comprehension levels (open evaluation with analysis of results according to the graph)
Teacher	Information provider or transmitter	Provider or transmitter of information that becomes in guide of learning, transfers control to the students through the simulation and interaction with the VLO
Student	Consumer/receiver information	Increasingly autonomous. Decision maker

4. Conclusions

In modern accounting education, in countries like Colombia, is essential to think and develop better and new teaching-learning methods of accounting. To that case, a method as virtual mediator in the teaching and learning of accounting formulas with free software tools technology was proposed. At present, the education needs pedagogy. Teaching requires to be clear about the purpose to which is wanted to arrive, the way students learn and grow, what kind of experiences are appropriate and effective, and what techniques and procedures are effective to perform the process.

Sometimes students are not interested in the learning process because they consider it monotonous and boring, have no motivating for the learning, are passive, no appropriate strategies, etc. That is the reason why is important the proposed model, which used ICT, something that is very close to the current generation. Furthermore, the use of software allows movement, change and in short time the student gets answer to his questions.

Model proposed is an appropriate strategy, with appropriate techniques where the student uses this tool for learning. It allows contextualize the analysis cases; perfect the use of memory in the applicability of knowledge-sharing strategies where he is more independent using active participation strategies which can test his creativity, and increases collaborative work in the classroom and the discussion of real problems by using these technologies.

The interaction between graphical accounting logic and dynamic perception logic facilitates the teaching and learning of accounting students, which is evident in the expressions of motivation and sustained understanding with analysis of the teacher interacting through the facility tool. Also, expected results with the accuracy of mathematical calculations make possible to focus on some financial mathematical equations to a most effective process in the projection of a scenario of teaching and learning to learn more, to better understand and visualize more effectively.

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Remote access for education and control of mechatronics systems

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Abstract

Applied training is important in mechatronics engineering, a multidisciplinary science. Laboratory practice should be done theoretical training to be efficient. Expert trainers are required for mechatronics education which is a complex science. In this study, a network infrastructure is made for education and control of modular production system which is a mechatronics system. The structure was applied to mechatronics laboratory where is Trakya University İpsala Vocational School. In this way, an educator will provide the education of trainees, from any location with internet. Also, a modular production system can be controlled remotely.

Keywords: Mechatronics Systems Education, Remote Access for Education

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1. Introduction

Mechatronics is a design process that includes a combination of mechanical engineering, electrical engineering, telecommunications engineering, control engineering and computer engineering(Department, 2011; Faculty of Mechatronics, 2011). Mechatronics Systems Structure shown in Figure 1. Mechatronic systems consist of mechanical and electronic piece. These systems detects around with using sensors and with the software installed on controls the actuator(Auslander, 1996; Bishop, 2006; Bradley, Dawson, Burd, & Loader, 1991). With the advances in technology, these systems are continuously developed. The development of mechatronic systems can be software or hardware; such a programmable logic controllers (PLC), human machine interface(HMI) sensor or actuator.

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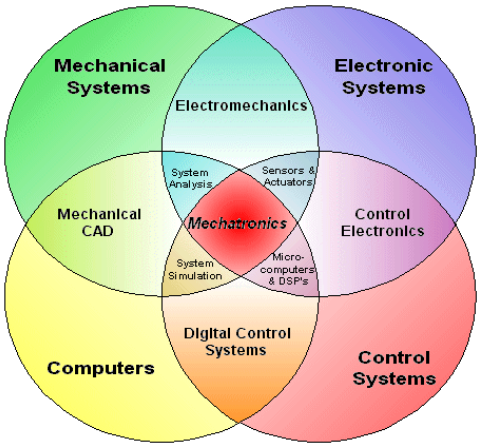


Fig. 1. Mechatronics Systems Structure

For the implementation of these changes to the system or to teach students, need to get support. Educators must be experts in the field for hardware and software training. In this study, an infrastructure has established to get help when needed from expert educators. With this infrastructure, over the internet from anywhere educators will be able to practical training in the laboratory. At the same time, control of the system in the laboratory can be done remotely, too. Educators will be able to tell lessons, visual and audible via projection, to students in the laboratory.

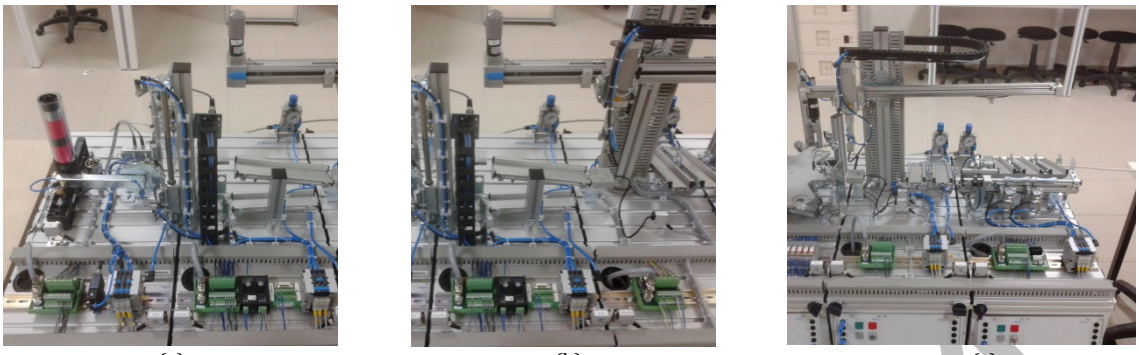
With the growth of internet in recent years, many studies are being conducted in the remote-access laboratory. Some of them; For phase-aided 3D microscopic imaging and metrology laboratory has been set up remote access(Wang et al., 2014). This study was made of the animation of laboratory equipment in remotely (Schulz, Chen, & Payne, 2014). In addition to remote access labs are carried out several studies on management and training (Maiti, Maxwell, & Kist, 2014; Pearson, 2014; Schauer et al., 2014). Remote accesses to the lab for different educational subjects are provided (Soares, Leão, Carvalho, Vasconcelos, & Costa, 2014).

In this study; from the training set used in laboratory is discussed in Chapter 2. Established network infrastructure in the laboratory is discussed in Chapter 3. Application notes are discussed in Chapter 4. In Chapter 5, results and evaluation are discussed.

2. Mechatronics systems

In this study, provided remote access and control of mechatronic systems, is located in Trakya University Ipsala Vocational School Mechatronic Laboratory. The system consists of six different stations. Stations respectively are distribution station, testing station, electrical handling station, processing station, pneumatic handling station and sorting station. The stations are shown in figure 2. All stations are a demonstration of the production system. The system is flexible and be programmed. Therefore it is called modular production system (MPS). Each station can operate independently of each other. The software can be designed to operate fully automatically. Each station has Siemens S7-1200 PLC. The transactions at stations are perceived by various sensors. Thereby data collected in the PLC, Output elements are controlled. Also there are five computers, six HMI and a projector in the laboratory. PLCs and HMIs communication protocol are Industrial Ethernet. All of the devices to communicate with each other and wi-fi access point switches are used. Established network is described in chapter 3. In this study, all six stations and HMIs can be accessed from a remote location with Internet. The students in the laboratory, practical software and station information, how it works, can be given by educators in remote locations.

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(a) (b) (c)

Fig. 2. (a)Distribution, Testing, (b)Electrical Handling, (c)Processing, Pneumatic Handling, Sorting Stations

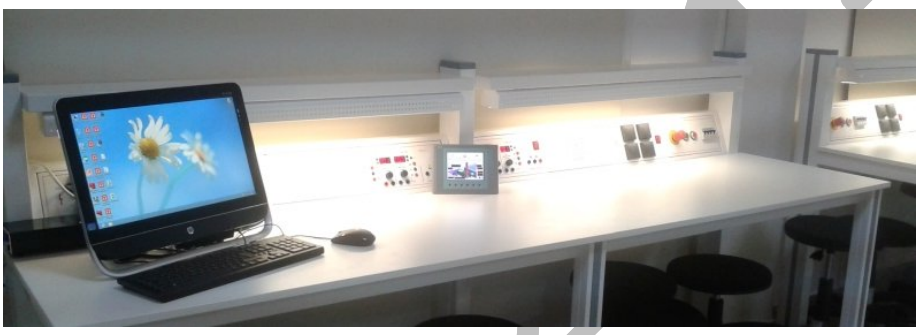


Fig. 3. Computer and HMI Station

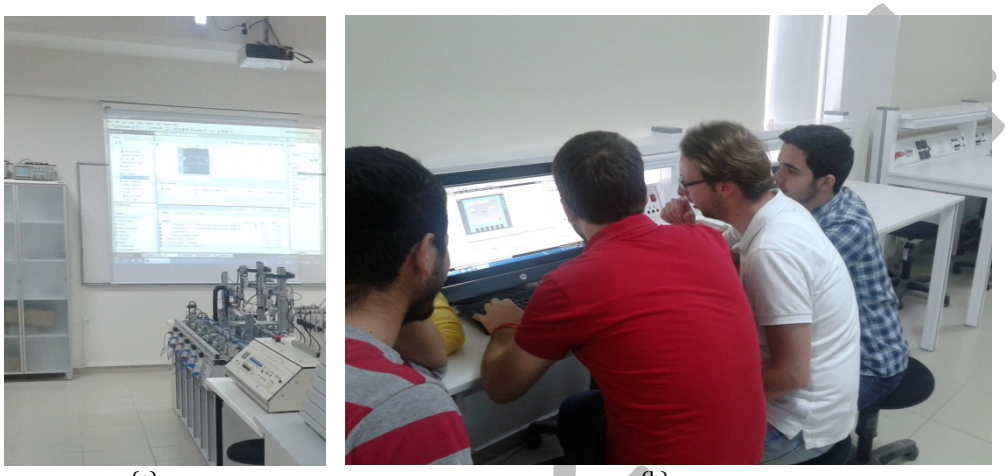
3. Remote access infrastructure

Industrial devices in the mechatronics laboratory are communicating via Industrial Ethernet protocol. Four of the computers can communicate with both Ethernet and wireless Wi-Fi. These computers are bridged Ethernet and WiFi connections. Last one computer can communicate via only Ethernet. Switches are used for cable communication. There are there four port switches in system. There is one access point, which has four ports, for Wi-Fi communication. The access point's WAN port is connected to the Trakya University network. The access point gives IP over DHCP to the devices in the laboratory. A fixed IP is given industrial devices to avoid IP conflicts. All other devices are given an IP address automatically. University and laboratory IP address is configured as different from each other. All network infrastructure diagrams are shown in Appendix 1.

4. Application

Remote access to all devices maintained in the laboratory is provided on the internet with the network connection established. Permitted persons can update the firmware of the device. In the laboratory, a computer that can connect remotely and online video lectures can be made. Images of training in the laboratory are shown in Figure 4.

In this study, two different distance education methods have been tried. The first of them; with the help of the Team Viewer program by making a remote connection is made lectures and station control. Team Viewer has set up a remote desktop connection to the computer in lab. Students with the help of the projector and speaker can follow the course. Education makes lectures over the internet thanks to Skype program. Students are able to follow the online course from their own computer or projector. Educators know the IP address of the station is able to remotely access and control hardware. Both methods were remotely practical lectures.



(a) (b)

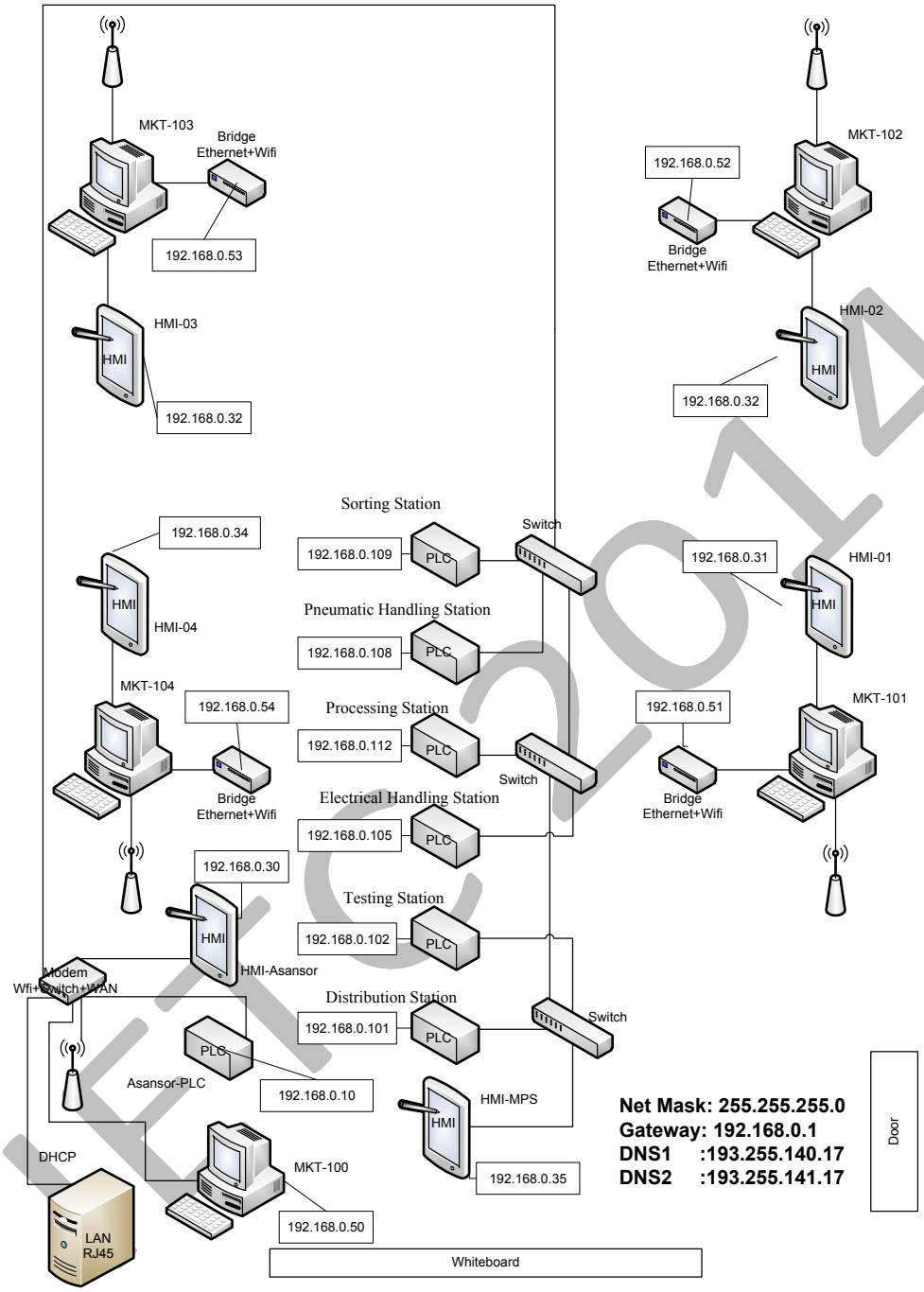
Fig. 2. (a) Stations and Projection Image (b) Students follow courses

5. Results and discussion

Mechatronic systems, known as of intelligent systems, are constantly evolving. Development can be hardware or software. The systems to perform the training, expert trainers are required. In this study, for remote education of mechatronic systems network infrastructure has been established. Remote access to the Trakya University Ipsala Vocational School Mechatronic Laboratory is provided with this infrastructure. Training and control can be done making connection to devices in laboratory with remote access. Training is provided in two different ways. One of them; video conference had established a remote desktop connection is made with the program. The second method; educators in remote locations to connect are provided with IP access to the laboratory. Either method, away from the laboratory via the Internet by connecting the educators gave practical training.

In this study, remote access infrastructure for mechatronics laboratory has been established. By designing a new interface, a link can be established more professional. At the same time, this infrastructure is the infrastructure of remote practical laboratory training.

Appendix C.



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Representation of women in computer game "prince of persia"

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Abstract

The stories of the popular video games include narrations like movies and other various media contents, and of course those contents are ideological. With this study, we are intending to, by making use of the feminist film theory, compare the 1989 and 2003 versions of Prince of Persia in the sense of representation of women. At the first version the story ends with the traditional patriarchal ends; however at the second version the Princess makes her own way. Within that scope it can be asserted that The Prince of Persia: The Sands of Time, despite being a popular text, includes a cracked-line that may be useful for oppositional readings.

Keywords: Computer games; women representation; feminist theory

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1. Introduction

Through the opportunities provided by the developing technologies, the stories of the video games are getting varied. Developments at the digital technology both made the stories more realistic in the audio – visual sense; and the videos that are shown at the beginning, end, and during the game started to take more and more place within the game. The stories of the popular video games include narrations like movies and other various media contents, and of course those contents are ideological. With this study, we are intending to, by making use of the feminist film theory, compare the 1989 and 2003 versions of Prince of Persia in the sense of representation of women. After the copyrights of the game were purchased by Ubisoft in 2003, it had been published as a trilogy, under the titles The Sands of Time (2003), Warrior Within (2004) and The Two Thrones (2005). In order to establish definite limits for the study, we have dealt with the first version of 1989 and The Sands of Time (2003), which had been improved with reference to the same story.

2. Feminist theory

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The history of feminist film theory begins in the 1970s and parallels the development of film theory itself as an academic discipline. It stems from the woman's movement of the 1960s and was influenced by germinal feminist works like Simone De Beauvoir's The Second Sex, Betty Friedan's The Feminine Mystique, and Kate Millett's Sexual Politics (Hollinger, 2012: 7). The male gaze theory, developed by Laura Mulvey with the assistance of psychoanalysis, had became one of the most commonly used paradigms in the feminist film theory (Smelik, 2008: 4). According to Mulvey, the pleasure obtained from the cinema is in relation with scopophilia, one of the motives that forms sexuality (Mulvey, 2010: 214). The impressive article of Mulvey, which had been published in 1975, not only puts psychoanalysis into the film theory, also examines the relation of the cinema with the patriarchal subluminal. This study, which enables the deepening of the film theory on the axis of the figuration and pleasure fictions with the questions that "how representations building the masculine and the feminine make themselves accepted by the means of the social myths and norms", and "how the social gender fictions make the social gender felt and how it effects the life styles", indicates that in the cinema audience had been placed as the subject of the masculine view and the body of the women had been placed as the subject of the sight; and thus the primary pleasures produced by the cinema are peeping and fetishism (Arslan, 2009: 18). Mulvey had examined the scopophilia at the classical cinema as a functional structure on the axis of effectiveness and passiveness, and had separated those two opposites into their genders. The narrative structure of the traditional cinema establishes the masculine character as effective and powerful: dramatic action opens around the actor and the view organizes with this. In that sense the cinema had previously idealized a visual mechanism being structured and organized according to the western art and westerns aesthetical criteria (Smelik, 2008: 4,5). According to Mulvey the cinema satisfies a primordial wish for pleasurable looking, but it also goes further, developing scopophilia in its narcissistic aspect. The conventions of mainstream film focus attention on the human form. Scale, space, stories are all anthropomorphic. Here, curiosity and the wish to look intermingle with a fascination with likeness and recognition: the human face, the human body, the relationship between the human form and its surroundings, the visible presence of the person in the world (Mulvey, 2010: 216). Mulvey had revealed narrative and cinematographic techniques that give the right to peep only to men. Within the narration of the movie, the masculine characters direct their sight towards the female character. The audience automatically, and mostly unconsciously unites with this masculine view. This is because the reason that the camera shoots not only from the optic, but also from the libidinal view of the masculine character. Thus, the cinematographic view has three levels that clarify the female character and turns it into something theatrical, which is the camera, character, and the audience). At the classic cinema peeping explains the women with their being charming (Cited by: Smelik, 2008: 5). Mulvey says that the mirror stage, which is particularly important for Lacan, in other words the moment that the child identifies his/her own image on the mirror is important for the establishing of the ego and for her theory. The mirror phase occurs at a time when children' physical ambitions outstrip their motor capacity, with the result that their recognition of themselves is joyous in that they imagine their mirror image to be complete, more perfect than they experience in their own body. Recognition is thus overlaid with misrecognition: the image recognised is conceived as the reflected body of self, but its misrecognition as superior projects this body outside itself as an ideal ego, the alienated subject which, reintrojected as an ego ideal, prepares the way for identification with other in future (Mulvey, 2010: 216). Because of that reason the forming of the ego is takes shape structurally with imaginary functions. Just like the cinema, even before the assertion of this analogy by Christian Metz at the articles on psychoanalysis and cinema, Mulvey had asserted that the cinematographic identification is structured at the border of gender differences. The figuration of the masculine character, which is more complete, stronger, and has a ideal ego, is a contradiction before the distorted passive and weak female character. Thus, the audiences are manipulated to identify itself with the masculine character rather than the female character (Smelik, 2008: 5,6). Woman then stands in patriarchal culture as a signifier for the male other, bound by a symbolic order in which man can live out his fantasies and obsessions through linguistic command by imposing them on the silent image of woman still tied to her place as bearer, not maker, of meaning (Mulvey, 2010: 212). Thus the visual pleasure has two dimensions that are transmitted by the means of gender difference: peeper – scopophilia view and narcissistic identification. Those two creative structures owe their importance to the clarified figuration of the female and the power of the masculine, holding the power. Furthermore, according to Mulvey, in the psychoanalytic sense the image of the women is already ambiguous; and the reason for that is its causing the fear of castration with its charm and seductive appearance. The female character that makes the masculine subject remind the lack of penis is rather the source of deep fears. The classic cinema overcomes the threat of castration by the means of the narrative structure or fetishism. In order to make the threat of castration imperceptible, the female character shall be found guilty. The confirmation of this crime is performed either by punishment or salvation. The reflection of this to the story of the movie is

realized by the means of two conventional ends, deemed proper for the women: the woman character either dies or marries at the end of the movie. In both cases catharsis is at the service of the male audience. (Smelik, 2008: 6)

3. Prince of persia

Prince of Persia is the general name given to the video game developed on by Jordan Mencher at 1989, and the other games derived from this game. The first game of the series had been published for Apple at 1989 first. The game had sold more than two million copies, and many versions adaption of it had been developed. In 2003, Ubisoft had bought the copyrights of Prince of Persia, and released the Sands of Time Trilogy, consisting of the games named The Sands of Time, Warrior Within and The Two Thrones. With this study, we are comparing the 1989 (Prince of Persia) and 2003 (The Sands of Time) versions of Prince of Persia in the sense of figuration of women.

3.1. Narrative structure and fetishism

The narration mainly consists of two parts, the story and the discourse. The story includes the plotline, the characters, and ambiance. On the other hand, discourse is the expression, the tool that transmits the discourse. The story is about "what" is being defined in the narration, and the discourse is about "how" it is defined. The story and the discourse are substantially important in the sense of the ideological construction of the narration, and they are articulated to each other in order to enable this (Abisel, 1994, s. 188-189). At the first version of the game, the story takes place in ancient Persia. The Persian King had gone to a war and left the throne to his Vizier Jaffar. Jaffar wants to marry the Princess, and take the throne. The Princess refuses her, and he locks her in a room, and tells her to accept his proposal, otherwise he will kill her. On the other hand, he also imprisoned the nameless stranger (the Prince), who was in love with the Princess. The game begins with the escape of the stranger from the prison. The stranger, who will be the Persian Prince at the end of the game, hurdles various barriers within the palace, and reaches the room of the Princess defeating his enemies. At the end the stranger kills Jaffar and marries the Princess. The game consists of 12 chapters. We see the Princess for 8 times in total, at the beginning while she refuses Jaffar and he locks her in a room, while she waits to be saved between the chapters, and at the end of the game, while being saved by the Prince. The only action of the Princess, other than waiting to be saved by the Prince, is at the beginning of the 8th chapter, giving the task of helping the Prince to a mouse. At the end of the 8th chapter, where the Prince cannot open the exit door, the mouse helps the Prince and enables him to pass to the 9th chapter. This is an exception for the Princess, because she waits for the Prince for salvation for the entire course of the game. Thus, as Smelik remarks, the Princess is given two opportunities at the beginning of the game, to die or to marry Jaffar. At the end of the game she is saved by the Prince, and marries the Prince; and catharsis is presented to the service of the male auditors. In the 2003 version of the game, released by Ubisoft in 2003, new characters had been added to the story, and the story had been improved. The story of the game can be summarized as; the Prince invaded a country and took magic sands from the country, enabling the control of the time. Then the Prince releases the sand, without guessing the results of his act, and then recollects the sands and put the clock back. Different from the first version, at this game the Prince does not receive the title "prince" at the end. At the very beginning of the game he is already a prince, as the son of Shahraman, the Persian Sultan. The Prince invades India, and the Princess is the daughter of the Indian Sultan Maharajah, Princess Farah. This time the Vizier is not the Vizier of the Persian, but Indian Sultan. At this version, the Princess has a more active role in the narration. At the beginning of the game, just like the first version, the Princess is captured, but then she escapes, and as being the wisest person at the game, tries to warn the Prince about the Vizier. The Vizier wants to get the blade of the Prince, and to become immortal by using the sands of time. It is only Princess Farah who knows the intention of the Vizier, and the evil side of the sands of time.

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At the beginning of the game she tries to prevent the Prince to unknowingly release the sands of time by using the blade, but she cannot succeed. Everyone turns into monsters, other than the Prince, the Vizier and Farah. The Prince defeats the monsters, passes various mechanical traps, solves riddles, and proceeds in the palace. At the 42nd minute of the game, which takes about 5 hours, Farah and the Prince meets, and they proceed together. At about three and a half hours of the five hours game, Farah takes active roles in the story with the Prince. She passes through narrow passages, opens the doors, and takes various tasks necessary to complete the game. In addition the uses an arrow, and physically fights shoulder to shoulder with the Prince, against the bad characters. Thus, Farah is no more a knick-knack for the story. She gets closer with the Prince as the game progresses, and when the Prince hesitates to place the blade in its place, she fights against him. The Prince loses her faith in Farah for a while, and hesitates to end the terror. Because of the hesitation of the Prince, Farah takes the blade, controlling the sands of time, from him, and, leaving the Prince, takes another way and decides to end the struggle all alone. The Prince moves alone for a while, and at the end of the game meet Farah, fighting the enemies. The Prince tries to help her, but he cannot succeed, and the Princess dies. At this point, the role assigned to Farah is consistent with the masculine roles imposed to the women; die or marry. As we mentioned before, in order to make the threat of castration imperceptible, the female character shall be found guilty. The confirmation of this crime is performed either by punishment or salvation. The reflection of this to the story of the movie is realized by the means of two conventional ends, deemed proper for the women: the woman character either dies or marries at the end of the movie. In both cases catharsis is at the service of the male audience. (Smelik, 2008: 6). Farah dies according to the principles of the conventional ends. Thus, Farah, who uses weapons like professional soldiers, fighting physically, and takes care of herself, is brought back to the point where she was located in the first version of the game. However, the narration does not end at that point. The Prince defeats his enemies, takes the blade back from Farah, and puts the blade in its place, takes the sands back. As he takes the sands he turn back the time, and the story return to the beginning, and thus Farah does not die. Since he held the blade, only the Prince remembers what had happened. Prince kills the Vizier, who did not take any actions yet, and the evil is stopped at the beginning. The Prince tells the story to Farah, but Farah, remembering nothing, does not believe in the Prince. The story ends as the Prince leaves her alone in her room, and move on. The game ends this way, and Farah neither dies, nor marries the Prince. In that sense the game has a cracked-line.

3.2. Subject positions

One of the main problems of the feminist criticism is the subject positions formed within the film watching as a result of the narration structure of the movie and it's dubbing methods. This is issue is discussed in connection with the issues like identification and peeping (Büker, 2010: 207). According to Mulvey, the pleasure of looking has been divided into two by the patriarchal system; the masculine - the effective, and the feminine – the passive. The determinist male view transfers its fantasy to the female figure, formed suitably. The women, in their conventional exhibitionist roles, with their appearance coded for a strong visual and erotic effect that gives the message "I am worth looking", are both the one being looked at and being exposed (Mulvey, 2010: 218). At the first version of the game, the Princess has long and frizzy hair, and in fancy dresses. On the other hand, the Princess is nothing more than a subject, waiting to be rescued, and only be seen between the chapters. However, at the version of 2003, Farah wears dresses, exposing her femininity, and assumes a role more than an object, with her tidy hair and bow. Farah, who had been captured at the beginning of the game, becomes the object of the looks of the audience and the Prince, while being carried on a couch, while her body is exhibited. However, rescuing within a short time, Farah becomes the subject by taking an active role at the struggle. At her book "The Acoustic Mirror" Kaja Silverman had moved the focus from the sight to the voice, and thus created the opportunity to approach to the female subject from a unique perspective within the framework of feminist film theory. Silverman asserts that the masculine subject is given the properties of being one and being complete in the cinema, not only by the image and the appearance, but also by the means of the recording and the usage of the voice (Cited by: Smelik, 2008: 15). There are no dialogues at the 1989 version of the game, and the story is told by three messages given at the beginning, middle, and end of the game, from which we learn that the Princess had refused the proposal of Jaffar, that she loves the Prince, and that she will wait for him to rescue her. At the end we are told that the Prince, who killed Jaffar, marries the Princess and becomes the Prince. At the 2003 version, Farah has been fictionalized as a powerful person,

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knowing the power of the sands even before the Prince, and trying to tell him what she knows. She tells the facts to the Prince, but the confused Prince does not believe her. At a great deal of the game Farah talks for a substantial time, and sometimes makes fun of the Prince. Different from the first version, Farah, resisting to objectification in the visual sense, strengthens her role as a subject with her voice, representing her will.

4. Conclusion

This study aims at, by making use of the feminist film theory, compare the 1989 and 2003 versions of the popular video game "Prince of Persia" in the sense of representation of women. It has been observed that at the 1989 version of the game the female character did not have an important role, just waited to be rescued as a passive character, and used as an object rather than a subject. On the other hand, regarding the 2003 version of the game, it has been observed that the female character holds a more important and central role within the narration. For the course of the game, she acts with the male character most of the time, accomplishes various missions, and takes active roles at fights by using weapons. According to Mulvey, the classic cinema overcomes the threat of castration by the means of the narrative structure or fetishism. In order to make the threat of castration imperceptible, the female character shall be found guilty. The confirmation of this crime is performed either by punishment or salvation. The reflection of this to the story of the movie is realized by the means of two conventional ends, deemed proper for the women: the woman character either dies or marries at the end of the movie. In both cases catharsis is at the service of the male audience. (Smelik, 2008: 6). At the first version the story ends by the marriage of the Princess, in compliance with the traditional patriarchal ends; however at the second version the Princess defeats the death, and refusing the love of the prince and makes her own way. According to Michael Ryan and Douglas Kellner's statement; conservative cultural or cinematic texts without exception includes a cracked line which overshadows seemingly successfull ideology of texts (Ryan&Kellner 1990: 112,113). Within that scope it can be asserted that The Prince of Persia: The Sands of Time, despite being a popular text, includes a cracked-line that may be useful for oppositional readings.

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Resolving Nigerian secondary school students' learning difficulties in nuclear chemistry using computer animation solutions

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Abstract

Chemistry is a central science subject because it is required at Senior School Certificate level for entry into nearly all basic and applied science courses at the tertiary level of education in Nigeria. Nigerian students have, for many decades, performed very poorly in Chemistry at the Senior School Certificate Examination (SSCE). Students' persistent mass failure in SSCE Chemistry has been attributed to many factors among which are the many topics which research has identified to be difficult for students to learn. Nuclear Chemistry (NC) is one of these difficult topics. Considering the importance of NC in national development in terms of energy, medicine, research, armament etc, efforts are being made to determine why it is found difficult by students, and to resolve the difficulties for better students' learning achievement. This study was aimed at resolving identified Nigerian students' learning difficulties in NC using simulated computer animation teaching strategies. A sample of 63 SSIII (grade 12) students who have been identified as indicating widespread learning difficulties in NC were exposed to 4 weeks of instruction on NC concepts using computer simulation animation strategies. The sample (35 females and 28 males) were in 4 intact classes in 4 public secondary schools in Calabar Municipal Area Council, South - South zone of Nigeria. The instrument for data collection was a 30-item short-answer essay test called Nuclear Chemistry Learning Difficulties Diagnostic Test (NCLDDT). Data was analysed using frequency and percentage. It was found that the use of computer simulation animation teaching strategy reduced the widespread of the learning difficulties experienced by SSIII Chemistry students in Nuclear Chemistry. This teaching strategy was therefore recommended for teaching NC concepts and other difficult concepts in Chemistry at SSCE level.

Keywords: Learning Difficulties, Nuclear chemistry concepts, Resolve, Computer animation teaching strategies

1.0 Introduction

Chemistry is a central science subject as credit score in it is required at senior school certificate level for entry into nearly all basic and applied science courses at the tertiary level of education. Nigerian students have, for many decades, performed very poorly in Chemistry at the Senior School Certificate Examination (SSCE) level (Njoku 2004, Nwagbo 2002). This persistent poor achievement in Chemistry has effectively undermined the attainment of a national policy that 60% of enrolment in tertiary education would be students in science and science – based courses, while 40% would be students in Arts and Humanities. Student enrolment statistics in Nigeria's tertiary educational institutions indicate that overwhelming proportions are in arts and humanities, rather than science and science-based courses (Njoku 1997). Students' persistent mass failure in SSCE Chemistry has been attributed to many factors among which are the many Chemistry topics which research has identified to be difficult for students to learn. Some of the topics which have persistently proved to be difficult at secondary school level include Nuclear Chemistry (NC), equilibrium reactions, chemical energetic/thermodynamics, chemical kinetics, electrochemistry, chemical equations, the mole concept, solubility of substances, electrochemistry, among others (Okebuko-

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la, 2005, Echekwube, 2009 Chief Examiner's Reports, West African Examinations Council (WAEC), 2010, 2011, 2012, & 2013).

One of the main reasons students find many Chemistry concepts difficult is the high level of abstraction of these concepts, and the teachers often do not have the necessary resources to make them more concrete through laboratory demonstration and experimentation. According to Johnstone (1980), the higher a concept is in the hierarchy of theoretical concepts, the more the difficulty such pose to learners. This is because the theoretical concepts lower in the hierarchy would have to be learnt first in order to develop a strong enough background for learning the higher concepts. It is therefore the case that the position of the concepts in the hierarchy of theoretical Chemistry concepts strongly influences the level of difficulty which learners experience. NC is one of such concepts that are very high in the hierarchy of theoretical concepts which students have to learn. Thus to successfully learn NC concepts students would have successfully learnt the prerequisite theoretical concepts under the theme, 'particulate nature of matter' namely: elements and symbols, names of atoms, atomic structure, composition of the atom and subatomic particles. These are all highly theoretical in nature, and difficult to concretise by the teacher experiments and demonstrations during Chemistry lessons.

Another source of difficulty in the learning of chemistry is learners' inability to understand and manoeuvre the three levels of representing chemical phenomena (Onwu & Randall, 2006). These levels are the macroscopic, the sub-microscopic and the symbolic levels. The macroscopic level is real and concrete; it may take the form of Chemistry activities like experiments which are visible, and the learners can see changes taking place as well as the products of the changes. The sub-microscopic level involves invisible particles which are real. These may include atoms, molecules, ions, electrons, protons and neutrons. The presence of these particles can only be imagined by learners; their presence can also be demonstrated instrumentally, but imagination is the basis of learning about them. Finally, the symbolic level of representation of chemical phenomena is the chemical language expressed as symbols, formulae, equations, pictorial representations, graphs and mathematical representations (Johnstone, 1993; Sirhan, 2007). These levels of chemical representation constitute chemistry thinking. It is the chemistry community that understands their professional language. Onwu & Randall, (2006) maintained that the experienced chemist is comfortable on all three levels of communicating chemical concepts and phenomena, and they can easily move from one level to the other. But the novice Chemistry learner is comfortable in none of these levels and has difficulty relating one level to the other. Devetak, Urbancic, Wissiak, Krnel & Glaser, (2004) attributed the complexity of chemistry teaching and learning to the relationship among these three levels of representing chemical phenomena, as learners have difficulties transferring knowledge from one level to the other. Studies by Johnson,(1998) and Gabel, (1999) showed that learners find it easier and more fun to deal with observable chemical phenomena which they handle as activities/experiments or demonstrations (macroscopic level), rather than handling theoretical and highly abstract concepts which require conceptual understanding (sub-microscopic and symbolic levels).

The traditional way of learning of NC concepts depends almost exclusively on the sub-microscopic and symbolic levels of representation of chemical phenomena, and it brings no fun to the learners; hence the learners experience widespread difficulties in their effort to understand the high level theoretical concepts involved in the study of NC. It is therefore appropriate to believe that teaching NC concepts using more concrete approaches would reduce students' learning difficulties, and improve the learning outcomes. This may be achieved by using animated computer simulations in teaching to reduce the level of abstraction of the concepts and increase their concretisation and hence the capacity of the students to understand the NC concepts.

The annual reports of the Chief Examiner, West African Examinations Council (WAEC) as well as National Examinations Council (NECO) have perennially indicated that candidates most often fail to attempt questions on NC concepts, or that they fail the questions when they attempt them. This is indicative of the high level and widespread nature of the difficulties experienced by students with the learning of NC.

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Effective learning of concepts in NC is very important especially considering the various applications of nuclear sciences to society and national development. As a nation Nigeria's pace of economic development has continued to be retarded by very low electrical energy generation and distribution. Nuclear energy is a cheap non-fossil source of energy which can be harnessed to increase the national energy mix and quantity for distribution. There is the need to find ways of helping secondary school students learn NC concepts more effectively and fruitfully. This study is an attempt to find out the extent the widespread learning difficulties of students in Nuclear Chemistry can be remediated or reduced using computer animation instructional technology.

2.0. Research questions

Two research questions guided the study. These include:

1. What difficulties do chemistry students experience in learning Nuclear Chemistry (NC) concepts?
2. To what extent has the Computer Animation Instructional Strategies (CAIS) remedied/reduced the identified students' learning difficulties in nuclear chemistry concepts?

3.0. Research design, sample and sampling technique

The design of this study is Research and Development design. The sample for the study comprised 187 SSIII (Grade 12) Chemistry students during learning difficulties diagnosis stage of the study, and 63 SSIII students, (35 females and 28 males) during the remediation stages of the study. The students were from four intact classes of four public secondary schools in Calabar Municipal Area Council, Nigeria.

4.0. Instrument for data collection

The instrument for data collection was called Nuclear Chemistry Learning Difficulties Diagnostic Test (NCLDDT), developed by the researchers. It is a 30-item short answer essay test which had been drawn from all the major concepts of NC which were covered during the teaching sessions, namely: atomic structure and subatomic particles, basic concepts of radioactivity, nuclear equations and nuclear reactions, rate of nuclear decay and effects and applications of radioactivity. The test items targeted the understanding of NC concepts and sub-concepts required at the SSCE level. The items were assessed for face validity by the researchers and were adjudged good enough to diagnose students learning difficulties in NC. Only one of the researchers scored the students test so as to consistently identify the learning difficulties.

5.0. Procedure

The study was carried out in three stages. First stage involved (i) thorough teaching of all the contents in NC at SSCE level using traditional approaches (Lecture and discussion methods), (ii) administration of NCLDDT to the students after teaching, (iii) identification of students' learning difficulties and the widespread nature of the learning difficulties through analysis of students' errors in the test, and (iv) elucidation of the root causes of the learning difficulties through in-depth interview of a sample of the students so as to understand their perspectives on the identified problems.

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The second stage involved the selection of a remediation teaching programme based on the lessons learnt from analysis of students' errors in solving NCLDDT and the root causes of difficulties from students' interviews. It was decided that most of the observed difficulties were rooted in the abstract nature of the concepts and sub-concepts, and students' general weak mathematical background. The proportion of students who indicated learning difficulties after the teaching session using traditional approaches served as the pre-remediation status of the students on Nuclear Chemistry Learning Difficulties Diagnostic Test (NCLDDT).

The third stage involved the selection and development of Computer Animation Instructional Programme (CAIP) for remediation of the identified learning difficulties as this would reduce abstraction of the concepts. This programme was used to re-teach the entire contents of SSCE level nuclear chemistry by the researchers for four weeks after six weeks of diagnosing the learning difficulties. Only a subsample of the students who had widespread learning difficulties was accessible for the re-teaching/remediation programme. At the end of the teaching with CAIP, (this was 10 weeks after the initial diagnosis) NCLDDT was administered to the students as a post remediation test. This was to determine the effect of the remediation programme on the widespread nature of the learning difficulties.

6.0. Data analysis

The collected data were analyzed using percentage. It was decided at the out-set that any item in the diagnostic test in which 50% or more of the students committed errors (an indication of learning difficulty), would be regarded as posing widespread difficulty to the students. On the other hand, any item in which less than 50% of the research subjects committed errors would be regarded as not posing widespread difficulty to the students. The percentage difference between the proportion of the subjects experiencing learning difficulties before and after remediation indicates the extent to which the remediation programme has resolved the learning difficulties of students in Nuclear Chemistry.

7.0. Results

Table 1: Nature of Learning Difficulties in Nuclear Chemistry and the proportions of students Experiencing the Difficulties, Before and After Remediation Treatment

S/N	**Nuclear Chemistry Concepts and Nature of learning difficulties**	Number and % ofstudents Experiencing leaning difficulties **Before remediation** N=187	Number & % ofstudents Experiencing learning difficulties **After remediation** N=63	**% Difference, before and after**
1	Inability to label parts of the atom	85 (46.4%)*	16 (24.7%)	**21.7**

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2.	Inability to identify nuclear particles, their masses, charges, symbols and the particle that takes part in nuclear reaction	126 (68.4)**	14 (23.0)	**45.4**
3.	Inability to identify numbers of electrons, protons, neutrons; or define mass number or atomic number	90 (45.8)	11(17.1)	**28.7**
4.	Inability to identify isotopes and explain meaning of isotopy	151(81.7)	32 (51.4)***	**30.3**
5.	Inability to calculate mass number from atomic number, number of neutrons and number of electrons	151(81.7)	32 (51.4)***	**30.3**
6	Inability to Conceptualize radioactivity, types of radiations, nature of radiations, changes masses due to radiation of alpha, beta particles, proton, neutron and positron	120 (64.7)	20 (32.5)	**32.2**
7	Inability to write nuclear symbols of α, β, proton, neutron and positron.	160 (85.4)	32 (50.7)***	**34.7**
8	Inability to calculate number of protons, neutrons and electrons from nuclear equations	144 (77.4)	26 (42.2)	**35.2**
9	Inability to write alpha decay equations, Beta decay equations and atomic fusion of hydrogen nuclei to form helium nucleus	148 (79.9)	18 (44.1)	**35.8**
10	Inability to balance given nuclear equations and identify α and β particles from balanced equation	95 (50.1)	10 (17.2)	**32.9**
11	Inability to determine values of atomic and mass number in nuclear equations	145 (77.6)	37 (59.3)***	**18.3**
12	Inability to write and balance nuclear equations from statements	178 (95.5)	43 (68.6)***	**26.9**
13	Inability to write and balance equations for nuclear fission, fusion and differentiate between them	170 (91.0)	29 (46.5)	**44.5**
14	Inability to balance nuclear equations from statements	164 (88.2)	37 (59.7)***	**28.5**
15	Inability to relate alpha emission to position of element in Periodic Table	163 (91.2)	38 (60.8)***	**30.4**
17	Inability to differentiate natural radioactivity from artificial radioactivity, through their equations.	170 (91.6)	27 (43.2)	**48.4**
18	Poor conceptual understanding of half life of nuclei, & give a name to the phenomenon	137 (74.1)	20 (31.4)	**42.7**
19	Inability to compare stability of elements based on their half lives, on their proton/neutron ratio	125 (68.1)	3 (4.7)	**63.4**
20	Inability to calculate time taken for complete nuclear decay	167 (89.4)	35 (55.4)***	**34.0**
21	Inability to calculate mass of material that decayed over time.	165 (88.0)	30 (47.9)	**40.1**
22	Inability to calculate half life from decay constant	160 (85.7)	22 (35.4)	**50.3**
2	Inability to name the instruments used for detecting	93 (49.3)	19 (30.4)	**18.**

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23	radiation			**9**
24	Inability to state some useful and harmful effects of radioactivity	94 (51.1)	9 (15.0)	**36.1**
25	Inability to give correct reason why solid radioactive waste is not disposed of by composting	166 (88.9)	38 (60.8)***	**28.1**
26	Inability to state specific uses of some radioisotopes like cobalt, iodine, phosphorus	182 (97.0)	34 (55.1)***	**41.9**
27	Inability to differentiate between chemical and nuclear reactions	168 (89.9)	32 (51.1)***	**38.8**
28	Inability to relate energy in fusion reaction to Einstein's equation	179 (95.8)	46 (73.9)***	**21.9**
29	Inability to estimate the penetrating power of radiations	45 (24.9)	10 (17.2)	**7.7**
30	Inability to identify the deflection of α, β, γ rays in electrostatic field, justify the directions of deflections and identify component stopped by metal foil	105 (61.7)	21 (34.6)	**27.1**

Figures in brackets are percentages (%)

* All % less than 50 indicate not difficult

** All % 50 and above indicate widespread Difficulty

*** Difficulty was still widespread after remediation, though there are considerable reductions

Research Question 1: This question sought to determine what difficulties chemistry students experience in the learning of Nuclear Chemistry (NC) concepts. Table 1 shows the various aspects of the concepts in Nuclear Chemistry in which students experience learning difficulties as indicated by the number and types of errors they committed while tackling questions on the concepts. The percentages (figures in brackets) indicate the proportion of students experiencing the difficulties (wide spread nature of the difficulties among the students). It can be observed from the Table that before remediation programme was applied, out of the 30 concepts and sub-concepts identified in NC, students experienced widespread learning difficulties in 25. Thus most of the concepts and sub-concepts are difficult to overwhelming majority of the students. Some of the concepts that posed most widespread difficulties include:

- Stating the uses of specific radio-isotopes (97.0%),
- Relating energy in nuclear fusion to Einstein's Equation ($E = MC^2$) (95.8%)
- Writing of nuclear equations (95.5%)
- Differentiating natural from artificial radioactivity (91.6%)
- Relating alpha emission to position of elements in the Periodic Table (91.2%)
- Calculating period of complete nuclear decay based on Half Life of decay of elements (89.4%)
- Giving correct reasons why solid radioactive wastes are not disposed of by composting (88.9%)

Interview of the students on the reasons they found the concepts difficult indicated that the roots of the difficulties was mainly due to high level of abstraction of concepts, weak entry behaviour of the learners on such topics as writing and balancing of chemical equations and atomic structure, and misconceptions that chemical changes can only involve orbital electrons in the atoms and atoms can neither be created nor destroyed.

Research Question 2: This question sought to determine the extent simulated computer animation teaching strategies remedied the observed learning difficulties among grade 12 students. Table 1 shows the frequencies and proportions of research subjects and the type of learning difficulties they experienced after application of remediation programme. It can be observed that the students experienced widespread difficulties in only 12concepts/sub-concepts, (reducing from 25 concepts before remediation). There is a general reduction of the proportion of students experiencing each identified learning difficulty. Percenta-

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ge reduction in the widespread of the difficulties for various difficult concepts ranged from **7.7% to 63.4%.** Majority of the concepts had their widespread difficulty reduced by over 30%. The mean percentage reduction in the widespread of the difficulties was **32.64%,** showing that on the average, the difficulties experienced by students in the learning of nuclear chemistry concepts reduced by 32.6% through the use of simulated computer animation teaching strategies. Certain NC concepts continued to indicate widespread difficulties among students in spite of the application of the remediation strategies. Some of the 12 concepts that remained difficult include:

- Relating energy in fusion reaction to Einstein's equation (73.9%)
- Writing and balancing of nuclear equations from statements (68.6%)
- Relating alpha emission to position of elements in Periodic Table (60.8%)
- Giving correct reasons why solid radioactive wastes are not disposed of by composting (60.8%)
- Determining the values of atomic and mass numbers in nuclear equations (59.3%)

Although there were general reductions in the widespread of the difficulties in all the concepts (ie. the number of students experiencing learning difficulties reduced in all cases) the proportions of students with these difficulties remained high. This indicates that these concepts are really challenging to students. This is most probably because the concepts are very high in the hierarchy of theoretical concepts which Chemistry students have to learn. There are many theoretical concepts and sub-concepts which must be mastered before students are able to effectively grapple with these highly abstract theoretical concepts that are on top of the hierarchy.

8.0. Discussion

The **52%** reduction in the number of difficult NC concepts (from 25 to 12) indicates the efficacy of simulated computer animation teaching strategies in clarifying to students the content elements that made the NC concepts difficult to learn. The simulated computer animation strategies appear to reduce concept abstraction, concretizing them, making it possible for the students to effectively visualise nuclear particles in the atomic nuclei, their interactions, transformations and the changes that accompany these properties/behaviours. Thus students become more able to learn the NC concepts and sub-concepts in more realistic and fruitful manner, thereby improving their conceptual understanding of the NC contents of the curriculum.

9.0. Recommendations

1. In view of the results above, there is need to build Chemistry teachers' capacity in the preparation and effective use of simulated computer animation strategies in teaching the concepts in NC and other very abstract concepts in Chemistry.
2. Chemistry teachers should be provided with the facilities such as computers, storage devices and projectors which they need for preparing and teaching their lessons using simulated computer animation strategies.

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Results and outlooks of robot education in republic of Korea

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Abstract

Approximately one century has passed since a Czech dramatist Capek Karel used a word "robot" for the first time in his satirical work "Rosumovi Univerzální Roboti (Rossum's Universal Robots)" in 1921. Indeed, the existence of a robot started with a literary imagination, when the word was used for the first time about one century ago, but the rot becomes an entity inseparable from human life, including housework and even nursing, in the contemporary society. Today, we have come to see intelligent robots going so far as not only to think and move of their own accord, but also revealing their feelings on their faces. That kind of robots is represented by ASIMO developed in 1980 by Honda in Japan, KISMET developed in the late 1990s by MIT in America, and HUBO developed in 2004 by KAIST in South Korea. Like this, robot research is currently led by Japan, the United States and the Republic of Korea. This presentation is about the robot education system currently implemented from elementary through high schools, the education results and the future prospects in South Korea. On the whole, robot education begins at college levels in America and Japan, but it is made in a systematic way after regular curricular activities at elementary schools in the Republic of Korea. In addition, more than 1000 private institutes for robot education are driving a booming trade and numerous robot competitions, including the International Robot Olympiad (IRO), are held in South Korea. Therefore, not only is the Republic of Korea expected to take the advantageous position first in the future robot education market, but the current robot education system in South Korea will be able to be a good guide for that which will be carried out throughout the world in a few years in the future.

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Keywords: Capek Karel, robot, Robot Education, Republic of Korea, Rosumovi Univerzální Roboti, ASIMO, KISMET, HUBO, International Robot Olympiad

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1. Introduction

Approximately one century has passed since a Czech dramatist Capek Karel used a word "robot" for the first time in his satirical work "Rosumovi Univerzální Roboti (Rossum's Universal Robots)" in 1921. When the word "robot" was used for the first time at that time, the existence of robot was still nothing but a product of literary imagination. However, robots currently play an important role that is not inseparable any more from human life, including housework, surgery and war. These days, we have come to see intelligent robots going so far as to think and move on their own. They are represented by ASIMO developed in 1980 by Honda in Japan, KISMET developed in the late 1990s by MIT in America, and HUBO developed in 2004 by KAIST in South Korea. Moreover, even the robots are emerging one after another that can understand human feelings and talk with humans, as shown by "Pepper" developed by SoftBank in Japan. The Pepper lets the external server connected by Internet perform numerous arithmetic operation and data processing instead of the robot's head by introducing the method of "cloud". This makes it possible to learn and share the experiences of other robots connected with the same server. Doing so leads to a kind

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of collective intellect, as in the world of ants. After all, a computer draws near to humans by its own evolution.

Around the world, robotic research is led not only by America, Europe and Japan, which led a robot industry from the beginning, but by South Korea and China which recently spare no pains to invest in the industry under the recognition that it is a next-generation growth engine. The United States virtually dominated the robot industry in the 1960s at the dawn of industrial robots. The Unimation, Inc. installed an industrial robot for the first time at GM's automobile parts factory in 1962. Thereafter, Yaskawa, Nachi-Fujikoshi, Fanuk etc. in Japan rushed into robot business one after the other, making every effort possible to catch up with the US level of robot industry. Europe also began to spur the development of independent robots with the advent of the 1970s. Based on solid technical ability in the field of refined machinery, West European countries built industrial robots superior to US-made ones. But with the advent of the 21st century, South Korea and China see robot industry as a future major industry and step up their investment with the acceleration of economic growth in Asia. In particular, South Korea makes great efforts to help the students of elementary, middle school, high school and college students learn robot expertise, as seen in the every-year opening of robot-related world competitions, including the World Robot Olympiad (WRO). As a result, robot learning is creating a huge boom among students in the Republic of Korea.

Based on such circumstances, this presentation aims to present the robot education system currently implemented from elementary through high schools, the education results and the future prospects in South Korea. On the whole, robot education begins at colleges in America and Japan, but systematically after regular curricular activities at elementary schools in the Republic of Korea. In addition, more than 1000 private institutes for robot education are driving a booming trade and numerous robot competitions, including the International Robot Olympiad (IRO), are held in South Korea. Therefore, not only is the Republic of Korea expected to take the advantageous position first in the future robot education market, but the current robot education system in South Korea will be able to be a good guide for that which will be carried out throughout the world in a few years in the future.

2. Robot industry in South Korea

Robot research began very late in South Korea, compared to America, Europe and Japan. As mentioned above, robot industry was dominated by the United States in the 1960s, greatly developed by Europe in the 1970s, and led by Japan in 1980s. Unlike these countries, South Korea was quite late in robot industry investment and robot education.

The Republic of Korea was burned to ashes after the Korean War (1950-1953). South Korea, whose per capita national income was no more than 65 USD directly after the Korean War, was one of the world's poorest countries that received aid even from Ethiopia and Bangladesh. In such poor conditions, a cutting-edge industry like robot industry had nothing to do with South Korea. However, ROK economy developed remarkably, as five-year economic development plan was carried out successfully four times from 1962 on. According to the IMF, South Korea recorded a per capita GDP of 24,000 USD and a foreign exchange reserve of 366 billion USD (6th ranking in the world) as of 2003. Such a remarkable economic development was greatly credited to the conglomerate (chaebol)-led growth policy of the ROK government. The ROK economy was expanded to a global level with the accelerating growth of the chaebols, such as Samsung, Daewoo, LG and Hyundai, supported by the government. However, the globalized chaebols were entangled in severe labor-management disputes from the 1980s on. They selected an automated system using robots as an alternative to overcome them. Samsung also built a robot television production line in 1992 as the first among ROK enterprises. Thereafter, other enterprises vied for introducing robot production lines as well. The result is that South Korea is rated the third best country (US and Japan: first and second, respectively) in the world in the overall level of robot industry. South Korea also ranks fourth or so in the world in the level of learning based on the papers presented at international robot-related academic conferences. Like this, the Republic of Korea has joined a leading group of robot industry in a period as short as some 30 years since its investment.

However, the ROK's robot industry has not experienced a continuous development alone. Automobile

and semi-conductor industries, which belong to South Korea's key industries, were thriving across the world in the 1980s. In this boom period, the ROK's robot industry also made rapid progress in terms of quantity. However, most chaebols closed robot business divisions in the 1990s, since there was no continuous investment or research in robot industry. As a consequence, the ROK considerably fell behind in robot industry, compared to the US and Japan. Recognizing the seriousness of the situation, the ROK's government invested in robot industry on a large scale by letting the Ministry of Science and Technology, the Ministry of Information and Communication, the Ministry of Commerce, Industry and Energy, etc. implement large robot-related projects. Especially, the field of intelligent robots has been designated as a next-generation growth engine industry and continuously invested in by the ROK government. The Mecca Center of Samsung Electronics counts as a representative chaebol manufacturer of robots, and Rotem and multiple defense industry members develop military robots. Eugene etc. are small and medium enterprises that distinguish themselves in manufacturing robots.

3. Robot education in South Korea

The intelligent robot industry is one of the ROK's ten next-generation growth engine industries. Based on excellent IT technology, the ROK's artificial intelligence robot industry is very likely to grow into a future industry. Intelligent robots are classified into the humanoid robots with artificial intelligence and the ubiquitous robotic companions (URCs) based on networking. America, the second robot producer in the world, focuses on developing humanoid robots, while South Korea and Japan focuses on developing URCs. South Korea, a holder of 384 (31.1%) URC patents, fiercely competes for the lead with Japan, a holder of 514 (41.6%) URC patents. Having rushed into robot industry much later than the US and Japan, the ROK has gone so far as to fiercely compete for the lead with Japan, the US and Europe thanks to the heated robot education from the 2000s as well as the active investment of the government and enterprises.

On the whole, robot education begins at colleges in America and Japan, but systematically after regular curricular activities at elementary schools in the Republic of Korea. This is because the ROK's parents judge that robot industry will play a pivot role in national economy in the future. The ROK's robot education is also characterized by being performed at more than 1000 private institutes across the country. Robot education comprises the various steps of definition, operating principles, manufacturing and programming. In South Korea, diverse robotic campaigns are carried out to find and foster robotic prodigies through such education and to exchange robotic research results. International robot competitions are held as part of such campaigns. The ROK organizes international robot competitions, such as ROBOT CUP and International Robot Olympiad (IRO) which began to be held in 1995 and 1999, respectively. In particular, the IRO draws so much attention that it is attended by more than 3000 persons from all over the country. The Olympiad consists of elementary, middle and high school divisions, each of which has the games of transformer, robot gathering, robot biathlon, traverse and hurdle. Held every year, the competition was held in the Republic of Korea, Hong Kong, China, Australia, Singapore, Malaysia, Indonesia, the United States, etc. In addition to the IRO, there are a variety of competitions in the ROK:

Korea International Robot Olympiad (organized by Korea Robot Soccer Association (KRSA));
Robofest Korea (organized by Robot Education Contents Association);
Robofest Asia-Pacific (organized by Robot Education Contents Association);
World Robofest (organized by Robofest Committee);
Korea Intelligent Robot Contest (organized by Korea Intelligent Robot Association);
World Robot Olympiad (organized by World Robot Olympiad Committee);
National Youth Robot Contest (organized by Government Youth Commission (GYC));
National Student Robot Contest (organized by Korea Association of Robot Education Advancement (KAREA));
SeoulTech Robot Festival (organized by SeoulTech);
Korea Robot Game Festival (organized by Incheon Information Service (INIS)).

In South Korea, robots attract such much concern from elementary, middle and high school students for three reasons: first, the ROK has attained a remarkable economic development in a short span of time after the Korean War, but is considered to have reached the limitations of development. The reason lies in that its economic growth is based on imitation by low labor costs and diligence rather than originality.

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Now, it forms a social consensus among Koreans that the ROK will not survive in intense international competition without originality. They consider robot education one of representative educations to improve the needed originality. Second, the prospect for robot industry is considered to be bright, as the ROK government designates robot industry as its next-generation growth engine industry. Accordingly, it appears favorable for finding jobs to have robot expertise and major in robotics in the difficult job-seeking conditions of the ROK society. Third, South Korea is world-famous for high competitive rates for college entrance exams. Therefore, it is not easy to enter prestigious universities. In such situation, students can expect to get additional points from their award-winning records at international robot contests.

4. Future prospects

Robot industry is a next-generation high value-added industry that has experienced a high growth of 10% per year from 2000 on. Given the trend, its market is expected to amount to 1 trillion and 400 billion USD and thus exceed the BT market. The robot industry centered on personal robots is expanded by the life extension and human isolation by the development of IT and BT. South Korea should compete with advanced countries using a strategy of mass-producing low-priced personal robots by combining its world's fourth industrial robot technology with the vitality of IT enterprises and the knowhow of manufacturers. However, the reality is that industrial robots considerably lag behind in distribution rate, compared to Japan and the US. Japan tries to develop various kinds of robots, such as pet robots, including Sony's IBO, errand robots, education robots and public welfare robots, but South Korea shows a huge technical gap with Japan, though its technical development ranks the forth in the world.

However, robot education is actively implemented at schools as well as more than 1000 private institutes, as investment and interest in robot industry increased in the ROK around 2000. Robotics-related departments are established at many universities, including KAIST and Kwangwoon University, which makes the outlook for the ROK's robot industry bright. Especially, various international robot competitions, including IRO, contribute to the cultivation of robotic prodigies. Such investment in robot industry will be surely a big asset fir the development of robot industry in South Korea.

In the future, the ROK's robot industry seems to be competitive in the field of the ubiquitous robotic companions (URCs) based on networking. As for humanoid robots, South Korea is considered to have great difficulty in keeping up with advanced countries, including the US due to huge technical gaps. But as far as the URC field is concerned, the ROK has already reached the world's highest level in the IT field and will have a high competitive edge, if the country applies its IT technology to robot industry successfully. As South Korea is also advanced in automobile industry, it will create a great synergy effect to combine automobile industry with IT technology and robot industry. Therefore, it will be desirable for the ROK's robot education to connect IT technology with automobile one instead of focusing on robotics alone.

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Results of enhanced learning with the edutainment format

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Abstract

The purposes of this research were to 1) study notions of teaching and learning by utilizing the Edutainment format in both local and foreign countries, 2) develop the Edutainment format to enhance learning of bachelor's degree students, and 3) study the effect of Edutainment format on learning by bachelor's degree students. The samples of this study consisted of printed documents, textbooks, academic journals, and electronic documents, of which 22 formats were selected from foreign countries and other 20 formats locally. Fifteen specialists were selected to evaluate and approve the formats. The 80 undergraduate student participants were selected by simple random sampling method from the Department of educational technology and communications. Purposive sampling was also applied to select 20 teachers from the Faculty of Technical Education, Rajamangala University of Technology Thanyaburi. The instruments adopted for this research were comprised of analyses derived form of Edutainment format; the approval form for specialists to approve said formats; questionnaires regarding students and teachers' needs to be used with the Edutainment format; opinion assessment forms for students and teachers to complete after using the Edutainment format; and an achievement test. The data were analysed by content analysis and descriptive statistics. The major findings were as follows:

1) The ideas of the Edutainment format from educators in both local and foreign countries indicated that technology and innovation used to enhance the Edutainment format included robotics, internet, games, movies, music, and television programs. The environmental factors included play activity, classroom designing, and campus facilities,

2) The Edutainment format to enhance undergraduate learning consisted of technology components including learning through Ubiquitous high-speed internet access, studio usage, light and sound, robotics, internet, games, movies, music and television programs. The environmental management, included performance stage, movie theatres, game rooms, wireless high-speed internet rooms, and activities to enhance creative thinking. The management of teaching and learning comprised activity based curriculum development, supporting learning emphasizing "Learning by Doing" approach, and tourism for entertainment.

3) After implementing the Edutainment format, the results revealed that all issues were rated at high levels. Concerning the opinions toward the Edutainment format implementation, the results in each area and at all items were rated at very appropriate level as well as most-appropriate level.

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1. Introduction

Learning in Edutainment is taught to blend many things together are Media, the classroom environment and a variety of activities were the aim to make happiness in play & learn. Change the classroom atmosphere follows the idea that Entertainment can create interest over the normal class. Have the advance planning of activity for learners do, and then they are fun, so they want to do it again, this is the heart of Edutainment. The taught previously, teachers attempt to help the learners remember in various ways such as recitation, doing exercises, etc. But now that thinking is not enough to manage efficiency learning. Because appearing the empirical data does not help the learners to learn by requirement. And the academ-

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ic progress discovers the new innovative can help learning better. Emotion has a direct influence on remembering. Moreover emotional pleasure is part of a learning to build an environment where learners want to know, to see, to play and to sample. Teacher need to teach in the same learning styles of learners to avoid boredom, angry or fear, but try to create a happy class. Therefore the power of life that everybody should have understood in the emotional process to achieve the learning efficiency. Making a good environment, instruct, and good support can change thinking are affected to IQ (40 – 70%) and heredity effect on IQ (30 – 60%). So the environment in learning should be happy, funny and also get the new things. (Oshima et al., 2004) So teachers will build the knowledge, not only the act of passing on knowledge, urge and encourage learners to learn by themselves, including to finding the experience of learning in both informal and formal (Education Act of section 24 (5)) Learners learn under the atmosphere of Education and Entertainment = Edutainment, They can reach knowledge and clearly understand to can solve their problems and the public responded the Thailand Government Policy which requires learners to learn well and happy. A fun game and acquiring knowledge at the same time was integrated between the educational theories psychology and computer science in the research found that playing this game with collaborative can improve efficiently learning and is free to choose according to their interests. (Michelle, 2004: 2) From the foregoing should that Instructional media and technology have important roles in supporting learning. Especially when bring the entertainment media enhanced in the class. Thus, this is a good idea to manage Edutainment in Rajamangala University of Technology Thanyaburi where focus on teaching learners to be specialists in using of specialized tools, had the ability in communication that match with the target group and objectives, support intellect or genius learners (IQ) to show their capabilities. In addition support in EQ, can systematically think, analyze and resolve appropriately problems with a modern technology. From the importance and the source of such problems, researcher found that Edutainment can be applied to use in order to completely contribute vocational graduates both IQ and EQ. The results from this research will be for intervening in new techniques for learning in the future.

2. Purpose of the study

The purposes of this study were:

2.1 To study notions of teaching and learning by utilizing the Edutainment format in both local and foreign countries.

2.2 To develop the Edutainment format to enhance learning of bachelor's degree students.

2.3 To study the effect of Edutainment format for learning by bachelor's degree students

3. Scope of the study

3.1 Edutainment is a method of learning that focuses on funny in the lessons by interpolation techniques of teaching, multimedia and Play and Learn activities.

3.2 The enhanced learning is bringing out Play and Learn to apply in the classroom to get both academic learning and entertainment.

3.3 The Development of Edutainment will study from both printed document and electronic document to analyze the principles relate to education form, which provide the knowledge with entertainment. The boundaries were:

3.3.1 Study idea of Edutainment both local and foreign countries.

3.3.2 Analysis and synthesis the Edutainment Concepts and inquire opinions from specialists of entertainment. It will be a frame to specify the scope, direction and guidance to conform the development and the implementation are integrated with philosophy, principles, missions, policies, goals and objectives of Rajamangala University of Technology Thanyaburi.

4. Conceptual framework

This research used the principles and the concepts of TREND to apply; TREND is the new word from combining 4 characters: Technology (T), Relax (R), Enjoy (E), Need (N) and Design (D) those origins and meaning are:

4.1 Technology (T) apply various technologies (variety) used to enhance learning, such as computer hardware, software, network, internet, intranet, LAN, multimedia, forums, etc.
4.2 Relax (R) refer to the relaxation increased meditation and wisdom to help study happily.
4.3 Enjoy (E) is to provide (learn + do + pleasure) under free learning by incorporating the information and the knowledge in various with Entertainment. The purpose is for learners to gain the knowledge.
4.4 Need (N) is teaching management by focusing on the needs of the learners. By catering in variety following:
4.4.1 Visual learning which include using visual to reading and studying diagrams, charts, and other media. 4.4.2 Auditory learning (learning by listening) refers to tasks that involve listening.
4.4.3 Kinesthetic learning (learning by behaving in different situations) refers to learning from behaving in the Simulation such as role-play and also the experiential learning and total physical involvement in the learning as well.
4.4.4 Tactile learning (learning by doing) are learning by doing in various actions (hands-on) such as building a model, the experiments in the laboratory and studying of tangible objects.
4.4.5 Individual learning (self-learning) means learners learn by themselves both in the classroom and outside.
4.4.6 Group learning (learning by working together as a group) refers to situations which learners work with friends.
5. Design (D) is a variety of environments designed, not boredom, such as the placement of tables and chairs, the positioning of the light. (Phanchalee Wassanasomsit, 1999)

5. Methodology

5.1 The first phase

5.1.1 To study concepts of Edutainment both local and foreign countries. Selected data that was printed document by analyzing of a database and searching from learning resources and a library of departments and universities, both public and private. The document electronic, the researchers search keyword on the program (Search Engine) via the internet. When it is collected and then recorded all in the analysis form of the Edutainment documentary that researcher developed.

1. Questioning notions of Edutainment format from specialists, professors and learners by the analyze form of Edutainment documentary both local and foreign countries, and then sends queries to analyze the data.
2. Making the learning achievement test that covered course description of the television production subject. Study of chapter 2-4 consisted of shot size, camera angle shot and camera movement to use as a pre-test and post-test.

5.1.2 To develop edutainment format.

1. Creating Edutainment format by data collection of the content analysis from printed document and Electronic document and inquiries from specialists by using the principle of TREND Edutainment.
2. The Edutainment assessment, collected data from the evaluation of Edutainment from the principle of TREND Edutainment with the evaluation of rating scale 5 levels by estimating of specialists of Edutainment form 5 persons and evaluated in this assessment. After that, analyze the results, and update Edutainment under the guidance of specialists.
3. The Opinions assessment of teachers and learners about problems and needs of using Edutainment format with the evaluation of rating scale 5 levels to analyze the results to develop perfectly Edutainment.

5.2 The second phase

The study of using Edutainment Form to support undergraduate learning. The researcher collected data following:

5.2.1 The Experimental use of TREND Edutainment to test on 80 undergraduate learners, year 3 who enrolled in The Educational Television Production subject. The researcher was a teacher who compiled data on the classroom environment. Created a learning situation in Edutainment was developed. After that, learners do the learning achievement test and evaluation forms of Edutainment by using the evaluation of rating scale 5 levels to analyze the data.

5.2.2 The evaluation of Edutainment (TREND Edutainment), the management of learning environment in 3.1 compiled the data from specialists joined to observe in the class. Consider conclusive TREND Edutainment and estimated opinion from the evaluation forms to analyze the data.

5.2.3 The certification of Edutainment to promote the undergraduate learning. Conducted the data by 15 specialists to consider the suitability of TREND Edutainment and collected information from the evaluation to certify to analyze the data.

6. Result

The results were by the synthesis, the idea and the principle. The specialists gave opinions and suggestion were to

6.1 The physical characteristics of the classroom for example colors of desks, chairs, lighting, air-conditioning and creating various recreation zones. The specialists suggested to ask for budget to improve formerly each part, then adjust to the needs of most learners. Might have to go a step of research when was on the point of full development to be a beautiful campus. Every building should have the recreation zones. And provide internet rooms for 24 hours, theatres, stage for various forms.

6.2 The strategic adjustment in the course from teacher's performance is in a bright character to adjusting the attitude of learners to be positive. Then teacher rewarded learners who had the best behaved. Trying to invite celebrity specialists to educate and share ideas. Build the classroom atmosphere likes a game show. Teachers would be the host who draws all eyes to catch them all the time.

6.3 The Technologies of instructional media such as multimedia, 3D game, theater, high internet access computer, etc. There are suggestions that should provide enough free Wi-Fi refer to the speed of download and view information. And can be reached anywhere and anytime as well (especially on campus). The entertainment media should have to play the game both online and DVD with the touch screen to watch TV in live, real-time and rerun. Have a good audio and high quality microphone to use for recording the songs for the different occasions.

6.4 On the question which course suit to bring for TREND Edutainment (both required subjects and elective subjects). The answers were the writing for radio and television education subject, the Production Sound subject, the Computer Multimedia subject, and the production of the television education program subject.

6.5 The suitable application of the tourism, this learning outside the classroom was a great idea to build experience. It should be slow travel to absorb fully knowledge in the real atmosphere and should be provided every semester.

During the development of TREND Edutainment Format was to bring the concept to use by exploring ideas and needs, from giving information of learners and professors. The results of the data analysis showed in the table 1.

No.	List of estimation	$\overline{X}$	(S.D.)	level
1.1	Have movies from the Blue Ray Disc.	3.41	0.59	high
1.2	Watch TV in real-time and rerun.	3.38	0.62	most
1.3	Have the various types of music to listen Storage.	3.50	0.50	high
1.4	Have the amplifier, microphones, audio recording systems	3.50	0.55	high
1.5	Have online games and play from disc.	3.63	0.51	high
1.6	Have High speed internet Wi-Max, Wi-Fi, 3G, 4G	3.53	0.51	high

1.7	Learn wirelessly anytime (Ubiquitous)	3.59	0.56	most
2.1	Have theatres And mini cinemas	3.35	0.46	high
2.2	Have stage performances such as bands, musicals.	3.33	0.55	high
2.3	Have Wi-Fi rooms for 24.	3.48	0.59	most
2.4	Have air Conditioners	3.47	0.49	high
2.5	Decorate fully studios both light and sound.	3.70	0.45	high
2.6	Place tables and chairs in the classroom by unique format.	3.43	0.53	high
2.7	Add colors of the furniture in the classroom	3.53	0.5	most
2.8	Have comfortable lounges, dining rooms and bathrooms	3.35	0.45	high
2.9	Decorate mini gardens with variety trees	3.63	0.59	most
3.1	Provide a stage for Creative expression	3.65	0.51	most
3.2	Invite specialists to exchange lectures	3.60	0.45	high
3.3	Contest projects and reward	3.80	0.54	most
3.4	Create the learning environment like a game show	3.65	0.50	high
3.5	Excursions outside the classroom at learning resources.	3.75	0.60	most
4.1	Insert to play mixed in all subjects	3.65	0.51	most
4.2	Emphasis on the practical rather than the theoretical	3.60	0.49	high
4.3	Teachers have humor and Insert gags all the time	3.60	0.49	high
4.4	Divide small groups and large groups for cooperative learning.	3.50	0.47	high

Table 1 Results of a survey from learners who want to study in TREND Edutainment.

7. Conclusion

The research was combined with the TREND Edutainment model covered various issues such as the personality of teacher, preparing the courses that could be inserted play and learn. The activities which help completely TREND Edutainment such as a perfect short film contest, simple video editing, shootings, etc. and mixed with slow travel to absorb fully knowledge. The TREND Edutainment, researcher have introduced the latest technology to manage the data files, such as large CPUs to store television shows, games and DVD movies that popular or latest movies to service via the internet access through a variety of communication. The prepared content was used to test the performance in the course. The Television Education Production chooses the specific chapters or relational units to role-play. The personality of the teacher was changed to follow the contents in the chapters to achieve a variety of teachings. If the narrative comes to various programs, so teachers choose related DVD to project. And also had been categorized by a group of academic vocabulary such as picture size (shot size) 7 formats, camera (camera angle shot) 4 formats, camera movements (camera movement) 9 formats, and editing sequences Photo (editing) 11 formats. And then, imported those items blend with the teaching method in comedy style, such as the teaching of sign language. Teachers would write lesson plans or teaching methods for example, smiles while gesturing, etc. so that the various dimensions of teaching, the bright teacher change the classroom atmosphere is friendly to everyone. The learners have the positive attitude, wanted to study. And finally, help to increase the learning achievement.

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Science and nature perception in the images and pictures of the children

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Abstract

The aim of this research is to search the perception of elementary school fourth grade students related to science and nature concept in artistic statements based on written descriptions related to their pictures and only pictures. The pictural and literal statements of the students related to science and nature have been examined based on this aim. The research has been realized at Diyarbakır, Kayapınar province Hantepe Eğitim Şehitleri Elementary School and Ankara, Çankaya Province Sokullu Mehmet Paşa Elementary School in 2013-2014 semestr of educational period. 32 of students are having education in Diyarbakır, 28 of students are having education in Ankara. The data of the research which has been figured by qualitative research method has been collected in the from of written ideas related to the pictures and the ones explained in the pictures, the taken findings have been commented by analyzing them with descriptive analysis. The research has been realized by using phenomonologic research figure from qualitative research figures. At the end of the research, whereas the students describe science concept with "population, research environment, invention and life field" concepts, they stated nature concept with "environment, living area and environmental change" concepts.

Keywords: Science and nature, child pictures, perception

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1. Introduction

Elementary education includes a period when emotional, cognitive and psychomotor attainments are achieved and the child expresses himself democratically and explains his thoughts and emotions without feeling any pressure on him. The figurative situations can be more realistic and reflect the emotional world of the child. Because of this reason, examination of the figurative pictures and reflecting realistic situation of the students related to their emotional world can be accepted as very important.

Arts have an important place in mental development and richness of the figures of the children. Arts is a pyshological action born out of the aim of stating their emotions and ideas of the people against the nature with an individualistic point of view in a beautiful and effective style with the instruments such as line, color, shape, word and rhythm (Artut, 2002). The painting has an important place in the perception and description of the objects in the nature by the person and describing himself. Painting and child has been a continuously changing fact which complete each other and take place in the most important and effective elements of communication(Artut, 2007).

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The paintings shed light on the inner world of the children, provide opportfunity discussing their ideas and emotions of them with a different point of view. Their paintings have the duty of a window in reflecting their ideas and emotions reflect their dreams freely(Crook, 1985, Thomas & Silk, 1990, Faroki & Hashemi, 2011). It can be understood by the way of drawings how the children have emotions related to the people or objects (Burkitt, 2004).

The painting process requires the child to arrange and choose colors, shapes and lines by analyzing many components such as content, style, shape and composition to transfer an idea, emotion, event or observation (Malchiodi, 2005). The children hate answering the questions which have been directly asked to them. They state their emotions more easily, enjoyable and quickly with drawings (Lewis ve Greene, 1983). Because of this reason, as painting has been accepted as an indicatior of the child's perception of outer world, it helps to communicate with the child and helps adults to solve the problems they met with the children (Artut, 2002). Also, critical thinking and understanding of the children can be increased by painting and developing the required skills opportunity can be presented to them to include those individual conversations and commenting the images (Uysal, 2011).

Another way to increase the students' understanding of what pictural statements mean is to listen their speech on the paintings (Malchiodi, 2005). Because the children have a tendency to draw "what they know" more than "what they see"(Toomela, 2006). In this context, the best way to understand the message in the children's picture is to speak about their paintings or images.

Science and technology education is existent in close environment of the student. All colors, lights, taste attract the child, because of this reason the child is interested with the world. Science and technology education is the education of this amusing and attractive richness and it tries to transform abstract information which the child needs to learn to concrete information (Soysal ve Afacan, 2012). Especially its close relationship with the nature makes this information more important. In this context, nature perception of the individual is related with how he he defines man-nature relationship and perceived beliefs, environment and ideas (Kutru ve Soran, 2012). This perception effects attitudes and beliefs related to many views such as accepting style of nature, sensitivity to nature and having environmental consciousness. Detailed information related to the nature is given in Science courses. Especially formation of perceptions related to science and nature on the children is provided by the way of Science courses.

When the literature on this field is examined , it can be observed that there are many paintings and image studies related to science and science man concept (Buldu, 2006; Oğuz, 2007; Rodari, 2007; Türkmen, 2008;, Ünver, 2010; Benli, Dökme & Kaya; 2011, Samaras, Bonoti & Christidou, 2012; Oktay & Eryurt, 2012; Çokadar & Demirtel, 2012; Ruiz-Mallen and Escales, 2012; Özel, 2012; Erdoğan, 2013a; Erdoğan, 2013b). In addition to this, studies such as god concept perception (Yıldız, 2013), class environment perception (Ülker & diğerleri, 2013), learning and teaching process perception (Aykaç, 2012), internet concept perception (Ersoy & Türkkan, 2009), popular culture concept perception (Erişti, 2010), school garden concept perception (Coronin-Jones, 2005), defining the family perception (Doğru & diğerleri, 2006) are the subjects about the children paintings. It can be told that limited studies which have been made by Yılmaz, Kobiatko and Topal (2012) with Ülker (2012) on nature perception take place. It can be stated that there are not studies related to science and nature directly.

In general meaning, the studies which the pictorial perceptions of the students are being determined are based on the adaptation of "draw a science person test" developed by Chambers(1983). This situation is thought to bring a limitation in determining the point of views to perceptions and concepts with different methods. Statistical analysis is being made in these studies; it can be told that entering the children's World directly seems to be limited.

In this research, it is aimed at determining the science and nature perceptions of the children by the way of pictures and literal statements. The questions below have ben tried to reply related to this aim:

- How do the elementary school students reflect their science and nature perceptions in pictures and images?

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- What are the similarities and differences between the elementary school students' science and nature perception and written ideas in their pictures and images?

2. Method

The research has been realized by the way of Phenomenology image from qualitative research images. In this image, it is aimed at commenting and stating individualistic perceptions or point of views related to a fact (Yıldırım & Şimsek, 2005). In the examination of children pictures in phenomenology image, different meanings, connecting to different meanings and world view of the one who is making the picture is emphasized(Malchiodi, 2005). In the research, science and nature perception of the students, the pictures which the students will make on science and nature and their written ideas on these pictures have been examined.

2.2 Collection of data and Application

The research data has been collected in 2013-2014 semester autumn period by document analysis which has been a qualitative research data collection method. The research data has been collected Diyarbakır Center Kayapınar Province Hantepe Eğitim Şehitleri Elementary School and Ankara center Çankaya province Sokullu Mehmet paşa Elementary School. The research includes 60 students from these two schools. 32 of them have been in Diyarbakır, 28 of them have been in Ankara. All the students participating in the research are in the fourth grade. The application of the research has been realized separately by the researchers. After the required permission has been taken related to researchers from the headmaster and the teachers, the researchers went to the school and gave drawing papers to the students and requested from them to take their pencils and drawing pencils. The students have been requested to divide the paper into two and draw what they understand when they are told the picture of nature one side and picture of science on the other side of the paper. The application has been realized in nearly one course period, 40 minutes.

After the picturing had been finished, the question of "what did you want to explain in this picture?" has been asked to the students by interviewing them again at the result of the analysis made by the researchers. The students have been requested to write the answers on the pictures they made by handwriting. The written things have been read by the researchers and have been analyzed by them.

2.2 Data collection environment

The research data have been realized in the classrooms of the students of Diyarbakır and Ankara Center schools in Arts course. The classroom where the research has been made was in three desks. The desks have been arranged freely for every student. The drawing papers for the students had been provided by the researchers in the application process, the students brought the pencils and drawing pencils by themselves. The students have been given 40 minutes, one course period, for the application, the application has been made under the supervision of researchers and teachers.

2.3 Analyzing and commenting of the data

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The pictorial explanations and literal statements have been examined by the way of document examination from the data taken from pictural explanations and written statements of the children, they have been analyzed by descriptive analysis method. The pictures made by the students and their replies to the written questions have been analyzed by the researchers in the analysis of the data process, and they have been presented to the idea of field experts related to which main themes belong to science and which ones belong to nature. The themes in the students' pictural explanations and written statements based on pictorial explanations have been determined in the results of the analysis. 4 themes have been determined as "environment, research center, invention and living area" related to science element, 3 themes have been determined as "environment, living area and environmental change" related to nature element. The items in which different opinions and consensus between the experts have been determined at the result of the analysis. 4 themes as "Population, research center, invention and living field" have been determined related to science element. 3 themes as"environment, living field and environmental change" existed related to nature element. The items with divergence and consensus have been determined at the result of analysis of expert. Reliability=Consensus/ (consensus+divergence)*100 formula has been used in reliability calculation of Miles and Huberman (1994, p.64) between researchers and field experts. The reliability value is 97.2%. Pictural drawings and written statements which do not have science and nature elements has been taken by taking ideas of the expert.

3. Findings

The findings taken in the research hve been collected with the main team as "Science and nature in the picture of students". The themes which have been determined by the analysis of studentstudies have been collected under 2 themes.

3.1. Findings related to science perception in pictual and literal descriptions of the students.

The perceptions of the students related to literal and pictural descriptions have been given in Table 1. When table 1 is examined, pictural and literal perceptions of the students related to "science" concept has been collected under the themes of "environment, research center, invention and living area". It can be stated that the students assimilated science with these 4 basic concepts. In addition to this, it can be seen that they describe these 4 concepts with subconcepts in themselves. When it is examined in general, it can be told that the students mostly assimilated science with the research based environments.

Table 1. Science themes stated in pictural descriptions and lieral statements of the students

Themes	
Population	
	World
	Alives
	Animal world
	Plant kingdom
Reseach Center Figure	
	Labortuar Environment
	Making experiment
	Cell and DNA chain
	Skeleton and muscle structure
	Evaporation
	Leverage and buoyancy of water
	Internal organs
	Solid, Liquid and Gas
Invention	
	Scientist
	Astronaut
Living environment	
	Environmental insensitivity
	Food with GMO

Population

It is observed that the students assimilated science concept with "world, living creatures, animals and plants world" subtheme in population theme. It can be told that they draw living world as animals' world and plants world, in two styles. In addition to this, it is seen that they drew science alone by assimilating it

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with the world. For example, Onur, a student drew science by assimilating it with the world. He used his description related to his drawing that" because science explains our world, moon, planets and the sun". Durmuş assimilated science and living creatures' world with "there are bees in science. Bees create a differentiation. Unless the bees are existent, there will not be living creatures. Also, the bees produce food for us." Examples from the students' drawing have been given in picture 1. When it is generally observed, we can say that the students see science as a part of population both in their drawings and written statements. However, they mentioned that they did not take the population as total; there are living creatures all in the world.

a b



Picture. 1. (a) Onur's picture; (b) Durmuş's picture.

Research Center Figure

When the students' drawing related to science have been examined, "Laboatory Environment, Making experiment, Cell and DNA chain, Skeleton and muscle structure, Evaporation, Leverage and buoyancy of water, Solid, Liquid and Gas" under the title of research concept have been stated as sub-themes. It is observed that the drawings which have been made by the students by assimilating science with research environment coincided with the principle of individuals who search question, criticize, analyze and synthesize as expected for science students and relevant to science nature. It is known that learning with making in laboratory environment provides permanent learning. In this context NS states while describing science in his picture "I thought melting of ice. Freezing, melting, evaporation is the best subjects in science which I can understand. Because of this reason, I drew this picture." He assimilated science with research environment.



a b

Picture. 2. (a) Arda's picture; (b) Zeynep's picture

Invention

It is observed that the students describe "scientist and astronaut" concepts related to invention in their drawings related to science. It can be told that there is a situation that they assimilate science with scien-

tist concept. The research dimension of science can be explained with this situation. Astronaut can be stated as another dimension of scientist. A student called as Gökay assimilated science and scientists as "scientists make research for us. They are always working for us in the laboratories" related to scientist figure by his statement. In the same way, Başak drew science as astronaut and told that "There are always astranouts in the science books". She explained this situation as "Because of this reason, I drew astranout". The students' assimilating scientists and astranouts with science can be explained coding them as working people to find something or as a researcher. The drawings of the students related to this subject have been given in Picture 3.

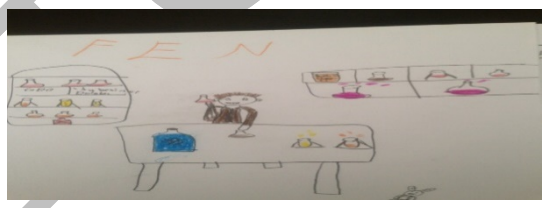
a b



Picture.3. (a) Gökay's picture; (b) Başak's picture

Living environment

It is observed that the students assimilate science concept with the living environment in their literal and pictoral descriptions. It can be told that they give importance to environmental sensitiveness while doing this. Because, they explained our living environment with the concepts of "environmental sensitivity and food with GMO". When it is asked the reason of this to Ayşe, it is seen that Ayşe told that "I hear that there is too much GMO in our food in the last days." This situation can be explained as this subject took attention of the students by the way of visual and written media in science courses.



Picture.4. Ayşe's picture

As a result, it is observed that the students see science in their drawings and written statements as a piece of population and assimilate it with research centers. At the same time, they stated them as invention and living field. In this context, it is seenthat the students reflect science concept in their pictural images and written statements relevant to the content of science courses.

3.2. Findings related to nature perceptions of the students in their pictural and literal explanations

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Nature perceptions of the students in their pictural and literal explanations have been given in Table 2. When Table 2 is examined, the students' pictural and literal perceptions related to nature have been collected under the themes of "environment, living environment and environmental change". It can be told that the students can perceive nature concept as environment based. The students' assimilating nature with environment concept show that they have true concepts related to nature. Because they stated nature common concepts with such as green fields, forests, mountains, valleys, living creatures' houses in green fields in their pictures and written statements.

Table 2. "Nature" themes in pictural and written descriptinos of the students

Themes
Environment figure
Natural environment
Forests
Mountains and rivers
Sea
Sky, sun and clouds
Living environment
Livings (butterfly, insect,bee, flower etc.)
Picnic areas
Houses and people
Enviromental change
Season changes

Environment figure

It is seen that the students conceptualize nature and environment in their pictural and literal explanations. "natural environment, green field, forests, mountains and rivers, seas, sky, sun and clouds" are being located by the students in this concept. Green field and natural environment concepts take as common concepts in students' pictural drawings. The same situation can be told as the same for forests, mountains, rivers. This situation means that the nature concept take place in the minds of the students in a correct style. The student named as Hayrettin used the statement for mountains, trees and sky in his drawing as "I think that flowers, trees and animals live in the nature. Because of this reason I drew ühis picture." Enes mentioned his perception related to nature with his statement in a similar picture that "I drew human beings, animals and plants in nature picture. All of these live together." Gökçe mentioned her perception related to nature with her statement that "There are many living creatures in the nature, human beings, animals and plants live together." The drawings of the students related to this situation have been given in Picture 5.

a b

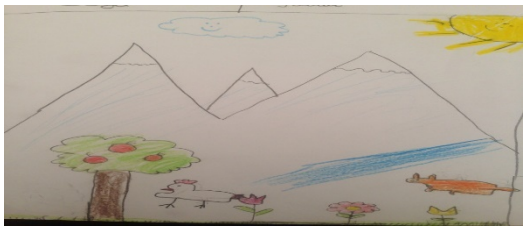


n's pictur



Living environment

It is observed that the students state nature by assimilating it with the environment we live in in their pictural and literal explanations. The living environment is stated as "living creatures, picnic areas and houses and human beings" in their pictural and literal explanations. It can be told that the students observe the living environment they have been in and they make evaluations according to this in their explanations about the living environment with nature concept. The students' description of nature perception as green areas and an alone house means that they perceive it as quiet environment faraway from city and they drew in this way. Their stating nature as insects, bees, butterflies and flowers living in natural environment show that they perceive and code nature in a true way. For example, Durmuş related to this theme had an explanation as " I drew by thinking birds, trees, lakes, rivers in the world.". The drawings of the students related to this situation have been given in Picture 6.



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Picture. 6. Durmuş's picture

Enviromental changes

The students stated that they see nature as environmental changes in their pictural and literal explanations. The environmental changes mean "seasonal changes". Every kind of change realizing in every season change such as dropping the leaves in autumn, opening of leaves in spring or greening of environment can be described as seasonal changes. It has been perceived by the students that the seasonal changes are situations which realize in itself and accepted this in this way." Şule stated her perception by telling that "As the season changes environment changes. This means the awakening of nature." The drawings of the students related to this situation have been given in Picture 7.



Picture. 7. Şule's picture

As a result, it has been observed that the nature concept is shaped according to a pattern in pictural and literal explanations of the students. The students assimilated nature with green fields. It can be told there is a natural environment, it has not been deformed by the people and they are perceived as virgin areas. It has been seen that there is a perception that there is green field where the living creatures live in, there is a lot of green field and people sometimes go to these places and have picnics and enjoy there.

4. Result and discussion

The elementary school students explained science with "population, research environment, invention and living environment" concepts in their pictural and literal statements in this research. They mentioned nature concept with "environment, living field and enviromental change" concepts.

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The findings in this research which "science and nature" perceptions of elementary school fourth grade students are being tried to be detemined in their pictural and literal statements show that general judgments have been created related to nature and science concept. Because it is observed that they meet at common points in science and nature concepts, it is seen that for example science is stated with generally laboratory environment and inventions, nature is explained with clean environment, green field, mountains and rivers.

Thu students assimilated science with population in general meaning. They see science as a piece of population, and related to this it has been observed that they perceive living world as a piece of whole. While explaining science with living creatures, it has been resulted that they perceived this as animal and plant world as in two dimensions. But they exclude human being from these categories. Because human beings are drawn as differenet figures in their pictures. This situation can be explained with the perception level of the students, meeting science firstly in fourth grade and not making a deep research. It has also been observed that the students assimilated science with research concept in their pictural drawings and literal explanations. Laboratory environment, science man, making experiment can be shown as an example. Especially it shows a similarity with many researches on making science man figure (Çokadar ve Demirtel, 2012; Ruiz-Mallen ve Escales, 2012). This situation can be explained as the perception of science and research together has been located in students and the first figure they remember when talked about science is scientist.

It is evident that the students have close ideas on nature concept in their in their pictural drawings and literal explanations. It can be told that they have a clear perception on nature subject. It has been seen that there is green field, water resources, mountains and sun in most of their drawings. For example, there are not any figures in their pictures showing people, houses, traffic and city life. Houses take place in some pictures but these houses are in the form of a country house and faraway from the city life. It has been observed that they drew nature a place to be relaxed and they did not talk about enviromental pollution in their pictures. Especially not talking about enviromental pollution can be explained as the students perceive nature as a place where people did not touch, and far and natural places.

The similarity between the drawings of student and their written statements in the research is seen as an important point. For example it is observed that they assimilate science with laboratory and research in their pictural drawings and literal explanations. Especially pictural and literal explanation related to nature perception show great similarities. When nature is talked about, the students state it with the same concepts When the drawings related to nature have been observed, natural environment, monutains, green gields, rivers, mouintains, lakes, sun and living creatures have been on the front size. Similar findings have been seen in the studies of Zuhal, Kuniatko and Topal (2012) and Ülker (2012). When it is thought that the study of Zuhal, Kuniatko and Topal (2012) has been realized with Czech students, the perceptions related to the nature heve been global common values.

One of the most important results of the research is that the students living in different social, cultural and economic regions perceive science and nature with common concepts. Because cultural and social environment effect the individuals' fact and situation and provide the formation of judgment. But it is seen that similar situations which effect the students' perceptions realize in the research. This situation is related with course boks, content of the program, teachers' point of view, audio and visual mass media which form a common perception.

When pictural development stages and literal statement skills of the fourth grade elementary students are taken into account, it is observed that their pictural and literal statements complete each other. Whereas pictural statements have been more complex, literal statements include statements explaining this situation. This situation can be explained that the children feel themselves more free in their pictural drawings, they find the opportunity of expressing themselves in the pictures, and related to this they have transferring their perceptions and observations more and deeper.

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As a result, it can be told that the perceptions of the students on science have been at an expected level. Especially, it is seen that their perceptions related to nature concept include judgments. For example, natural pollution has not been perceived as nature concept and has not been drawn and stated by the students. The students should be provided about enviromental sensitivity and importance of enviromental pollution and the nature cannot be clean forever.

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Scientific visualizations based on integrated model of text and picture comprehension via eye-tracking

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Abstract

This study investigates the "*color combination effect"* and the "*sequence of pictures and text effect"* in the "Integrated Model of Text and Picture Comprehension" (ITPC) on the formation of the mental model and cognitive load in both desktop and mobile devices. These effects are studied using an experiment including scientific contexts with specific color combinations and different picture and text sequences. The participants of this experiment are graduate students from different fields of science in Universiti Sains Malaysia. Four tasks are assigned for each participant in each phase and every task includes a scientific context accompanied with visualization. After each task the participant is asked to answer a set of questions related to the context. Eye-tracking methods are adopted to record gaze data of the participants while reading each context. Analysis of the gaze data and the percentage of the correct answers to the questions indicate that the sequence of picture and text and use of color in the visualizations results in reduction of the cognitive load of the participants.

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Keywords: eye tracking; picture-text sequence; visualization; cognitive load

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1. Introduction

The main intention of information visualization is to provide insight about the information in order to solve some prominent problems such as information overload and misinterpretation of data. Several empirical studies have shown the superiority of the visual representations versus the sequences of verbal representations in different tasks such as trend recognition and relation illustration. In the Integrated Model of Text and Picture Comprehension (ITPC), developed by Schnotz, it is claimed that formation of the comprehension of text and visuals are considered as active processes of "*coherence formation*", but at the same time it mentions that combination of textual and visual data should be implemented carefully, as it might cause interference in the learning of the users because of inappropriate graphics (Schnotz & Kürschner, 2007). In the scientific domains, information visualization is used extensively to provide better representation for the verbal contents (Börner, Chen, & Boyack, 2005; Ware, 2012). The terms, "better representation" is not a precise explanation and there exist a demand for a more explicit comparison parameter to describe the quality and effectiveness of the visualization (Few, n.d. pp.24-26). In order to achieve a general instruction in this study, effect of the parameters, color and the sequence of pictures and text in the formation of the mental model is studied. To provide a comparison between desktop and mobile devices the experiment is conducted on both mediums as nowadays, millions of people use mobile devices for different tasks such as browsing the Internet, reading email, books, blogs and even scientific papers

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(Maurer, Hausen, De Luca, & Hussmann, 2010). The participants of this experiment are graduate students from different fields of science at Universiti Sains Malaysia. The first phase of the experiment studies the "Picture-text sequencing effect" and "Color combination effect" in scientific contexts containing visualizations on the desktop computer. At the same time the participants are asked to read four short scientific contexts and their gaze data is collected using the eye-tracking devices. Also participant's comprehension from the context is evaluated using a set of questions at the end of each context. The second phase of the experiment aims to study the "Picture-text sequencing effect" and "Color combination effect" on the mobile devices of small and medium-sized screen. In the second phase, the steps of the first phase are repeated on the mobile devices and likewise the gaze data and the answers to the questions are collected and analyzed. In the final phase the participants are asked to complete the Felder-Silverman learning style model test in order to identify preferred learning style of the participants.

1.1. Related work

In the past decades, a great amount of research has shown that the combination of text and picture provides better learning compared to text only and picture only situations (Anglin, 2004; Fletcher & Tobias, 2005). Several research also is conducted to answer this question that if the text and picture appear in sequence, which model would be more effective. Some of these studies have provided experiments, to study the effect of picture and text sequencing (Canham & Hegarty, 2010; Eitel, Scheiter, Schüler, Nyström, & Holmqvist, 2013; McCrudden, Magliano, & Schraw, 2011; Shaw, Nihalani, Mayrath, & Robinson, 2012). The results of the conducted experiments varies for each study, meaning that some of the experiments concluded in the effectiveness of picture before text sequence (Borges & Robins, 1980; Dean & Enemoh, 1983; McCrudden et al., 2011; McCrudden, Schraw, & Lehman, 2007; Salmerón, Baccino, Cañas, Madrid, & Fajardo, 2009; Ullrich, 2007), and also almost equally a big body of research have achieved positive results on behalf of the text before picture or text only model (Bransford & Bransford, 1972; Canham & Hegarty, 2010; O'Keefe & Solman, 1987; Robinson, Katayama, Dubois, & Devaney, 1998; Robinson & Kiewra, 1995; Simmons, Griffin, & Kameenui, 1988). The Picture-text sequencing effect mentioned in the ITPC model, claims that the presentation of the picture before text, provides the mind preliminary visual information that helps with the creation of the mental model (Schnotz & Kürschner, 2007).

1.2. Picture and text sequencing effect on desktop and mobile devices

This study is important because, it investigates effect of picture and text sequencing on both the desktop and mobile devices side by side, while examining the influence of color on it. The effect of picture and text sequencing on mobile devices can be of more importance, as the screen size of the mobile devices are generally smaller than the desktop computers; which in this case when the picture is accompanied by text (or vice versa), the content producer is limited in the display size, thus there is no other way but to present picture and text in a sequential format.

2. Experiment

This study aims to determine the effect of color combination and image/text sequencing on the understanding and cognitive load of postgraduate students while reading scientific contexts on desktop and mobiles devices. In order to investigate the effect of these variables, an experiment is designed with two parts including four tasks to examine the cognitive load of the students using the desktop monitor and a mobile device.

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2.1. Participants

Participants of this study are 10 third year Universiti Sains Malaysia postgraduates with a science background aged between 29 to 35 years old. The participants are assured that their test results would be anonymous and their score will not be disclosed. The participants are divided into 2 groups, each group with eight similar texts but different sequence of picture and text.

2.2. Apparatus

In this experiment, the main goal was to investigate the cognitive load, of the participant in the picture first, followed by text and then text first followed by picture, on both desktop and mobile devices. In order to achieve this goal, Gaze data was collected using SMI Red, remote eye-tracking device in the desktop based tasks and SMI eye-tracking glasses (ETG) for the mobile device based tasks. The calibration of the devices are renewed after each task and the participants are asked to answer a set of questions related to the tasks.

After completing the tasks the participants are given the Felder-Silverman learning style questionnaire, to determine if they are visual or verbal learners.

2.3. Materials

Material used in this experiment, are eight simple passages which provides description on the results of the survey conducted on the academic databases. The length of each passage is between 150 to 210 words and the readability score for each of the passages is calculated using the readability formula (Kincaid, Fishburne Jr, Rogers, & Chissom, 1975) and the mean of the readability score is 14.2 with below 10% standard deviation. The material is accompanied with diagrams related to the context.

2.4. Procedure

The participants, initially are informed that they would read four tasks which include a short passage with a picture before or after the passage, on desktop computer and four tasks on mobile device and after each task they will answer a few questions related to each task.

The experiment includes three major sections:

(a) Reading tasks with questions on the desktop with remote eye-tracking device (RED):

Four reading tasks are assigned for each participant and after each task participants are asked to answer a set of questions about the context and their gaze data are recorded using the remote eye-tracking devices.

(b) Reading tasks with questions on the mobile devices with eye-tracking glasses (ETG):

The same procedures in step (a) are implemented, except this time the tasks and the questions are provided using small and medium-size screen devices and their gaze data are recorded using eye-tracking glasses.

(c) Felder-Silverman learning style model test:

In the final step, the participants are asked to answer 44 questions of the "Felder-Silverman learning style model" to identify their Learning Style Index (LSI) for further analysis. Fig. 1 demonstrates the schematic process of the experiment.

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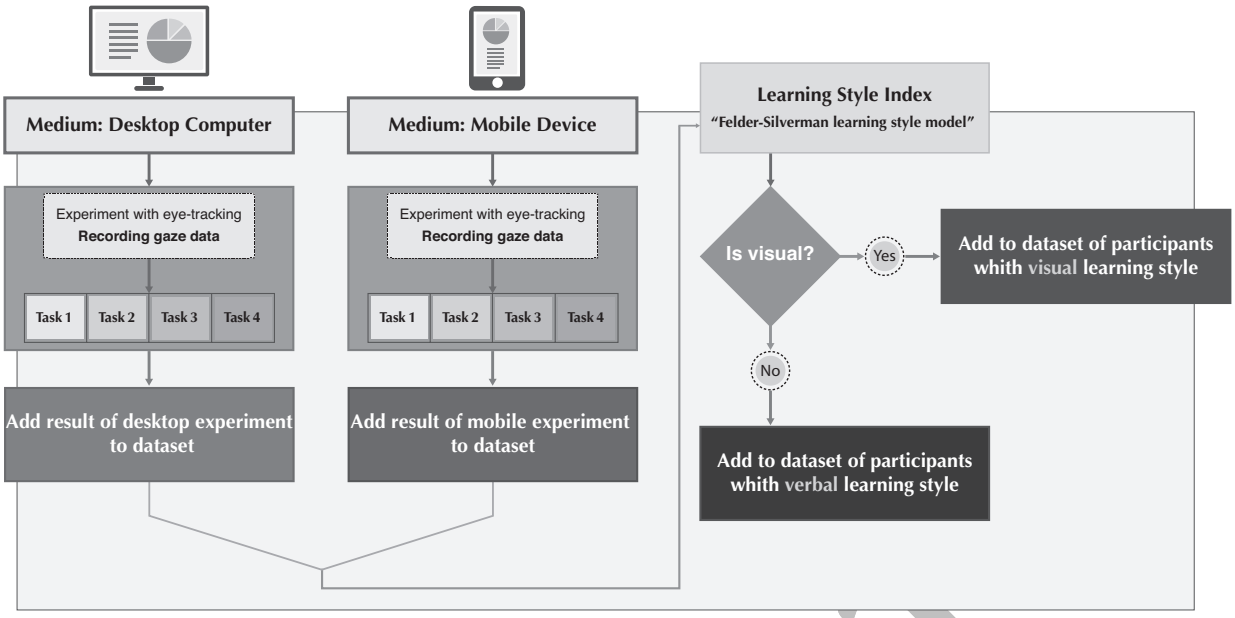


Fig 1. Schematic process of the experiment

3. Results

The collected information from the experiment can be divided into four categories:

- Scores of the questions about the context on the desktop and mobile device
- Eye-tracking results of the experiment on the context on the desktop
- Eye-tracking results of the experiment on the context on the mobile device
- Results of the Learning Style Index test

The analysis of the collected information is completed in three steps, firstly, the learning style of the participants is identified and the attributes of the *visual*/*verbal* learner are added to the database of the collected information. In the second phase, the mean score of the questions for all the participants for each test is calculated. Later the mean results for each group of *visual* and *verbal* learners are also calculated separately. Then the gaze data are plotted using the heat map and the scan path visualization methods to investigate the fixations and movement sequence of the eyes collected by the eye-tracking devices.

3.1. Gaze data

For further analysis, the scores and gaze data collected from the desktop and mobile devices are clustered and the results are analysed using classification method. The eye-tracking data provides information about the time needed for the participant to read and recognize each part of the context. It can also help estimate the cognitive load of the participant while going through the context. The collected eye tracking data are usually visualized either by heat map and scan path or by analysing the number and duration of the fixation on an Area of Interest (AOI) or POI. However the other eye tracking parameters such as blin-

king, pupil size variation and length of the saccades, ratio of fixations, are also very important parameters (Bixler & D'Mello, 2014). In this study, the parameters for each task and for each participant are put into a matrix of the eye tracking data, and 50% of all the features are recorded in this matrix are used for training the model using a supervised learning method. In the next step, the rest of the records are used for testing the hypothesis on the effectiveness of picture-text sequencing model.

3.2. Collected data on the experiment

The analysis of the results are completed using a method based on the records of the fixation, saccades, blinks and pupil size on two large AOIs. In order to investigate the relation of the cognitive load and gaze data in a quantitative manner, all the eye tracking data are summarized into 7 features and 2 matrices. This matrix of gaze data contains: (1) Time ratio of the Fixations, (2) Mean of the Fixations, (3) Number of Saccades, (4) Number of blinks, (5) Mean time between blinks, (6) Mean pupil diameter, and (7) Total length of eye movement. The results of the answers to the questions are used as the classifier attribute for the training step, and then this attribute is again used for testing the model. The ZeroR classifier in the WEKA data mining toolkit (Hall et al., 2009) is used for the training and testing. In this process, 50% of the participant's data (attribute matrices) are selected randomly for training purpose, 10% for validation and 40% for testing.

3.3. Normalization of the data

The data in the matrices for each participant are not all in one range, as each attribute represents one different feature, also physical characteristics (such as pupil diameter) vary for each participant, which leads to a bias in the modeling. In order to avoid this, the data inside the matrices are all normalized using a common method of normalization (in this case Hyperbolic Tangent function) therefore all the parameters will have values in the same range of 0 and 1. Fig. 2 is the matrix of the normalized features for participant one from group one.

The features matrix for participant one, after normaliztion	Tasks	Time ratio of the Fixations	Mean of the Fixations	Number of Saccades	Number of blinks	Mean time between blinks	Mean pupil diameter	Total length of eye movement
Desktop computer (RED)	1	0.386	0.7311	0.709	0.484	0.158	0.169	0.353
	2	0.377	0.8637	0.687	0.740	0.172	0.177	0.591
	3	0.396	0.6415	0.822	0.396	0.370	0.595	0.176
	4	0.395	0.5918	0.722	0.555	0.449	0.211	0.169
Mobile device (ETG)	1	0.431	0.6383	.8645	0.581	0.434	0.643	0.901
	2	0.395	0.4807	0.762	0.780	0.662	0.141	0.585
	3	0.379	0.6014	0.609	0.888	0.617	0.592	0.170
	4	0.432	0.6639	0.555	0.760	0.725	0.143	0.495

Fig 2. The features matrix for participant one after normalization for modelling

3.4. Results of the questions

The participants are asked to answer questions related to the context in each task, and the results of these questions are used as a measure of the understanding of the participants from the context. The mean of the results for all the participants is presented in Table 6 and Table 7. Although the number of participants was not too many, the results provide clues about the effectiveness of the use of color. Also, better results are achieved in the Picture first cases compared to the Text first cases, which supports the ITPC theory.

Table 6. Results of the questions on Mobile device (Mean results of Groups 1 and 2)

	Group 1		Group 2	
Context	Colored	Black and White	Colored	Black and White
Picture first	90%	80%	80%	80%
Text First	65%	70%	65%	60%

Table 7. Results of the questions on Desktop computer (Mean results of Groups 1 and 2)

	Group 1		Group 2	
	Colored	Black and White	Colored	Black and White
Picture first	90%	70%	85%	73%
Text First	67%	65%	75%	67%

3.5. Analysis of the pupillary response

According to Klingner, Kumar, and Hanrahan (2008), pupil diameter increases with the difficulty of the context. In this experiment, the pupil data for each of the participants, for each task on two main AOIs are collected and analyzed, the Fig 3 demonstrates changes of the pupil size while the participant is reading the context.

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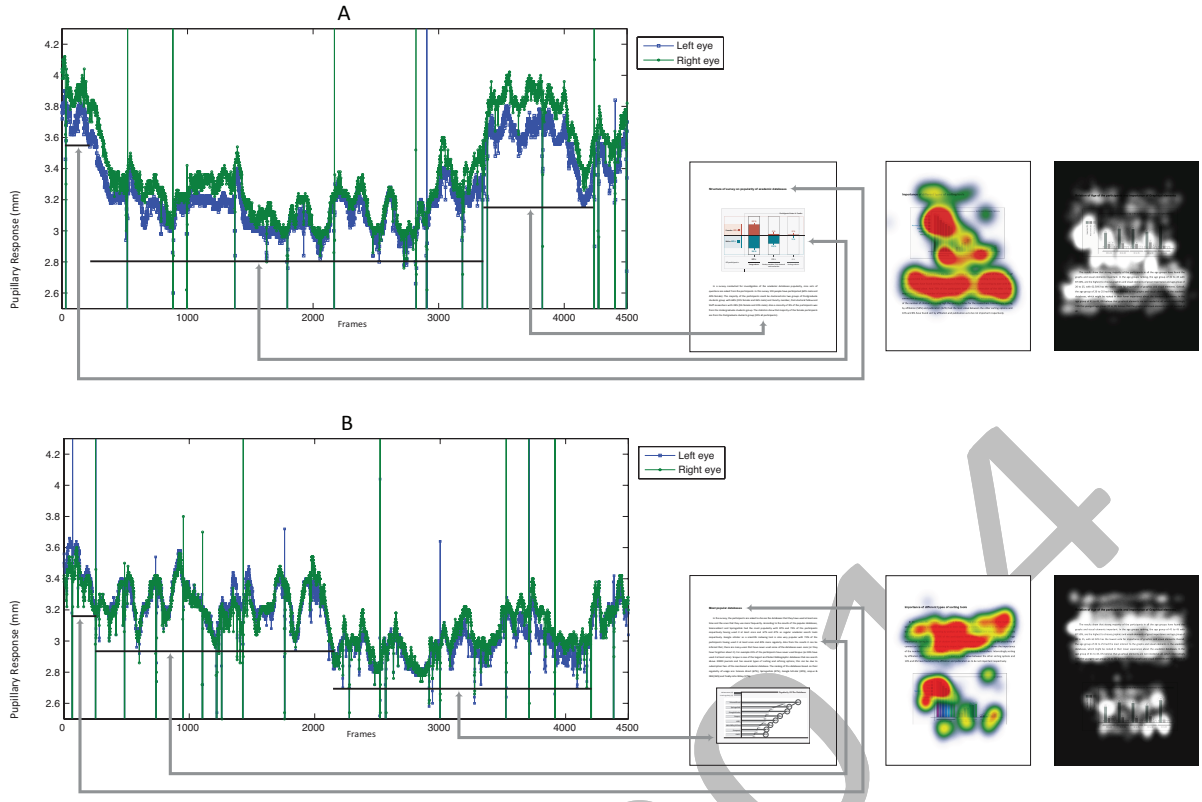


Fig 3. (a) the pupil diameter increases while reading the text and (b) during the process of reading pupil diameter is higher than while gazing at the figure

3.6. Analysis and classification

A parameter, representing the cognitive load is presented in this section which represents the cognitive load score (CLS). This parameter, is achieved by normalizing the maximum score of the parameters monitoring the cognitive load (number of blinking, size of pupil and fixation). In other words, values of the eye tracking features while watching a black space and while trying to read and understand a difficult section of the tasks is scored (between 0% and 100%). The mean value of the all features are tested using the model and the similarity factor is considered as the mean cognitive load for the tested tasks. Table 3 shows the results of the analysis.

The results of the cognitive load score, reflects the difficulty of the contexts for all the participants (Table 8), the scores suggests that, sequence of picture before text, can reduce the mean of the cognitive load. Also the mean of CLS in the contexts with colored figures is noticeably lower than the contexts with black and white figures.

Table 8. Mean cognitive load score from testing of the model trained by 50% of the participants

Device	Tasks	Cognitive load score	Tasks	Cognitive load score
Mobile device	Picture first, Colored	69%	Picture first, B/W	67%
	Text first, Colored figures	74%	Text first, B/W	81%
Desktop computer	Picture first, Colored	59%	Picture first, B/W	65%
	Text first, Colored figures	70%	Text first, B/W	78%

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4. Discussion

In this work, the effect of the color and the sequence of picture and text in the formation of the mental model and cognitive load is investigated for both the desktop and mobile device. The results support the Integrated Model of Text and Picture Comprehension on the effect of the sequence of the picture and text in both mobile devices and desktop computers. Also the results confirm the positive effect of color in the reduction of cognitive load in all the cases. Results of the Felder-Silverman test, provided that 75% of the participants were visual learners and 25% verbal learners. Nevertheless, in this experiment both verbal and visual participants had better scores on the *picture first* tasks.

5. Conclusion

The effect of sequence of pictures and text in the cognition load and the formation of the mental model in the scientific contexts in the Integrated Model of Text and Picture Comprehension is a rarely investigated issue and in this experiment, the authors try to conduct an analysis regarding this effect on both the desktop and mobile devices. The contribution of this study is both on the investigation of the theory and also technically analyzing the effect of using mobile devices versus desktop computers.

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Self- motivation as a mediator for teachers' readiness in applying ICT in teaching and learning

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Abstract

The aim of this study is to examine teachers' motivation as a great mediator for teachers' readiness in applying ICT in their teaching and learning. Apart from that, this study was carried out to differentiate the effect of exogenous variables from the endogenous variables based on the academic fields (pure science and social science). This is a quantitative study using a survey method, involving a total of 874 high school teachers in Indonesia, including 446 science teachers and 428 social science teachers. Data was analyzed using path analysis (path analysis/ SEM) with AMOS software version 18. The results show that motivation is a significant variable as a mediator between the variables of readiness with ICT application in teaching and learning science and social science. Analysis of structural equation path model (SEM) shows that the data used in this study has a reasonable suitability for the proposed regression model. Thus, it is proved that the two independent variables are linked directly and indirectly to the dependent variable of the study which is the application of ICT in teaching and learning. The implication of this study is that the governments and ministry of educations take into account teachers attitudes and motivations in terms of ICT application and address this issue by providing sufficient infrastructure, equipments, facilities, and training for teachers to develop positive attitudes towards the ICT use in education.

Keywords: Motivation, Readiness, Mediator, ICT Aplication, SEM Analysis

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1. Introduction

The world is experiencing rapid changes which cause the explosion of ever-changing technologies. These changes are happening all over the globe, including developing countries like Indonesia. Therefore, it is inevitable that these changes should be embraced realistically so that the developing countries are not to be left behind in improving the quality of education as well as strengthening the implementation of classroom instructional process. The presence of various new means of information has changed the state of thoughts, ideologies and cultures. In addition, the world is now borderless; hence, various external elements are invading other countries without border controls. As such, this development of information technology is synonymous with the universal theme as the world without boundaries, which as Davis (2001) stated, one of human tendencies in the early 21st century is the information revolution. This means that information is obtained more rapidly, which put conventional methods, such as going to the library and printed materials are so out of styles.

Now, the education system has fully realised the potential of ICT as a valueable assisting tool in teaching and learning (Drier, 2001; Giannakos, 2014; Vajargah & Saadattlab, 2014). Students are now more interested in using ICT to access information, and having personal websites is a current trend where they can easily check their status via social networkings such as myspace, friendster, blogspot, facebook to

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name a few. This phenomenon has become a trend among school students (García-Santillán et al. 2014; Youssef et al., 2013; Zhao, et.al, 2002). This new type of students' interests and hobbies should be taken advantage of by teachers and parents to guide the students on the correct use of ICT (Badri et al., 2013; Öz, 2014). However, the most significant challenges faced by teachers are in handling a paradigm shift towards the ever-changing methods of teaching and learning and how to use computers and ICT as an alternative approach.

According to Baharuddin et al, (2000), for over the last thirty years, most classrooms in the European Countries have integrated ICT in the instructional process by learning how to use technology and ICT competencies also known as ICT literacy, which involve knowledge about the basic concept and operation, computer usage, word processing, spreadsheet, database, file management, documentation, presentation and communication of information. Technology can make our lives easier and simplify our daily tasks (Brooke, 2013; Holmes, 1999; Wang, 2014). In the context of teaching and learning, technology can facilitate tasks and improve teachers' performance in creating effective teaching and learning activities. According to Pisapa (1994), the integration of ICT in the instructional process refers to the use of learning technologies to promote, strengthen and enhance skills. Information technology should be used in combination with other teaching methods. Teachers need to integrate ICT to add value to the teaching and learning activities.

In the Indonesian context, ICT was first developed in 1983 at the University of Indonesia, in the form of University Network (UINet) by Dr.Joseph F.P Luhukay, who at the moment had just completed the Computer Knowledge doctorate program in the United States. The network was developed for over four years. In the same year, Luhukay initiated the establishement of the UlNet at the Department of Culture and Education which was a computer network covering a wider reach of the University of Indonesia, Bandung Institute of Technology, Bogor Institute of Agriculture, Gadjah Mada University, Surabaya Institute of Technology and HasanudinUniversity (Sutedjo, 2002). However, ICT is generally still an exclusive matter for the Indonesian people (Onno, 2003). Internet service in Indonesia is still a cost center and not yet a profit center. This is due to the significant facts of the minimum number of phones available, the uneven distribution of accessible networks (fiber optic cable), and the rental of internet line is still very expensive. In addition, Internet users in Indonesia are mostly among the upper middle social class and consumption patterns are more for educational purposes.

Naidu et al. (2006) stated that attitudes are beliefs, emotional reactions and behavioral tendencies toward an object that induce or inhibit a person to make a choice of action in an activity that is academic or informal. Skills could be considered as the ability or capacity to do something well. According to Wong (2002), information and communication technology skills can be viewed in two dimensions of ICT content skills and the skills of using ICT to complete tasks. ICT is a new means of technology to access information through an interactive spreadsheet that is more attractive through the integration of audio-visual and multimedia. Hubona and Whisenand (1995) viewed the use of ICT as a combination of traditional computer application and modern communication tools involving electronic mail and websites through communication networks and great access to information through search engines (Google & Mozilla). Correspondingly, Albirini (2006) highlights the importance of teacher's vision of technology itself, his/her experiences with it, as well as the cultural conditions under which ICT is introduced into schools in shaping teacher's attitudes toward technology and its subsequent diffusion in his/her educational practice.

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2. Problem statement

Indonesia is still lagging behind in terms of ICT provision as the usage of ICT in Indonesia is still limited and only available in the state of Java, and despondently the areas outside of Java are experiencing limited internet access. Prayitno (2007) stated that the use of internet as a whole is still relatively new to the Indonesian people and the number of users is still slightly lower than the total population and its accessibility is only in the big cities.

Siti Aishah et al. (2002) and Robiah et al. (2003) have found that teachers are comfortable with the conventional aids compared to the use of ICT. Their willingness to improve their knowledge and ICT skills is also very low, with their nonchalant attitude and disregard ICT as an urgent need to improve the quality and standards of their teaching and learning. The majority of teachers do not have good computer skills, which in this context referred to the basic knowledge of using Microsoft Word, Microsoft Excel and Microsoft PowerPoint. This is a clear evident that teachers do need helps. Apart from that, their skills in handling Microsoft Access and multimedia softwares such as Paint and Photoshop are still limited and their ability to use multimedia equipments such as scanners, digital cameras and digital video is very low. Teachers are also weak in electronic communications such as e-mail, chat, and exploring information from CD-ROMs and internet (Abdullah bin Md Yatim, 2002).

The common problem faced by the teachers is the lack of knowledge on how to use the internet to search and identify certain information. This dissuades them to apply it in their teaching and learning (Yunus & Wekke, 2009). They are disheartened with fear that their weaknesses will be known by students .This is consistent with a study by Laurillard (1994) which found that teachers were not competent in the use of technology, especially computers because of a lack of knowledge. For example, they took a long time searching for information via the internet; some were unable to search because they did not have the knowledge of internet search (Rye, 2009).

This study was designed to examine the readiness and self-motivation of high schools teachers in Indonesia in the use of ICT and ICT applications in teaching and learning in order to create a meaningful learning experience for students and to improve their teaching effectiveness. This study also identified factors which work as mediators on teachers' willingness to apply ICT in their teaching and learning and to support the optimal use of ICT in teaching and learning activities.

3. Literature review

3.1. ICT motivation

Motivation includes several factors which drive the selection, the persistence, as well as the engagement in particular activities to achieve an objective (Dweck & Elliott, 1983). Besides, motivation is refered to as the process in which goal-directed behaviour is prompted and sustained (Schunk, 1990). Therefore, motivational factors are regarded to be part of a person's goal structures and beliefs regarding what is significant (Ames, 1992). Accordingly, teachers' sufficient levels of motivation are seen to be associated with the innovative role of technology. Likewise, empirical study has effectively linked motivation to teacher's computer use (Sang et al., 2010)

3.2. Teacher readiness

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Teachers are considred as the main factor that generally determines educational development and innovation since they are the ones to employ the ICT investments for the pupose of educational development (Öz, 2014). It is argued that technology has no educational value in itself (Sang et al., 2010). However, their importance is highly recognized when being used by teachers in the process of teaching and learning (Chiu, 2014). While some people claim that the presence of technology in the classroom produces a pressure and requires efficient and effective use (Sang et al., 2011), study results display that these are also connected to teachers' attitudes and their levels of knowledge (Badri et al., 2013; Tezci, 2010). Teachers' positive views towards the applications of ICT or rejecting them all together are affected by their attitudes, (Albirini, 2006) as well as other significant factors such as their information about and experience with ICT (Badri et al,. 2013) their experiences in how to utilize these technologies in classroom environment (Keramati, 2011), information and experiences regarding the kinds of applications based on ICT, age, self-confidence (Molnár & Benedek 2013; Reading & Doyle, 2013).

The main issue in teachers' decision to utilize or not to use ICT is related to their attitudes. The results of a study by Badri et al. (2013) show that an individual's attitudes have a significant impact on his/her behaviors in ICT use. Teachers' attitudes (positive or negative) effect how they respond to and employ ICT. Therefore, information is needed about teachers' attitudes for planning about and future investment in ICT (Öz, 2014; Tezci, 2010). Likewise, Keramati et al. (2011) found that teacher's motivation and training play a substantial role in ICT application in education. Sang et al. 2011 has emphasized the strong relationships between computer-related attitudes and computer application in education. Attitudes towards computers affect teachers' acceptance of the usefulness of technology, and also affect whether teachers will integrate ICT into their classrooms.

Thus, Teachers' positive attitude can facilitate their use of more instructional technology tools in order to make learning more interesting as well as attractive for their students. However, teachers who have negative attitudes towards technology application in education cannot benefit in this area nor efficiently integrate technology into the education system. In Indonesia, as a developing country, the use of ICT in education by teachers is far from sufficient (Rye, 2009; Yunus & Wekke, 2009).However, very few studies have been reported in this area. Therefore, given the importance of teachers' attitutes and motivation in the application of ICT in education the relationship between motivation and ICT readiness, this area needs to be investigated.

4. Objectives of the study

The primary objective of this study was to identify self-motivation as a mediator on teachers' willingness to apply ICT in their teaching and learning. The other objective was to determine the effect of the independent variables (exogenous) on the dependent variables (endogenous) based on the academic fields (pure science and social science teachers).

5. Materials and methods

5.1. Instrument

This is a quantitative study using a survey method.

5.2. Population and sample group a

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The study sample was selected using purposive sampling and simple random techniques.A total of 874 high school teachers, including 446 science teachers and 428 social science teachers comprise the study sample.

5.3. Data analysis

Data was analyzed using path analysis (path analysis/ SEM) with AMOS software version 18.

5.4. Study procedure

The survey method was employed to collect data using questionnaires. A pilot study was conducted involving a total of 200 secondary school teachers for the purpose of determining the validity and reliability of the research instrument. The Cronbach's Alpha value for each aspect is as follow: teachers' attitudes towards ICT (0815), the use of ICT (0923), ICT facilities in schools (0888), ICT knowledge (0968), ICT skills (0.970) and the application of ICT in teaching and learning (0943). Every aspect has high reliability and fit to be used in the actual study for all of the instruments for readiness, motivation and application of ICT in teaching and learning. Respondents for the actual study were teachers from secondary schools in Indonesia. A total of 874 teachers were selected using purposive sampling and simple random techniques. Data was analysed by using Structural Equation Model (SEM) with AMOS 18.0 software to test the research hypotheses.

6. Results

Analysis of Structural Equation Model (SEM) with AMOS 18.0 software was used to test motivation as a mediator for teachers' readiness towards the application of ICT in teaching and learning. The results of the SEM analysis are as shown in Figure 1 below.

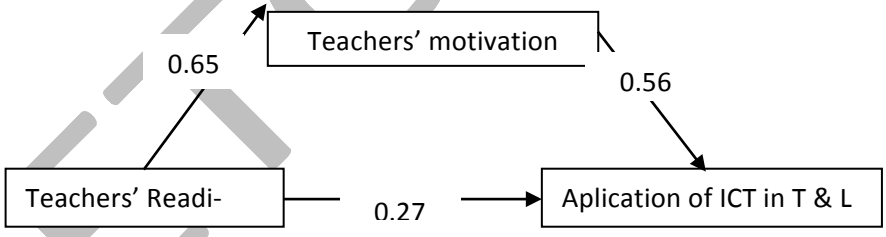


Fig 1. Motivation as a Mediator for Teachers' Readiness towards the Application of ICT in Teaching and Learning

SEM analysis of AMOS 18 software shows that teachers' motivation is a mediator towards teachers' readiness to apply ICT in teaching and learning. The results of the path analysis SEM equations model indicate SEM measurements as the following: Chi Square / df = 0.000, Root Mean Square Error Approximation (RMSEA) = 0:07, Goodness of Fit Index (GFI) = 1.000 and comparative fit index (CFI) = 1.000. All of the measures used show that the data used in this study proved to have reasonable compatibility with the model.

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Table1. Goo

dness of Fit Index (GFI) of the Respondents

Parameter	Coefficient /Index	
GFI	>0.9	1.000
NFI	>0.9	1.000
RMSEA	<0.08	0.069
CFI	>0.9	1.000
X^2/df	<0.3	0.000

Path analysis of the structural equation model (SEM) showed that the regression model proposed is compatible, where teachers' motivation is a significant predictor for the variable of readiness (motivation β = 0.65, p <0.000). Results of the analysis also indicate that variables in term of teachers' readiness and motivation are significant predictors for other variable which is the application of ICT in teaching and learning (readiness β = 0:56, p = 0.000; motivation β = 0:27, p <0.000).

In overall, the results of path analysis structural equation model (SEM) showed the variance in the endogenous variables, the application of ICT in teaching and learning as predicted by exogenous variables is 0.59. This shows that 59% of the variances of the application of ICT in teaching and learning is predicted by all the independent variables of the study. Thus, this means there is 0:41 or 41% of the variances in the variable of ICT application in teaching and learning can not be predicted by the regression model. Sobel test results show the impact value of motivation as a mediator for teachers readiness in applying ICT in their teaching and learning with the value of z = 19 576 and sig = 0.000 (p <0.05). This shows that motivation is a significant factor which plays as a mediator for the teachers to be ready in applying ICT in their teaching and learning process.

A model was designed and analyzed by using AMOS 18 to show a detailed look of the contribution of each aspect in teachers' motivation as mediator for teachers' readiness in applying ICT in their teaching and learning. The result is shown as in Figure 3 below.

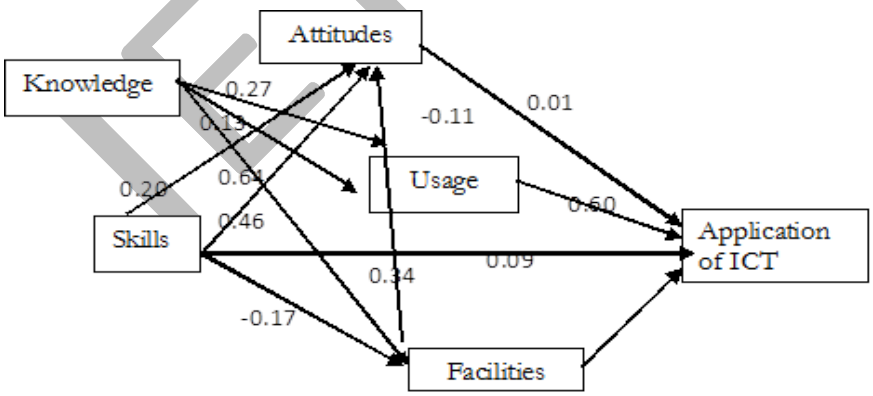


Fig 2. The aspects of motivation as mediator to each aspect of readiness towards the application of ICT in Teaching and Learning

SEM analysis of AMOS 18 software shows that the usage of ICT and ICT facilities are mediators for teachers in terms of ICT knowledge and ICT skills in the application of ICT in teaching and learning. Path analysis of the SEM equations model shows results that indicate the following: measurement of the Chi Square / df = 301 345, Root Mean Square Error Approximation (RMSEA) = 0.059, Goodness of Fit Index

(GFI) = 0.972 and comparative fit index (CFI) = 0.906. All of the measures used show that the data used in this study proved to have reasonable suitability for the proposed model.

Table 2. Goodness of Fit Index (GFI) of the respondents

Parameter	Coefficient /Index	
GFI	>0.9	0.972
NFI	>0.9	0.906
RMSEA	<0.08	0.059
CFI	>0.9	9.06
X^2/df	<0.3	0.000

The results of structural equation model (SEM) path analysis showed that the regression model is compatible as proposed, where ICT knowledge and ICT skills are significant predictor variables for the attitude variable (knowledge, β = 0:13, p <0.000; skills, β = 0.20, p = 0.000). The analysis also shows ICT knowledge and ICT skills of the teachers are significant predictor variables for the following variables: the use of ICT (knowledge, β = 0:27, p <0.000; skills, β = 0.246, p = 0.000), ICT knowledge and ICT skills are significant predictor variables for the variable of ICT facilities (knowledge, β = 0.64, p = 0.000; skills, β = -0.17, p = 0.000). The anaysis shows that the variables of ICT knowledge and ICT skills are significant predictor variables for the variables of ICT application in teaching and learning (knowledge β = -0.11, p <0.000; encouragement β = 0:34, p <0.000). As a result, this shows that the use of ICT is a significant mediator for the teachers to apply ICT in their teaching and learning (use β = 0.60, p <0.000). However, the attitude and ICT facilities are not mediators for the application of ICT (ICT attitude β = 0.01 and p> 0.001; facility β = 0:09, p <0.001).

Sobel test results, used to see the impact of every aspect of motivation as a mediator in the aspect of teachers support towards ICT applications, can be seen in Table 3 below.

Table 3. Sobel test on the effect of Motivation as mediator for teachers' readiness in applying ICT in teaching and learning

Mediated pathway	Z	P
Knowledge → Attitude → ICT Application	8.42	0.00
Skills → Attitude → ICT application	11.28	0.00
Knowledge → Usage → ICT application	19.04	0.00
Skills → Usage → ICT application	20.18	0.00
Knowledge → Facilities → ICT application	11.99	0.00
Skills → Facilities → ICT application	9.85	0.00

Table 3 shows that attitude, usage and facilities are significant mediators for knowledge and skills in the application of ICT (p <0.05). This clearly shows that the elements of teachers' motivation which consists of attitude, usage and facilities, effectively react as mediators for the teachers to be ready. In this context, readiness involves knowledge and skills to apply ICT in teaching and learning.

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7. Discussion

The results showed that motivation is a mediator that help teachers to be ready in applying ICT in their teaching and learning. These findings reaffirm a study by Abdul Wahab (2006) that there is a significant relationship between knowledge, skills and the usage of information and communication technology with the attitude towards information and communication technology. The study result is also consistant with the finding of a study by Aldunate and Nussbaum (2013) as they report that teachers who do not emply technology early in their teaching process and devote a small portion of their time to incorporating educational technology are less likely to adopt new echnology. Attitude is seen as a catalyst in determining whether teachers are willing to use ICT or otherwise. Normally, it is common for teachers to be positive in adapting with changes and accepting new technologies. Hence, their professional attitudes will help them in utilising the technologies as a way to improve the quality of their teaching and learning (Tezci, 2010).

Teachers are professionals who constantly experience changes and face development of new technologies in their lives. As professionals, they understand their roles and functions as a resource and catalyst for learning activities. According to Norton & Willburg (2003), teachers are always keen to have new technologies in the hope that technologies can help them in overcoming problems encountered in the context of teaching and learning. However, there are still teachers who do not realize the importance of ICT and multimedia as teaching and learning aids. Thus, according to Norhayati Abd Mukti (1995), teachers are still not fully ready to use computers in their teaching and learning and they rely more on their usual ways of teaching which normally include oral presentations and question and answer with the least emphasis on ICT development.

There are also teachers who do not fully utilize the advantages and capabilities of ICT in their schools, even if the government has supplied complete equipments and ICT facilities (Lim & Pannen, 2012). This occurs due to a number of factors that discourage the teachers in using ICT. Teachers are actually facing great challenges and problems in the use of ICT in their teaching and learning, especially their negative attitudes towards the use of ICT and their lack of the knowledge and skills in using ICT for teaching and learning process. This statement reinforces the study by Newby et al. (2000) which found that technical teachers do not use ICT in their teaching, even though they are given adequate facilities.

Face-to-face teaching is still relevant and seems a common practise. However, it is an added value if teachers are able to integrate ICT in their lesson. This in fact will enhance effectiveness in which teachers are still the most important players, as they are the ones who should know how to integrate ICT in the curriculum content (Konstantinos, Andreas, & Karakiza, 2013; Tezci, 2010). The lesson should be presented in such a way that learning would be fun, more attractive and effective through information management and integration with pedagogical competency and practice methodology. However, Dlodlo (2009) argues that information technology alone will not change anything without great operators and drivers (i.e., teachers) (Badri et al., 2013).

Teachers who regularly use the technologies will have extensive knowledge not only about the content of the subject but also on information and communication technology. Teaching with information and communication technology (ICT) such as the use of blogs, videos, websites, e-mail, etc. will reflect the maturity level of the educators, and level up students' appreciation as teachers are viewed as visionary, advanced and up to date (Owen et al., 2000; Sang et al., 2011). Teachers' competencies and their knowledge on how to access information via the Internet is also supported by the way they explore the applications through search engines. Lack of appropriate skills and knowledge will discourage teachers to use ICT and this will eventually cause desperate fall. Teachers need to get familiar with computers and keep on searching for information through the Internet multi resources. In the long run, they will naturally adapt with the latest technological developments through a variety of devices and networks. Siti Fatimah et al. (2005) argue that learning to apply ICT for data presentation such as a power point presentation, Prezi and graphics editor would be a form of improvements, as information is delivered in a more attractive and impressive mannner.

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8. Contribution of the study

The primary finding of this study is that teachers' motivation is a mediator on their willingness to apply ICT in their teaching and learning. The study found that teachers' motivation is the most important factor in ICT readiness and there is a positive correlation between self-motivation and ICT readiness.In general, the result of the study can be used for developing and popularizing ICT usage at both school and higher education levels across diciplines. Findings of this study will also be valuable for both academics and practitioners of ICT in education. As technology readiness and adaptation process is positively correlated with the type of teacher's attitude and motivation towards new technology, hence, preparing and training teachers in this vein to embrace technology is of paramount importance which needs to be taken into account by stakholders. Furthermore, since the technology adoption process appreas to be qualitatively different for different technologies, in terms of complexity of application, hence, the stakholders and those in charge of ICT application in education need to take this issue into consideration.

As some related studies have been conducted in the other countries and have come up with almost similar results locally, for example, Iran (Keramati et al. 2011), the Emirats (Badri et al., 2013), and Greece (Konstantinos et al., 2013), it can be concluded that the issue is prevailing in developing countries. The solution for this issue is that the developing countries, which have the sufficient infrastructure and facilities to integrate ICT into the education system and curriculum, should take efforts to facilitate the introduction of ICT into the education system. To this end, they need to train and educate the teacher to be familiar with the benefits of ICT as well as learn how to employ it in the process of teaching and learning.

Furthermore, since teachers' attitudes and motivation play a key role in the willingness and readiness for ICT application, governments need to address this issue by facilitating the transition from traditional system of education to the modern system where ICT has a leadning part in education. More specifically, in addition to establishing the infrastructure and providing the necessary equipments, the governments should provide sufficient training for teachers. Thus, In addition to adding to the body of knowledge, this study lays the ground for longtitudinal study to delve into this area and unveil the issues and bariers of ICT usage in developing countries, since the issue of ICT readiness and adoption is a challenge specifically prevailing in the developing countries.

9. Implication, suggestion and conclusion

To effectively integrate technology into education, government should provide facilities to train teachers and advocate for technology's advantage to the teachers and students alike, and accordingly develope a positive attitude toward technology in the schools' teaching practices. In addition, feedback needs to be collected for the purpose of integrating technology continuously. Furthermore, the major problem is teacher's conception of ICT since teacher's attitude toward ICT is not appropriate. Therefore, it is important to first convince managers and second train teachers and elucidate and hihghlight benefits of this new paradigm for teachers.

As this study has demonstrated that teachers' motivation is a mediator on their willingness to apply ICT in their teaching and learning, this is very much associated with knowledge of ICT usage, so, teachers must be able to apply the knowledge to use ICT with their own information technology skills. Frequent use of the applications will in fact improve the skills and capability, which in the long run increase the application of ICT in teaching and learning. Sustainable efforts are required to improve the skills of using ICT. Therefore, the Ministry of Education needs to encourage all teachers especially by providing sufficient trainings and facilities for them to use ICT. Hence, such experiences can lead to more comfort, confidence, acceptance, and eventually development of a positive attitude toward ICT integration into curricula and teaching.

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Service learning for medical students: program development and students' reflections

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ABSTRACT
We designed a cross-disciplinary interdepartmental volunteer program, which involved student participation in "community care teams for the elderly living alone." Our aim was to enhance communication between students and the elderly. Students were expected to meet and learn to get along with the elderly, to develop listening and communication skills, and learn to cooperate with student participants in other services. Students were required to devote at least 14 hours per semester to this two-semester program. Between September 2008 and June 2009, 19 students (1st semester), 34 students (2nd semester), 7 students (both 1st and 2nd semesters), respectively, and 15 elderly participants became involved in the program. Students were divided into 15 groups (each with 2–4 students), and each group visited the assigned elderly person at least 6 times per semester. According to student accounts, these visits improved their interpersonal and communication skills and their ability to express concerns with self-confidence. Our analysis of students' reflections found that early exposure to such community experiences increases their capacity for self-reflection and teaches them how to show respect. The opportunity to develop empathic communication skills with the elderly and learn to cooperate with faculty and colleagues can be beneficial to students in their future medical practice and strengthen the quality of community care.

INTRODUCTION

Medical care reflects not only scientific knowledge, but also communications skills and desire to improve the quality of medical care. In clinical practice, doctors frequently miss opportunities to respond to patient emotions and to strengthen the patient-physician relationship (Avdi, Barson, & Rischin, 2008). Because of the brevity of doctor-patient interactions, it is difficult to establish trust (Rhodes et al., 2004; Klig, 2005).

Klig (2005) and Little (2002) both proposed that teaching medical humanism could improve the relationships between health care providers and patients and that health care providers could be trained to treat every patient humanely, and to be sensitive to patient values, culture, and ethnicity. Shapiro et al. (2009) suggested that periodic visits to members of the patient's family would increase a student's understanding of how the psychological, spiritual, or economic circumstances of patients impact the course of their diseases. Students would understand the true meaning of caring. Students would thus become more thoughtful medical professionals for the sake of their patients.

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The major goal of medical education should be improving the empathic communication skills of medical students (Avdi et al., 2008). In Afghani's study (Afghani, Besimanto, Amin, & Shapiro, 2011), 55% of responders (3rd and 4th year students) thought that empathy could be taught. Evans and colleagues reported that a consulting skills course could improve students' empathic behavior. In the study by Borges and Hartung (2007), 87% of students were inclined to volunteer their time to the indigent. Community service learning has been shown to increase communication skills. However, most previous studies on service learning were short term, and their findings were based on questionnaire surveys. One study revealed that 10-week service learning activities significantly increased medical and nursing students' overall knowledge of aging and their understanding of mental health needs in old age. However, the effect was not long-lasting (Leung et al., 2012). There has been little research on service learning over a longer period of time and using repeated exposure and feedback to sustain attitude change toward older adults.

Leung, Liu, Wang, and Chen (2007) commented that planned feedback as well as the opportunity to work with different people as a team are necessary for the program to succeed. Therefore, we developed a multidisciplinary service-learning program aiming to enhance the student caring experience through longer exposure to the community. In this program, students learned listening and communication skills during visits with elderly individuals living alone, and how to cooperate with students in other departments. This article describes the program's development and provides student feedback about this program.

THE STUDY

Fu-Dey Citizen House is located at the center of the capital Taipei. The residents were low-income, similarly aged elderly people who lived alone. Most were jobless and relied solely on low-income subsidies from the Taipei City Government. In addition, many residents were physically impaired, sick, handicapped, and facing the possibility of resettlement due to demolition of their homes. They were therefore afraid of leaving their familiar environment and uncertain of the future.

This community consisted of 3 three-story and 3 four-story buildings, and a house used as an activity center. Each household contained a bathroom, kitchen, and living room. The actual space available was very limited, accounting 216 square feet per room. The average age of residents was 80.4 ± 11.2 years for males and 67.8 ± 16.0 years for females.

Taipei Medical University is located in the municipal area of the capital city, and offers caring experience courses intended to preserve community health and teach students how to serve and communicate with the elderly. The service learning courses were given to first-year students of our university. Two semesters per year were offered as an optional non-credit course. The curriculum was free and open to all students, but at least 14 hours of service per semester were required to pass the course.

The course was tutored by two teachers (SHY, WPC) and two teaching assistants (CHL, HTP) with service experience. Between September 2008 and June 2009, a total of 26 and 41 students attending nine different schools were assigned to community care teams for the first and second semesters, respectively. Students were from departments of Medicine (1st semester, 4; 2nd semester, 10), Dentistry (2, 6), Pharmacy (2, 2), Medical Technology (2, 3), Health Care and Nutrition (3, 12), Public Health (3, 3), Hospital Management (6, 0), Nursing (1, 4), and Nursing & Health Care for the Elderly (3, 1). Of these participants, 7 students completed two semesters of the course.

Four social workers selected the family services provided to residents of the Fu-Dey Citizen House. Initially, the elderly of 384 households were screened based on their service needs, compliance with a set of criteria, and absence of mental illness. Finally, a total of 8 men and 7 women (15 households) were chosen to participate for 2 semesters.

On the first day of the 1st semester, the community health center staff held a one-day garden party to introduce students to all residents of the 384 households, increase their familiarity with one another, and allay feelings of strangeness and fear. In addition to the students enrolled in caring experience courses, 120 second-year medical students joined and participated the garden party day. Activities covered the basic health check, depression scales assessment, and health education to prevent falls and address nutrition concerns.

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After the garden party day, each group of students (2–4 people per group) was assigned one elderly person. At least 6 visits per semester to the same venue and regular scheduling of service were required to complete the course. The services selected were decided during the first home visit after the needs of the clients were determined. Needs were roughly divided into static and dynamic services. Static services included chess playing, newspaper reading, and information (current photos and data on the hometowns of the elderly) sharing. The dynamic services included assistance with climbing stairs, showering, and walking. In addition, students provided the elderly with the experience of warmth by giving cards and small gifts to them at certain festivals in particular. If the students could not visit the elderly regularly, they would mail their cards instead.

Students were accompanied by their teachers on the first and second home visits and were unaccompanied on follow-up visits. In addition to providing conversation, the students documented the life stories of the elderly after receiving their consents.

Before the first visit, the teacher briefed students on the basic characteristics of the community and clients to be served, to eliminate the tension and to familiarize students with the curriculum support system.

After the first home visit, each student (by completing the "Table of Learning Program Experiences") summarized the background data collected from the elderly subjects, the plans for future learning experiences, and the expected outcome of that experience.

On subsequent visits, students chatted with the elderly, so that they would have someone to talk to. Information gained from these visits was recorded in the "Learning Log", including the dates of each visit and the names of the families visited (Part I) and observations, feelings, reflections, changes, etc. (Part II).

The students met to share experiences after the end of the course, and express their opinion on the services offered the elderly during the semester. Furthermore, the students submitted final reports describing their impressions of the services they provided, the difficulties they encountered, the solutions to problems, event-related growth and change, service-related issues, ways to improve the course, and insights into future volunteer service.

The learning support system included contact links between teachers and students by phone and via online social networking. Teachers and students engaged in interactive discussions before, during, and after the courses, to ascertain the student's level of progress and need for help to deal with problems or difficulties.

Students' reflections were qualitatively analyzed. Representative feedback was quoted when we thought it was relevant to the goal of the project (Côté & Turgeon, 2005). A non-quantitative process was used to interpret and conceptualize the original data. Statements with similar meanings were merged into one category and the number of people expressing the same thought was noted. The datasets were based on the classification of student skills into communications and interpersonal skills, decision-making and critical thinking skills, processing and self-management capabilities (Taiwan Health Promoting School, 2012). (Table 1)

Table 1: The Hypothetical Variables of "Skill-based Life Health Education"

Communications and interpersonal skills	Decision-making and critical thinking skills	Processing and self-management capabilities
Interpersonal skills Negotiations and rejection capabilities Understanding the feelings of others Cooperation and team work Advocacy capabilities	Decision making and problem solving skills Critical thinking skills	Ability to increase self confidence, self discipline, and take responsibility, influence, or promote change Ability to control ones' emotions Ability to control ones' emotions and anti-stress

Modified from "Taiwan Health Promoting School" (2012)

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Interviews of elderly clients by students elicited the following information.

For example, as quoted from the records of Student A5, "At first I did not know what to talk about, but finally I felt encouraged to speak with him, and the dialogue eventually seemed to become more natural. This was very encouraging to someone like myself who had always been at a loss for words."

As quoted from the records of Student A4 commenting on interpersonal skills: "The elderly are actually very eager to be taken care of, and we should be more active in looking after them."

As quoted from the records of Student B5 commenting on understanding the feelings of others: "Caring means knowing when someone needs to be cared for. It is a matter of give and take, and it can not be achieved unilaterally" (spirit of serving). However, the ability to negotiate and reject was not significantly improved because most of the time students are listening and so they are unable to make recommendations except at a superficial level. Students could raise issues and comment on them, but they could not troubleshoot them. Student A6 provided an example: "Social change has led to increased numbers of single people and double-income-no-kids families. Thus the number of vulnerable families and vulnerable elderly has increased. More volunteers devoted to caring are highly encouraged" (advocacy capabilities).

From observations during their period of service, students were able to comment or raise issues bearing on the care and environment of the elderly. For example, "I found that many elderly people have serious hearing impairments, so that we must speak loudly and slowly."--Student B22.

An example of focus on issues of the elderly: "The actions of students can be more focused on community care by encouraging more participation and meaningful community service activities."--Student B29.

An example of focus on current environmental issues: "Recruiting young students to establish social service teams in order to regularly help with clean-up work."--Student C3.

An example of raising issues of current service, not just silently receiving service: “Listen to what the elderly say, and find practical ways to help them, other than ways that we think subjectively are ideal and feasible."--Student B15.

"One day we will finish the course and never visit uncle Chen again. What will he think of us then?! What will the other elderly not served by us think of us then?!"--Student C4.

Students who provided more substantial feedback indicated that the service learning program helped enhance their confidence, ability to handle issues and take responsibility, and self-management skills. Through visits, students overcame communication barriers with others, addressed the concerns of others appropriately, identified personal strengths and weaknesses, and recognized self-value.

For example: "I’ve learned how to express other peoples' concerns, how to initiate conversation and chat with people."--Student B9. "Service not only helped others, but also enabled us to gain experience, adopt new attitudes, and find practical ways to resolve problems."--Student A11. "Participation in social service activities will greatly influence our future service as doctors and nurses. Only by providing service at basic levels, can we become good doctors in the future!”--Student B19.

Students learned that it was sometimes necessary to provide services under poor hygienic conditions. Controlling emotions and stress in such circumstances was a challenge. For example: "Some old people were incontinent, and they were unable to get rid of the flies attracted to their faces and feet. I need to learn to accept such a situation which I would never have tolerated before."--Student C5.

The feedback from our students can enhance future service learning as summarized below.

An excellent medical staff needs to be knowledgeable and needs to have good communication skills. Our

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students will be members of future health care teams. Though their backgrounds, abilities, and attitudes currently vary and their social class and environment may differ from those of their elderly clients, students find through service learning courses and listening that the elderly are not that difficult to get along with.

During service-learning courses, students discover their shortcomings and identify issues. "I used to think that the elderly at home were annoying, but now I can adapt and take the initiative to care for the people around me, especially the elderly at home. Caring must be self-initiated, through empathy for the feelings of the elderly, changing one's attitude for the sake of the elderly, and learning how to care for them."

Having learned how to think and see things from different perspectives, students then thought about "how to improve the health of the elderly", "whether visits to provide services would disturb the elderly", "what aspects of life would be changed for elderly who received visits and those who did not at the end of the course", etc. Thus the attitudes of students toward the elderly were improved.

During the service learning period, students gained greater respect for service, the efforts made by their teachers, the importance of the community of volunteers, and the hard work of enthusiastic volunteers.

Students learned that there were community elderly in need of care, identified the social problems, and learned that basic education, concepts, and work improved these problems. Vulnerable groups need love in addition to material support. Learning to help the elderly living alone, students become more confident in their ability to provide care. Service learning enhanced empathy, self-satisfaction, and knowledge of how to care for vulnerable people and how to communicate with others. Service learning is expected through the process of sharing to reduce future occurrence of medical malpractice.

CONCLUSİONS

Traditional medical education including classroom teaching and internship training cannot meet the needs of those with chronic diseases, especially the elderly (Shapiro et al., 2009). More and more scholars have recommended exposing students to real patients as early as possible during training (Shapiro et al., 2009; Borges & Hartung, 2007). In Shapiro's study (2009), students taking the course "long-term community care" noted that the elderly were in fact their teachers. Second-year medical students visited chronically ill patients on average of 4.4 times during eight months. The course was highly rated by students for its impact on enhancing their appreciation for patient-centered care, improving their knowledge of community resources, and improving their understanding of the roles of allied health professionals. In Borges' study (2007), first-year medical students spent six hours helping to prepare and serve food to clients at community-based agencies. Most students endorsed volunteering their time to assist the indigent. Our project involved more students and longer and repeated home visits (at least six times or 14 hours per semester). Through direct experience, students can learn and improve communications and interpersonal skills, decision-making and critical thinking skills, and processing and self-management capabilities.

The American Association of Medical Colleges includes altruism, compassion and empathy, trust and honesty among the qualifications of twenty-first century physicians. Effective communication increases the level of satisfaction of both doctors and patients, supports the treatment program, and facilitates the making of more appropriate medical and policy decisions. Service courses teach students to pay attention to the cultural and ethnic background sensitivities of their patients (Klig, 2005). Crandall and Marion (2009) believe that use of effective communication tools and multiple opportunities to practice these skills paired with constructive feedback provided by educators will preserve and enhance student attitudes. In our project, students were able to overcome the language barrier, identify subjects of conversation, and reduce the barrier to student-elderly interaction by being willing to listen.

Though negative attitudes toward medically underserved patients have declined (Crandall & Marion, 2009; Chen, Lew, Hershman, & Orlander, 2007), empathy level was reported to be highest in first-year students but lower by the end of internship and throughout residency (Chen et al., 2007). The attitudes of students in traditional or problem-based learning curricula become increasingly negative over the four-year period of study (Prince et al., 2000; Seabrook, 2004) and are not influenced by the preclinical curriculum. A lack of attending and resident role models and time pressure were described as major barriers to

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empathy (Afghani et al., 2011).

The present study has a few limitations. The reflections of students who visited elderly living alone program were self-reported. Similar to other studies (Leung et al., 2007), our study found it difficult to determine 'real' feedback outcome even by objective assessment. Long-term outcomes are often difficult to obtain. Further research on community service volunteerism before college admission may predict a change in social attitudes. Such an achievement requires proper supervision and guidance.

Through experiencing, students learned to recognize the differences between the living environment of others and their own living environment, view things from a new perspective, communicate with others, and then change themselves. Experiencing also improved doctor-patient communication and increased the student's capacity for empathy, ensuring that students will look forward to their future as medical practitioners.

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Setting a global mindset for future entrepreneurs: the share of bulacan state university as an academic institution

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Abstract

As an academic institution that provides opportunity both for future managers and entrepreneurs and the builders of entrepreneurial foundations as well as molders of competitive skills, this research study aims to presents the share of the College of Business Administration faculty and experience of students on how to develop a global mindset among the students. Global mindset is the ability of someone to influence individuals, groups, organizations, and systems that are unlike him/her (Javidan, 2007). This study covers the graduating business and entrepreneurs students for the academic year 2013-2014. A mixture of qualitative and quantitative technique in data gathering was utilized to determine and assess the perception of the respondents in the development of global mindset. The results revealed that the institution provides the students an adequate avenue to think creatively and responds to ideas quickly which is a psychological factor in setting the minds globally of the students. Also, by allowing a quite number of foreign students to mingle with local students, the study reveals that the institution provide the students an opportunity to learn and observe the actual practices and behavior of people from other countries. As such, this study provides inputs to further develop the curriculum and projects for the programs to strengthen the share of the institution in developing a global mindset to the students.

Keywords: Global, Mindset, Entrepreneurs, Students, Development, Inlfuence

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1 Introduction

More than ever before in history, the effects of globalization are being experienced around the world. The interconnectedness and interdependency of cultures is felt within and between the organizations, cultures, and societies of the world. That's why today's changing global competitive landscape has created a need for managers to develop a global mindset. Whether you are a senior business leader or an Olympic athlete, the key to success is a winning mindset (Smith ,1999). This term, along with the alternative, "positive mental attitude", are, unfortunately, often viewed as meaningless business jargon. However, it is true that battles are won and lost in people's heads long before they are fought. Our thoughts dictate our moods, our emotions, our body language and, ultimately, our ability to perform. Ensuring the way you approach a challenge mentally is correct is the key to success. What most people forget is that thoughts are not random; we can learn to control them to ensure that we always perform with an aura of self-belief. The world's top business leaders have a strong connection with their inner thoughts and train them, as an athlete would train a muscle, to make them work in their favors.

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Business schools and universities are currently facing a number of challenges. Their missions and strategies must change and adapt to reflect changes in the educational and business environments. Over the next decade or so, all businesses must face and deal with a number of interrelated forces: demographics, technology, and sustainability not only the impact on each other, but they are the fundamental drivers of globalization. Indeed, each of these forces interact and influence each other in a complex brew specific to each country, industry, and business. Whether we like it or not, globalization is here to stay; and most likely will even expand its reach and influence. How should higher education prepare students to be prepared in this era of increasingly rapid change?

2. Research objectives

This study aims to determine how the College of Business Administration of Bulacan State University develops a global mindset among its students as future entrepreneurs. Specifically, the study sought to reveal the following objectives.

1. Developed attitudes and social experiences that add to global mindset as perceived by the student-respondents;
2. Importance of attitudes and social experiences that add to global mindset as a future manager as perceived by the student-respondents;
3. Experiences of faculty members that contribute to the development of global mindset among the students.

3. Methodology

This study was conducted in the College of Business Administration of the Bulacan State University, Philippines involving graduating students and selected faculty members. Survey method was utilized to quantitatively describe specific aspect of a given population. (Kraemer, 1991). The survey is used to gather data on the student's perception about global mindset and its importance. An online questionnaire using Google documents was sent to their email if they were unavailable to answer the printed survey questionnaire. Faculty members teaching entrepreneurial subjects to students from different courses expected to contribute in the development of global mindset among the students, were interviewed individually. In some cases, an unscheduled focused group interview were conducted to gather the about the experiences of faculty members that they can share among their students that they believed to be contributory in developing a global mindset.

4. Research instruments

The instruments used in this research were; a printed and online self-constructed survey questionnaire, and a semi-structured interview questions. The self-constructed survey questionnaire was used to gather data related to the factors that add to the development of global mindset as perceived by the student-respondents and its importance as a future manager. This is a multiple choice and likert scale survey questionnaire sent to the student via Google documents or personally during their breaks. The questionnaire was answered in minimum time duration of about 3 to 5 minutes.

The semi-structured interview questions were used during one-on-one interview and focused group discussion with the faculty. This is to gather information on the experiences of the faculty in the different phases of professional career that believe to be contributory of developing a global mindset among the students.

5. Results and discussion

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5.1. Developed attitudes and social experiences that add to global mindset

Factors related to the development of global mindset involves both psychological and social. Psychological factors relates to individual's setting of positive attitude that builds enthusiasm despite presence of differences in culture, belief and practices. This is related to the ability of the mind to set flexibility and adaptability on situation or condition that is different from expected. Social factors are experiences of students within the campus that perceived to be contributory in developing of global thinking. Table 1 reveals that the students generally believe that they were able to think creatively and respond to a new idea quickly, enjoy browsing websites and information about other countries and excited to explore new environment or workplace. Under social factors, most of the student respondent were able to experience to mingle with other people with different foreign and local culture, second was able to observe different people's value system and reasoning based on the teachings and experience of their culture and lastly having an opportunity to meet business people from different places locally and internationally.

Table 1. Developed Attitude and Social Experience that Add to Global Mindset as Perceived by the Students

Psychological assessment factors	F	Rank
Enjoy browsing websites and information about other countries.	64	2
Excited to explore new environment or workplace.	60	3
Think creatively and respond to new ideas quickly.		
Have tolerance to take work under pressure.	74	1
	48	
Social assessment factors		
Were able to mingle with other people with different foreign and local culture.	75	1
Experience ease with starting conversation with a foreign people.	43	
Have a network of people from different discipline and to some extent other countries.	27	
Able to observe different people's value system and reasoning based on the teachings and experience of their culture.	69	2
Have an opportunity to meet business people from different places locally and internationally.	62	3

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The data revealed that on the psychological level, the College of Business Administration were able to provide within the program a sense of awakening of the minds of the students. They were given an opportunity to think creatively and be able to not just simply look into the situation within their reach, but to look into the situation globally, considering the situation around the world. One specific example of which is when students are ask to research on topics such as economics, finance, business opportunities, and even as simple as a corporate name or product name, they would always look for what is it in the news, what is happening around the globe, what are the international laws covering such topics, what is trending in the internet. They show high enthusiasm to explore the internet and view what is outside of what they see daily. In one of their subject in the program, International Business for management students and New Market Development in Entrepreneurship, students were very active in researching and discussing issues on foreign markets, international trade relations, and the ASEAN integration. As a result, there were student researches that focused on topics relative to effects of foreign laws, regulations, and integra-

tions. In line with these global mindsets of the students, the College of Business Administration were able to send interested students to participate in foreign trips in other countries such as Beijing, sponsored by the Confucius Institute; Singapore and USA, coordinated by the Public Employment Service Office, and other Asian countries coordinated by the Office of External Affairs.

5.2. Importance of attitudes and social experiences that add to global mindset

The follow up objective of this study is to determine the level of importance of the above developed attitudes and social experiences of the students in the development of global mindset. This is to set the areas for improvement or strengthening of the attitudes and experiences of the students. Table 2 shows that creative thinking and be able to respond quickly to new ideas is very important attitudes in developing a global mindset. As to social experience, students perceived that it is important to have an opportunity to mingle with other people with different foreign and local culture.

Table 2. Importance of Attitudes and Social Experiences that add to Global Mindset

Psychological assessment factors	F	Verbal interpretation	Rank
Enjoy browsing websites and information about other countries.	3.73	Highly Important	3
Excited to explore new environment or workplace.	3.82	Highly Important	2
Think creatively and respond to new ideas quickly.	3.87	Highly Important	1
Have tolerance to take work under pressure.	3.52	Highly Important	
Social assessment factors			
Were able to mingle with other people with different foreign and local culture.	4	Highly Important	1
Experience ease with starting conversation with a foreign people.	3.46	Moderate Important	3
Have a network of people from different discipline and to some extent other countries.	3.19	Moderate Important	
Able to observe different people's value system and reasoning based on the teachings and experience of their culture.	3.88	Highly Important	2
Have an opportunity to meet business people from different places locally and internationally.	3.44	Moderate Important	

The table shows that students gives high importance to activities that allow them to think creatively and requires them to explore new environment. This is manifested by the number of students who actually join educational field trips, quiz bee competition, debates, students conventions, youth assemblies that involved competition using limited resources and skillful thinking. Table below show that number of students participation in different activities involving creative thinking conducted in other places for lst Semester of 2013.

Table 3. Participation of Bulacan State University to various activity.

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Activity	Number of Student Participant	Venue
International Business Management Conference	45	Manila
Retreat and Team Building Activity	200	Quezon Province
CBA Educational Field Trip	987	Camarines Sur
Go Negosyo	120	World Trade Center Manila
Accounting Quiz Bee	20	Bulacan
Mid Year Accounting Convention	65	Baguio City
Student Business Registration	36	Bulacan
Overseas Training	4	USA, Singapore

Experiences of faculty members that contribute to the development of global mindset

Faculty members share their actual life story of success as an entrepreneur through video presentation supplemented by classroom discussion of life challenges and how they were able to surpass it by thinking differently and innovatively. This involved giving attention to quality of outputs and services that leads to recognition from one place to another, and eventually to a larger market.

Faculty member experiences and opportunity to travel from different countries allows a wider learning of different cultures, tradition and practices related to the conduct of business. This allows them to motivate and inspire students to think globally and encourage them to grab all possible opportunity to travel from different countries as well.

Faculty members keep themselves updated to global issues and trends related to marketing, technologies and business strategies by attending international seminars and symposia, workshop and conferences. Faculty members keep themselves connected to industry related professional organizations and networks to able to gain exchange of ideas and experiences of other successful entrepreneurs.

6. Recommendation

Based on the above findings, the school may strengthen the development of global mindset by promoting activities that encourage creative thinking among students. Establishing trade fairs conducted by students will provide them challenges to think of new, innovative and unique business that is expected to get the buyer's attention.

For social aspects, the College may provide the students a test scenario on how the students will react together with other people from different cultures by inviting foreign students in a social gathering together with business people and allow them to communicate freely and be able to observe and understand different cultures of the guest.

In addition, programs like foreign language communication will help students to develop a global mindset. The Institution may consider offering other languages such as French, Nihonggo, Korean and Spanish. In this case, communicating and socializing with other nations will not be a hindrance for the students to be globally competitive. Other suggested activities that help develop global mindset that can also be implemented in the Bulacan State University College of Business Administration are as follows.

- Cultural Partner Program
- Globalization Seminars
- International Awareness Week
- International Coffee and Tea Hour
- International Education Week

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- Language and International Trade Conference
- Member of International Club
- Study Abroad Fair

To date, the College of Business Administration continues to provide the students an opportunity of internship program to other countries thru participation and membership to international and national networks of business industry. The College of Business Administration also send students delegates to join international youth camp, symposium, workshops and educational field trips to abroad to actually influence and expose them to the global arena where they will be field after graduation.

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Share of structural engineering in curricula of CTU vs. selected European faculties of architecture

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Abstract

Objectives

Comparison of percentual share of Structural Engineering in curricula of Czech Technical University with 27 leading European German (15) and English (12) speaking universities.

Results

Bachelor curricula:

35%	leading British universities, Architectural Engineering combined courses
10-15%	English speaking European universities
15-25%	German speaking European universities

Master curricula:

Up to 5%	majority architectural courses
Up to 45%	universities offering further specialization in Structural Engineering

Conclusions

With 8.33% share in bachelor studies, Structural Engineering subjects at the Faculty of Architecture, Czech Technical University in Prague, seem to be underrepresented in context of European universities, where the share ranges between 10-25%.

Keywords: structural mechanics education, structural mechanics for architects, structural engineering architectural curricula

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1. Introduction

The subject is being researched for the use of Faculty of Architecture at the Czech Technical University in Prague (CTU). In the introductory analysys (Vavruskova, Pospisil, 2013), percentual share of Structural Engineering subjects in curricula at CTU was compared to two leading German speaking universities (TUM Munich, Germany, ETH Zurich, Switzerland) and two leading English speaking universities (University of Bath, United Kingdom, Imperial College London, United Kingdom).

Structural Engineering is an essential subject in Architecture courses in European universities, but its share on curricula varies according to the type of course as well as type of university. There are currently two main types of architectural courses: Architectural Engineering and Architectural Design.

Architectural Engineering is predominantly offered by faculties of Civil Engineering, which put more emphasis on technical subjects. Architectural Design, mostly offered by faculties of Architecture, is more artistically orientated. Following courses were taken into account whilst comparing the amount of Structural Engineering in curricula: Structural Mechanics, Statics, Concrete Structures, Steel Structures, Wooden Structures and Foundations.

For bachelor Architectural Design courses, the study showed relatively high percentage of Structural Engineering subjects in curricula at the German speaking universities (12.5 % - 13.5 %) in comparison with other European universities (4% - 9 %). To find out whether German speaking universities have bigger volume of Structural Engineering in general, following study has been carried out.

10.1. Selection of universities



Fig.1 Map of selected universities

For the comparison with Czech Technical University in Prague, 27 leading European German (15) and English (12) speaking universities have been selected in accordance with rankings listed at the end of this article.

List of the selected universities as shown on the map:

English speaking universities – England, United Kingdom

1. UB University of Bath, England
2. UC University of Cambridge, England
3. WSA Welsh School of Architecture, University of Cardiff, England
4. UL University of Liverpool, England
5. UCL University College of London, England
6. NCL Newcastle University, England
7. NTU University of Nottingham, England
8. SSoA School of Architecture, University of Sheffield, England

English speaking universities – Ireland

9. UCC University College Cork, Ireland
10. UCD University College Dublin, Ireland

English speaking universities – Scotland, United Kingdom

11. UE University of Edinburgh, Scotland
12. UG University of Glasgow, Scotland

German speaking universities – Germany

13. RWTH RWTH Aachen
14. TUB Technical University of Berlin
15. AHS Alanus University, Bonn
16. TUD Technical University of Dresden
17. FH FFM Frankfurt University of Applied Sciences
18. HCU Hafen City University, Hamburg
19. LUH Leibniz University of Hannover
20. TUM Technical University of Munich
21. ABK ABK Stuttgart
22. TUS Technical University of Stuttgart
23. BUW Bauhaus University Weimar

German speaking universities – Austria

24. TUG Technical University of Graz
25. KUL University of Art and Design Linz
26. TUW Technical University of Wien

German speaking universities – Switzerland

27. ETH Technical University of Zurich, Switzerland

University conducting the study – Czech Republic

28. CTU Czech Technical University in Prague, Czech Republic

10.2. Selection of courses

For the purpose of this study, only Architectural Design and Architectural Engineering courses have been selected as in courses with specialization in Landscape, Urban Design etc. amount of Structural Engineering is negligible. However, only a few universities offer Architectural Engineering courses, as seen on the chart bellow.

10.3. ECTS standard

Most of the above listed universities support ECTS (European Credits Transfer and Accumulation System), which has been used as an objective quantity indicator. It represents a standard for comparing the study attainment and performance of students of higher education across the European Union and other

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collaborating European countries. For successfully completed studies ECTS credits are awarded. One academic year corresponds to 60 ECTS credits that are equivalent to 1500-1800 hours of study in all countries. For universities which do not support ECTS, the share of a particular subject in curricula was recalculated to comply with ECTS.

2. Structural engineering as a proportion of curricula

2.1 Bachelor courses:

- **Length of bachelor architectural courses**. Bachelor architectural courses at most universities from our sample take three years. The exceptions, where such courses take four years, include for example Technical University of Stuttgart and Alanus University of Bonn. The Scottish universities, University of Edinburgh and University of Glasgow, also have four-year bachelor studies, but they have one year shorter architectural masters studies. University of Bath has a three-year Architectural Engineering course followed by one-year professional placement.

- **Share of Structural Engineering in bachelor architectural curricula**. Overall share of Structural Engineering in bachelor architectural curricula ranges between 5-42% within our sample.

- **Architectural Design vs. Architectural Engineering courses**. Most architectural courses are offered as Architectural Design. Architectural Engineering courses are offered only at three universities from our sample, The Czech Technical University, University of Bath and University of Glasgow. Interestingly, share of Structural Engineering in bachelor curricula does not differ significantly between Architectural Engineering and Architectural Design courses, typically ranging between 15-35%.

- **Combined courses of Structural Engineering and Architecture**. Two universities from our sample, University of Edinburgh and University College of Dublin, also offer combined courses of Structural Engineering and Architecture. Share of Structural Engineering in curricula of such bachelor courses ranges between 35-39%.

- **German vs. English speaking universities**. In general, Structural Engineering represents higher share of architectural bachelor curricula at German-speaking European universities (Germany, Austria, Switzerland) vs. English-speaking European universities. Such share ranges between 15-25% for the former compared with 10-15% for the latter.

- **Share of Structural Engineering in bachelor architectural curricula vs. ratings of universities**. While, as explained above, the overall share of Structural Engineering in curricula of bachelor architectural courses is generally higher in German-speaking European universities vs. English-speaking European universities, two British universities represent an exception. Architectural bachelor curricula at University of Cambridge and University College in London have 38% and 42% share of Structural Engineering, which is among the highest from our sample. We also note that these two universities belong to the top rated British and European universities.

- **Share of Structural Engineering in bachelor architectural curricula at The Czech Technical University**. Structural Engineering represents only 8% of the bachelor architectural curricula at the Czech Technical University, which is among the lowest within the context of our European sample, where such share typically ranges between 10-25%. This share is for example approximately 80% lower compared to the leading UK universities and 45-67% lower compared to German-speaking universities from our sample.

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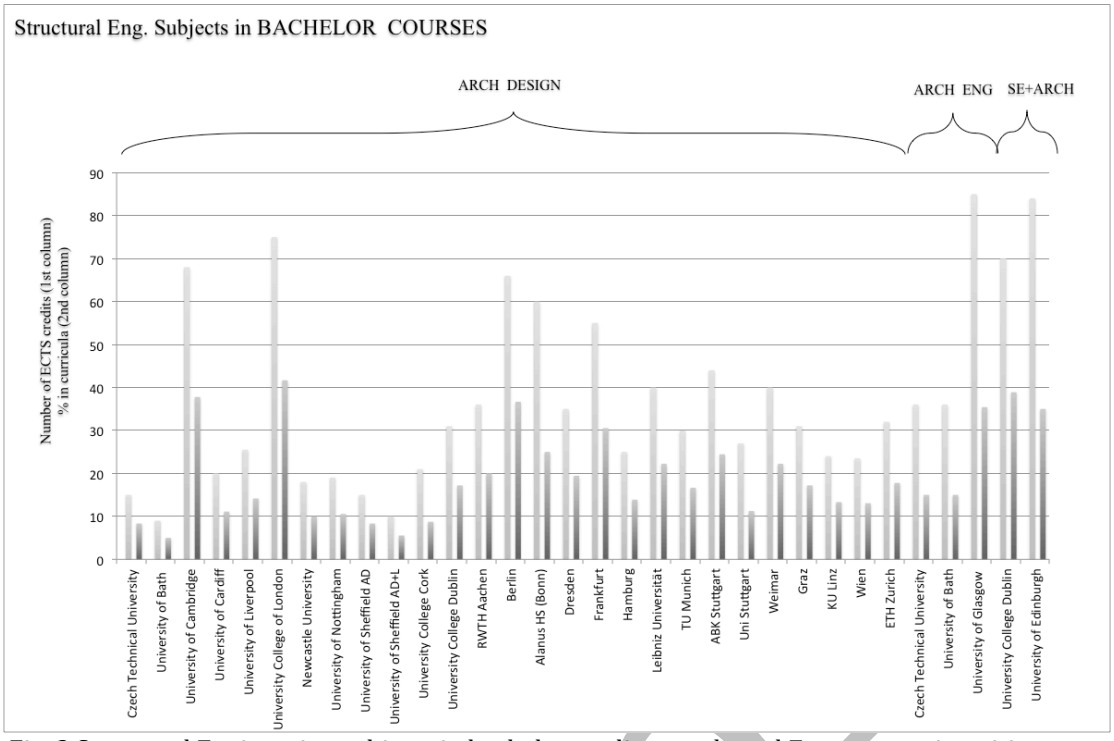


Fig. 2 Structural Engineering subjects in bachelor studies at selected European universities

2.2 Master courses:

- **Length of master architectural courses**. Master architectural courses at most universities from our sample take two years, following three-year (exceptionally four-year) bachelor courses. As mentioned about the two Scottish universities, University of Edinburgh and University of Glasgow, offer four-year bachelor courses followed by one-year master courses. University College of Cork, Ireland, offers bachelor, but no master courses in architecture.

- **Share of Structural Engineering in master architectural curricula**. The share of Structural Engineering on Architectural Design curricula is significantly lower compared to that for bachelor curricula in our sample of universities, usually below 5%. Three German universities, FH Frankfurt, LU Hanover and HCU Hamburg, represent an exception with such share in a range of 12-29%.

- **Architectural Design vs. Architectural Engineering courses**. As mentioned above, Architectural Engineering courses are offered only at three universities from our sample, The Czech Technical University, University of Bath and University of Glasgow. Share of Structural Engineering in Architectural Engineering master curricula ranges between 4-42%.

- **Architectural master courses with specialization on Structural Engineering**. Some universities offer further specialization on Structural Engineering as part of their architectural master courses. These include for example TU Berlin, HCU Hamburg, TU Stuttgart, BU Weimar, KU Linz and TU Vienna. This specialization boosts the share of Structural Engineering on architectural master curricula to 10-45%.

- **Combined courses of Structural Engineering and Architecture**. As mentioned above, two universities from our sample, University of Edinburgh and University of Glasgow, also offer combined courses of Structural Engineering and Architecture. Share of Structural Engineering on curricula of such master courses is around 42%.

- **Masters-only architectural courses**. Some architectural courses are available as master only and they

take four years. These include Architectural Engineering at the University of Bath and Architecture Courses at Sheffield University. Share of Structural Engineering on curricula of such courses ranges between 27-37%.

- **Share of Structural Engineering in architectural master curricula at The Czech Technical University**. Architectural Design master courses at The Czech Technical University have no Structural Engineering in their curricula, similarly to approximately two thirds of universities from our sample. Curricula of the Architectural Engineering master courses provided by the Faculty of Civil Engineering at The Czech Technical University contain approximately 4-5% of Structural Engineering. This share is considerably lower compared to European alternatives such as combined courses of Structural Engineering and Architecture or Architectural Design with specialization on Structural Engineering.

Additional notes:

- There were no specific data on curricula available for master architectural courses at the following universities from our selection: University of Cambridge, University College of Dublin, TU Dresden.

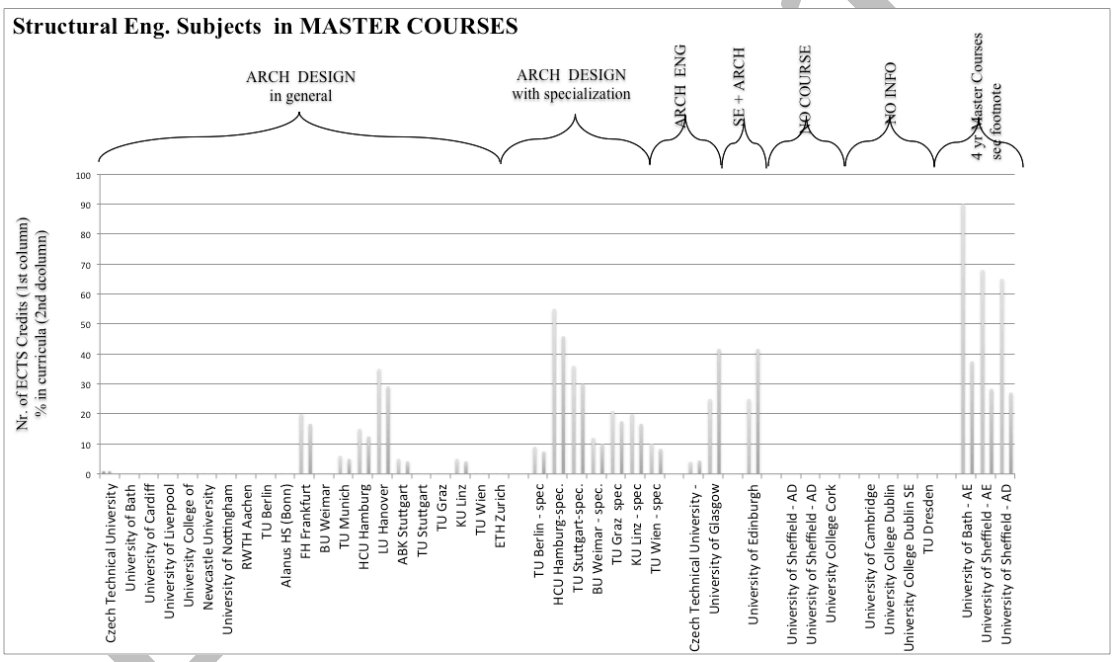


Fig. 3 Structural Engineering subjects in master studies at selected European universities

3. Conclusions

Structural Engineering appears to be an important part of architectural curricula at all European universities, especially for the bachelor courses. That said share of Structural Engineering on architectural curricula varies considerably among the analyzed universities, ranging between 5-42% in bachelor courses and 0-45% in master courses. This among others depends on whether the courses are offered as 'pure' Architectural Design on one hand or Architectural Engineering (possibly Architectural Design with specialization on Structural Engineering) on the other.

German-speaking and the best UK universities tend to have higher than average share of Structural Engineering on their architectural curricula. In bachelor studies, Structural Engineering represents around 35% of curricula at leading British universities and at architectural engineering combined courses. Most English-speaking European universities have 10-15% of Structural Engineering in their curricula. German speaking European universities (Germany, Austria, Switzerland) show overall higher volume of Structural Engineering in their courses, which varies between 15-25%. For majority master architectural courses, Structural Engineering subjects represent up to 5% of curricula. Some universities offer further specialization in Structural Engineering, which boosts share of Structural Engineering subjects in their curricula to 10-45%

Finally, with 8.33% share in bachelor studies, Structural Engineering subjects at the Faculty of Architecture, Czech Technical University in Prague, seem to be underrepresented in context of the above-mentioned European universities, where such share most typically ranges between 10-25%. Share of Structural Engineering on architectural curricula at The Czech Technical University is also low in curricula of the Architectural Engineering bachelors and master courses provided by the Faculty of Civil Engineering in comparison with similar European Architectural Engineering or Architectural Design courses with specialization on Structural Engineering.

We plan to further broaden our sample to non-English or non-German speaking European universities (e.g. Spanish, French, north European universities) as well as to study more detailed content of the courses and their possible interconnections with other technical subjects.

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http://www.topuniversities.com/university-rankings

http://www.timeshighereducation.co.uk/world-university-rankings/

http://ranking.zeit.de/che2014/en/

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CTU Czech Technical University

http://www.fa.cvut.cz/Cz/Studium

http://www.fsv.cvut.cz/student/bakalmag/plany/planba.php

UB University of Bath

http://www.bath.ac.uk/catalogues/2014-2015/ar/uear-anb08.html

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http://www.bath.ac.uk/catalogues/2014-2015/ar/UEAR-ANM08.html

http://www.bath.ac.uk/catalogues/2014-2015/ar/uear-afm03.html

UC University of Cambridge

http://www.arct.cam.ac.uk/courses/architecturecourses/ba-tripos-arb-riba-pt1

http://www.arct.cam.ac.uk/courses/architecturecourses/mphilbhome

WSA Welsh School of Architecture, University of Cardiff

http://coursefinder.cardiff.ac.uk/undergraduate/course/detail/K100.html

http://www.cardiff.ac.uk/archi/BSc_Year1_AR1102.php

UL University of Liverpool

https://www.liv.ac.uk/study/undergraduate/courses/architecture-ba-hons/module-details/

https://www.liv.ac.uk/study/postgraduate/taught/architecture-march/module-details/

UCL University College of London

http://www.bartlett.ucl.ac.uk/architecture/programmes/undergraduate/bsc-architecturehttp://www.bartlett.ucl.ac.uk/architecture/programmes/undergraduate/bsc-architecture

http://www.bartlett.ucl.ac.uk/architecture/programmes/postgraduate/march-architecture

NCL Newcastle University

http://www.ncl.ac.uk/undergraduate/degrees/k100/modules/

http://www.ncl.ac.uk/postgraduate/modules/5843.htm

NTU University of Nottingham

http://www.nottingham.ac.uk/ugstudy/downloads/school-brochure-pdf/architectureandbuiltenv.pdf

http://modulecatalogue.nottingham.ac.uk/Nottingham/asp/FindModule.asp

SSoA School of Architecture, University of Sheffield

https://www.sheffield.ac.uk/prospectus/courseDetails.do?id=K1002015

https://www.sheffield.ac.uk/prospectus/courseDetails.do?id=KK132015

UCC University College Cork

http://www.ucc.ie/calendar/engineering/eng007.html

UCD University College Dublin

https://sisweb.ucd.ie/usis/

UE University of Edinburgh

http://www.drps.ed.ac.uk/14-15/dpt/utsenab.htm

http://www.drps.ed.ac.uk/14-15/dpt/utsenam.htm

UG University of Glasgow

http://www.gla.ac.uk/undergraduate/degrees/civilengineeringwitharchitecture/degreestructure/

RWTH RWTH Aachen

http://arch.rwth-aachen.de/cms/Architektur/Studium/Studiengaenge/~ngb/B_Sc_Architektur/lidx/1

http://arch.rwth-aachen.de/cms/Architektur/Studium/Studiengaenge/~ngc/M_Sc_Architektur/lidx/1/

TUB Technical University of Berlin

https://www.planen-bauen-umwelt.tu-berlin.de/fileadmin/f6/Studieng_nge/Architektur/Arch_B_StuPO_080312.pdf

AHS Alanus University, Bonn

https://www.alanus.edu/eng/studying/study-programmes/downloads/

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http://www.ufg.ac.at/fileadmin/media/zentrale_verwaltung/studienplaene_und_anrechnungen/Studienplaene_aktuell/Architektur-Bachelor-100602-englisch.pdf

TUD Technical University of Dresden

http://tu-dresden.de/die_tu_dresden/fakultaeten/fakultaet_architektur/studium/studienfuehrer/sf_ss_14

FH FFM Frankfurt University of Applied Sciences

https://www.fh-frankfurt.de/fileadmin/de/Fachbereiche/FB1/Modulhandbuch_B_A__Architektur_12_2012.pdf

https://www.fh-frankfurt.de/fachbereiche/fb1/masterstudiengaenge/architektur-master/moduluebersicht.html

HCU Hafen City University Hamburg

https://www.hcu-hamburg.de/fileadmin/documents/Studium/Studienangebote/Architektur/Studieninfos_2012/HCU_Vorlesungsverzeichnis_SoSe14.pdf

LUH Leibniz University of Hannover

http://www.uni-hannover.de/imperia/md/content/webredaktion/universitaet/publikationen/verkuend_blatt/ordnungen/fk-arlan/f_archit_bpo2n.pdf

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TUM Technical University of Munich

http://www.ar.tum.de/fileadmin/w00bfl/www/05_Studiengaenge/01_Bachelor/01_Bachelor_of_Arts/01_B.A._Architektur/06_Pruefungen/2012-83-Aenderungssatzung-BA-Architektur-01-10-2012.pdf

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ABK ABK Stuttgart

http://www.architektur.abk-stuttgart.de/wp-content/uploads/2009/03/TABELLE_Studienplan-BA-04.08.131.pdf

http://www.architektur.abk-stuttgart.de/wp-content/uploads/2009/03/TABELLE_-Studienplan-MA-04.08.13.pdf

TUS Technical University of Stuttgart

http://icd.uni-stuttgart.de/public/ITECH/ITECH_Information_Brochure.pdf

http://icd.uni-stuttgart.de/public/ITECH/ITECH_Information_Brochure.pdf

http://www.iusd.uni-stuttgart.de/index.php?page_id=35

BUW Bauhaus University Weimar

http://www.uni-weimar.de/fileadmin/user/uni/universitaetsleitung/kanzler/mdu_akad/11/14_2011.pdf

http://www.uni-weimar.de/fileadmin/user/uni/universitaetsleitung/kanzler/mdu_akad/13/15_2013.pdf

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TUG Technical University of Graz

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http://mibla.tugraz.at/12_13/Stk_16g/443_MA_Architektur_2013.pdf

KUL University of Art and Design Linz

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TUW Technical University of Wien

https://tiss.tuwien.ac.at/curriculum/public/curriculumSemester.xhtml?le=false&windowId=ff2&key=37047&semester=YEAR

https://tiss.tuwien.ac.at/curriculum/public/curriculum.xhtml?windowId=ff2&key=41934&semester=YEAR

ETH Technical University of Zurich

https://www.ethz.ch/content/dam/ethz/main/education/bachelor/studiengaenge/files/Study-programmes-ETH-Zurich.pdf

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Simulation in the elimination of conceptual problems related to the issue of nerve conduction

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Abstract

The issue of nervous system, one of the subjects of biology, is difficult and abstract to understand, and is inherently capable of causing misconceptions. Conducting a class allocated to the subject matter by employing effective teaching methods and techniques is, therefore, very important for fully understanding the subject and for eliminating such conceptual mistakes. Information and communication technologies are frequently used in biology education in order to form effective learning environments. In this way, problems which cannot be resolved through traditional methods of teaching can be overcome. This research aims at determining the effects of teaching through simulation- which has been performed in relation to the topic of nerve conduction- on concept teaching and on eliminating the misconceptions. The study group for the research was composed of 25 third year students attending the Biology Education Department of Hacettepe University Faculty of Education. In consequence, it was observed that the misconceptions carried by the students were removed thanks to classes taught through the simulation.

Keywords: Nervous system; teaching through simulation; misconception

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1. Introduction

The role played by qualified teachers is extremely important in creating the manpower necessitated by the epoch and in raising the quality in education. For a developed society, teachers need to have adequate technological, pedagogical and field knowledge, and to follow technological developments. In terms of teachers' efficacy, Shulman (1987) divided the knowledge that teachers should carry into seven categories; namely, (a) field knowledge, (b) pedagogical field knowledge, (c) knowledge of curriculum including materials and the programme, (d) pedagogical knowledge including knowledge of classroom management and organisation, (e) knowledge of learners and their characteristics, (f) knowledge of the educational environment and the circumstance of it, (g) knowledge of educational objectives, targets and values and of the philosophical and historical foundations of them. The first two of the categories are evaluated as the efficacies of the special field. According to Shulman, field knowledge is composed of teachers' knowledge of the concepts and phenomena in their field; and pedagogical field knowledge consists of the ways of representing and formulating to make a subject comprehensible to others. For effective teaching, teachers must have sufficient field knowledge and be able to transfer the knowledge into learners efficiently. Hence, in order to be able to perform an effective biology teaching, firm knowledge of biology and skills to effectively present the topics of biology are necessary.

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Information technologies are expected to be integrated into the process by both teachers and learners in the teaching and learning of biology. Students cannot learn the topics deeply and meaningfully without technological devices, especially in the case of complex science topics. Besides, technological devices can help learners by establishing the models in their minds with animations (Ainsworth and VanLabeke, 2004; Boucheix and Schneider, 2009; Mayer and Moreno, 2002). Multimedia animations as a technological device bring the microscopic concepts and topics into the macroscopic level, and can provide learners with better learning environments; and thus they can raise the quality of learning (Dalacosta, Kamariotaki-Paparrigopoulou, Palyvos and Spyrellis, 2009; Özmen, 2011).

Due to the general content of the topics, terms of Latin origin, and the complex associations between topics; many topics in the high school biology curriculum are considered to be difficult by students. The topic of Nervous System is also one of the topics difficult to comprehend, and by its nature, it causes misconceptions because of the abstract concepts available (Lazarowits and Penso, 1992; Bahar, Johnstone and Hansell, 1999; Tekkaya, Çapa and Yılmaz, 2000; Tekkaya, Özkan and Sungur, 2001). For this reason, researching into whether or not prospective teachers have any misconceptions in the topics of nervous system difficult for students to understand, and eliminating them if they have any are very important in raising the quality of biology education conducted in schools.

This research aims at determining the effects of teaching through simulations- which has been performed in relation to the topic of nervous system- on concept teaching and on eliminating the misconceptions.

2. Method

2.1. Study group

The study group was composed of 25 third year students attending the Biology Education Department of Hacettepe University Faculty of Education.

2.2. Research model

This research was designed in the single group pre-test – post-test model, an experimental research model.

2.3. Data collection tool

Nervous system

- The test on Nervous System contained questions requiring written answers and drawings for the purposes of uncovering the prospective teachers' knowledge in relation to the target behaviours specified in the curriculum for high school 3rd grade biology course.

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Audio-visual Simulation

- Original animation was produced by Physio Viva Educational Animations Company. Having the permissions necessary, the audio-visual simulation was adapted by the researchers and in this adaptation process the Adobe After Effects software was used.
- The content of the simulation was prepared in accordance with the target behaviours specified in the curriculum for high school 3rd grade biology course.
- In the part about impulse transfer, such topics as the structure of pre-synaptic and post-synaptic neurons and the procedure of impulse transfer between two neurons were included.

2.4. Analysis

The answers given by prospective teachers to the questions concerning the nervous system were grouped according to the similarities and differences, and then the frequencies and percentages were calculated.

3. Findings

3.1. The answers given by prospective teachers to the questions concerning impulse transfer

For the questions on nervous system, in relation to impulse transfer, the prospective teachers were asked to draw a picture of a nerve cell and to describe the changes occuring in the nerve cell by using the drawing.

The findings obtained from the prospective teachers before and after teaching through simulations in relation to impulse transfer:

According to the pre-test results, 5 (20%) of the prospective teachers were able to represent the structures of a nerve cell via drawings correctly. 10 (40%) prospective teachers were able to draw the picture of a nerve cell only without demonstrating the structures. It was also found that 10 (40%) of the prospective teachers represented the structures of the nerve cell incorrectly.

The most frequent misconception was the confusion of the terms axone and dendrite. One of the participants (4%) stated axone as synapse.

Another misconception was the direction of the transfer. Only 5 (20%) of the prospective teachers mentioned the direction of the transfer; yet 4 (16%) of them were found to have misconception in this matter (by describing the direction of transfer as from the axone into the dendrite).

Only 2 (8%) talked of the change of electrical load; and none of the participants were able to answer the questions fully.

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According to the the post-test results, 14 (56%) of the prospective teachers were able to represent the structures of a nerve cell correctly on a figure.

2 (8%) of the participants drew a picture of a nerve cell without demonstrating the structures.

1 (4%) of them confused the terms axone and dendrite.

12 (48) of them who talked of the direction of transfer were able to state it correctly.

6 (24%) talked of the change of electrical load. Only 6 (24%) of the students were able to answer the question fully.

3.2. The answers given by prospective teachers to the questions concerning the concept of synapse

The prospective teachers were asked to explain the concept of 'synapse'.

Synapse is the area where a neuron transfers the impulse into the axone, dendrite, soma, muscle or soma, muscle or gland of another neuron (Campbell, 2013).

According to the pre-test results:

6 (24%) of the prospective teachers did not give an explanation about the concept. 16 (64%) gave insufficient explanations by saying 'it is the space between the axone and the dendrite; and 2 (8%) were found to have misconceptions. One of those who had misconceptions described it as "a concept occurring with the passing of an impulse from the axone into the dendrite or from the dendrite into the axone" while the other described it as "the point of junction of the dendrites".

The number of those who explained the concept correctly was only 1 (4%).

According to the pre-test results;

2 (8%) of the prospective teachers did not give an explanation on the concept. 7 (28%) of them gave insufficient explanations by saying "it is the space between the axone and the dendrite".

The number of those who explained the concept correctly was 16 (64%).

3.3. The answers given by prospective teachers to the questions concerning the concept of neurotransmitter substance

The prospective teachers were asked to explain the concept of 'neurotransmitter substance'.

Neurotransmitter substances play a role in transferring the impulse. They are chemical substances, and they enable an impulse to pass from a neuron into another or into the effector organ.

According to the pre-test results:

15 (60%) of the prospective teachers did not give an explanation on the concept. 7 (28%) used the statement "chemical substance enabling transfer from the axone into the dendrite". 1 (4%) used the statement "an intracellular substance". 2 (8%) were found to have misconceptions. "ıt is the substance placed in the dendrite side of the neuron cell", "carrier substance".

According to the post-test results:

1 (4%) of the prospective teachers did not give an explanation about the concept. The number of those who explained the concept correctly was 24 (96%).

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4. Conclusion and recommendations

It was found through this research that insufficiency of knowledge and misconceptions were available with regard to nerve impulse transfer. The misconceptions and insufficiency of knowledge were in parallel to the findings obtained in research conducted by Özsevgeç (2007) with prospective biology teachers for the unit "Controller and Organizer Systems". The research found that the insufficiencies and misconceptions were reduced to a certain extent with classes taught through simulations.

It is pointed out by both teachers and students that the nervous system is a topic difficult to learn. The fact that the concepts of the topic are abstract and that biological events are at the microscopic level can lead to learning problems. In order for meaningful learning to occur, teaching techniques which do not direct students into memorization and which make them active should be preferred by teachers. Animations will carry the microscopic concepts and topics into the macroscopic level and thus will be able to raise the quality of learning. Curricula and course books must guide teachers in techniques of teaching through animations. Additionally, the topic of systems has concentrated content. The parts related to real life must be emphasised and the content must be made lighter, and re-organised by revising the time, and the teaching techniques.

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Social media usage by open education faculties: Atatürk university case

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Abstract

Social media, which provide to sharing of resources irrespective of physical space and time in terms of individual and institutional practices, has been important assistant element. The universities ,which include tuition activity among essential functions, whack up course contents and information with students using social media. Especially, universities which include open education faculty defined as distance education, thanks to social media examine and evaluate student without attendance.

Keywords: Social Media, Open education Faculty

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Preamble

The information and communication technologies, which had substantially improved after the 90's, had introduced various innovations and improvements from the coding of the information to the delivery of it to the receivers. Especially convergence, which takes place at the communications literature as the meshing of data processing systems, and the digitalization that enable the production, delivery and storage of such data, renders employ the delivery of the picture and sound to everyone, without any need for time and space, at those days that information had became instantaneous.

Convergence of the TV and radio channels and the newspapers with digital and telecommunication technologies, open the way for new services and products that will be presented on digital communication media; such as Internet (Yıldırım,233:2010). Especially as a result of the Internet the, the social media, which is an important corner-stone at the phase of transition from one-way information sharing to two-way and simultaneous information sharing, is becoming one of the most important platforms of forming new life-forms for the new generations; and the new generations are meeting their personal and social needs; such as socialization, entertainment, and even education, via the social media.

In addition to its multimedia features, the getting easier of it had entrenched the place of the social media within the daily living practices; and the education institutions, which may not be indifferent to such developments, had go into the effort of using the social media with an efficient and effective manner.

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The existence of the universities, especially the ones that have open education faculties within their structures, at the social media for the purposes of educational activities, and their effective usage of this communication environment had brought with the result of performing the remote education course contents and student evaluation transactions via social media. Our work, which places the Open Education Faculties to the center, studies the relation between the open education faculties and the social media by using the method of "content analysis", in the sense of revealing the social media, in which the picture and sound contents are paid importance, and revealing for which purposes had the social media been used during the education periods of the open education faculties.

1. Conceptual framework

This work, which studies the usage of the social media by the open education faculties, is in need of a conceptual framework in order to discuss the topic in detail. With the purpose to specify this effect, subjects like "social media" and "open education faculties" will be explained conceptually by the means of literature review.

Following the explaining of the concepts, the open education faculty that takes place at the focus point of the work, will be analyzed by using the content analysis method in terms of the sample of usage of the social media by the Ataturk University.

1.1. Open education faculty

Open Education is a sort of a remote education system which had been opened for various departments first in Anadolu University and then in Ataturk and Istanbul Universities, for the ones who could not attain a definite grade at the annual university entrance exams for formal training, or for the ones who may not attend the regular courses at the university.

Those faculties, which had been constituted with the attempts of the Anadolu University first, are now presenting services with various departments, especially at social sciences, firstly in Ataturk and then in Istanbul Universities, parallel with the increase in he recent years, at the number of the persons who desire to attend a higher education program in Turkey.

The remote education system, which had became a field of study in Turkey since from the 1960's, had actively came into service at 1982 as a result of various reasons. *"The remote education attempts in Turkey between the 1960's and 1980', could not be transformed into effective and continuous practices as a result of the undetermined and unfounded attitudes of the governments"* (Özer,4:1989).

As a result of such unfavorable situations and the disbelief of the public towards the remote education the activation of such faculties had always been delayed till 1981, in which the 2547 numbered law on the universities had taken effect and the remote education had taken a place in the public documents.

Thereafter the necessary steps had started to be taken for the institutionalization of the open education faculties.

"With the 2809 numbered law, the Open Education Faculty opened by Anadolu University, had been given the task to provide remote education all over the country, with a central manner" (Özer,5:1989). At the beginning the number of the students enrolled to the Anadolu University Open Education Faculty was 30.000;

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and this number had today reached to 650.000, which makes the faculty one of the most important remote education centers all over the world (Curabay,Demiray,97:2003).

The enormous increase at the number of the students and the changes at the conceptualization of education in Turkey had emerged the need for new open education faculties, and after the Anadolu University, the second open education faculty had been opened in Ataturk University in order to close the gap.

The preregistrations are made online at the open education faculties, and the courses are followed by the students by the passwords given to them by the affiliated university or by the publications made at definite hours of the day by public broadcasting channels.

In addition, the course books prepared by the affiliated universities are the resources that the students may procure after they complete necessary procedures for enrollment to the university, both the increase at the number of the students at the recent years and the increase of the place of the social media in the daily life, had made the social media an important complementary element in the sense of the following of the lectures and the evaluating of the students.

1.2 Social media

The developments at the information and the technology do shape the life of the individuals' routine life forms, especially by making the Internet users gain new attitudes and behaviors. Especially the development of the technology as web 2,0 is the main reason for such a development at the social media. The besiege of the individual starts right at this moment.

As the Web 2,0 had been presented to the service of the users a transition from one-way information sharing to two-way and simultaneous information sharing had taken place, and this age had been named as "The Second Media Age" (Poster, 1995). As a matter of fact the concepts of "Web 2.0" and "Social Media" are generally used instead of each other. It would not be appropriate to argue that such a usage is completely wrong, however those two concepts do not completely mean the same thing. "*Web 2.0 is mostly defined as the online applications, and the social media is defined as the social aspects of such applications"* (Koçak,29:2012). Parallel with the technological shift from web 10 to web 2.0, there took place some substantial and important changes at the social aspects of such technological shift applications.

Web 2,0 is accepted to be the beginning of the social media. Today, by the means of the blogs, labeling, synchronize contents, as a result of easy publication of the content, and with the freedom to share and making comments to the content (multidimensional communication) the individuals are in a close relation with the social media at any time of the day.

"Social media is a humanistic communication means which the basis of is sharing and discussing without any limitations by the time or the space (Vural ve Bat, 2010: 3351). The two-way communication, the passing away of the time and the space, and the individuals' enjoying those, had opened the door to use the social media for various purposes.

The social media had first appeared at the beginnings of 90's, with the software named mIRC, easing the chatting of the individuals between each other (http://sosyaling.com). mIRC had been subject to a deep ,nterest, and the beginnings of the 90's had been entered in the history of Internet as "the era of mIRC". The mIRC era was the era at which the people had first encountered with the communicational dimensions of the Internet, and also at which the seeds of mistrust and insensitivity had been sowed for the first time. By the end of the 90's the social media had appeared in front of the people with a different trend; the trend of dictionaries and blogs. With this trend the social media had proven that besides establishing communication it may also be used as a source of information.

"Social media is the aggregate of the web services which receives most of its contents from its users and which collects contents from other web-sites" (Koçak,30:2012).The social media, consisting of various positive and adverse features intended for the purpose of use, consists of various threats and convenience, not

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for the provider but for the receiver, especially in the sense of education and informing and the two-way using of the social media by the provider and the receiver.

2. Method

2.1. Purpose and scope

The work intends to introduce the ways of usage of the social media by the open education faculties, which use the social media as an effective activity field in terms of education, and how much active are they at the social media, with reference to the communication activities of Erzurum Ataturk University Open Education Faculty's official Facebook Page (ATA-AÖF).

With that purpose, the wok includes the Ataturk University Open Education Faculty and it has a particular importance in the sense of identifying the perspective of the faculty about the social media, its purposes to use the social media, and its frequency of using the social media.

2.2. Method and limitations

With the purpose to set forth the necessary information for this work, we first applied to the literature review method and formed the conceptual framework of the work. At the research and assessment phases of the work, the content analysis method had been used in order to attain the necessary systematic and objective information. *"Content analysis is a scientific research method being used in order to make meaningful and valid inferences for the texts and the context they are used at"* (Krippendorff 2004: 18). Within that scope, the content analysis method is being used at a variety of communication means, including but not limited to the television and radio shows, posters and banners, personal conversations, and the messages of the advertisements (Gürel,Alem,2010:336).

The concept of "social media" that had been handled within the scope of this work, has been limited with Facebook, because of its including many participation areas of different types and because of the intention to prevent the possible mistakes that may take place as a result of the broadness of the research field. As a matter of fact Facebook is the most commonly used and popular social media platform, with the highest number of members; and the possibilities it offer meets the concept "social media" at an adequate level. The conceptual framework of the work has been limited with the concepts "open education faculty" and "social media"; and the research and assessment parts, in which the content analysis method had been used, had been limited with the official Facebook page of Ataturk University Open Education Faculty (ATA-AÖF). Another limitation has been applied in the sense of the period of research. For the purposes of the work the Facebook page of Ataturk University Open Education Faculty (ATA-AÖF) had been examined for a period of one month, which is between the dates of July 19th and August 19th of 2014.

Assessment and result

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The open education faculties, in which no physical attendance is necessary, just like the faculties providing formal education, apply to communication measures in order to get institutionalized and to increase their rate of preferability. The social media, enabling the improvement of the personal and institutional relations by the means of the interactive communication opportunities it provide, is an effective communication means that the open education faculties use in order to attain their institutional targets and goals. The social media, differentiating from the conventional communication means in the sense of instant sharing the necessary information without any need for time and space, creates a process, with the participation of all parties that would bring the efficiency and effectiveness of the communication among the organization and its target groups to the highest level. Within the scope of that work, intending to set forth the usage means of the social media by the open education faculties, researches had been performed on the Facebook page of Ataturk University Open Education Faculty ATA-AÖF. Accordingly, before all, researches had been made on the statistical data of the official Facebook page of ATA-AÖF with the purpose to see at what point of its communication activities does the Ataturk University Open Education Faculty places the social media, and to better comprehend its usage activities and forms. Please find below, at Chart – 1, the statistical information regarding the Facebook page of the Ataturk University Open Education Faculty

Statistics of the Facebook Page	
Date of Establishment	2013
Likes	9.664
Most interaction from the city of	İstanbul
Age Range of the persons who liked the page	18-24
Average number of the users talking about the page	124

Chart 1: Statistical Data on the official Facebook page of ATA-AÖF (http://facebook.com) (Access: July 19th, 2014)

The statistical information about the official Facebook page of ATA-AÖF provide important and updated information regarding the communication activities of the Open Education Faculty at the social media. The faculty, which had initiated its educational activities in accordance with the 14.04.2010 dated decision by the Board of Ministers (http://ataaof.edu.tr), just after a little time after its establishment had taken important steps in the sense of institutionalization. The faculty, conducting institutional communication activities at various social media, had opened its Facebook account in 2013, which indicates that it is an organization that is well aware of the power of the social media. The faculty, giving lectures at 20 different programs, namely 4 license, 15 associate, and 1 license completion (http://ataaof.edu), is getting bigger and bigger each and everyday with its students above 20.000. Today, the number of the likes at the official Facebook page had reached to 9.664, almost half the number of the Faculty's students, indicates that the Faculty had used an effective social media communication strategy. The amount of the users talking about the page, which is 124, is not quite a big amount, but it may not be considered as low as it is considered that the page had been established not so long ago. The age of the users who liked the page is between 187 and 24, and this indicates that the page is being followed by the students. One of the features of the open education faculties is to have students living in different cities. In that sense Istanbul is the city that the utmost interaction takes place on the page, and this shows the demographic structure of the Faculty's students. We can also say that the prominence of Istanbul is about the high population of the city.

Another point that we focused on within the scope of the work is the applications at the official Facebook page of the Faculty. The applications at the page provide particularly important data regarding the Faculty's means of usage of the social media and its purposes to use the social media. Please find below, at Chart – 2, the applications at the official Facebook page of the Faculty and their contents.

Page'a Applications	
Application	**Content**
Timeline	General Shares
About	About, Mission, Vision, General Information
More	Page Rules, Followers, Photos, Activities, Videos
Visitor Page	General Links (about us, management, contact, FAQ , announcements). I want to be student, I am a student Our Programs, LMS-OBS-GİS, Student Support Examination System, Academic Calendar
Social Media	Main Page, About Us, Search, Help, Contact Facebook, Youtube, Twitter, Google+

Chart - 2: ATA-AÖF Official Facebook page – applications and contents (http://facebook.com) (Access: July 19th, 2014)

The application titled "Timeline", which is one of the applications at the official Facebook page of the Faculty, is an application that Facebook provides to all its users and that provide access to contents shared from the date the page is opened to the actual date. By the means of this application it becomes easier for the students to follow the contents shared at the page of the Faculty, and make it possible to reach the past contents.

The application at the page, titled "About", provides information to the users regarding the institutional identity of the Faculty. This application, which includes orienting links, the vision and the mission regarding the accounts at other social media platforms, with the general information regarding the Faculty and the page, and which focuses on organizational identity and activities, becomes prominent at the point of institutional image constructed with effective communication strategies. The controlling of the information by the Faculty about itself, and the access of the page's users to the information regarding the faculty by the means of the primary source is a particularly important communication strategy. As a matter of fact the institutional information is an subject that the target groups evaluate by using rational criteria. Establishing controlled and orienting information regarding a subject is particularly important in the sense of influencing the visitors.

Another application, which draws the attention, is the application named "More". The "Page Rules" function that takes place in the application content, consists of the rules that the users shall comply with during their visit to the page. It is so normal to expect the Open Education Faculty, which is a public organization, to comply with the public rules at the social media application areas. The "Likes" function at the application includes statistical information regarding the users those liked the page. This function, that enables the users to access to the information regarding the page, provides the opportunity to measure the population in the page.

The "video" and "photograph" functions are commonly used in the sense of the continuing of the education activities, by presenting visual and audio supportive materials and education programs to the students. At the page of the Faculty, generally the videos of the education programs and the images used for the announcing of such programs may be found.

The "visitor Page" and "Social Media" applications, specially formed for the page, indicates that the Faculty conducts effective and comprehensive communication activities. The collecting of all the information tak-

ing place at the Web Page of the Faculty under a simple application, gives the students the opportunity to make their transactions by using the social media, without entering the web page. The links at the application link the user to the website. Those links include a wide spectrum, including but not limited to the student affairs, exams, academic calendar, contact, Faculty's Programs, and director – lecturer – student information systems.

By the function "I want to be a student" the new students are given the opportunity to obtain information regarding the faculty and the enrollment procedures. To state briefly, this application, which may be considered as a miniature of the webpage, enables a comprehensive and multidimensional information transfer, and gives the students to perform all their transactions by using their Facebook accounts, and this increases the attention and participation level against the page. Creating a multifunctional communication environment, which can respond to all of the expectations of the students, would positively effect the image of the Faculty on its potential target group.

The "Social Media" application includes the links that route the users to the accounts of the Faculty at other social media platforms. In addition to the contact, information, and help links, with the search link routing the user to Google Search Engine and with the links for the accounts of the Faculty at Facebook, Twitter, Youtube and Google+, the students are giving the opportunity to make use the other communication channels easily. Thus, all the communication channels of the Faculty transfers information to the target groups with a synchronized manner.

With the purpose to make the usage means and the effectiveness of the official Facebook page of the Faculty more comprehensible, it is necessary to examine the contents of the shares at the page. As a matter of fact, in this environment in which relations depending on sharing are constructed, the contents shared clearly set forth the usage means and usage purposes of the users. Within this scope, please find below, at Chart – 3, the data regarding the surveys conducted on the contents of the shares at the page of the Faculty's page.

Content Distribution			
Content		**F**	**%**
Announcement		11	68,75
Celebration		1	6,25
Training Video		4	25
	TOTAL	16	100

Chart – 3: Content distribution of the Shares (http://facebook.com) (Access: July 19th, 2014)

The sharing contents examined under the category titles of Announcements, Celebrations, and Training Video, have been categorized with regard to the common meanings they include. The number of the shares during the course of the research includes an effectiveness level that may be considered as normal. Within the one month period, during which the research had been conducted on the page of the Faculty, it had been observed that 16 shares had been made on the page, which 11 (68,75%) of was for announcement, 4 (25%) of was for training video, and 1 (6,25%) of was for Celebration purposes. The widely using of the Announcements, which is one of the communication methods that the public organizations most commonly use, at the shares on the page of the Faculty, sets forth the similarity of the communication strategies maintained at the conventional and social media areas. Furthermore, a training a video, including the course contents and the lectures, had been shared at the page at least once a week. During the course of the research 29th, 30th, 31st, and 32nd programs had been shared. The celebration shared for the Ramadan Feast had been taken into assessment within the scope of the research.

Facebook provides the necessary environment and the hardware necessary for embodying the organizational communication strategies on the basis of a two-way communication. Functions; such as the likes, the comments, and the sharing, enables the achieving of feedback. Please find below, at Chart – 4, the data, which may set forth the effectiveness of such functions.

Distribution of comments, likes, and shares

Content		Comment		Likes		Shares	
		F	%	F	%	F	%
Announcement		178	79,5	160	55,9	3	60
Celebration		13	5,8	112	39,2	-	-
Training Video		33	14,7	14	4,9	2	40
	TOTAL	224	100	286	100	5	100

Chart - 4: Distribution of the comments, likes, and shares for the shared contents (http://facebook.com) (Access: July 19th, 2014)

The basic feature of the social media that distinguishes it from the conventional communication means and media, is the continuance of the communication process with an interactive manner, by the participation of the parties. The feedback functions at Facebook forms communication channels that enable the effective operation of the interactive communication process. Within that scope, the comments', likes', and sharings' distributions of the shared contents gives us a clue about how the feedback process works. The content that ensure the maximal interaction about commenting is announcements. In total 224 comments had been made by the users, which 178 (79,5%) of was for announcement, 33 (14,7%) of was for training videos, and 13 (5,8%) of was for celebration purposes. Most of the comments are consisting of the questions that are not really much related with the content. When the number of the likes are examined, it is observed that the announcement contents prevail. The sharings had been liked for 286 times in total, which 160 (55,9%) was for announcement, 112 (39,2%) of was for celebration, and 14 (4,9%) of was for training videos. One important point here is that, the celebration message, which had been shared for once, had been liked the most. However, it is not surprising that the sharing about the Ramadan Feast, which is about a communal sensibility, had been liked at high numbers. When the number of the sharings are examined, it is observed that the announcement content is prominent in that category. It had been noted that the shared contents had been shared by the users at their pages for 6 times. There are 6 contents that had not been shared, which 3 (60%) of was for announcement, and 2 (40%) of was for training video purposes. The celebration content had not been shared by the users. As the comment, like, and sharing numbers are examined, it can be assumed that the interaction process is at a normal level, and the interaction may increase at the following processes. The status of the increase at the data achieved supports this comment.

One of the main features of the interactive communication is the return to the source that feedback is provided to, and thus the birth of the interaction as a result of cyclicality. At the examination made within that scope we handled the responding situation of the comments to the shared contents by the Faculty's page. Thus, the responding of the comment contents is an issue that shall be handled within the scope of informing. Please find below, at Chart – 5, the data regarding the research.

Distribution of Responding the Comments						
Content	Unresponded Comment		Responded Comment		TOTAL	
	f	%	f	%	f	%
Announcement	24	14,5	154	85,5	178	100
Celebration	4	30,8	9	69,2	13	100
Training Video	7	21,2	26	78,8	33	100
					224	100

Chart - 5: The distribution of the comments made to the sharings (http://facebook.com) (Access: July 19th, 2014)

When the responding distributions of the comments to the sharings at the page of the Faculty, which the total number of is 224, it has been observed that 189 (84,5%) of them was responded by the page, and 35 (15,5%) of them had not been responded. In general, the comments are about the educational issues of the users. The 84,5% of the comments had been responded by the page, which indicates that the Faculty is using the social media quite effectively in the sense of an interactive process. It had been observed that the responses to the comments are sometimes official and sometimes sincere, and this is the indicator of a

balanced communication strategy. As the shared contents are examined it is observed that 178 comments were made in total and 154 (85,5%) of them had been responded by the page, and 24 (14,5&) of them had not been responded by the page. In total 13 comments were made to the celebration content, and 9 (69,2%) of them had been responded and 4 (30,8%) of them had not been responded. In total 33 comments were made to the training video, and 26 (78,8%) of them had been responded and 7 (21,2%) of them had not been responded.

As a result, it has been identified that the Ataturk University Open Education Faculty, examined within the scope of the study, has been using the social media for announcement, informing, training, and congratulation purposes. Announcements and notifications are the methods that the public organizations commonly use at communication activities. As a matter of fact, at the Faculty's page, in which the organizational communication strategies, considered within the scope of the public relations, are being practices, there took place the announcements regarding the issues that may interest the students, training videos that give the students the opportunity to participate in the training period, the notification system that enable the responding of questions, and the celebration message that is considered within the scope of establishing a positive image. The Faculty continues its organizational image and its communication strategies via social media on one hand, and enables the easy access of the students to the course contents by providing the lectures on the electronic media. At that point, it becomes possible for the students of the Open Education Faculty to take part in the process without becoming distanced from the education process. The students get answers to most of their questions, and this stops the information pollution. When the findings achieved from the Faculty's usage of the Facebook, it is observed that the social media accounts provide a plenty of advantages to the students, and assist them to have an effective education period.

The applications at the Faculty's page, in addition to their contribution to transmit the institutional identity to the target group, they also assumes a role to strengthen the bonds among the students and the Faculty. With the Visitor Page and the social media applications formed by the Faculty a multi-media environment had been formed and functions that enable easy access to the contents taking place at the website had been presented. This improves the preference rate of the social media, and enable the users to access to the required satisfaction.

Furthermore, the social media application formed by the Faculty, which continues its existence at all the popular social media platforms, in order to improve its recognition and usage level, enables the users to easily access to the other social media platforms. Thus the necessary coordination among all the communication activities will be enabled.

When the number of the sharings during the course of the research is considered, it had been observed that the usage frequency was neither so high, nor at low levels. At that point we can argue that the shares of the Faculty at the social media are at a normal frequency. In addition, when the rates of the comments, likes, and the sharings are examined it had been identified that the interaction effectiveness was not so high. When the numbers of the likes, comments, visits, talks, and sharings are compared with the number of the likes of the page, it had been observed that their number is quite low. However, despite the Faculty had been recently established, its efforts to actively use the social media indicates that it will use the social media more effectively in the future. In addition, the activities of the Faculty at all other popular social media platforms indicates that the Faculty had placed the social media at an important point among the communication processes.

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Strategic practices of public diplomacy policies in educational field and Turkey's potential for cultural diplomacy

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Abstract

Public Diplomacy has become a primarily preferred strategic factor in the new international system in which strategic value of communication has grown, the concept of public diplomacy has become prominent, the accurate information and persuasion have gained importance. Unlike traditional diplomacy, public diplomacy that prioritizes affecting other countries' public opinion aims non-state actors and public opinions. These are goals of public diplomacy: Informing and manipulating foreign public opinions; increasing this effect; correcting misunderstanding and establishing the ground for a deep inter-society dialogue. Public Diplomacy management, based on mutual communication and interaction, largely benefits from the elements of soft power such as culture, education, sport and etc. for creating mutual sympathy. This paper explains the role of public diplomacy in the new century, underlines the success of strategies practiced in educational field and emphasizes on the Turkey's potential for cultural diplomacy.

Keywords: Turkey, Cultural Diplomacy, Education, Strategy, Policies

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1. Introduction

Recently, the perception based on propaganda and one-way information becoming ineffective is among the most important changes and transformations. The symmetric communication, persuasion and interaction, in the new international order, have gained importance while the concept of public opinion has become prominent. Thus, decision and policy makers have required the participation of public opinion to the decisions, as they start to play a determinant role in both countries and societies in the new century in which democracy, human rights and freedoms have gained importance. Public opinions inquire, discuss, learn and participate to the process with the development of communication technology, rapid access to information, internet becoming widespread (Özkan, 2014a, 301).

This radical change has created the need to interact with public opinions (both local and foreign public opinions), convey accurate information properly, express and introduce oneself and establish mutual understanding. In the 21st century, Public Diplomacy is the most practiced tool to communicate and establish relations with other countries and societies effectively. The countries implementing Public Diplomacy based on mobilizing current soft power potential (education, culture, sport and etc.) achieve to make other countries/societies adopt their policies (Nye, 2005, 2).

The flexible Public Diplomacy perception is the most preferred approach in the new century. It is aimed in this approach that the mutual understanding is established between countries and societies by using soft power elements intensely (Signitzer, & Wamser, 2006, 438). While in the flexible approach, the long

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term activities gain importance, an atmosphere for the mutual understanding is created by benefitting from education opportunities, life styles, political and economic systems and artistic skills (Yağmurlu, 2007, 17).

The education includes crucial possibilities and opportunities to establish sympathy and relation between countries and societies through Public Diplomacy policies. Countries could address to foreign societies with their language, culture and education opportunities while they could convey/teach their cultures. Thus, they could introduce themselves. As a result of this relation based on mutual trust, countries could have support for their policies and gain the sympathy of public opinions. In this paper, there are examples of public diplomacy practices in several countries and the methods and technics that were used and resulted in success in educational field.

In this paper, the literature review method is used. These are also discussed elaborately in the paper: practices and public diplomacy strategies used in educational field after public diplomacy and relevant phenomena of soft power are discussed. In addition to the past and required practices, it is also argued in the paper that the present value of Turkey could be used effectively in the public diplomacy policies. It is mentioned that the countries achieving to use great potential in the educational and cultural fields properly with a strategic intelligence will gain competitive advantage in the 21st century.

2. Paradigm shift in the international order

The globalization process has brought about several changes in financial, social, political and cultural fields. This process has almost resulted in a paradigm shift across the world. The 21st century will be remembered with the changes and transformation brought by the globalization process. While the 20th century represents Cold War era in other words nation-states world with limited communication/interaction; the 21st century represents an era that communication method and tools have become widespread, the concept of public opinion has become prominent and the image, perception and prestige have gained importance.

In the globalization process, non-state actors have appeared and they have played an active role in global relations. The interstate relations have shifted to the international level from the nation-state one. Public opinion is one of the most important elements of the new international order. During this process, the accurate and realist information and so the persuasion of public opinions have become important (Yavaşgel, 2004, 1). The will in the foreign policy issues is not only the will of government representatives but also various political and cultural elements (Canbolat, 2009, 4). In the new international system, now, NGOs, opinion leaders and highbrows have taken part both in policy-making and implementation. After the new international system and approach have enabled the mentioned support, different opinions and distinctive points of views easily affect the decisions. While the globalization process, in the new international system, deepens the mutual dependence on primarily financial and political issues, the borders between domestic and foreign policy have been removed (Sönmezoğlu, 1989, 488). The improvements in domestic policy have also become a part of foreign policy and domestic policy has directly started to affect the foreign policy-making process. The new international system has a multipolar characteristic and this decreases the effect of military, strict and realist approaches on inter-state relations despite the increasing importance of idealism, cultural relations, diplomacy and interaction. Due to all these developments, the implementation of foreign policy for states and countries has been legitimized by considering social, global and political backgrounds (softpowers) (Canbolat, 2009, 8).

3. The new century and public diplomacy

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In the new century, some significant paradigm shifts have occurred in diplomatic field. The diplomacy is defined as the process in which a government expresses opinions about specific topics directly to the decision makers of foreign countries and this process is managed by the government officers through negotiations (Gönlübol, 1993, 115). The concept of diplomacy includes various political manipulation methods and technics used in the foreign policy of a state (Sönmezoğlu, 1989, 323). The rapid developments in globalization process deeply affect the diplomacy. These developments lead a comprehensive change (Tiedeman, 8). The "inter-state" diplomatic relations during Cold War era, have turned into "inter-society" relations with the paradigm shift. In the new international order, several new actors appear such as media, public opinion, NGOs and international associations. Furthermore, these actors have started to affect the decision makers directly (Kalın, 2011, 6).

Public Diplomacy aims to manipulate manners of public to shape and implement the foreign policy. It also embodies the matters –out of traditional diplomacy frame- the effort of molding public opinion in foreign countries, interaction of NGOs and cultural communication process (Morrow). The governments and NGOs, with Public Diplomacy, could express their opinions to foreign NGOs and public opinions (İnan, 2012, 64). Public Diplomacy emphasizes on the communication process launched to establish sympathy of foreign public opinions for their opinions, missions and interests (Signitzer, 2008, 206).

Unlike traditional diplomacy, Public Diplomacy aims non-state actors and public opinions rather than foreign governments. Via Public Diplomacy, countries could deepen the dialogue between their own citizens with foreign citizens and associations. Public diplomacy has some other goals such as informing and manipulating foreign public opinions, enhancing this manipulation and correcting misunderstandings (Doğan, 2012, 13). Public diplomacy enables that governments and NGOs could express their opinions to the foreign public opinions and NGOs (İnan, 2012, 64) while other governments could communicate by serving their opinions, missions and interest besides helping to establish sympathy (Signitzer, 2008, 206). The policies implemented by the countries, aiming to have effective results from public diplomacy practices should be certainly rational, convincing, legal and defendable as it would be impossible to declare and defend policies which are against the international law and based on illegal methods (Kalın, 2012, 151). The countries having public diplomacy vision primarily update their images, correct misunderstandings and establish bridges to develop relation with other societies (Leonard, & Alakeson, 2000, 10).

4. The concept of "soft power" in diplomacy

The power is defined in international order as ability of affecting the manner of other societies and acting freely (Nye,2005,2). In the international order, the concept of power has dramatically changed; "soft power" has replaced "hard power" in the Cold War era. The countries, now, impress others with their soft power potential (science, art, culture, sport, education and etc.) rather than army, weapon and etc. (Snow, 2009, 3). These countries, manage to use soft power elements, have become attractive and so they could declare their policies. Furthermore, the policies of these countries could easily be adopted by the foreign societies. This process is based on mutual communication and interaction, persuasion and cooperation.

Joseph S. Nye (2005) making the first scientific study on the concept of "soft power" says that the policies with attractive identity, political value and institutions and also based on moral values and legitimacy are necessary to create soft power. He also underlines that an attraction center could only be created by this way and the preferences of foreign society could be manipulated through persuasion. As it is seen, this process underlined by Nye is long-term and challenging. This also requires being decisive, being patient and working hard besides using all the present soft power elements accordantly. During the planning process of public diplomacy strategy, these should be determined to have effective results: Which soft powers will be used, when, how and who will manage (Özkan, 2014a, 305).

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This is one of the public diplomacy goals to enhance the image and prestige of countries via mutual understanding (Simonin, 2008, 24). Recently, credibility and prestige are the most important elements for countries. As long as a country has these values it could express its own policies to foreign countries and societies and become an attraction center. In communication, the source of message is as important as the message. In public diplomacy, countries are the sources. The messages in frame of public diplomacy are so reliable and credible that the countries are reliable and prestigious. It would not be enough to focus just on the message while creating public diplomacy. The perception of countries as sources conveying the message to the target group is, also, required to be changed. Thus, the soft power elements should be used properly. The strategic communication method together with the concept of soft power could establish a permanent success in public diplomacy (Özkan, 2014a, 306).

Countries could mobilize soft power capacities and use them effectively just with the public diplomacy vision. On the other hand, in the international order, the competitive power of countries that fail to develop public diplomacy policies with strategic power and to use effective tools and methods of public diplomacy will be weakened.

5. The concept of education as a soft power element

The public diplomacy policies are conducted by primarily NGOs. Afterwards, these are accepted as main actors of public diplomacy: universities, schools, opinion leaders, media and news agencies, domestic mass media, global business, private sector industry, pressure groups and supra-state institutions (Szondi, 2008, 17; Signitzer, 2008, 209; Sancar, 2012, 91).

In this paper, education as a soft power element will be discussed and so the role of universities and schools as actors will be analyzed. In public diplomacy, the schools and universities are important tools for their support to research process and being a cultural implementer of public diplomacy. The research centers in the universities have contributed to the public diplomacy strategy with their scientific report, analyses and publications. Universities are, also, effective in implementing cultural diplomacy and conveying the public diplomacy messages properly. Besides all these, universities hold international conferences, seminars, workshops and congress for supporting the conveying message process. The scientists either representing Turkey in abroad or participating to these activities in Turkey are both message sender and receiver. These people are effective public diplomacy tools as they have important and credible identity and prestige. Therefore, the information transmitted by them is thought as credible (Sancar, 2012, 92).

Unfortunately, universities in Turkey could not keep up with the rapid development in the world. Still, there is no center for research and practice at any university in Turkey. There is a need to research the concept of public diplomacy scientifically and create a comprehensive roadmap about future strategies and policies.The schools in foreign countries are also important tools in public diplomacy. The law of host country is applied in these schools but they transmit their own cultural values via foreign language courses, course books and cultural and art activities. In Turkey, some schools transmit their own cultural values to Turkish students: The French high schools such as Saint Benoit, Sainte Pulchérie, Saint Joseph, Saint Michel, Notre Dame de Sion and İzmir Saint Joseph; German high schools such as St. George's Austrian High school; and others such as Galileo Galilei Italian High school, Robert College, Üsküdar American High school, Tarsus American High school (Sancar, 2012,94). Analogously, Turkey should aim to create schools in foreign countries within the public diplomacy vision as the cultural value transmitted via education will be persistent.

6. Public diplomacy policy practices of countries in educational field

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Countries that prefer to conduct their public diplomacy policies via education aim to leave a lasting impression in long term. It is observed that many EU member countries choose to popularize the public diplomacy policies via education.

Many European countries are more successful as they become culturally attractive in educational field. For instance, half of the popular languages spoken in the world are European languages (mostly spoken European languages are English, Spanish, Portuguese, Russian and German). Latin America via Spanish and Portuguese, the Commonwealth via English and Franchofon countries mostly in Africa via French are connected to Europe. In educational field, some European languages have international agency networks acting for popularizing their language and culture. The French Institution, Cultural Centers and British Council sponsored by their governments are examples for it. Besides these official institutions, more is available that serve to the same purpose and established by NGOs such as Alliance Française and German Goethe Enstitut. Europe has a rooted tradition in international cultural relations and allocates important fund. Three countries, respectively spending the most on this are France, England and Germany (Akçadağ, 2012, 234).

France has wide diplomatic network, deep cultural relations and international media. In worldwide, France having embassies, consulates and diplomatic mission over 650 has established almost 200 institutions and culture centers in abroad. The centers sponsored by the government and aimed to teach French language and culture like Institut Français are very common in Africa. Although the public diplomacy vision of France is shaped by the Foreign Affairs; Department of International Cooperation and Development, Ministry of Culture and Ministry of Higher Education and Research support this vision. In educational field, France gives financial support to 22000 foreign students coming from abroad. 80% of scholarships given to these students are provided by the bilateral agreements between France and other governments. Besides, there are two programs: First is Eiffel for students coming from Latin America and Asia and second is 'Major' for students having French Baccalauréat (high school diploma) and living in abroad. To support French public diplomacy, there is also a network composed of cultural centers and institutions. 'Radio France Internationale' broadcasting almost in 20 languages makes contributions to promote French culture in abroad with nearly 50 million audiences (Akçadağ, 2012, 235).

Foreign and Commonwealth Office, *British Council* and *BBC World Service* are important institutions in public diplomacy. Moreover British government has allocated the largest budget for these institutions. *Foreign and Commonwealth Office* having 153 Embassies and High Commissioner across the world, 10 delegates and 70 consulates within the international organizations is responsible for implementing and coordination of British foreign affairs and for national interests. *British Council* having 220 centers in 109 countries makes effort for educational and cultural relations and includes a wide range area such as art, science, language courses and social work. *BBC World Service* broadcasting in 43 languages reaches to 150 million people (Akçadağ, 2012, 235).

Goethe Institut established to teach German language and culture with over 120 centers and German Academic Exchange Service (DAAD) managing the academic exchange programs in educational field are the basic elements of German public diplomacy. *Deutsche Welle*, one of the major broadcasting corporations with its broadcasts in over 29 languages reaches nearly 40 million audiences. Considering Spain, cultural ties with Latin America are deepened by the public diplomacy practices. 40% of the scholarships offered by Spanish Ministry of Foreign Affairs are given to Latin America and Caribbean countries while 14% of it is given to students coming from North America and Middle East countries. Besides, there are special university cooperation programs between Spain and Latin America countries. These three institutions are important for Spain in terms of educational and cultural relations: *The Cervantes Institute* established in 1991 and sponsored by the government; Institute for Oversea Cultural Activity Collaboration established in 2000 for organizing international activities in Spain and the Carolina Foundation established in the same year for improving cooperation in cultural and educational field with countries having historical ties with Latin America and Spain. Spain has become an attraction center as a result of its long term efforts in educational and cultural field and gained more success in many fields, primarily tourism (Akçadağ, 2012, 236).

As it is understood, the European countries have put the elements of language and culture at the core of public diplomacy. They have also aimed to be an attraction centers in the world with their efforts in educational field. Considering the results, they have achieved many of the goals.

China is one of the countries determining the education and culture as the basic elements of public diplomacy. China, one of the heading countries in the new international system, has established Confucius Institute and Confucius College; emphasizes deeply on student exchange programs and offers scholarships for tens of thousands students from across the world. Media is also a significant tool to popularize Chinese; *China Radio International* broadcasts in 43 languages and *Xinhua*, the Chinese news agency broadcasts in English. Chinese Public Television reaches to the whole world via satellite. The internet opportunities are, also, used effectively. Besides, many Chinese websites are created in control of Information Agency to support public diplomacy and these websites include information about Chinese language, values and culture, recent news about China and official information. (Akçadağ, 2012, 185).

Lastly, we will analyze the last country, the USA. Like China, education and culture are the most important sources of public diplomacy. The United States Information Agency (USIA) benefits from the "universal American culture" effectively.

USIA has several goals such as enabling academic and cultural transmission, reaching people via informing and radio broadcasts and developing public diplomacy. The most known academic Exchange program is Fulbright including 125 countries and governed by USIA. International Visitors is the other program under the control of USIA. Every year, nearly 5000 future leaders coming from different countries could witness American institutions in situ. Today, 28% of all students applied to foreign universities have been studying in the USA. Hundreds of thousands lecturers are employed there. This increases the success of the American public diplomacy when these students and lecturers return their countries with a positive perception about American values and institutions. The following years after the Cold War, nearly one million people participated to the cultural and academic Exchange program of the USA and many of them were assigned to important positions in their countries. The American public diplomacy managers see education as a significant tool to transmit their values and benefit effectively (Akçadağ, 2011,9).

As it is seen, countries taking advantage of possibilities and opportunities with a favorable strategy could effectively transmit their public diplomacy policies to foreign countries/societies besides convincing them easily and developing a mutual understanding.

7. Cultural diplomacy and Turkey

Turkey needs to benefit from possibilities and opportunities of public diplomacy, express itself correctly, create positive image and build "nation-branding". For Turkey, the management and strategy of public diplomacy are the most significant tools to build nation-branding. (Özkan, 2013, 10). Turkey has realized the importance of public diplomacy too late and so it could not use this strategic power effectively. "*Office of Public Diplomacy"* has been established firstly in 2010 within the Prime Ministry. "*Public Diplomacy Institution"* founded within a NGO has started to act since 2001. Unfortunately, apart from these two institutions, there is no other institutional structure scientifically. This prevents that Turkey could not benefit effectively from the public diplomacy possibilities and opportunities as there is no perception of value of public diplomacy yet and the society is not completely informed about the capacity of the new century's strategic tool. Besides, nearly 200 Turkish universities have strategic potential for public diplomacy. These academic institutions should definitely be mobilized to support future roadmap of Turkey about public diplomacy (Özkan, 2013, 11).

Cultural diplomacy is defined as controlling the international area with cultural sources and by simplifying cultural change. These are also among the goals of cultural diplomacy that policies of a country are adopted, approved and sympathized by exporting cultural samples (Cull, 2009, 33).

The governments of countries could only have a positive perception and image when they transmit their values, ideas and messages via cultural diplomacy- a significant element of soft power. The credibility will be established following to such an atmosphere and this also enables creating a mutual understanding.

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These are significant tools of public diplomacy: education and language. Countries that benefit from these two elements create a ground for introducing, being shared and sympathized by teaching their language to foreign societies and conducting exchange programs in education (Sancar, 2012, 170).

The cultural values have important role in creating and transmitting the public diplomacy policies. Culture could be the attraction center as it includes the whole spiritual and material values of a country. The most determinant part of public diplomacy vision should definitely be created by the cultural history and wealth along with civilization background. The cultural artifacts produced by the culture industry affect the whole world while artificial objects have replaced the local cultures after being destroyed. Turkey, now, should be extremely careful and selective about artifacts of the culture industry and avoid from "cultural mandate". Cultural mandate leads weakening and destroying your culture slowly in front of your eyes. For this reason, Turkey should primarily take steps to support its culture. However it is impossible to put the effect of global culture aside. The Countries, supporting their culture could have different acquisitions after interacting with the artifacts of culture industry. It is necessary for Turkey both to prioritize its cultural background and realize the possibilities and opportunities of globalization of culture.

The Yunus Emre Foundation, established in 2007 benefits effectively from the significant element of culture, "language" and cultural values. This Foundation has been established for the goals of promoting Turkish language, history, arts and culture across the world. It also aims to enhance the exchange programs with other countries. The Yunus Emre Institution which is affiliated with Yunus Emre Foundation conducts studies for the promotion and teaching of the Turkish culture, history, language and literature, and also performs various activities involving cooperation with other institutions to support scientific studies and their publication.

The Yunus Emre Institution conducts studies to support promotion of Turkey and Turkish language, culture, arts and history with the Yunus Emre Turkish Cultural Centers in abroad. It is aimed in the Yunus Emre Turkish Cultural Centers to support promotion of Turkey and deepen the relations between Turkey and other countries via scientific projects, cultural activities and courses. Yunus Emre Turkish Education and Teaching Centers (YETEC) which is organizationally a part of the Yunus Emre Institute conducts activities in foreign countries to teach Turkish as a world language and gives support for promotion of Turkey and Turkish language. "Turkology Project" conducted by the Yunus Emre Institute is a significant study for public diplomacy vision. Turkology project, aiming to develop Turkish language teaching, deepen the relation with other countries and produce a Turkish speaking mass, provides lecturer and material for nearly 40 departments of Turkish Language and Literature and Turkish language courses (yee.org.tr).

The Yunus Emre Institute that is established affiliated with the Foundation is a big step to use cultural values and language as a strategic communication tool. It is significantly important to increase and popularize the studies along with planning for producing the permanent values. The societies knowing about Turkish cultural values and speaking Turkish will naturally adopt and support Turkish public diplomacy policies. It will be always easier, more convincing and credible to promote Turkey, its values and policies.

Turkey has recently made important initiatives within the public diplomacy activities through TIKA (Turkish Cooperation and Coordination Agency). TIKA, established in 1992, aims to assist countries willing to develop - primarily Turkish-speaking and neighboring ones- and establish cooperation in economic, commercial, technical, social, cultural and educational field via projects. When it is analyzed carefully, it will be understood that these are among the goals of public diplomacy strategy of a country. For this reason, TIKA has an important role in promotion, spread and support of public diplomacy activities and cultural values in abroad. TİKA is important for being an institution to represent Turkey in abroad. It also has achieved permanent practices and conducted important studies in capacity building. (Özkan, 2012, 90).

NGOs and the business world play a significant role in protecting, promotion and spreading the Turkish values of culture. Notably with the recent steps taken in democratization, the perception of NGOs has developed and so NGOs have become more attractive. NGOs, also, are the most important tools of the implementation of public diplomacy policies. For this reason, it is crucial for Turkey to mobilize the potential of all the NGOs for the public diplomacy vision. Countries will acknowledge and adopt each other after NGOs develop a dialogue with foreign NGOs, establish collaboration in many fields -notably cultural one- and maintain the process of mutual listening/knowing/understanding. The presence of societies, closely related to each other, is important for achieving the implementation of the public diplomacy policies. The messages and views of NGOs could be adopted and received more easily as they are independent of a public authority, state or government.

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Simultaneously, the business world has strategic values for public diplomacy. Businessman does not conduct just their business but he represents his country. Businessman, also, plays significant role in promotion of his country culturally, socially, politically and economically. Turkey, recently, has made important economic initiatives and has become a country that it has made contribution and investment to several countries notably in the Middle East, North Africa and Central Asia besides building business relation. Businessman could serve to the public diplomacy vision for Turkey. However, rather than acting freely, businessman should be channeled into a determined policy. The expectations from them should be told and the public diplomacy vision should be promoted through the business world. Businessman should have enough knowledge, skills and vision to serve like an ambassador in abroad. Besides the sympathy for Turkey, the relation developed by businessmen will serve to their economic interest. The message of business world will be more credible and persistent as it is independent of the public authority. This is significant for effectiveness of the public diplomacy policies.

As the other element to mobilize cultural potential is mass media, TRT (Turkish Radio and Television Association) is the most important tool for Turkey. TRT, as a public broadcaster, plays an important role in promotion of our culture and explaining our policies through the recently created channels for foreign societies such as TRT Avaz, TRT Arapça and TRT Turk. This will also make contributions to the promotion of Turkey and adoption of the public diplomacy policies by other societies that TRT has created two more channels; one is addressed to Balkans and the other is an internationally effective and popular news channel.

8. Conclusion

In the new international system, public diplomacy is one of the most strategic tools for a proper promotion of a country to the foreign societies. Public diplomacy is analyzed in three dimensions: "Daily communication and information", "Strategic planning and nation-branding" and "Building long-term relations and developing them" (Nye, 2005, 83).

This is important for "*Daily communication and information"* that the accurate information should be permanent, always in time and create a correct perception. These are also significant for effectiveness of the message to attract the public opinion and to establish the holism and cohesion. The second, "*Strategic planning and nation-branding*" is based on long term planning and strategy. Public diplomacy makes great contributions to the nations "branding". The convincing opportunity of countries, developing "nation-branding" and enhancing the image in the public opinion, might improve. The messages might be more effective if a country is credible and reputable. The third dimension of public diplomacy, *"Building long-term relations and developing them"* emphasizes on the permanent successes. To make the messages permanent, relations with the target country and society in various fields should be established through the tools and methods of public diplomacy. The tools notably such as educational activities, exchange programs and practical trainings create significant opportunities for establishing permanent and long term relations. These relations enable that countries come closer so they could increasingly understand and convince each other (Özkan, 2014a, 303).

The public diplomacy practices in educational field create strategically that countries could express themselves and convince other societies. If a country is aware of this opportunity, benefits from it and creates a proper ground, it could be "an attraction center" which is crucial for public diplomacy. Simultaneously, with the public diplomacy practices in educational field, societies learn and adopt the foreign languages and cultures. The common characteristic of countries implementing public diplomacy policies effectively is being powerful and developed in the international order. On this success, the long term investments on elements such as education, culture and language and communicating with other societies via these elements have significant effect. The "capacity building" is conducted by educational practices and this makes policies more permanent and deep-rooted. The cooperation and long term relations do not easily suffer from every crisis and unexpected problems besides endless success. Actually, the countries, conducting public diplomacy in educational field should constantly develop education system along with

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its infrastructure and quality as only this enables creating a strategic value and this value could be offered as an attractive option.

In Turkey, a really effective public diplomacy practice is not available in educational field. However, cultural richness and historical values of Turkey indicate the presence of a serious potential. Turkey is a country that would take important steps only if it has public diplomacy vision to mobilize this potential. In the fierce competition environment of the 21st century, it is inevitable that Turkey should take required steps without further delay.

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Students' aptitude to edutainment

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Abstract

Today, education institutions continue to invest to partly mythologized technologies. More recent shifts in technology supported course offerings undoubtedly pushes the need of teachers who are armed with pedagogical components necessary to provide a technology supported quality course. Such shifts are also telling prospective German as a foreign language teacher about the role of the future education in contemporary Turkey.

Engagement and motivation has been a challenge when working with students learning a second or foreign language. There is no doubt about the benefits of using edutainment methods with foreign language learners. But how high is the qualification of the German as foreign language students in this regard? Observations, surveys and projects for exams of Students who visited the Computer-Assisted German Training I-II courses provided relevant data to determine the findings for this study.

In providing a comprehensive overview of the educational use of technology by the students for vocabulary teaching, this paper contributes and highlights key tensions emerging from the current research that should be considered by practitioners and researchers alike.

Keywords: Edutainment, Foreing Language, Students Aptitude, Vocabulary.

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1. Introduction

The use of technology for teaching and learning in education systems causes no surprising reactions by insiders. The usability of technology is not surprising; perhaps from a historical perspective there is nothing new. From clay tablets, as a rough example, which were used especially as a writing medium throughout the Bronze Age and well into the Iron Age to the tablet Pcs of the modern classrooms. Maybe this are exaggerated examples but it is fact that the uses of technology and out coming tools have influenced practice in educational systems. On the other side it is hard to explain the current position of technology in the education systems or ever harder to predict what its integration will mean in the future. However, education institutions continue to make educational reforms and invest into unpredictable technologies nowadays (National School Boards Association, 2007; Greenhow, Robelia & Hughes, 2009; Jonassen, Howland & Marra, 2011; Chih, 2014); which will not lasting for ages, like the clay tablets and from this angle to mythologized technologies. Despite, it is also observable in the context of technological developments, that the educational environment and educational systems will remain changing by increased technological components. From this point, educators are facing a process for determining which technological tools or new methods for implementing them are appropriate for given classrooms and their challenges.

In Turkey, the Ministry of National Education has recently initiated the "Movement of Enhancing Opportunities and Improving Technology" project. This project aims to improve computer literacy in schools through providing students with access to emerging tools and resources (MNE, 2012). This is an enormous investment in schools infrastructure. All schools will be equipped with interactive white boards, data projectors, Internet connection.

Technological improvements has also a critical influence foreign language teaching (Louise, 2012). The following timetable is experimenting to demonstrate the dramatically altering relationships in foreign language education.



Fig. 1. Technology in the classroom timetable

There is no claim on completeness, topicality, quality and correctness of Figure 1. It is quite difficult to expect, due to the nature, a complete and up to date timetable. There are so many piece of technology, which should be included even if it is for a demonstration purpose. A very comprehensive topic, which would exceed the scope. Technology has a palpable influence on the daily life of a foreign language teacher and it offers colossal prospects for increasing the effectiveness and efficiency of foreign language teaching and learning. Over the past few years, various technologies are more integrated then ever into most areas of education (William, 2013). On the use and misuse of technology in education, respectively foreign language teaching, technology has his own pro and con viewpoints. Like societal, cultural, equity, educational and technical aspects. More recent shifts in technology supported course offerings undoubtedly pushes the need of teachers who are armed with pedagogical components necessary to provide a technology supported quality course (Robert, 2013). Such shifts are also telling prospective German as a foreign language teacher about the role of the future education in contemporary Turkey

Efforts to educate German foreign language teacher's to use technologies for teaching in educational processes are in reality efforts to make from teacher's "Edutainers". Without their own experience and awareness, this is not an easy task. Pursuant to the technology acceptance model, users needs with regard to technology, their experience with the technology, their awareness of technology and purpose of use can change instructional practices and learning experiences (James & Elisabeth, 2011). These features may further determine ongoing teacher candidate's opinions, particularly when the technology is in active use in the classrooms (Mayer, 2014).

Motivational features are capable to boost student learning through stimulating generative processing and the role of specific positive emotions can be a benefit to cope with complex learning processes (Magner, Schwonke, Aleven, Popescu, & Renkl, 2014; Plass, Heidig, Hayward & Homerand Um, 2014). In order to achieve this benefit and to provide ample opportunities for professional development for enhancing the educational experiences of our students the courses "Computer-Assisted German Training I-II." have been added as elective courses into the curriculum of German as foreign language teacher education Program.

2. The course

The launch of innovative educational technology projects has led the embodiment of interactive whiteboards (IWB) into the Turkish educational environment. Developments like whiteboard installations in the Faculty of education of the Anadolu University are not only exciting; it is also a challenging experience for all faculty members. As the teaching stuff adapt their courses to interactive whiteboards, they find that whiteboard teaching bearing challenges, raises new issues, but at the same time presents many opportunities for professional development and for enhancing the educational experiences of their students. Planning and implementing technology effectively means not only to effort and optimise material's qualities for its specific application it also means that this education technology must remain focus on people, on meeting needs, and on social inclusion, not on technology as a one-stop solution (Jeff, Susan & Robert, 2014)

Computer-Assisted German Training I-II courses positioned on the needs of the future German as foreign language teachers. The courses are not about what they teach it is about how. Each sections has two theoretic and two practical overall four hours. The first six weeks of a 12-week length course covers the following topics:

- Creating quizzes and activities for language teaching and learning,
- Integrating Digital Assets into language teaching materials,
- PowerPoint for language learning,
- Digital Storytelling,
- Social networking and instructional materials,
- Evaluating commercial products.

The course participation means also for all the 30 participants to attend in several mini-surveys. All 30 Students were asked on the very beginning about their thoughts in terms of Computer-Assisted German Training. This paper will not proceed to a statistical comparison of Students tendency, due to the lack of a statistically significant number of participants neither the theoretical underpinnings of IWB use in language learning from the perspective of cognitive learning theory. Even from the perspective of Students, wide range of benefits were identified, including the personal development and there is no doubt about the benefits of using edutainment methods for foreign language learners. The data discussed here is the qualification of the ongoing German as foreign language teachers in this regard. Student build working teams to prepare a 40 minutes lesson and evaluate others lessons by a given form to find out the pros and contras from their own perspective.

3. Student experimental lessons

After theoretical and practical six course weeks, the prerequisites for experimental lessons were determined. Their target audiences was elementary school students and they war asked to plan a lesson for 40 minutes using PowerPoint. Several textbooks were offered as reference sources. Some contents of the textbooks, irrespective of subjects, was seen as very difficult to explaining. Teams are build and individual chapters were picked to create an experimental lesson in two weeks time. Following topics are chosen;

Table 1. Experimental Lessons Topics.

Computer-Assisted German Training I	***Computer-Assisted German Training II***
. Guten Tag und herzlich willkommen! (welcoming)	. Ich hätte gern vier Brötchen (In the bakery / On the market)
. Stellen Sie sich bitte kurz vor! (Details of the person)	. Alles für Ihre Küche (All about the kitchen)
. Ich bin Ärztin - kann ich Ihnen helfen? (Occupations & activities)	. Wir möchten gern ein Konto eröffnen (At the bank)

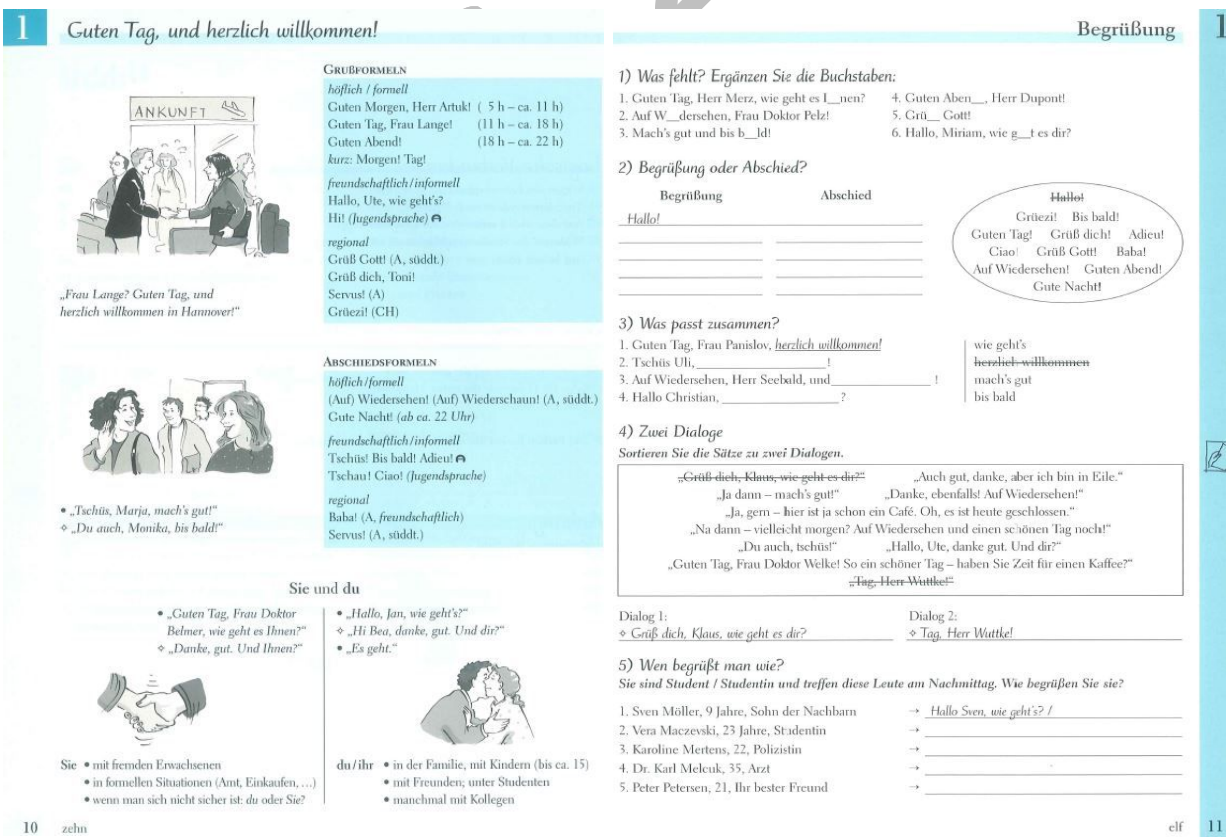
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. Das ist meine Familie!(Family and kinship)	. Kochkünstler (Cooking and Eating)
. Meine Freunde, meine Kollegen (Social relationships)	. Entschuldigung, wo finde ich Kartoffel-Chips (In the supermarket)

A sample lesson plan was given as a guideline for forming their own lesson.

- Goals: Students will be able to Identity Important words of the course. They will also be able to understand and use these words.
- Objectives: Given a set of pictures, the students will match the picture to the word.
  Introduction: Through questioning, establish students' background knowledge of classroom vocabulary.
- Development: Using the picture dictionary as a reference model the appropriate actions or words.
  Practice: Students will repeat the vocabulary while looking at the presentation. Students will work with
  partner- asking each other questions about words of the unit.
- Accommodations: Students in the class will complete worksheets.
- Checking For Understanding: Listen to the students pronounce the vocabulary.
- Closure: Review the vocabulary words Assign practice work at home.

An evaluation form were handed out before; which is also used later by each team, to evaluate other presenting respectively teaching teams. Each team had a meeting day, if they need it, before their experimental lesson, to show or rather to explain their unit for early feedback and to make recent edits if there was any necessary. While each team hold their lesson other class members was taking the role of the elementary school students. On average two or three experimental lessons were hold, designed and presented by students. The evaluation forms are handed out before the lessons started. Afterwards each section was discussed under the aspects of the evaluation form.



4. Summarized lesson sample and students

evaluation

Fig. 2. (a) Textbook unit page sample; (b) Textbook unit exercises page sample.

Each unit from the textbook has also one exercise page, so the students must also include unit exercises to their lesson. Based of the given space limitations of this paper one example will be summarized. The name of the unit in the Textbook is “Alles für Ihre Küche” All about the kitchen. The teaching topic here are the objects in our kitchens. A common context for language learners; which allows an easy comparison and sampling.

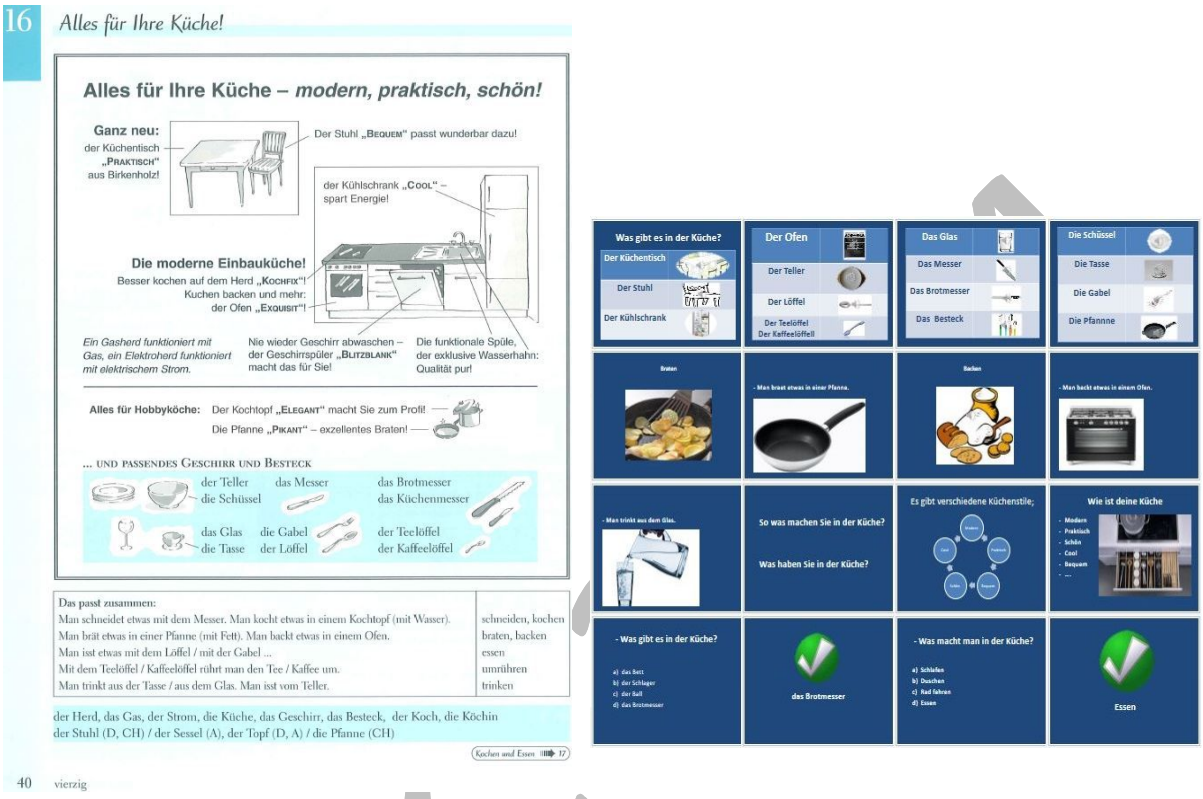


Fig. 3. (a) Textbook All about the kitchen unit sample; (b) All about the kitchen lesson presentation.

The figure 3. (b) Only shows a mixture from the lessons PowerPoint. The vocabulary is articulated this is beyond visualization, also after each sets a multiple-choice test is added. Therefore, the elementary school students must response to the questions. Colors and fonts, font sizes are according to the given instruction. Moreover, a simplicity dominates the PowerPoint slides. The absence of turmoil and chaos facilitates to follow the lesson. Each course participant, had to take notes to the given evaluation form.

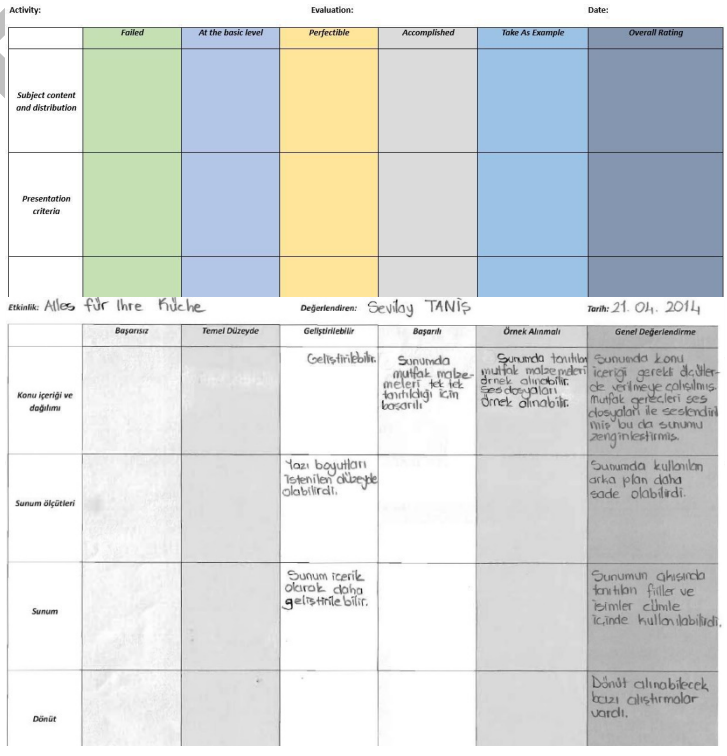


Fig. 4. Evaluation form sample in English.

Fig. 5. Filled authentic evaluation form sample.

The first two columns left are titled with "Failed" and "At the basic level" of the lessons in terms of: Subject content and distribution, Presentation criteria, Presentation and Feedback in up to down sequence. None of the given evaluation forms had this columns filled. The critiques formulated in the third column of this evaluation form that has the title "Perfectible". All aspects have been discussed after reading, even if they was not filled out. Each point had to be justified and explained.

5. Results and discussion

A number of new technologies have emerged in recent years that have been largely regarded and intended for educational use. The influence of technology on the daily teaching life of a foreign language teacher offers increasing the effectiveness and efficiency of teaching and learning. Teachers need to be armed with pedagogical components necessary to provide a technology supported quality course. Efforts to educate German foreign language teacher's to use technologies for teaching in educational processes are in reality efforts to make from teacher's "Edutainers". Without their own experience and awareness, this is not an easy task. Only their own experience, awareness of technology can change instructional practices and learning experiences for the future. Computer-Assisted German Training I-II courses offered ongoing teacher candidates a theoretical and practical starting for their own active use of technology in the classroom in order to concretise their own experience and awareness.

This study investigated the opinions and expectations of 30 ongoing German as foreign language teacher candidates after an experimental active technology use in the classroom. From the Student's point of view, not all courses are suited to technology supported Foreign language teaching; there is often a concern expressed about the time taken to prepare and maintain such courses, motivate students, cope with an expected greater demand from students in technology supported classes, and intellectual property issues. It is especially emphasized that the programs offered in the curriculum also lack in supporting students in establishing a technological teaching philosophy. Teacher candidates reported the importance of offering such kind of courses. If future teachers are expected to adopt current actively use of technology theories, these practices should be compulsory as part of the policy for teacher education programs. Findings revealed that in developing these characteristics, not only contents and processes have a vital role but also the physical environment and teacher educators' tendencies and knowledge have significant effects on the professional development of a future teacher. At this point, participants strongly criticized the physical conditions of faculties of education. Thus, it is strongly recommended that quality of physical conditions should be accepted as a part of an effective teacher education process. The participants of the study reported that educators are insufficient in being role models for ongoing teachers. The educators expect students to develop certain skills and adopt certain teaching methods. However, educators fail to do the same thing; educators tend to use of ineffective and traditional methods of teaching according to the participants. This understanding strongly points to the need for further research in Turkey to examine the attitudes and methods of teacher educators in relation to technology supported teaching and learning.

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Students' experiences in using spectrum: textbook or classroom?

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Abstract

Since the 2000s, many universities have introduced virtual learning environments in their educational system to deliver "blended learning" (BL). The University of Malaya, in Malaysia, launched its BL system, named SPECTRUM in 2010. Five years after its implementation, this research aims to gain a more detailed and deep understanding of the lived experiences of postgraduate students in the faculty of education who have been using SPECTRUM for their learning practice. The research purpose required focusing attention on the qualitative aspects of the experience itself. So phenomenology is chosen as an appropriate methodology to answer the research question. We have used focus group and individual semi -structured interview for collecting data. Results show that students found SPECTRUM as a useful platform in their studies. Lecturers' styles of using SPECTRUM in the classroom contributed to students' experience. They perceive SPECTRUM as an online classroom for interaction and textbook when materials are uploaded weekly.

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Keyword: students's experience; blende learning; textbook; classroom

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1. Introduction

Blended learning (BL) has become an inevitable tool in education on any campus all over the world. Since the 2000s, many universities have introduced virtual learning in their educational system to deliver "blended learning" (BL) (Osgerby, 2012). Since most postgraduate students are also working, they cannot come to campuses all the time for face-to-face meetings and discussions. Therefore, BL is introduced to help students acquire knowledge and exchange ideas through technology anywhere and at any time. A BL system is supported by technology and a combination of teaching techniques including self-study, classroom and on-the-job instruction; fitting with the individual learners' needs (Gray, 2006). That is why University of Malaya has adopted this technology through its system 'SPECTRUM' where students are able to interact according to their various learning styles. This research aims to gain a detailed and deep understanding of the lived experience of postgraduate students in the faculty of education who have been using SPECTRUM for their learning practice.

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The term 'blended learning' is recently used by US researchers in their studies on online based teaching and learning (Wakefield, Carlisle, Hall & Attree, 2008; Tselios, Daskalakis & Papadopoulou 2011) However, there are other alternative terms such as "hybrid", "technology-mediated instruction", "web-enhanced instruction", and "mixed-mode instruction" that are used in current research literature (Martyn, 2003). According to Staker and Horn (2012), BL is a formal education program where student learn partially through content and instruction online with some element control over time, place, path and/or pace. From Gray's (2006) training perspective, "BL using an effective learning model with suitable supporting technology coupled to an appropriate mix of teaching techniques such as self-study, classroom and on-the-job instruction, tailored to the needs of each individual learner." Nevertheless, Oliver and Trigwell (2005) argued that BL is concerned with the process of blending media, teaching processes and presentation, rather than students' learning. Sharpe, Benfield, Roberts and Francis (2006), on the other hand, concluded that the term is ill defined, yet remained a useful as it could mean different things to different people.

In this fast developing world, technology has taken center stage in education. Many past researchers have taken an interest in BL and the classrooms. Delivery modes may vary from face-to-face, blended, and fully online. Bleffert-Schmidt (2011) and Risner, (2011) found that no statistically significant difference was found between three different delivery modes which are face-to-face, blended, and fully online. However, general satisfaction and appreciation of the blended modality was observed. Online classroom pedagogy was more student-centered (Ruck, 2012).

McDonald (2012) indicated three different patterns of blended learning in higher education: supplementary learning, interdependent learning and adaptable learning. Supplementary learning is the experience pattern of adult learners when they assign meaning to BL based on perception of face-to-face and online component (McDonald, 2012). Meanwhile interdependent learning is the complimentary relationship between online and face-to-face components of the course to generate greater understanding of the course content, peer and the instructor and adaptable learning is the adaptability of the learning structure and process which learners feel would beneficial between traditional learning or online learning (McDonald, 2012).

In addition, the differences in the course contexts, experience of process and learner orientation influence the meaning of blended learning. Eventually, adequate technical support is important for implementing blended learning Moukali (2012), as well as teacher technical training (Peruso, 2012). In terms of interaction, this indicated that teacher feedback on discussion board lowers student satisfaction as well as grades (Giacumo, 2012). BL also has an influence on teaching practices and behavior. According to McDonald (2012) and Ruck (2012) students are more responsible for their own learning and teachers provide better-personalized assistance, keep better track of student progress, and cover more material in BL. Edginton and Holbrook (2010) research reported on students' initial concerns were on their ability to communicate with the instructor about the online components, but shifted to their own time management skills at the end of the course. However, Shroff and Vogel (2010) observed that students were eager to engage in textual dialogue in the online discussions and participated more compared to the face-to-face discussions.

Blended learning demonstrates positive attitudes, on the students' side, toward the value of intercultural awareness (Risner, 2011). On the faculty development level, adopting blended learning environment leads to improving the educators (Badawood & Steenkamp, 2012). According to Vaughan (2007), the lecturers suggested that blended courses create enhanced opportunities for teacher-student interaction, increased student engagement in learning, added flexibility in the teaching and learning environment, and opportunities for continuous improvement.

2. Research questions

Many past research about blended learning focuses on students' perception and satisfactions with the purpose of evaluating blended learning implementation in the classroom. Little research has been done to understand students' experience of using blended learning in their studies. This research will look at an in depth account and lived experiences of postgraduate students who used SPECTRUM to learn. The research question of this research is as follow:

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- What do UM postgraduate students' experiences in learning through SPECTRUM?
- What contexts or situation influenced UM postgraduate students' to use SPECTRUM?

The focus of this study will be on postgraduate students from the faculty of Education in University Malaya.

3. Research methodology

The purpose of this research requires a focus on the qualitative aspects of the experience. Therefore a phenomenological method is chosen to answer the research question. This method allows data to be analysed and reported in a descriptive and interpretative manner.

Data collection is done through interview with postgraduate students in a focus group and also some one-on-one sessions. Students were chosen by purposive sampling method based on availability and convenience.

Interviews were conducted in semi-formal way that allow students to freely express their experiences in using SPECTRUM. The study was designed to investigate students' experience in using SPECTRUM in their studies as well as their feelings towards the online system. Consequently, researcher plays an important role in the study as an active interpreter.

Postgraduate students from the faculty of education were first contacted to find a suitable time for an interview. Nine students were available for interview. Two interviews were conducted in a group while the rest was one-to-one. Then data was collected through a semi-structured interview. Initial question were asked followed by additional question derived from students answers. Students' responses were then transcribed into text for further analysis. Initial readings of the data were done to find similar concepts or ideas. A second reading was carried to connect the concept or ideas of similar traits.

4. Research findings

The interviews talks could be classified into following themes; Function of SPECTRUM, Lecturers' style of using SPECTRUM and SPECTRUM as a textbook or classroom.

4.1. Functions of spectrum

SPECTRUM is a BL tool that serves several functions to users. Out of the many functions SPECTRUM has, students express that it is useful for them to get notes and submit assignments. They perceive SPECTRUM as a place to share information. One of them says:
"…sometimes when the lecturer is giving notes in the class, PowerPoint, we don't have enough time to write or we miss the class we still can download from the SPECTRUM."

From the above excerpt we can infer that student uses SPECTRUM to download notes prepared by lecturers. There were other instances in the interview where students feel that lecturers who uploaded the PowerPoint notes or other material in SPECTRUM helps in the learning process.
"We just read. We don't have to find other articles... They are provided in the SPECTRUM. It's easier for us. Because some of our friends are working and they don't have time to search for other articles."

Furthermore, students find the function of uploading files onto SPECTRUM helps them save time and energy. In terms of submitting assignments, student express that it is convenient to upload it online than to hand it in personally.

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"We don't have to come here, make an appointment with her just to submit the hard copy."

The data also shows that the word 'time' being used over and again. Whether it is time in the classroom or time outside the classroom, students are aware that SPECTRUM is useful for them to counter the lack of time. Furthermore students log on to SPECTRUM on a weekly basis usually two to three times a day. Their time on SPECTRUM are used for different purposes.

"Between… but it is certainly more than three times. Usually I will log in, let's say I log in on a weekend, skip a day and I'll log in again… For example, if tomorrow there's a class, then this morning I will log in."

However, it is apparent that this habitual log in is dependent on lecturer's activity in the SPECTRUM as well. When asked about when they will use SPECTRUM on their own, a few students say that they will unless the lecturer doesn't use SPECTRUM at all.
"I would share something through SPECTRUM because my friends had done so and I use the information. So of course we have to contribute something too. Unless if the lecturer never use SPECTRUM for their class. It's because everybody won't look at SPECTRUM. Lecturer themselves only log in a few months before."

Student uses SPECTRUM for different purposes such as to share information, get notes or submit assignment. Both full-time and part-time students are aware that by using SPECTRUM to get information from lecturer and friends, it helps them reduce time to look for materials to read and help them focus on their studies. Students recognize the usefulness of SPECTRUM only because the lecturers are active in using the web-application in their class. This brings us to the next theme identified in the data, Lecturer's style.

4.2. Lecturer's style of using spectrum

. Different lecturers have a different but somewhat the same way of using SPECTRUM in the classroom. Based on the interview, we have identified three distinctive ways lecturer uses SPECTRUM which are; Lecturers who uses SPECTRUM fully, Lecturers who only upload notes onto SPECTRUM and Lecturers who doesn't use SPECTRUM at all. Below is an excerpt from one of the interview on the matter:
"There's a lot of way lecturer using it [SPECTRUM]. Some had post material early. So we can read first at home… meaning to say when we enter class we're ready. There are lecturers who teach first. Then they will post [notes] on SPECTRUM. But for me, who is staying in Tapah, I think it's easier if lecturer post it early before rather than later. Plus, if I'm not in class, at least I would get the notes as well. I won't be left behind. However, there are lecturers who doesn't use SPECTRUM too. Those who doesn't use SPECTRUM, we have to fully depend to the class sessions."

Lecturers who use spectrum fully would use some feature in SPECTRUM like the forums for discussions, announcement board, upload notes and the function of submitting papers online. We see a recurrent theme of lecturer's style of using SPECTRUM and students experience. It seems that it is more beneficial to students when lecturers uses SPECTRUM. One student claims that SPECTRUM is beneficial for student who doesn't have time.

"But for people who working, part-time, and then they have other commitments, ok this SPECTRUM, like, some sort like last minute study, it's very helpful, and make the person feel like not so stressful. And can depend on the spectrum and so on."

On the other hand, students believe that even if the lecturer do not use spectrum to upload notes, they should use it to get in touch with students. Without the use of SPECTRUM, it is difficult to get information.

"If he didn't want to put notes, at least he could put announcements or important reminders."

However, it is apparent that the student's purpose of using SPECTRUM is tied to how the lecturers implement it in their classroom. This brings us to the fact that lecturers will introduce SPECTRUM to students. They will brief students on the basic ways of using the application. This gives a chance for students to get familiarized with SPECTRUM. However, the usefulness of this web application takes time to get used to. Therefore, many of the interviewed students had the same thoughts of using SPECTRUM for the first

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time; it is a new 'thing' that they have to learn on their own. As for Lecturers who do not use SPECTRUM in their classes, students claimed to experience difficulty and have a negative perception towards it.

"…I'm not familiar with SPECTRUM. It's because when I was in the first semester, I never use SPECTRUM. All my lecturers use e-mail, more towards e-mail or we have our own yahoo group to upload notes. So we don't use SPECTRUM at all. But I'm only just getting acquainted with SPECTRUM this semester."

Without encouragement from the lecturers they would not use SPECTRUM and thus have difficult to get the full benefit of blended learning using SPECTRUM. Furthermore, student will need to learn how SPECTRUM works on their own or with the help of friends. However, students who are introduced to SPECTRUM by lecturers have an advantage of getting acquainted with SPECTRUM faster. Lecturers' style of using SPECTRUM is important to implement blended learning in the courses. If the lecturer's do not use the application, students will not get any beneficial experience from it.

4.3. Spectrum as a classroom or textbook

SPECTRUM is seen as a textbook for some students while others feel as though it is an online classroom. For some classes, lecturers will post notes in a weekly basis. Students feel that with this they are able to keep track of their learning.

"So far for me, it's easy to use SPECTRUM because it is [organized] week by week, it's like a text book. I'll know that this week we'll be learning about what topic because it follows a week by week view."

This type of view is also beneficial to Postgraduate student because most of them prefer to read or go through notes before classes to get a general idea of the lesson. As certain lecturers uses SPECTRUM to upload notes for students before classes; so, students are able to take learning into their own hand. An excerpt from the interview below expresses how students use SPECTRUM as a textbook:

"…in case she [the lecturer] is going to ask us anything and we are still blur, we can still refer to the notes she has given before."
"Especially when the lecturer asks us to read the article … then we really need to study and go through the article. Because sometimes the article is really hard to understand…"

On the other hand, there are lecturers who use SPECTRUM to get students to interact with each other. Here students perceive that SPECTRUM is like an online classroom. The environment set up in the class will determine the environment in SPECTRUM as well. Student says that if the lecturer exudes a negative aura, then they will feel the same way in SPECTRUM.

"It's like going to an online class…."

"You have to be formal. You cannot post something however you like. We have to think twice before we post. Is our grammar right? Just in case the lecturer will read it. Because it's just like being in class."

There is a wall between the student and educator that impedes students from expressing themselves freely. They believe that they should always be professional and formal in the class. Therefore, when blended learning is introduced, they see it as an online class where everything is formal which leaves little room for ad-lib or development of character. Students see SPECTRUM as a textbook for them to keep track of their studies but when interaction takes place in the forum, they see it as an online classroom to discuss further about the topic of the week.

5. Discussion

Analysis of the interview transcription shows various interesting points from students experience with SPECTRUM. All students agree that SPECTRUM was a useful platform in their studies. This is similar to past research on students' perception on BL (look at Edginton & Holbrook, 2010; Tselios, Daskalakis, & Papadopoulou 2011; Uğur, Akkoyunlu & Kurbanolu, 2011; Smyth, Houghton, Cooney & Casey, 2012). Students are more aware of the usefulness of BL after using the system (Edginton and Holbrook, 2010). In

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terms of using BL in the classroom, results of this study show that students need time to familiarize with how spectrum works. Students will get use to SPECTRUM if lecturers use it in their classrooms. However students who meet with lecturers who never use spectrum at all in the first semester will need more time to adjust. According to Wakefield, Carlisle, Hall and Attree (2008) students did not engage with the e-learning resources probably due to lack of awareness regarding the e-learning component and inconsistent access to computing facilities. Postgraduate students in our study had no trouble with connectivity. However, even with lack of knowledge in the use of SPECTRUM, students will inevitably learn to use the online application. Student priorities persist that teacher presence is a vital component for student's success and satisfaction (Peruso, 2012).

Students experience SPECTRUM as an online classroom when interaction is required in the forums but it is more used as a textbook when educators only upload the learning materials. This allows students to have greater time flexibility and improve their learning outcomes (Vaughan, 2007). However, Smyth et. al. (2012) mention in their students that the online component was more invasive on students everyday life as they had less time for break from studying. In our study, students were given a choice to read the notes before or after the lectures. This increases their learning time and was not in any way forced. In a research done by Akkoyunlu and Meryem Yilmaz Soylu (2008) on thirty-four students at Hacettepe University learning styles and views, results shows no significant differences between their achievement level and learning styles. Even though the information gathered here are deem useful to gather initial ideas of what the students experience and in what context, there are some limitations to the current study that could be addressed in future research. This study did a purposive sampling method and therefore could not have covered the vast range of students in the faculty. Further study could also be done to find teachers experience in using spectrum seeing as teachers play a larger role in enhancing students experience in using spectrum. Another criteria that could be taken into account are the type of student the faculty have, such as local students or foreign students.

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Students' perception of mobile augmented reality applications in learning computer organization

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Abstract

Augmented reality is a human-machine interaction tool that presents information generated by computer on the real world using a camera. Augmented reality technology has the potential to draw students' attention to visualize a layer of information on real objects using handheld devices such as tablets and smartphones. The objective of this study was to assess students' perception of the use of augmented reality in learning microprocessor. Therefore, a mobile application was designed and developed by integrating elements of augmented reality for teaching and learning this topic. This study was conducted based on the ADDIE model that consists of five phases: Analysis, Design, Development, Implementation and Evaluation. The study found that students' perception of the use of augmented reality is positive based on the average mean score. However, the disadvantage of this application is the use of images as compared to the use of real microprocessor as the learning object. An area for future study is to assess the students' perception of the use of real objects as the learning object in using mobile augmented reality application.

Keywords: mobile augmented reality; teaching and learning; computer science

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1. Introduction

Computer organization and architecture is one of the core subjects in the computer science programs. The importance of this subject was stated in the IEEE / ACM Computer Science Curriculum 2008 report in which all computing students need to gain an understanding and appreciate the functional components in a computer system, its features, performance and also the interaction between the components (Stallings, 2013). One of the main components which is also the most complex component in the computer system is the central processing unit (CPU) or microprocessor. Providing a learning environment that can engage students to learn continuously this complex component is difficult because the materials are very theoretical and hard to visualize. Thus, there are several learning tools that have been developed such CPUsim tool for simulating the operation of microprocessor (Mustafa 2011). However, there is still a lack of teaching aids that links between theories and the real microprocessor.

The problem in engaging students in learning this complex material has motivated this study to use augmented reality (AR) technology as one of the learning technology. The aim of this study is to identify the students' perception towards the use of AR technology in learning complex materials. Therefore, the objective of this study is to design and develop an AR based application for learning microprocessor, and evaluate students' perceptions on the use of AR in learning this complex subject.

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2. Background

AR technology was born after virtual reality technology. Virtual reality replaces reality with a simulation. On the other hand, in AR technology, a view of a reality can be modified by addition of digital information so that it can improve a person's perception of the reality. In AR, there are four main components: (1) a camera to capture a target information, (2) marker which is the target information, (3) mobile phones to store and process information when the captured image is the target information (marker), and (4) digital content is the content that will be displayed on the screen when the camera is able to track the marker. Fig. 1 shows an example of an AR application where the marker is a real memory stick called random access memory (RAM). When the camera phone has tracked the RAM, the phone will then display digital information associated with the marker on the screen.

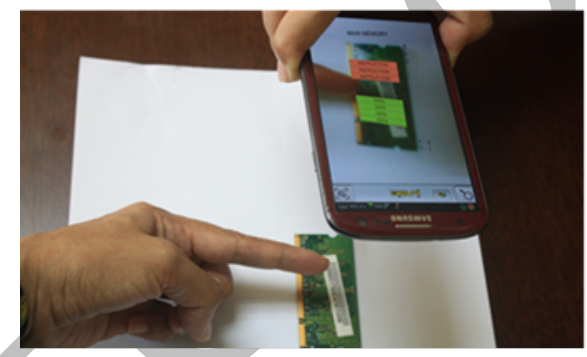


Fig. 1. AR technology can add digital information on the real object through the mobile phone screen

Now, the use of AR in education has become more widespread and practical. Table 1 shows four main features for some applications in education. These features are: environment, instructional approach, level and peripheral. The first application, Alien Contact! (Dunleavy, Dede et al. 2009), for example, is developed for outdoor environment. The instructional approach for this application is based on role, the level is school and the peripheral used is handheld devices. Instructional approach is classified based on the use of AR in which Wu et al (2013) divided the usage into three categories: role, task and instruction. AR-Dehaes toolkit (Martín-Gutiérrez, Saorín et al., 2010) is an application that is based on task. This application had positive responses from engineering students. Therefore, the question of this study is whether a mobile AR based application can get positive response from computer science students in learning complex materials?

Table 1. Examples of AR application in education

Application	Environment	Instructional design	Level	Peripheral
Alien Contact! (Dunleavy, Dede et al., 2009)	Outdoor	Role	School	Handheld devices

ACCampus (De Lucia, Francese et al. 2012)	Outdoor	Location	University	Handheld devices
EULER (Liu et al., 2009)	Outdoor	Task	School	Handheld devices
AR-Dehaes toolkit (Martín-Gutiérrez, Saorín et al., 2010)	indoor	Task	University	Desktop

3. Methodology

The ADDIE model has been used as a research methodology. In this model, there are five main phases of analysis (A), design (D), development (D), implementation (I) and evaluation (E).

3.1. Analysis

In the analysis phase, the content of the application was selected based on a specific topic in the computer organization and operating systems course. Since microprocessor is an important topic in this subject, a set of exercises has been identified with four main sub topics:
(1) Introduction
(2) The main functions of microprocessor
(3) Components on a motherboard
(4) How microprocessor processes data

3.2. Design

In the design phase, the application was designed based on five layers: application, the application programming interface (API), Metaio software development kit (SDK) and operating system. In the first layer (application layer), the main focus is user interface and logic operations. There were four main buttons for four different sub topics. In the second layer (API), Android SDK based on Java was selected. The third layer involves Metaio SDK where there are three major components: capturing, tracking and rendering. Capturing component will capture images from the camera. Then, the tracking component will process the image based on the specified markers. In this study, an image of a motherboard was used as a marker. When images recorded by the camera have been identified similar with the marker, then the rendering component will display the specified digital content on the mobile phone screen. The last layer in this architecture is the operating system where android mobile phone platform was chosen in this study.

3.3. Development

In the development phase, three tools have been used:

- Eclipse Integrated Development Environment (IDE) for the development of the Android platform using the Java
- Metaio SDK for the development of AR applications
- GIMP for image editing

In the development phase, the main interface has been developed where there are five buttons, A, B , C , D and E. The E button is for non-academic content. When students click button A and track the image of a motherboard, digital materials displayed on the screen is a video. Students need to answer some simple questions based on the video. When students click button B, the digital information is displayed on the screen along with the audio that explains the concepts and basic functions of a microprocessor. To increase students' knowledge about a number of components on a motherboard, students can click button C

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to see a list of labels for the main components related to microprocessor. Button D is to help students in identifying how the microprocessor, main memory and bus are working together in the execution of a command. Button E is also included in the application to provide an opportunity for students to relax during practice. When students click button E, a 3D model is displayed on the screen of the mobile phone.

3.4. Implementation and evaluation phase

The fourth phase of the methodology is implementation where the application was used by 24 students in a lecture room while learning computer organization and operating systems course. Students were allocated to a small group where each group consisting of two to four students. Each group used a tablet that was installed with the application. The groups were required to discuss how to solve a set of exercises that have been developed based on digital information displayed on the mobile phone screen. The fifth phase is the final evaluation phase where each student will fill out a questionnaire to determine the level of satisfaction of using the AR application. Questionnaires used in the form of a five point scale adapted from Martín-Gutiérrez, Contero et al. (2010).

4. Results and discussion

Descriptive statistical analysis was carried out to identify the satisfaction level of using the developed AR application in learning complex materials. The mean and the frequency, scale of 4 to 5, were calculated to identify the level of student satisfaction for using the application. It can be seen from Table 2 that item 4 has the highest level of satisfaction with min 4.54 and frequency 24. While item 7 has the lowest level with a mean value of 3.92 and a frequency of 1. The overall mean for each of the attributes are in the range of 3.92 to 4.5. This indicates that the respondents were satisfied with the use of the AR based application in learning microprocessor. Two responses of students who support item 4 are as follows:

"*AR allows content to be more interesting for students to learn and students are more attentive when learning*"
"*This application can be used as a learning tool to attract students*"

This positive response is as expected where AR applications such as AR-Dehaes (Martín-Gutiérrez, Saorín et al., 2010) also received a positive response from the students.

Table 2: Frequency (scale of 4 to 5) for the satisfaction of using mobile apps AR

Item	Satisfaction	Frequency	Mean
1	I am motivated to use AR in learning	23	4.38 (0.58)
2	AR technology is attractive to use in learning	23	4.29 (0.55)
3	Do you think the use of AR can improve spatial skills	22	4.33 (0.64)
4	AR technology is attractive	24	4.54 (0.51)
5	AR technology seems original	10	4.46 (0.72)
6	AR technology seems useful	24	4.16 (0.38)
7	AR technology seems satisfactory	17	3.92 (0.65)
8	Technology AR seems flexible (you can do the training either at university or in your room)	22	4.08 (0.72)

During the implementation of AR technology in learning microprocessor, students enjoyed, interested and active in discussions to complete the tasks. Fig. 2 shows the situation where each student in the group actively gives their opinion in completing the tasks. AR appears to increase student motivation and interest where some students want to practice using AR in the future as shown below:

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"*Need a lot of tasks that use mobile AR for every student*"
"*Do more exercises in class with proper supervision from lecturers*"



Fig. 2. Students discuss actively to solve the problem using mobile application based on AR

In terms of flexibility, there were some students who did not agree with item 8 which is AR technology seems flexible. This may be due to some students who did not have a mobile phone or tablet that supports this AR application. AR application requires Android platform 4.0 and above. Feedbacks from students on the use of devices are:

"*Must have affordable device and use the device to do the assignment and presentations*"

However, there are still many a number of students who support that AR seems flexible. One of the comments related to this is:

"*Students can learn and study everywhere*"

For item 7, AR technology is satisfactory, had the lowest mean score, 3.92. This may be because there are some limitations of the developed AR applications. Some comments related to this situation are:

"*Learning using AR can be improved by clear and better audio, sharp visuals and explanation*"
"*Better sound or voice, clear image and video*"

Low mean score may also relate to the use of an image as a marker, not a real object. This is because Azuma et al. (2001) stated that digital information in the form of 2D can be beneficial for collaborative activities, by allowing the spread of information in the physical world. Therefore, further research uses real 3D objects as a marker would be very interesting because this new technology allows us to manipulate real objects as the learning object.

5. Conclusion

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An AR mobile application has been designed and developed in this study in order to identify students' perceptions in learning complex materials in a computer science course. This application was implemented to 24 second year students who took computer organization and operating system course. Results of the evaluation showed that most of the students were motivated to

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use AR in learning. They also think that the application was useful and attractive. However, there were students who did not have suitable devices for using the AR based application. In the future, it would be most likely that there are many students who will have suitable devices so that they can use this application in and outside the classroom.

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Synchronous and asynchronous e-learning styles and academic performance of e-Learners

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Abstract

It is important to keep in mind that every individual is a unique learner. Educators have, for many years, realized that some learners prefer certain methods of learning. These methods, referred as learning preferences or learning styles. This study was aimed to ascertain the learning styles of students in mode of synchronous and asynchronous e-learning and to compare the learning styles of e-learners with their academic performance. Synchronous or asynchronies e-learner determiner test and the Kolb's Learning Styles Inventory (KLSI 3.1) were conducted to identify differences in the learning styles among 731 e-learners from six virtual universities which were confined in Tehran and categorized in three different academic performance groups including low, mediocre and high . The sample was selected by multi-stage sampling based on Cochran formula and researchers conducted Kruskal-Wallis test to assess whether there is any significant difference within synchronous and asynchronous e-learners' learning styles based on their academic performance groups. The results revealed that in synchronous e-learners while, synchronous e-learners in low, mediocre and high academic performance groups preferred Assimilating and Diverging styles. In contrast, the results demonstrated that asynchronous e-learners in low, mediocre and high academic performance groups preferred Assimilating and Converging styles. Researchers conducted Mann-Whitney U as Post Hoc and their effect size value was calculated for significant Post hoc tests.

Keywords: Learning style; Academic performance; Synchronous; Asynchronous; e-Learner

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4. Introduction

The review of each one of the recent learning theories has shown an emphasis on the role of learners as major point of any learning process which has become popular among the educators. Basically, individual differences are effective on the process of learning among learners so, today this principle has become a natural reality as the ancient great philosophers believed it.

The approach of the learner-oriented in instruction has emphasized on the influence on the part of the learners about the content, activities, materials, and pace of learning. This approach is more popular than the other approaches which as four foci's including knowledge-oriented, learner-oriented, assessment-oriented, and community-oriented. The concept of these approaches have considered the individual differences as the most concerned role for the learners (Froyd & Simpson, 2008). An example to practical

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development and necessity to improve and adapt the above mentioned approaches which are reflected to one of the major challenges, published in a report entitled "A Nation at Risk".

Concurrent with stressing on recent advancements in educational technology, researchers believe that learning environment is one of the causes to satisfy the learners' diverse requirements. The developed web systems particularly brought about a revolutionary phase in education by bringing an alternative "anytime and anywhere" learning delivery methods for online learners around the world (Zolfaghari, Shatar Sabran, & Zolfaghari, 2009).This kind of advancement in educational technology has produced many benefits for both individual learners and organizations in several ways. Individual learners take advantage of self-paced learning environments in which they have control over their pace of learning, information flow, selection of learning activities, and time management.

Personalization of learning environment is a phenomenon which emphasis on effective individual characteristics during a learning process. It has become important gradually when distance learning has become more electronically. It is a process that emphasis on learning-oriented process and learning style of the learners is a determinant factor in improvement of any learning process. Regarding the necessity to facilitate the learning process as ultimate purpose in any ICT-based environment, recent theories related to learning and educational psychology should be considered. It becomes more important when education has not any access to target e-learners. Virtual University and e-learning centers provide opportunities for e-learners to learn at their own paced and their learning style.

Unfortunately, quick developing of online learning environments and growing demand in the extension service for e-courses without research by researchers and educators being equipped with the necessary skills required for successful completion has created some issues which need comprehensive consideration. Undoubtedly, taking advantages of all research and researchers in case of learning styles of learners in online learning environment are impossible. Considering these issues of learning styles, the authors strive to focus on the above questions and answers via review of the theoretic frameworks and foundations.

4.1. Learning styles and effective factors

A literature review on learning styles introduced them as individual preferences which are as per the individual and differ from one learner to the others (Dunn, 2000; Felder, 1996; Honey & Mumford, 1999; Kolb & Kolb, 2005; Peter, Bacon, & Dastbaz, 2009; Ramayah, Sivanandan, & Nasrijal, 2009). Hence, learning styles of students are affected by some variables, study of these situations are necessary (Ally & Fahy, 2004; Garland & Martin, 2005; Honigsfeld & Dunn, 2003; Lau & Yuen, 2010; Sanders & Hausler, 2007; Shukr, Zainab, & Rana, 2013; Slater, Lujan, & DiCarlo, 2007; Smith, 2008; Terrell, 2002).

Review of definitions in learning styles show that one of the most effective factors in distinguishing the learning styles from other similar concepts such as cognitive styles or thinking styles is depends on relation between learning styles and learning environment(Dinn, 2009). Although, several theorists have described the learning style but Keefe's definition is repeated due to its consideration on individual differences and its relation with learning environment as an indicator in distinguishing the learning styles from other concepts including cognitive styles or thinking styles.

Keefe (1979) defined learning styles as the "composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment"(Keefe, 1979).

The major effective factors on learning styles have been considered in a long spectrum including several factors. Garner, Furnam, Jackson, and Miller believe that the behavior associated with the four basic learning styles are shaped by transactions between people and their environment at five different levels of personality, educational specialization, professional career, current job role, and the adaptive competencies are most effective factors (Kolb & Kolb, 2005).

Although, the above mentioned researchers have considered on some factors while, others highlighted different factors which can influence on learning styles such as culture, school atmosphere, expectations, teaching style and classroom practices. Given and Reid (1999) have classified these factors into social variables, personality types, modality preference, cognitive processes, movement and later alit and emotional factors. Dunn (2000) believes that four learning-style traits significantly differentiate between groups and among individuals within the same group. They differ by achievement level, gender, age and culture.

4.2. Kolb's learning style theory

The authors used *Kolb's Learning Style Theory (*KLSI) which is on the basis of Experiential Learning Theory (ELT) and that is built upon the idea that learning preferences can be described by using two continuums: active-reflective and abstract-concrete. It creates four types of learners: active-abstract (Converging), active-concrete (Accommodating), reflective-abstract (Assimilating), and reflective-concrete (Diverging). The LSI is designed to determine an individual's learning preference (Esichaikul & Bechter, 2010).

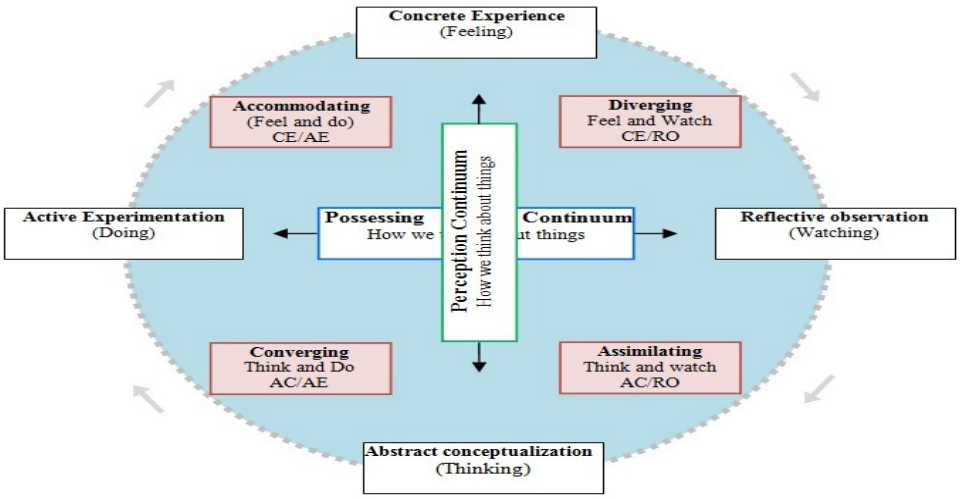


Figure 1. Kolb's learning styles cycle

4.3. Synchronous and asynchronous e-learning

Online learning due to the use of advanced and sensitive tools enables the e-learners to apply those tools which are adapt to their individual preferences. This (personalized the learning environment) is a process that any modern educational theories have emphasized on it. Today, the preferred learning style is as one of the most important criteria for recognizing any individual differences in learning process which have been considered for adaptability. Sabine Graf (2007) has mentioned this as a necessity and stated that adaptability includes all facilities to customize the system for the needs of the educational institutions (Graf, 2007).

Methods of providing e-content in an online classroom, instructors, learners, interactive tools, modes of interaction and many other factors in online learning modes are classified into two modes including synchronous and asynchronous e-learning. This part focuses on the mentioned modes and some concerned issues.

Synchronous e-learning have been expanded due to proven demands in various eras such as education. In the online educational environment, there is no physical meeting. Synchronous and Asynchronous learning tools, such as threaded discussions, instant messaging and blogs, play an important role in humanizing online courses by replicating the classroom experience of information exchange and social construct, not just between learners and instructors but among the learners as well.

People might just know it by reference to a particular vendor, tool or software program that enables the creation and delivery of synchronous e-Learning. Synchronous e-learning is live, real-time (and usually scheduled), facilitated instruction and learning-oriented interaction.

In this type of learning, learning experiences are live and real-time. The roots of synchronous e-learning are derived from three main influences: the classroom, the media, and the conference (Clark et al., 2007). Several researchers provide a comprehensive definition of the synchronous e-learning which is unanimous and it must include two components. They are interactions and time. Khan (2006) on the basis of these components defines Synchronous e-learning as "Interact of participants with an instructor via the Web in real time" (Khan, 2006).

Asynchronous online learning is defined variously due to some components, its nature and facilities that are common in some characteristics. On the other hand, one of the popular definitions that focus on the components of asynchronous e-learning introduced it as "an interactive learning community that is not limited by time, place or the constraints of a classroom"(Mayadas, 1997).

Asynchronous e-learning is similar to synchronous e-learning which is a learner-centred process which uses online learning resources to facilitate information sharing regardless of the constraints of time and place among a network of people. Asynchronous e-learning takes advantage of computer-mediated communication (CMC) to achieve the promises of learning "anytime and anywhere" through asynchronous online discussions. Asynchronous e-learning is on the basis of constructivist theory, a learner-centred approach that emphasize on the importance of peer-to-peer interactions. This approach combines self-study with asynchronous interactions to promote learning, and it can be used to facilitate learning in traditional on-campus or regular education, distance education and continuing education. This combined network of learners and the electronic network in which they communicate are referred to as an asynchronous e-learning network.

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The conditions and factors driving the Asynchronous e-learning are different so, this method is defined by another component. Khan (2006) on the basis of these components mentioned that "Asynchronous learning refers to instruction that is not constrained by geography or time" (Khan, 2005).

4.4. Academic performance

Academic performance is multidimensional variable which might be affected by internal and external classroom factors so the authors assumed the different learning style as a determiner of classroom factor in relation to the different academic performance groups.

In fact, this study follows an outcome-centric approach which has attempted to classify academic performance in terms of the learning outcomes that are designed to match, or the particular competencies that are designed to measure. Thus, the outcome-centric approach is a taxonomy process and then overall generality of the taxonomy can have advantages and disadvantages. The general nature of the taxonomy means that it is easily applicable across the different disciplines (Anderson, Krathwohl, & Bloom, 2001; Semper, 2008).

Researchers are eager to assess the learning styles of e-learners in different modes of e-learning and their academic performance. Thus, researchers based on above mentioned approach, and necessity to evaluate whether there is any significant difference between successful academic performance groups and particular learning styles in the mode of synchronous and asynchronous e-learning or not. On the basis of nature of academic performance and outcome-centric approach of the research and three existent groups of academic performance in educational system and higher education of Iran selected three different levels of academic performance for the study. The categories are on the basis of average marks of the last two semesters of the sample and the authors have transformed them to the Grade Point which has achieved by each one of the sample. They include low (0-13 out of 20 as the maximum marks which everybody can obtain from an exam), mediocre (14-17 out of 20 as the maximum marks which everybody can obtain from an exam) and high (18-20 out of 20 as the maximum marks which everybody can obtain from an exam). It should be noted that in a graduate degree, the students who obtain an average which is less than 12, are considered failed students while, in post graduate degree the fail criteria is 14. Researchers eliminate the students who have average marks less than 10 or very low academic performance.

1.5. *Objectives of the study*

- To determine learning styles of synchronous and asynchronous e-learners
- To compare learning styles of synchronous and asynchronous e-learners based on their academic performance groups
- To compare learning styles of synchronous and asynchronous e-learners

1.6. Research questions

- What are preferred learning styles of synchronous and asynchronous e-learners?
- Is there any significant difference in learning styles within different academic performance groups of synchronous e-learners?
- Is there any significant difference in learning styles within different academic performance groups of asynchronous e-learners?
- Is there any significant difference in learning styles of synchronous and asynchronous e-learners?

2. Methodology of the research

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Regarding the objectives of the research, the authors have applied multi methods to interpret different research types based on research requirements. Researchers used survey method for description of the learning styles while; researchers used casual-comparative method in order to compare the learning styles of synchronous and asynchronous e-learners based on their academic performance.

2.1. Sampling and sample

Sample size: The researchers regarding the two modes of virtual learners (Synchronous & Asynchronous) and by *Synchronous or Asynchronous e-learner test* selected 388 Synchronous and 343 Asynchronous e-learners from six virtual campuses which were confined in Tehran. The total sample size for the study includes 731 e-learners. The authors conducted the sampling procedure within virtual universities by multistage sampling design as follow:

In the first stage, the authors selected all colleges and Universities which had presented their course in online mode. These Universities comprise of twenty e-learning centers and virtual Universities in Tehran. In *the second stage* the authors selected six universities out of twenty by simple random sampling. In the *third stage,* the authors selected all the students of these Universities and sent the e-questionnaires to all of them. *In the last stage* of sampling of e-learners, the authors selected the sample of the study by stratified random sampling from those who filled up the e-questionnaires in each of the online circumstances including synchronous and asynchronous e-learning environment. For this procedure, Universities have linked the e-questionnaire and students have filled up and duly submitted the same. Due to the large number of completed e-questionnaires Lottery Sampling technique was administrated.

2.2. Data collection tools

Synchronous or asynchronous e-learner test: a questionnaire for e-classes:

The authors developed an instrument which is suitable to determine the preferred or the most used mode of learning among e-learners in online learning environment. The instrument has focused on the measure being used by admitting students in synchronous e-learning classes in order to determine mode of learning environment. This questionnaire includes 22 questions and is related to the synchronous e-learning classroom (e-classroom), tools, preferred e-facilities, attending issues, trainers, and its affiliated modes that are synchronous or asynchronous learning. Questions were asked to the virtual students purposefully and indirectly about the preference types, available methods which are provided and commonly used instruments by the students through online environment. The main objective of the questionnaire was distinguishing synchronous from asynchronous learner. Likert scale is used and each question is rated on five–point scale of distress (1-5) ranging from "Strongly Disagreed" to "Strongly Agreed".

Kolb's Learning Styles Inventory (KLSI V.3.1):

The authors have used Kolb's Learning styles Inventory (KLSI V.3.1) as a main instrument of the study. This form of the Kolb's Learning styles Inventory (KLSI V.3.1) created by instruments of Google Docs in e-format. This form of the inventory is suitable for synchronous and asynchronous e-learners. The e-format of the instrument linked to website of selective virtual Universities that are as sample of the study after allowing by the Universities (Appendix-B certificate of the institutes). This instrument is consisted of twelve sentences, with a choice of endings. The respondents were asked to rank the four endings for each of the sentence according to their preferences about their learning.

2.3. Reliability of the research tools

Conducting a pilot study in this study was necessary because the authors have used different tools such as e-instrument. To assess the above mentioned purposes, doing a pilot study was essential. The researc-

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hers have conducted the instrument among 37 virtual students and Cronbach's alpha through test-retest design during three weeks was found a= 0.752.

2.4. Statistical tools

The authors used nonparametric statistical tools considering some criterions. The obtained data from determiner Synchronous or Asynchronous e-learner test and Kolb's Learning Styles Inventory were categorized in rank or ordinal scale and due to serious violation to the assumptions of parametric data, the authors used nonparametric tests(Pagano, 2013). The authors used Kruskal-Wallis H Test and the Mann-Whitney test used as Post Hoc test and their effect size value was calculated for significant Post hoc tests. effect size in some nonparametric tests such as Mann- Withney U and Kruskal-Wallis which are used in this study are computed through division of Z on N square $(r) = \frac{|Z|}{\sqrt{N}}$ (Corder & Foreman, 2009). Researchers analyzed data by SPSS.

3. Results of the study

In order to examine the differences between learning styles of students based on variables of the study in two different modes of learning, the authors analysed the research questions in three parts. Based on this classification, researchers in first part determined learning styles of synchronous and asynchronous e-learners and second part was considering to the differences of learning styles within different academic performance groups. Finally, researchers compared preferred learning styles in mode of synchronous and asynchronous learning along with comparing on the basis of different academic performance groups.

1. What are preferred learning styles of synchronous and asynchronous e-learners?
This research question was relevant to the first objective of the research which is stated as follows: *"To determine learning styles of synchronous and asynchronous e-learners".*

Table 1. Distribution of Learning Styles of students based on mode of e-learning

Learning Style		Diverging	Assimilating	Converging	Accommodating
Synchronous	Frequency	146	181	37	24
	Percent	37.6	46.6	9.5	6.2
Asynchronous	Frequency	78	89	127	49
	Percent	22.7	25.9	37.0	14.3

a. Mode = Synchronous Vs Asynchronous

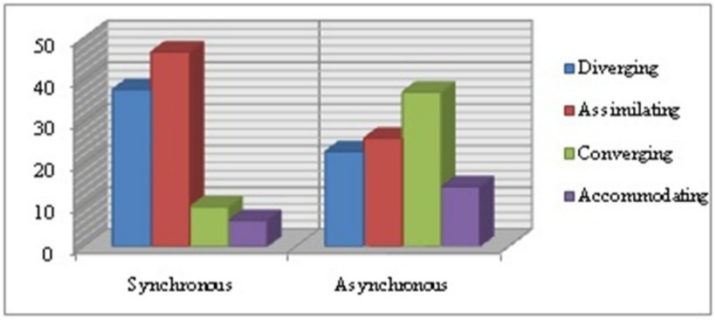


Figure 2. Distribution of Learning Styles of students based on mode of e-learning

Interpretation: Table and concerned figure show in mode of Synchronous e-learning, most of the students preferred Assimilating while, Diverging was preferred as the second learning style in Synchronous e-learning environment and Converging and Accommodating learning styles were preferred subsequently. In contrast, in mode of Asynchronous e-learning, e-learners mostly preferred Converging learning style while, Assimilating, Diverging and Accommodating were preferred as their learning style preferences subsequently.

2. Is there any significant difference in learning styles within different academic performance groups of synchronous and asynchronous e-learners?

This research question was relevant to first objective of the research which is stated as follows: *"*To compare learning styles of synchronous and asynchronous e-learners based on their academic performance groups*".*

The authors in order to examine the differences in learning styles of students within different academic performance groups and in two different modes of learning, analysed data through Kruskal-Wallis Test for each mode of e-learning separately. These processes continue with conduct Mann-Whitney *U* test as Post Hoc for those results which were significant. Thus, due to above mentioned reasons, the first and the second research questions and based on differences in learning styles within Low, Mediocre and High academic performance groups in two mode of e-learning, conducted statistical analysis presented in following Ranks table and Kruskal-Wallis table.

Table 2. Output of Rank table on the basis of Academic Performance Groups

No.	Environment	Academic Performance Groups	Frequency	Mean Rank	Preferred style	Total
2	**Synchronous e-learning**	Low:10 -13 out of 20	122	229.76	Assimilating	388
		Mediocre:14-17 out of 20	210	182.60	Diverging	
		High:18-20 out of 20	56	162.29	Diverging	
3	**Asynchronous e-learning**	Low:10 -13 out of 20	88	152.69	Assimilating	343
		Mediocre:14-17 out of 20	197	180.66	Converging	
		High:18-20 out of 20	58	171.88	Assimilating	

The output of Kruskal-Wallis Test for each one of research questions based on differences in learning styles within three academic performance groups of the students in three different environments summarized in the following Kruskal-Wallis Test table.

Table 3. Output of Kruskal-Wallis Test based on Test statistics

		Test Statistics[a,b]		
No.	**Test**	**Chi-square**	**df**	**Asymp. Sig.**
2	**Synchronous e-learning**	22.559	2	.000
3	**Asynchronous e-learning**	5.246	2	.073

a. Kruskal Wallis Test

b. Grouping Variable: Academic Performance

A Kruskal-Wallis test was conducted to determine whether statistically significant difference between learning styles in different academic performance groups in synchronous and asynchronous modes of

learning separately. The results of the analysis interpreted in separate research questions as "2. Is there any significant difference in learning styles within academic performance of learners in synchronous e-learning environment in Tehran Universities?"

Interpretation: A Kruskal-Wallis test was conducted to determine whether statistically significant difference between learning styles of students and different academic performance in Synchronous e-learning environment. The results indicated that whether x^2 =22.559 (df =2, N = 388) is larger than the critical value of the Kruskal-Wallis (5.99) while, p= .000< 0.05 = α. The students of low academic performance recorded a higher median score (Md = 229.76, N=122) than the other academic performance groups while, mediocre performance group recorded the second median (M =182.60, N=210) and high academic performance group recorded the last median (Md = 162.29, N=58). Thus, there exists enough evidence to conclude that there was a significant difference in learning styles within academic performance of students in synchronous e- learning environment in Universities of Tehran.

The results of the analysis indicated in the third question as "3.Is there any significant difference in learning styles within academic performance of students in asynchronous e-learning environment in Universities of Tehran?" there was no any statistical significant difference in observed variables. The results demonstrated as follow:

Interpretation: A Kruskal-Wallis test was conducted to determine whether statistically significant difference between learning styles of students and different academic performance groups in asynchronous e-learning environment. The results indicated that whether x^2 =5.246 (df =2, N = 343) is less than the critical value of the Kruskal-Wallis (5.99) and p= .073> 0.05 = α. Mediocre performance group recorded a higher median score (Md = 180.66, N=197) than the other groups while, students in high academic performance group recorded the second median (Md = 171.88, N=58) and low academic performance group recorded the last median (Md = 152.69, N=88). Thus, the authors found out that there was no significant difference in learning styles within academic performance of students in asynchronous e-learning environment in Tehran Universities.

A Post Hoc: Mann-Whitney U

Mann-Whitney U is a Post Hoc test which is applicable whenever the analysis of Kruskal-Wallis test is significant. In order to determine most effective factor in significance difference among three groups that were including Low, Mediocre and High academic performance, the authors conducted Mann-Whitney U as Post Hoc test between each two academic performance groups and the results were categorized in the table 4. It should be noted that the authors have not done any Post Hoc analysis for asynchronous e-learning. Regarding the above mentioned, due to not having any significance in the results of Kruskal-Wallis Test so, conducted Mann-Whitney U as Post Hoc test in asynchronous e-learning environment was not required.

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Table 4. Output of Mann-Whitney U Test as *Post Hoc test* within academic performance for synchronous e-learners

Environment	**Academic Performance**	**Mann-Whitney U**	**Wilcoxon W**	**Z**	**Asymp. Sig. (2-tailed)**	**N**	$(ES) = \frac{\lvert Z \rvert}{\sqrt{N}}$
Synchronous e-learning	Low & Mediocre	9723.500	31878.500	-3.997	.000*	332	0.22
	Low& High	2200.500	3796.500	-4.287	.000 *	178	0.32
	Mediocre & High	5292.000	6888.000	-1.253	.210	266	-

A Mann-Whitney *U* test was conducted to evaluate and determine the research questions related to significant difference between learning styles and academic performance groups of students including low, mediocre and high academic performance groups. The results of the analysis show that the major and root causes of these differences in synchronous e-learning and regular learning were due to differences between learning styles of one academic performance group with another or others. The authors summarized them as follow:

Interpretation: A Mann-Whitney *U* Test was conducted and the results indicated that in Synchronous e-learning, analysis of differences between learning styles of students among low and mediocre academic performance groups was a significant while, U=9723.5 (N=332), z= -3.997>1.96 and *p*=.000< .05=α. The results show a mediocre ES of academic performance groups on learning styles (ES=0.22). At the same time, it repeated among Low and High academic performance groups while, U=2200.5(N=178), z=-4.287>1.96 and *p*=.000<.05=α. The results show mediocre ES of academic performance groups on learning styles (ES=0.32).

The results of the Mann-Whitney *U* test indicated in synchronous e-learning environment differences between learning styles of low and mediocre academic performance groups and low with high academic performance groups was a major reason for having the differences in learning styles of students.

It was necessary to compare the learning styles of learners in mode of Synchronous and Asynchronous. Thus, authors considered on a separate question to asses this research question as follow:

4. Is there any significant difference between learning styles of learners in mode of Synchronous and Asynchronous in Universities of Tehran?

This research question was relevant to third objective of the study which is *"*To compare learning styles of synchronous and asynchronous e-learners*".*

Table 5. Output of Mann-Whitney U Test based on mean ranks

Ranks				
No.	**Academic Level**	**Frequency**	**Mean Rank**	**Sum of Ranks**
1	**Synchronous**	388	329.67	127913.50
2	**Asynchronous**	343	407.09	139632.50
	Total	731		

Table 6. Output of Mann-Whitney U Test in learning styles based on mode of learning

Post Hoc: Test Statistics[a]					
Mann-Whitney	**Wilcoxon W**	**Z**	**Asymp. Sig. (2-tailed)**	**N**	$ES = \frac{\lvert Z \rvert}{\sqrt{N}}$
52447.500	127913.500	-5.401	.000	731	0.2

Interpretation: The Mann-Whitney *U* test conducted in order to evaluate the fourth research question and significant difference between learning styles in different modes of e-learning including synchronous, asynchronous. The results indicated that U=127913.500 (N=731) while, z = -5.401>1.96 and *p*=.000 < .05=α. The results show mediocre ES (ES=0.2). Thus, the results revealed a significant difference between learning styles of e-learners in mode of "*synchronous-asynchronous".*

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4. Discussion

Researchers based on the conducted analysis and comparisons within learning styles of learners demonstrated that there was a significant difference between learning styles and academic performance of students. Learners of the first academic performance group (10-13) preferred learning in Assimilating style while, the second (14-17) and the third (18-20) groups opted for Diverging style. In contrast, researchers found out that there was no significant difference between learning styles and Academic Performance of asynchronous e-learners. The results indicated that the first Academic Performance group (10-13) preferred learning through Assimilating style while, the second group (14-17) preferred Converging and the third academic performance group (18-20) went for Assimilating style.

These results are relevant to findings of Dunn, Beaudry, Lu, Jia, Gong and Clark (2008), and Klavas (1989) that demonstrated the academic performance of convergers and assimilators were higher than diverge and accommodators while, Akbari, Ghanbari and Ghanbari (2013) in their results concluded significant and positive relationship between the different learning styles and the academic performance of the sample.

In contrast, Zywno (2002) found out that there was no significance difference between learning style and academic achievement based on hyper media treatment. Marium Dinn (2010) found out the same results within regular learners while, Nick Zacharis (2011) studied the differences between learning styles among online and regular learners. The results indicated that there was no any effect on selected modes of learning, including online and regular and ability to successful complete of the courses.

5. Conclusion

As researchers reported, the first preferred style of students in asynchronous e-learning is Converging and Assimilating style; while Diverging and Accommodating styles followed subsequently. Converging and Assimilating styles are similar in dimension of abstract conceptualization thus; those students who preferred these styles may experience the asynchronous e-learning environment similarly. As reported by Kolb (2005), students who use the abstract conceptualization value scientific approaches in solving the problems instead of the artistic approach characteristics' of the concrete experience dimension. Thus, preferring the abstract conceptualization is processing towards giving the meaning the contents which are relevant to the Converging and Assimilative learning styles. The most ability of Converging style which was selected by asynchronous students is in practical application of ideas and theories. Asynchronous students prefer solving their problem and finding solution for issues, the problems and deciding about them in decision making process. They prefer to be involved with technical issues rather than social and interpersonal issues. Individualized learning projects that allow for practical applications, online laboratory, listservs to provide information in various formats including text, video, graphic & sound, experimenting new, ideas, simulations, labs and practical application and doing individual assignment are some preferred and suitable methods of learning among asynchronous e-learners.

An individual with an Assimilating style as the most preferred one has included Abstract Conceptualization (AC) and Reflective Observation (RO) as the dominant learning abilities. Individuals with this learning styles preferred organizing information into logical & concise form, learn by watching and thinking, prefer reading, lectures and analytical models, prefer logic values, information and science careers and prefer personalize learning. Researchers recommend to facilitate learning process in mode of synchronous e-learning through providing interactive synchronous tutorials concepts, theory and analytical models, individualized learning projects that includes personal reflections on assigned readings, Synchronous chat tools, e-face to face communicate with instructors as coach or helper.

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T.C. İLAHİYAT FAKÜLTELERİ ARAPÇA HAZIRLIK SINIFLARI NAHİV DERSLERİNDE "ARAP NAHVİNİN TÜRKÇE DİLBİLGİSİ İLE KARŞILAŞTIRILARAK ÖĞRETİLMESİ YÖNTEMİ"

Arif GEZER[100]

Abstract

Comparative Teaching Methods Regarding Arabic and Turkish Grammar in Arabic Preparatory Grammar Courses at Divinity Schools in Turkey

Arabic has been of great importance for Turks ever since they converted to Islam. At that time Arabic was accepted as the language of education in the Medreses. This situation continued for 500 years during the Selcuk Era, and the 600 years of the Ottoman Empire. At one time during the rise of the Ottoman Empire, Islamic scholars (ulema) are approached Beyazid II and asked to write a history of the Turks in Turkish. After much debate among the scholars, the Seyhulislam complained "Your Majesty! The Turkish language is unrefined and out of tune. You cannot convey knowledge with it."

This response illustrates the understanding among the Ottomans that Arabic was the language of science version that of arts and poetry and Turkish that of administration. Arabic has much importance in Turkish daily life, as it was undoubtedly the language of religion. The Turks embraced Islam so much that they abandoned their word for God (Tanri) and adopted the Arabic word (Allah). Henceforward, people doubted one's faith if the word Tanri was used.

However, Arabs would not be upset if another Arabic word for God (Ilah) was used for Allah. Persians also would not have any problem if the word "Huda" was used for Allah.

Arabic became so influential to the Turkish language that the majority of words were borrowed from it. Statistically, the approximate percentage of Arabic origin words remains 20 to 30%.

In this sense, it is very important to consider Turkish grammar from this perspective. The number of borrowed Arabic words are clear from a brief glance at a few grammatical terms: sentence (Cumle), word (Kelime), noun (Isim), verb (Fiil), particle (Edat), adjective (Sifat), adverb (Zarf), pronoun (Zamir), command (Emir).

We can see this if we briefly examine a grammar book. For example, if we look at the third chapter from Mustafa Ozkan's *Syntax of Anatolian Turkish (*Sevinçli, Veysi-Özkan, Mustafa: *Türkiye Türkçesi Söz Dizimi (Kelime Çözümlemeli)*, Akademik Yay. İst. 2009.*)*:

''Chapter 3: Sentence Types (Ucuncu Bolum: Cumle Cesitleri)
I Sentences According to Verbs: (Yuklemlerine Gore Cumleler)
1) Nominal Sentence (Isim Cumlesi)
a) Simple-Time Nominal Sentence (Basit Zamanli Isim Cumlesi)
b) United-Time Nominal Sentence (Birlesik Zamanli Isim Cumlesi)
2) Verbal Sentence (Fiil Cumlesi)
a) Sentences with Simple Verbs (Basit Fiillerle Kurulan Cumleler)
b) Sentences with United Verbs (Birlesik Fiillerle Kurulan Cumleler)
c) Sentences with United-Time Verbs (Birlesik Zamanli Fiillerle Kurulan Cumleler)''

From the above citation from the grammar book, 21 of 32 words, or 66% were of Arabic origin.

But in terms of sentence structure and emphasis, as well as a number of other aspects, Turkish grammar is very different from Arabic.

In order to better understand learning, we have considered students enrolled in grammar courses for years at the Arabic language department in the preparatory class at the faculty of Divinity.

We have used this method for years in our work on comparative grammar teaching methods on Turkish grammar.

Our work can in the future also be of assistance to those who learn and teach Arabic.

Key Words: Arabic, Turkish, Grammar, Theology, Preparatory Courses, Comparative Method

ÖZET

Türkler İslamiyet'i seçtiği günden beri, Arapça onlar için çok büyük bir önem arz etmiştir. O kadar ki Arapça, medreselerde eğitim dili kabul edilmiştir. Bu durum hem 500 yıl hüküm süren Selçuklu, hem de 600 yıl hüküm süren Osmanlı dönemlerinde böyle devam etmiştir. Osmanlı'nın İmparatorluk anlayışını da yansıtan meşhur sözlerden biri şudur: *"Osmanlı İmparatorluğu'nda İlim Dili Arapça, Sanat (şiir) Dili Farsça ve İdare Dili Türkçe idi."* Hatta Osmanlı'nın Yükselme Döneminde II. Beyazıd-ı Veli, Ulemadan bir Türk Tarihi yazılmasını ama Türkçe yazılmasını istemişti ve

[100] Yüzüncü Yıl Üniv. İlahiyat Fak. Hadis ABD Öğretim Üyesi.

demişti ki *"Türk Tarihi, Türkçe yazıla."* Uzun tartışmalardan ulemanın kararını Reisu'l-Ulema, Padişaha şu şekilde arz etmişti. *"Hünkarım! Türk Dili natıraş ve dilhıraştır. Onunla ilim olmaz."*

Türklerin hayatında Arapçaya bu derecede önem verilmesinin en büyük sebebi, onun *Din Dili* olması idi. Türkler İslam'ı ve terimlerini o kadar benimsemişlerdi ki kendi öz dillerindeki Tanrı kelimesini dahi neredeyse terk etmişler onun kullanıldığı her yere Allah kelimesini yerleştirmişlerdi. Tanrı kelimesinin kullanılmasının neredeyse itikadi bir sorun olarak görülüyordu.

Hâlbuki *Tanrı* kelimesinin Arapçadaki karşılığı olan *İlah* kelimesinin kullanılması konusunda, Araplar hiçbir beis görmemişlerdi. Aynı şekilde Farsçadaki karşılığı olan *Hüda* kelimesinin kullanılmasında da, Farisiler hiçbir sorun görmemişlerdi.

Arapça ile bu kadar içli dışlı olmanın bir sonucu olarak Türkçede kullanılan kelimelerin birçoğu hala Arapçadır. Bu konuda tam bir istatistikî bilgi olmamasına rağmen bu oranın % 20-30 arasında olduğu tahmin edilmektedir.

Bu durum *Türkçe Dilbilgisi* açısından değerlendirildiğinde yine azımsanmayacak bir derecede Arapçadan etkilenmenin söz konusu olduğunu görmekteyiz. Mesela, dilbilgisi ile ilgili ilk anda akla gelen birkaç konu sıralayacak olursak, *Cümle, Kelime, İsim, Fiil, Edat, Sıfat, Zarf, Zamir, Emir...* gibi başlıklarının dahi çoğunun halen Arapça kelimeler olduğunu görmekteyiz.

Rastgele açtığımız bir Dilbilgisi kitabının içindekiler kısmına göz attığımızda bunu görebilmekteyiz. Mesela biz, elimizin altındaki bir dilbilgisi kitabını[101] açtığımızda içindekiler kısmının Üçüncü Bölümünde şunları gördük:

"ÜÇÜNCÜ BÖLÜM CÜMLE ÇEŞİTLERİ

I. Yüklemlerine Göre Cümleler:

1) *İsim Cümlesi*
   - *A. Basit Zamanlı İsim Cümlesi*
   - *B. Birleşik Zamanlı İsim Cümlesi*

2) *Fiil Cümlesi*
   - *A. Basit Fiillerle Kurulan Cümleler*
   - *B. Birleşik Fiillerle Kurulan Cümleler*
   - *C. Birleşik Zamanlı Fiillerle Kurulan Cümleler..."*

Daha yeni kaleme alınmış bu dilbilgisi kitabından yaptığımız yukarıdaki alıntıda, toplam 32 kelimenin 21 tanesi yani % 66'sı Arapça kelimelerdir.

Fakat bütün bunların yanı sıra *Türkçe Dilbilgisi* temel olarak, cümledeki söz dizini, vurgu anlayışı... gibi birçok açıdan *Arapça Dilbilgisi* ile tamamıyla zıttır.

Yıllardır İlahiyat Fakültesi Hazırlık Sınıflarında, Nahiv Dersi okutan Arap Dili Bölümü mezunu birisi olarak biz, öğrencilerin dersi daha iyi anlayabilmeleri için bu iki dilin dilbilgisi yapılarını, örneklerle karşılaştırmaktayız. Bu konuda ki yıllara dayanan birikimimizi akademik bir çalışma olarak değerlendirmenin faydadan hali olmayacağını düşündük.

Bu çalışmamızda biz yıllardır uygulamalı olarak gerçekleştirdiğimiz bu metodu, *Türkçe Dilbilgisi ile Karşılaştırmalı Nahiv Öğretim Metodunu* ele alacağız. İki Dilbilgisinin benzer ve farklılıklarını sistematik bir şekilde karşılaştırmalı olarak bazı temel konular bazında işleyeceğiz.

Daha çok öğretime (uygulamaya) yönelik olarak tasarladığımız bu çalışmamız bu yönüyle ileride Arapça öğrenen ve öğretenlere de yardımcı olabilecektir.

Anahtar Kelimeler: Arapça, Nahiv, Türkçe, Dilbilgisi, İlahiyat, Hazırlık Sınıfı, Karşılaştırmalı Yöntem.

GİRİŞ

"Bir dili iyi bilen diğer dilleri kolay öğrenir" şeklindeki meşhur söz, dil öğretiminde çokça uygulanan yöntemlerden birisinin temelini oluşturmaktadır. Bu yöntem "*Karşılaştırmalı Dil Öğretim Yöntemi"*dir. Gerçekten, ikinci bir dil öğrenilirken farkında olunarak ya da olunmayarak en çok yapılan şey onu diğer bir dil ile karşılaştırmaktır. Kendisiyle karşılaştırılan bu diğer dil, genellikle o kişinin *anadili* olmaktadır.

Peki, *anadil* ne demektir? Annemizin konuştuğu dil midir? Ya da babamızın konuştuğu dil midir? Ya da içinde yaşadığımız milletin konuştuğu dil midir? Yoksa herhangi bir sebeple ayrı düştüğümüz, kendisinden uzak bir yerde doğduğumuz ve büyüdüğümüz, başka bir coğrafyadaki kendi asli milletimizin konuştuğu ve fakat bizim öğrenemediğimiz ve dolayısıyla konuşamadığımız bir dil midir bizim *anadili*miz?.. Bu sorular daha da çoğaltılabilir. Fakat bizim anlayışımıza göre anadil, kişinin 6 yaşından önce öğrendiği dildir. Bu birden fazla da olabilir. 6 yaşından sonra öğrenilen diller artık *anadil* değildir. Başka ((öteki) bir dildir.

Malumdur ki anadiller semai (duyumsal) olarak öğrenilir. Bu öğrenme yönteminin, "kolay olması" gibi faydaları var belki ama noksanlıkları da yok değildir. Bunların başında özellikle "Dilbilgisi" gelmektedir. Çünkü *dilbilgisi* semai olarak değil de kitabi olarak öğrenilmesi gereken bir *dilbilim*dir. Doğal olarak

[101] Sevinçli, Veysi-Özkan, Mustafa: *Türkiye Türkçesi Söz Dizimi (Kelime Çözümlemeli)*, Akademik Yay. İst. 2009.

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bunun öğrenildiği yer okullardır. Okul veya medrese okumayan kişiler anadillerini rahat konuşurlar ama dilbilgisi kurallarını bilemezler. Bu durum anlaşılabilen bir konudur. Nitekim anadili Arapça olan bazı öğrencilerimizin İlahiyat Fakülteleri hazırlık sınıflarında muhadese (diyalog) derslerinde başarılı olmalarına rağmen sarf, nahiv, yazı, inşa… gibi derslerde, Arapça ile yeni tanışmış diğer öğrencilerimize nispetle daha çok zorlanmalarının sebebi budur. Hatta daha önce Arapçayı hiç okumamış diğer öğrenciler, Türkçe dilbilgileri iyi ise, Nahiv konularını onlardan daha çabuk kavrayabilmektedirler. Bunun sebebi giriş cümlemizde de belirttiğimiz gibi bir dili iyi bilmeleridir.

Bilindiği gibi *Arapça, İslam Medeniyet Dili*dir ve muazzam bir zenginliktedir. Halen, onlarca ülkede yüz milyonlarca insan tarafından konuşulan birçok lehçelere sahip çok yaygın, canlı ve hareketli bir dildir. Aynı şekilde *Türkçe* de binlerce yıl boyunca tarihteki birçok devlet ve İmparatorluk tarafından kullanılmış çok eski bir dildir. Halen dahi birçok devlet tarafından kullanılan, değişik lehçelere sahip oldukça zengin ve yaygın, ayrıca dünyadaki sayısı nadir denebilecek *İmparatorluk Dillerinden bir dil*dir.

Diğer taraftan yüzyıllar boyunca İslam Âlemi'nin sancaktarlığını ve hamiliğini yapan Türkler, din dili olan Arapçadan pek çok kelime, vecize, deyim ve ıstılah (terim) almışlardır. O kadar ki bir *İmparatorluk Dili* olan *Osmanlıca; Arapça*, *Farsça* ve *Türkçe* kelimelerden, neredeyse birbirine yakın oranlarda oluşan müşterek bir dil gibiydi. Aynı şekilde *Cumhuriyet Dönemi Türkçesinde dahi, Dilbilgisi* başlıklarının birçoğu (kelime, cümle, isim, fiil, sıfat, zarf, zamir, emir… vs.) halen Arapça kelimelerle ifade edilmektedir.

Bizim bu çalışmamızın gayesi, Türkçe bilen ve ikinci bir dil olarak Arapçayı öğrenmek isteyen öğrenciler için, iki dili kısmen de olsa karşılaştırmak ve "*Karşılaştırmalı Dil Öğretim Yöntemi"*ni örneklerle ortaya koymak olacaktır. *Arap Nahvi'nin (Cümle Bilgisinin)* öğretilmesinde *Türkçe Dilbilgisi* ile karşılaştırılması; ele alınan konular bazında ve sistematik bir metot çerçevesinde uygulanacaktır. Nitekim, benzer sayılabilecek bir gaye ile İngilizce bilenlere yönelik olarak hazırlanmış, Arapçayı basit seviyede de olsa (sarf ve nahiv de kısmen dahil olmak üzere) öğreten özel seriler vardır[102] Bu araştırmada biz, *bu iki* muazzam *dilin, dilbilgilerinin her yönü ile karşılaştırılması* gibi *büyük* bir iddiada bulunacak değiliz. Sadece, İlahiyat Fakültesi Hazırlık sınıflarımızda Arapça Nahiv dersindeki bazı temel konuları öğretirken, ilgili konuların Türkçe Dilbilgisindeki karşılıklarını göz önünde bulundurmak ve örnekler getirmek suretiyle uyguladığımız *"Karşılaştırmalı Öğretim Yöntemi"ni göstermeye çalışacağız.*

"Arap Nahvi" ifadesinden kastımız, Arapçadaki *"Cümle Bilgisi" (Sentaks)*dir. Türkçe Dilbilgisi ifadesinden de kastımız, Türkiye Türkçesindeki *"Söz Dizimi"*dir.

FİİL CÜMLESİ

Arapçada *Fiil Cümlesi*; herhangi bir fille başlayan, geçmişte işlenmiş veya şu an işlenmekte ya da gelecekte işlenecek bir işi, oluşu ya da hareketi anlatan cümlelerdir ve olayları zamana bağlı olarak anlatır.[103] Türkçede ise *Fiil Cümlesi;* yüklemi çekimli bir fiil olan cümleye denir. Fiil cümleleri; bir oluşu, durumu, duyguyu ya da istek ve temenniyi ifade ederler.[104]

Arapçada Fiil Cümlesindeki esas unsurlar *fiil* ve *fail*dir. Bunların ardından *mef'ulun bih* de gelebilir. Buradaki *fiil* Türkçe *Fiil (Eylem) Cümles*indeki *yüklem*dir, *fail* de *özne*dir, *mef'ulun bih* ise *nesne (düz tümleç)*dir.

Fiil cümlesine bir örnek:

كَتَبَ الْمُتَعَلِّمُ رِسَالَةً. Öğrenci bir mektup yazdı.

Bu basit fiil cümlesi üzerinden Arapça ile Türkçeyi karşılaştıralım:

1) Cümle öğelerinin sıralanışı açısından iki dilin karşılaştırılması:

a) Her iki cümlenin *fiil*lerine baktığımızda; Arapça cümledeki كَتَبَ kelimesi fiildir ve cümlenin başındadır. Fakat aynı cümlenin Türkçesine baktığımızda bu kelimeye karşılık gelen *"yazdı"* kelimesi *yüklem*dir ve cümlenin sonundadır.

b) Arapçada *fail* dediğimiz *özne*nin cümle içindeki yerine bakalım. Arapça cümledeki الْمُتَعَلِّمُ kelimesi faildir ve cümlenin ortasındadır.[105] Fakat aynı cümlenin Türkçesine baktığımızda bu kelimeye karşılık gelen *"Öğrenci"* kelimesi öznedir ve cümlenin başındadır.

c) Arapça cümledeki رِسَالَةً kelimesi *mef'ulun bih*dir ve cümlenin sonundadır. Türkçe cümlede buna karşılık gelen kısım *"bir mektup"* kelimeleridir. Cümle içinde buna *nesne (düz tümleç)* denir ve öğelerin sıralanmasındaki yeri özne ile yüklemin arasıdır.

[102] Örn. Abdurrahim, Dr V. : *Durusu'Lugati'l-Arabiyye/Arabic Course for English-Speaking Students*, UK İslamic Academy, 2004

[103] Maksudoğlu, *Arapça Dilbilgisi*, s. 242; Çörtü, *Nahiv,* s. 206; Aslan, *Nahiv*, s. 10.

[104] Sevinçli, *Türkiye Türkçesi Söz Dizimi,* s. 141; Hengirmen, *Türkçe Dilbilgisi,* 360.

[105] Fail hakkında gerniş bilgi için bkz. Aslan, Ahmet, *Nahiv*, s. 84-101).

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d) Sonuç olarak Arapçada fiil cümlesindeki öğelerin sıralanışı şu şekildedir: *Fiil-fail-meful*. Arapçanın kendi fonetiği ile seslendirdiğimizde ise şöyle olur: *Fi'lun-Fa'ilun-Mef'ulun*. Türkçe fiil cümlesinde ise cümle öğelerinin sıralanışı şu şekildedir: *Özne-Tümleç-Yüklem.*

2) Cümledeki öğelerinin irab açısından incelenmesi:

a) Arapçada irab; amilin icabına göre cümledeki kelimelerin sonlarındaki harf ve hareke değişikliklerine denir. Cümle yapısına göre öğelerin her birinin son harfleri ya da bu harfin harekesi çeşitli değişikliklere uğrar. Şöyle ki: Cümledeki her bir kelime, cümle içindeki yerine göre *merfu, mansub, mecrur* yada *mec-zum*dur. Mesela müfred kelimeler için, son harfin harekesi *ötreli, üstünlü, esreli* ya da *harekesiz*dir.[106] Türkçede ise böyle bir sorun yoktur. Çünkü hareke diye bir mefhum yoktur. Zira Arapçada hareke denen sesler, birer müstakil sesli harf olarak *Türk Alfabesi*ndeki yerlerini almışlardır.

b) Fiil cümlesinde *Fail* daima *"merfu"* olur. Onun merfu olması demek mesela müfred/tekil kelimeler için son harfinin harekesinin dammeli (ötreli) olması demektir. Türkçede böyle bir durum yoktur.

c) Fiil cümlesindeki *Fiil öğesi*; eğer zaman bakımından mazi ise çeşitli alametler üzere mebnidir, fakat muzari ise çeşitli amillere göre merfu, mansub yada meczumdur. Onun irab alametleri ise, bazen harf, bazen de hereke diğişikliği şeklinde olur. Aynı şekilde gelecek zaman ve emir halleri için de çeşitli ve teferruatlı irab durumları ve alametleri vardır. Bütün bu durumların hiçbirisi Türkçedeki fiiller için söz konusu değildir.

d) Yine *fiil* için geçerli diğer bir durum da failinin sayısına *(tekil, ikil, çoğul)* göre son harfinin değişebilmesidir. Türkçedeki cümlelerin fiillerinde ise *tekil* ve *çoğul*a göre sonlarının değişebilmesine (-ler/-lar eki almasına) rağmen, failin *ikil (iki kişi)* olması durumu için özel bir ek yoktur.

e) Mef'ulun bih (nesne/düz tümleç) daima mansubdur. Mansub olması demek mesela müfred kelimeler için son harfinin harekesinin fethalı (üstünlü) olması demektir. Türkçede ise böyle bir işaret söz konusu değildir.

f) Arapçadaki fiil cümlelerinde daha birçok teferruatlı bilgi vardır ki bunların hiçbirisi Türkçede yoktur. Bu kadar teferruatlı İrab konularının Türkçede olmaması, Türkçenin Arapçaya göre daha sade bir dil olduğu şeklinde yorumlanabilir. Ama diğer taraftan, bir dilin kurallarının çok ve teferruatlı olması ve kelimelerin, delalet ettikleri şahıslara, sayılara, cinsiyete, zamana, belirlilik ya da belirsizliğe göre ayrı şekiller, ekler ve alametler alması, o dilin zenginliğini ve muhataplarına verdiği değeri yansıtan bir gerçekliktir. Ayrıca bu durumun, o dil ile düşünen kişilere çok daha geniş bir hayal, düşünce, ilham ve hareket sahası da açtığı erbabının malumudur.

3) Cümle öğelerinin sıralanışındaki fonetik/ses yapısı açısından iki dilin karşılaştırılması:

a) Malumdur ki her dilin bir fonetik yönü vardır. Fonetik özellik dillerin ses yapısı ile alakalıdır ve herhangi bir dildeki *Şiir ve Musiki Edebiyatı*nın gelişmesinde çok önemlidir.

b) Arapçada fiil cümlesi öğeleri olan *"Fi'lun-Fa'ilun-Mef'ulun"* kelimelerinin Arap fonetiği ile seslendirilişine dikkat ettiğimizde (bu kelimelerdeki kesme işaretinin hemzeye {ا} değil de çok yumuşak bir ses olan '*ayın {ع}harfine* delalet ettiği akıldan çıkarılmamak kaydıyla) kulağa hoş gelen çok güzel bir sesteşlilik ve hatta şiirsellik söz konusudur. O kadar ki yüzyıllar boyunca Osmanlı Türkçesindeki şiirlerin vezin ölçüleri dahi bu kelimelerle veya bunların müştakları (türetilmişleri) ile ifade edilmişlerdir. Arap Şiirinin ve musikisinin bu denli geniş ve yaygın olmasında, *Arap harflerinin fonetik yapısı*nın etkili olduğu da yadsınamayacak ayrı bir olgudur.

c) Türkçedeki fiil cümlesi öğeleri olan *"Özne-Tümleç-Yüklem"* kelimelerinin Türk fonetiği ile seslendirilişine kulak verdiğimizde ise böyle bir *hoş seda* yerine, belki şiirselliği de zorlaştıran çok sert sesler ile karşı karşıya kaldığımızı fark ediyoruz.

4) Fiil Cümlesi öğelerinin kelime manaları ile cümle içindeki görevleri arasındaki uyumluluk açısından iki dilin karşılaştırılması:

a) *Fiil* kelimesinin Arapçadaki lügat manası, *iş, oluş, hareket* bildiren bir mana içermekte olup cümle içindeki öğesel pozisyonu da aynı şekilde iş, oluş, hareket bildiren kelimenin yerine delalet etmektedir. Mesela yukarıdaki örnekte "*ketebe*" kelimesi, cümlenin *fiil* öğesidir. "*Ketebe*" kelimesi yazmak şeklindeki bir iş, oluş ve hareket ifade etmektedir. Onun öğesel karşılığı olan *fiil* kelimesi de zaten aynı anlamdadır.

b) Türkçede ise *yüklem* kelimesi ile cümledeki *fiil (eylem)* arasında bu kadar bir uyumluluk söz konusu değildir. Mesela yukarıdaki örnek cümlede "*yazdı*" kelimesinin cümle içindeki öğesel karşılığı *"yüklem"* ile ifade edilmektedir. "*Yüklem ve yazdı"* kelimeleri arasında, *fiil-yazdı* ikilisi kadar bir manasal uyumluluk yoktur.

c) Arapça cümledeki *Fail öğesi*, *fiil* kelimesinden türetilmiş (müştak) bir kelime olup "*o işi, oluşu, hareketi gerçekleştiren"* anlamına gelmekte ve cümle içindeki öğesel pozisyonu da aynı şekilde *fiili gerçekleştiren*in yerine delalet etmektedir. Mesela yukarıdaki cümlede *fail* kimdir? Yazma fiilini gerçekleştiren öğrencidir. Öğrencinin bu fiili gerçekleştirmesi zaten onu *fail* yapmaktadır ve bunun öğesel karşılığı da aynı kelime *(fail)* ile ifade edilmektedir. Dolayısıyla "*fail"*in kelime manası ile cümle içinde, *fiili gerçekleştiren öğrenciye*

[106] Geniş bilgi için bkz. Birgivi, *Avamil ve İzhar*, s. 56-62.

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delalet eden bir öğe olması arasında çok mükemmel bir uyumluluk vardır. Türkçe örnekte ise aynı derecede bir uyumluluk fark edemiyoruz. *"Özne"*nin kendi kelime manası ile cümle içindeki öğesel yeri, yani *yazma eylemini gerçekleştiren öğrenciye delalet etmesi* arasındaki uyumluluk, Arapçadaki kadar değildir.

d) *Muf'ul* kelimesi de aynı şekilde fiil kelimesinden türetilmiş müştak bir kelime olup, *failin o fiili üzerinde gerçekleştirdiği şey* anlamına gelmekte ve cümle içindeki öğesel pozisyonu da *yapılan bir şeyi* ifade eden kelimenin yerine delalet etmektedir.

e) Aynı bakış açısıyla "t*ümleç"* kelimesini incelediğimizde; bu kelimenin sözlük manası ile öğe olarak cümle içinde kullanıldığı pozisyonu arasında, Arapçadaki kadar bir uyumluluğun var olduğunu söylemek pek de mümkün görünmemektedir.

5) Son olarak, iki dil arasındaki en bariz farklılık ya da zıtlık cümlelerin yazılış ve harflerin sıralanış şeklindedir. Arapçanın, Arap harfleriyle ve sağdan sola, Türkçenin ise Latin harfleriyle ve soldan sağa yazıldığı herkesin malumudur. Yukarıda verdiğimiz örnek cümlemizde de görülmektedir.

İSİM CÜMLESİ

Arapçada *İsim Cümlesi;* herhangi bir isim ile başlayan, bir durumu ya da bir varlığın nasıl olduğunu haber veren cümlelere denir ve bunlar bir hüküm bildirirler.[107]

Türkçede de yüklemi isim cinsinden olan cümlelere *İsim Cümlesi* denir ve isim cümlelerinin hüküm bildirişi ek fiil (-dır, -dir, -tır, -tir) ile sağlanır.[108]

İsim cümlesinde iki öğe vardır. Birincisi cümlenin kendisi ile başladığı kelimedir ki buna *Mübteda denir*. İkincisi bu ilk kelimeyi niteleyen ve onun durumunu bize bildiren kelimedir ki buna da *Haber* denir.[109]

Türkçe isim cümlesinde Mübtedanın karşılığı *Özne*dir. Haberin karşılığı ise *Yüklem*dir.

İsim cümlesine bir örnek:

Bahçe güzeldir. لَحْيَةٌ جيدٌ

Bu basit isim cümlesi üzerinden Arapça ile Türkçe arasında bazı karşılaştırmalar.

1) Cümle öğelerinin sıralanışı açısından iki dilin karşılaştırılması:

a) Arapça cümlede لَحْيَةٌ kelimesi mübtedadır ve cümlenin başındadır. Türkçe cümlede buna karşılık gelen *"Bahçe"* kelimesi öznedir ve o da cümlenin başındadır.

b) Arapça cümlede جيدٌ kelimesi haberdir ve cümlenin sonundadır. Türkçe cümlede buna karşılık gelen *"güzeldir"* kelimesi yüklemdir ve o da cümlenin sonundadır.

c) Fiil cümlesinin tersine isim cümlesindeki öğelerin sıralanışı hem Arapçada hem de Türkçede aynıdır: Mübteda-Haber. Özne-Yüklem.

2) Cümledeki öğelerin irabları açısından incelenmesi:

a) Mübteda daima merfudur. Onun Ref' (merfu olmasının) alametleri, kelimenin tekil, ikil ya da çoğul olmasına göre değişik olmakla beraber mesela müfred isimler için son harfinin harekesinin dammeli (ötreli) olmasıdır.

b) Haber de aynı şekilde daima merfudur. Ref alameti olarak yukarıda söylenenler bunun için de geçerlidir.

c) Özne ve Yüklem öğelerin için böyle bir şey söz konusu değildir. Çükü Türkçede irab yani kelime sonlarının her bir öğe için farklı olması diye bir şey yoktur.

3) Marifelik-Nekrelik açısından iki dilin karşılaştırılması:

a) Arapça isim cümlelerinde mübteda daima ma'rifedir. Yani belirli bir isimdir. Ma'rifelik alameti başındaki {ال} takısıdır.

b) Haber ise daima nekredir. Nekrelik alameti sonundaki tenvindir. Yani kelimeleri -en, -in, -ün şeklinde bitmeleridir.

c) Türkçede ise *"Bahçe güzeldir."* cümlesindeki öznenin yani *bahçe* kelimesinin, bağlamda aksine bir karine yoksa hem belirli hem de belirsiz olması mümkündür. Çünkü Türkçede belirlilik ya da belirsizlik sadece zihindedir. Onların Arapçada olduğu gibi yazıya yansıyan bir alametleri yoktur. Dolayısıyla bu cümledeki bahçe kelimesi siyak ve sibakında (bağlamında) aksine bir karine yok ise her iki şekilde de anlaşılabilir. Eğer bahçe kelimesini belirli kabul edersek, zihinlerde var olan belli bir bahçenin güzel olduğundan bahsedilmektedir. Eğer onu belirsiz kabul edecek olursak cümlemiz *"Bahçe güzel bir şey."* anlamına gelir. Ma'rife-Nekre/Belirlilik-Belirsizlik konusu Arapçada, Türkçenin tersine çok şümullü bir konudur. Dolayısıyla biz onu biraz sonra müstakil bir konu olarak da işleyeceğiz.

4) -dır -dir (imek) eki açısından iki dilin karşılaştırılması:

a) Türkçede isim cümlesindeki yüklem, ek fiil i- (imek) ile çekime girer. Bu ek fiil için sadece 4 çekimli şekil (şimdiki zaman, görülen geçmiş zaman, öğrenilen geçmiş zaman ve şart) bulunmaktadır. İsimler ancak bu

[107] Maksudoğlu, *Arapça Dilbilgisi*, s. 241; Çörtü, *Nahiv,* s. 205; Akdağ, *Arapça Dilgilgisi*, s. 185; Aslan, *NAHİV*, s. 9; Uralgiray, *Arapça İlk ve İleri Dilbilgisi*, s. 103-7; Antaki, *el-Minhac*, s.7.

[108] Sevinçli, *Türkiye Türkçesi Söz Dizimi,* s. 137; Hengirmen, *Türkçe Dilbilgisi, s.* 360.

[109] Geniş bilgi için bkz. Aslan, *NAHİV*, s. 73.

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kiplerle çekimlenerek yüklem olurlar. Bu çekimlerin en çok kullanılanı ise, şimdiki zamanın teklik üçüncü şahıs eki olan "-dır, dir; -tır, tir" "-dur, dür; tur, -tür" ekiyle kullanılan şekildir.[110]

b) "Bahçe güzeldir." cümlesindeki "güzeldir" kelimesi yüklemdir. İsmin (sıfatın) sonuna imek çekim eki (-dir. şeklinde) eklenmiş ve isim bir nevi fiile dönüştürülmüştür. Bu ek, yüklemin tanınması için çok güzel bir alamettir.

c) Arapçada ise böyle bir alamet yoktur. Biz haberi ancak cümle içindeki yerinden (pozisyonundan) tanıyabiliyoruz. Çünkü ona (habere) has bir ek veya işaret yoktur. İsim cümlesindeki bu durum, Türkçenin Arapçaya göre farklı, bariz ve pratik bir yönünü ortaya koymaktadır.

5) Öğelerin kelime manaları ile cümle içindeki görevleri arasındaki uyumluluk açısından iki dilin karşılaştırılması:

a) Arapça isim cümlesindeki birinci öğe *Mübteda;* başladı anlamına gelen *"bedee"* kelimesinden müştaktır[111] ve başlangıç yeri anlamına gelmektedir. Yukarıdaki örnekte görüldüğü gibi mübtedanın cümle içindeki yeri de gerçekten cümlenin başlangıcıdır. Yani kelime manası ile cümle içindeki görevi arasında tam bir uyumluluk vardır.

b) Yine aynı şekilde Arapça isim cümlesindeki ikinci öğe *Haber*in kelime manası, *bir şeyin durumunu birine bildirmek* anlamına gelmektedir ve cümle içindeki öğesel görevi de gerçekten mübtedadan sonra gelmekte ve onunla ilgili bir durumu bize haber vermektedir. Yani bu öğenin kelime manası ile cümle içindeki görevi arasında tam bir uyumluluk vardır.

c) Fakat diğer yandan, Türkçe isim cümlesindeki öğelerin kelime manaları ile cümle içindeki öğesel manaları arasında bu denli bir uyumun var olduğunu söylemek ise pek de mümkün görünmemektedir. Zaten bu öğe isimleri fiil cümlesinden alınmıştır.

d) Arapçada, *İsim Cümlesindeki Öğeler* ile *Fiil Cümlesindeki Öğeler* farklı isimlerle ifade edilirler. Yani farklı bir cümle yapısında, bu yeni cümle çeşidine özel yeni öğe isimleri, ayrı ıstılahlar (terimler) vaz' edilmiştir. Fakat Türkçede ise fiil cümlesindeki öğeler (özne-yüklem), isim cümlesi için de kullanılmış ve bu cümle çeşidine has yeni öğe isimleri düşünülmemiştir.

6) Mübteda ile Haberin birbirine uyumu açısından bir karşılaştırma:

a) Arapçada mübteda ile haber arasında cinsiyet bakımından bir uyum söz konusudur. Yani mübteda müzekker ise haber de müzekkerdir. Yine aynı şekilde mübteda müennes ise haber de müennestir (Carim, *en-Nahvu'l-Vadıh*, c. III, s. 4). Türkçede böyle bir durum yoktur.

b) Arapçada mübteda gayri akil (eşya ve hayvan gibi) ise onun haberi müfret ve müennes gelir. Türkçede böyle bir konu yoktur.

c) Arapçada haber müştak (ismi fail, ismi mef'ul, sıfat-ı müşebbehe gibi türetilmiş) ise onun irabı, sayı ve cinsiyet bakımından mübtedaya uymak durumundadır. Türkçede ise böyle bir mefhum yoktur.

MARİFE VE NEKRE

Arapçadaki ma'rifelik ve nekrelik konusu, Türkçede belirlilik ve belirsizlik olarak ifade edilir. Arapçada her bir kelime ya ma'rifedir ya da nekredir. Ma'rifenin çok çeşitleri ve teferruatları vardır. Biz sadece ma'rifelik ve nekrelik alameti açısından ele alacağız.

1) Arapçada marife bir kelimenin başına daima {ال} takısı gelir. Yani Ma'rifelik alameti {ال} takısıdır. Mesela kapı anlamına gelen لبَبٌ kelimesi ma'rife (belirli)dir. Çünkü başında {ال} takısı mevcuttur. Bu demektir ki bu kapı herhangi bir kapı değil, bilinen belirli bir kapıdır.

2) Arapçada nekre bir kelime eğer gayri munsarif (çekime gelmeyen) değilse, tenvin ile yani -en, -in, veya -ün şeklinde biter. Bu onun nekrelik alametidir. Mesela kapı anlamına gelen ببٌ kelimesi ki bunun telaffuzu babün şeklindedir nekre (belirsiz) bir kelimedir. Çünkü sonu (ün) ile bitmektedir. Bu demektir ki bu kapı bilinen belirli bir kapı değil herhangi bir kapıdır.

3) Türkçede ise belirlilik ya da belirsizlik sadece zihindedir. Onların Arapçada olduğu gibi yazıya yansıyan bir alametleri yoktur. Dolayısıyla mesela "kapı" kelimesi tek başına yazıldığında onun belirli mi ya da belirsiz mi olduğu anlaşılamaz. Ancak bir metin içinde ise ve siyak-sibakında (bağlamında) onun belirliliği ile ilgili bir karine var ise belirli kabul edilir. Aksi takdirde belirsiz kabul edilir.

4) Ma'rife-Nekre/Belirlilik-belirsizlik konusu Arapça dil kitaplarının hepsinde teferruatlı bir şekilde işlenmektedir.[112] Fakat Türkçe dil kitaplarında bizim görebildiğimiz kadarıyla, müstakil bir konu olarak ele alınmamaktadır.[113]

5) *"Ma'rifelik-nekrelik/belirlilik-belirsizlik"* konusundaki bu farklılıklar, Arapçanın Türkçeye göre daha teferruatlı, bariz ve pratik bir yönünü ortaya koymaktadır.

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[110] Sevinçli, *Türkiye Türkçesi Söz Dizimi,* s. 138.

[111] Müştak: İster fiil ister isim olsun başka bir kelimeden elde edilen yani türetilen yeni bir kelimedir. Bkz. Uzun, Arapça Sarf Nahiv Terimleri Sözlüğü, s. 77.

[112] Maksudoğlu, *Arapça Dilbilgisi*, s. 29-32; Çörtü, *Nahiv,* s. 187; Akdağ, *Arapça Dilgilgisi*, s. 154-6; Aslan, *NAHİV*, 60; Uralgiray, *Arapça İlk ve İleri Dilbilgisi*, s. 470-81; Kaçar, *el-Kavaidu'l-Muşecci'atu,* c. I. s. 20.

[113] Sevinçli, *Türkiye Türkçesi Söz Dizimi*; Hengirmen, *Türkçe Dilbilgisi*.

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İSİM TAMLAMASI

Arapçada isim tamlamasına izafet terkibi veya kısaca izafet denir. Arapçada *İzafet;* bir ismin kendisinden sonra gelen bir diğer isimle bir hususiyet veya bir destek kazanmasına denir. İzafet genellikle ardı ardına gelen iki isimden oluşur. Birinci isme muzaf (desteklenen), ikinci isme ise muzafun ileyh (destekleyen) denir. *Muzaf* kelimesinin Türkçedeki karşılığı *tamlanan*dır. *Muzafun ileyh*in Türkçedeki karşılığı *ise tamlayan*dır.[114]

Türkçede isim tamlaması; iki veya daha çok ismin sahiplik, tahsis, tür, cins vb. nitelikleri belirtmek üzere özel bir biçimde bir araya gelmesinden oluşan kelime grubuna denir. İki temel unsuru vardır. Birincisi tamlayan (belirten), ikincisi tamlanan (belirtilen). Tamlamada asıl anlam ikinci kelimenindir. Birinci kelime ikinci kelimeyi belirtir ve ikinci unsura ekli ya da eksiz bağlanır. Ekli bağlandığında *Belirtili İsim Tamlaması* (örn. kuşun kafesi), eksiz bağlandığına ise *Belirtisiz İsim Tamlaması* (örn. Kuş kafesi) yapılmış olur.[115]

İzafet terkibine (isim tamlamasına) bir örnek:

بابُ المَدْرَسَةِ Okulun kapısı

Bu basit isim tamlaması üzerinden her iki dilin karşılaştırılması:

1) Arapça izafet terkibindeki بابُ kelimesi *muzaf*tır. المَدْرَسَةِ kelimesi ise *muzafun ileyh*tir.
2) Türkçe isim tamlamasındaki *okulun* kelimesi *tamlayan*dır, *kapısı* kelimesi ise *tamlanan*dır.
3) Arapça izafet terkibindeki muzaf birinci kelimedir, Türkçe isim tamlamasında buna karşılık gelen *tamlanan* ise ikinci kelimedir.
4) Arapça izafet terkibindeki muzafun ileyh ikinci kelimedir, Türkçe isim tamlamasında buna karşılık gelen *tamlayan* ise birinci kelimedir.
5) Arapça izafet terkibinde asıl olan kelime ilk kelimedir. Yani muzaftır. Vurgu ona yapılır. Türkçe isim tamlamasında ise asıl olan kelime ikincisidir. Yani tamlanandır. Vurgu ona yapılır.
6) Görüldüğü gibi, öğelerin sıralanışı ve vurgunun yeri her iki dilde birbirinin tersidir.
7) Arapça izafet terkibinde ikinci kelime olan *muzafun ileyh* marifedir (belirlidir). Dolayısıyla başında (ال) takısı gelmiştir. Aynı şekilde Türkçe isim tamlamasında da *tamlayan (okulun kelimesi)* belirlidir. Fakat herhangi bir belirlilik işareti taşımamaktadır. Çünkü Türkçede böyle bir işaret yoktur. Belirlilik sadece zihindedir. Bununla beraber (–un) şeklinde bir *ilgi eki*ni almıştır. Bu ek, *tamlayan eki* olarak da ifade edilir.[116] Tamlayanı bu eki alan isim tamlamaları, *Belirtili İsim Tamlaması*dır.[117]
8) Arapça izafet terkibindeki birinci kelime olan *muzaf da* marifedir (belirlidir). Fakat onun marifeliği (ال) takısından değil, *marife olan bir kelime tarafından tamlanmasından* anlaşılmaktadır. Yani tamlayan okul belirli ise onun tamladığı ve dolayısıyla bir hususiyet kazandırdığı kapı daha da belirli hale gelmiştir.
9) Aynı durum Türkçedeki isim tamlaması için de geçerlidir. Okul (tamlayan) belirli olunca, onun bir özelliğini beyan ettiği kapı (tamlanan) da belirli hale gelmiştir. Ama yukarıda belirttiğimiz gibi belirlilik alameti yoktur. Ona bitişen –sı eki sadece *iyelik eki*dir.[118]
10) Arapça izafet terkibindeki ikinci kelime yani muzafun ileyh nekre olsaydı başındaki (ال) takısı düşecekti. Buna mukabil sonu tenvin ile bitecekti. Yani bu kelime (مَدْرَسَةٍ) şeklinde olacaktı ve manası *"okul kapısı"* olacaktı. Buradaki okul belirli bir okul değil de herhangi bir okulu ifade edecekti.
11) Aynı şekilde Türkçe isim tamlamasındaki ilk kelimenin yani tamlayanın belirsiz olması, yani *okulun* kelimesi yerine *okul* denmesi durumunda da bu tamlama belirsiz isim tamlaması olacaktı. İki dil arasında bu açıdan bir benzerlik vardır.

SIFAT TAMLAMASI

Arapçada bir ismin kendisinden sonra gelen bir sıfat ile nitelenmesine ve bir hususiyet kazandırılmasına *Sıfat Terkibi* veya *Sıfat-Mevsuf* ya da *el-Mevsuf ve's-Sıfatu* denir. Bu terkibin iki öğesi vardır: *Sıfat* ve *Mevsuf*. İlk kelime mevsuftur, ikinci kelime sıfattır. Sıfat daima mevsuftan sonra gelir.[119]

Türkçede ise sıfatların adları nitelemesi ya da belirtmesiyle oluşan tamlamalara *Sıfat Tamlaması* denir. Sıfat tamlamasında sıfatlar tamlayan, adlar da tamlanan durumundadır. Bu tamlamanın da iki öğesi vardır ve bunlar isim tamlamasıyla aynı öğelerdir: *Tamlayan ve Tamlanan*.[120]

Sıfat tamlamasına bir örnek:

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[114] Maksudoğlu, *Arapça Dilbilgisi*, s. 235; Çörtü, *Nahiv,* s. 204; Akdağ, *Arapça Dilgilgisi*, s. 289; Uralgiray, *Arapça İlk ve İleri Dilbilgisi*, s. 482.

[115] Daha geniş bilgi için bkz. Sevinçli, *Türkiye Türkçesi Söz Dizimi*, s.17-27 ve Hengirmen, *Türkçe Dilbilgisi,* s. 118-121.

[116] Hengirmen, *Türkçe Dilbilgisi,* s. 119.

[117] Sevinçli, *Türkiye Türkçesi Söz Dizimi*, s.19.

[118] a.y.

[119] Çörtü, *Sarf-Nahiv Edatlar*, s.203; Kaçar, *el-Kavaidu'l-Muşecci'atu,* c. I. s. 138; Maksudoğlu, *Arapça Dilbilgisi*, s. 239; Aslan, *NAHİV*, s. 171-177; Uralgiray, *Arapça İlk ve İleri Dilbilgisi*, s. 482.

[120] Sevinçli, *Türkiye Türkçesi Söz Dizimi*, s.30; Hengirmen, *Türkçe Dilbilgisi,* s. 141-2.

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Kısa kalem. اَلْقَلَمُ قَصِيرٌ

Bu basit sıfat tamlaması üzerinden her iki dilin karşılaştırılması:

1) Arapça sıfat terkibindeki اَلْقَلَمُ kelimesi *mevsuf*tur, قَصِيرٌ kelimesi ise sıfattır.
2) Türkçe sıfat tamlamasındaki *kısa* kelimesi *tamlayan*dır, kalem kelimesi ise *tamlanan*dır.
3) Arapça sıfat terkibindeki mevsuf birinci kelimedir, Türkçe sıfat tamlamasında buna karşılık gelen *tamlanan* ise ikinci kelimedir.
4) Arapça sıfat terkibinde sıfat ikinci kelimedir, Türkçe sıfat tamlamasında buna karşılık gelen *tamlayan* ise birinci kelimedir.
5) Arapça sıfat terkibinde asıl olan kelime ilkidir. Yani mevsuftur. Vurgu ona yapılır. Türkçe sıfat tamlamasında ise asıl olan kelime ikincisidir. Yani tamlanandır. Vurgu ona yapılır.
6) Görüldüğü gibi, öğelerin sıralanışı ve vurgunun yeri, her iki dilde birbirinin tersidir.
7) Arapça sıfat terkibinde birinci kelime olan mevsuf ma'rifedir (belirlidir). Dolayısıyla başında (ال) takısı gelmiştir. Türkçe sıfat tamlamasındaki *tamlanan*da ise herhangi bir ek veya takı yoktur.
8) Arapça sıfat terkibinde ikinci kelime olan sıfat da marifedir (belirlidir). Dolayısıyla başında (ال) takısı gelmiştir. Çünkü bu konuda mevsufuna tabidir. Türkçe sıfat tamlamasında ise böyle bir durum söz konusu değildir.
9) Arapça *Sıfat Tamlaması*ndaki "sıfat"; *sıfatı hakiki* ve *sıfatı sebebi* olmak üzere iki çeşide ayrılır. Ayrıca sıfatı hakiki de kendi içinde *müfret, şibhi cümle, isim cümlesi, fiil cümlesi* gibi çeşitlere ayrılır…[121] Fakat biz bu kadar teferruata inerek bu çalışmamızın ana gayesinden uzaklaşmak istemiyoruz
10) Arapça sıfat terkibinde sıfat mevsufuna 10 açıdan tabidir:

a) Bunların 3'ü irab bakımındandır:
1) Mevsuf merfu ise sıfat da merfudur.
2) Mevsuf mansub ise sıfat da mansubdur.
3) Mevsuf mecrur ise sıfat da mecrurdur.

b) Bunların 3'ü sayı bakımındandır:
1) Mevsuf müfred/tekil ise sıfat da müfred/tekildir.
2) Mevsuf tensiye/ikil ise sıfat da tensiye/ikildir.
3) Mevsuf cemi/çoğul ise sıfat da cemi/çoğuldur.

c) 2'si ma'rifelik-nekrelik/belirlilik-belirsizlik bakımındandır:
1) Mevsuf ma'rifel/belirli ise sıfat da ma'rifel/belirlidir.
2) Mevsuf nekre/belirsiz ise sıfat da nekre/belirsizdir.

d) 2'si de cinsiyet bakımındandır:
1) Mevsuf müzekker/eril ise sıfat da müzekker/erildir.
2) Mevsuf müenneslik/dişi ise sıfat da müenneslik/dişidir.

Sıfat ile mevsuf arasındaki bu mükemmel uyumluluğu Türkçeye kıyasladığımızda maalesef göremiyoruz. Yukarıdaki 10 maddenin sadece birinde (isim tekil ise sıfatın da tekil olduğunu) görüyoruz. Diğer 9 maddedeki uyumluluğun hiçbirisi Türkçedeki sıfat tamlamasında mefhum olarak dahi yoktur. Sonuç olarak, *Sıfat Tamlaması* diye ifade edilen bu konuda Arapça, Türkçeye nazaran neredeyse 10 misli daha teferruatlı, daha geniş ve daha zengin bir yapı arz etmektedir.

SONUÇ

Arapçadan Türkçeye geçen kelimelerin bir hayli fazla olması Türkiye'de doğup büyümüş öğrencilere Arapçanın öğretilmesini daha da kolaylaştırmaktadır. Bu kolaylık dilbilgisinde de görülebilmektedir. Türkçe Dilbilgisi konu başlıklarının dahi hala Arapça olarak kullanılması (kelime, cümle, isim, fiil, sıfat, zarf, zamir, emir… vs.) bunun en güzel örneklerindendir.

Meslek hayatımızdaki tecrübelerimizden ve uygulamalardan yola çıkarak gerçekleştirdiğimiz bu mütevazı çalışmamızda ortaya çıkmıştır ki T.C. İlahiyat Fakülteleri Hazırlık Sınıflarında Nahiv Dersinin Türkçe Dilbilgisi ile Karşılaştırılarak Öğretilmesi Yöntemi, Türkçeyi bilen öğrenciler için oldukça faydalı ve pratik bir metottur. Bu çalışmamızda biz, yıllardır uyguladığımız bu yöntemin ne kadar faydalı ve kolay olduğunu, Arapça *Cümle Bilgisi*ndeki *bazı* temel konularda örneklerle göstermeye çalıştık.

Bu yöntemin uygulanabilmesi için öncelikle hocanın her iki dili de iyi bilmesi, ardından da öğrencilerin Türkçe Dilbilgilerinin yeterli bir seviyede (en azından lise seviyesinde) olması gerekmektedir. Haliyle bu yöntemin başarılı olabilmesi, hem öğreticinin hem de öğrencinin Türkçeyi bilmesi şartına bağlıdır.

Bu çalışmamızda ortaya çıkan tabi sonuçlardan biri de şudur ki İlahiyat Fakültelerimizin Hazırlık Sınıflarında Nahiv derslerinin Türkçeyi bilen hocalar tarafından işlenmesi, Türkçe bilen öğrencilerin daha başarılı olabilmesi açısından uygun bir seçim olarak görülebilir.

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[121] Geniş bilgi için bkz. Nimet, *Kavaidi'l-Lugati'l-Arabiyye*, s. 51-3; İşler, *Arapça Çeviri Kılavuzu*, s. 83.

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Teachers and mobile learning perception: towards a conceptual model of mobile learning for training

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Abstract

Before designing and implementing a mobile learning system, it is important to ascertain the perception of future users towards mobile learning since their perception will influence their willingness and readiness to use the system. This research investigated the perception of teachers in Indonesia of mobile learning to ascertain their readiness to engage in mobile learning for training. This study conducted a survey with 308 high school teacher respondents. The results show that teachers in Indonesia had positive perception of mobile learning and were looking forward to engage in mobile learning. Financial and device issues were not obstacles for the teachers to participate in a mobile learning environment. Interestingly, the knowledge and readiness for mobile learning of teachers who taught ICT subject was lower than teachers with mathematics, science, and other subjects. Findings obtained from this study are used as a base for designing and developing a mobile learning system for ICT training for teachers in Indonesia.

Keywords: teachers, mobile learning, perception, training system

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5. Introduction

With the rapid development of mobile technology and the increasing availability of wireless mobile devices in everyday life, mobile learning can be a solution to the problem of delivering ICT training to teachers in Indonesia. These problems include a lack of opportunity for teachers, geographical challenges and, time and cost problems (Yusri and Goodwin, 2013). Mobile learning is a type of learning model allowing learners to obtain learning materials anywhere and anytime using all kind of wireless handheld devices such as; mobile phones, personal digital assistant (PDA), wireless laptop, personal computer (PC), and tablet (Ozdamli and Cavus, 2011).

The potential of a mobile learning system in a training environment was studied by Sampson (2006) and Tucker and Winchester III (2009). The research suggested that mobile learning is suited to deliver training and provides the benefit of personalized education anytime and anywhere. Another study on mobile learning for training used a Mobile Performance-centered Self-directed System (mPSS) for education and training in engineering education (Martin, Gil, Lopez, Oliva, Monteso, Martinez, & Peire, 2009). This project was implemented in real training settings and users expressed satisfaction with the system.

Mobile learning has proven to be an effective tool for skill training. The Mobile Learning Network (MoLeNET), the largest mobile learning initiatives in Europe, has conducted projects specifically aimed at using mobile technologies for vocational learning in areas such as hair beauty, heating and ventilation,

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plumbing, and wood machining (Douch et al, 2010). The projects were successful and highlighted the key benefits of mobile learning for training, which are engagement with learning, flexibility of learning, learner retention and achievement, personalization of learning, and access to learning resources.

Cisco learning network also develop mobile learning applications for IT training (Cisco, 2012). These applications have been developed specifically for network engineers who wish to take the CCNA certification but they are only available for selected brands of video-enabled mobile devices including Apple, Android, and BlackBerry.

Before designing and implementing a mobile learning system, it is important to ascertain the perception of future users towards mobile learning since their perception will influence their willingness and readiness for using the system (Mahat et al, 2012). Studies about perception and readiness on mobile learning in the literature had mostly university students as their object of research. Research that focuses exclusively on teachers' perception and readiness on mobile learning is very limited

The main propose of this study is to investigate the perception of teachers in Indonesia towards mobile learning in order to evaluate their readiness to engage in mobile learning for training. Information obtained from this study will be used as a basis for designing and developing the ICT training system.

6. Methodology

The participants of this survey comprised teachers from general and vocational high schools in South Sulawesi Province, Indonesia. The reason that teachers from general and vocational high schools were used is because ICT will be integrated into all subjects in the high school curriculum and therefore the data that will be collected will be of use in designing an ICT Training System specifically for them.

The questionnaire comprised two sections; the first section was related to the demographics of the participants and the second section consisted of questions relating to teachers' perception on mobile learning. All questions had a five-point graded response scale. Teachers in this study were recruited directly and the questionnaires were handed out to teachers in their school where they were asked to complete them either before, while waiting for their class, or after the class had finished.

The survey was carried out for a period of 2 months in July – August 2013 with 308 participants from 25 high schools in South Sulawesi Province, Indonesia. Ethical approval for the survey was granted by the Flinders University Social and Behavioural Research Ethics Committee (Project No. 6095). Research permission for the survey was also granted by Regional Government of South Sulawesi Province, Indonesia (No. 0114/P2T-BKPMD/19.36/06/VII/2013).

7. Findings

7.1. Teachers' demography profile

The following section summaries the respondent profile. Table 9 indicates that there were more female than male teachers in this study (67.2% compared to 32.8%) and the majority were aged between 41 to 50 years old, which is 41.2% of the participants.

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Table 9. Teacher demography and background

Teacher demography and background (N=308)	Frequency	Percentage (%)
Gender		
Female	207	67.2
Male	101	32.8
Age range		
21-30	48	15.6
31-40	83	26.9
41-50	127	41.2
51-60	48	15.6
>60	2	0.6
Educational Background		
Diploma	24	7.8
Bachelor	224	72.7
Magister	57	18.5
Doctoral	3	1.0
Years of service		
0-7	84	27.3
8-14	59	19.2
15-21	78	25.3
22-28	59	19.2
29-35	24	7.8
>35	4	1.3
Type of school		
General high school:		
Junior high school	175	56.8
Senior high school		
Vocational high school	86	27.9
	47	15.3
Subject of teaching		
Mathematics	46	14.9
English	31	10.1
Science	49	15.9
Social science	55	17.9
Bahasa	32	10.4
ICT	19	6.1
Other subject	76	24.7

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In terms of academic qualification, the highest level achieved by most of participants was a Bachelor Degree (72.7%), followed by Master's Degree (18.5%). Only 7.8% of teachers had achieved a Diploma. Overall, there were two distinct groups of respondents according to their years of service as teachers, which are 7 years and less (27.3%) and between 15 to 21 years (25.3%).

Of the participants, 84.42% were teaching in a general high school, consisting of 178 junior high schools and 82 senior high schools. The remaining 15.58% respondents were teaching in a vocational high school. Most respondents were teaching Social Sciences, Science, Mathematics, English and Bahasa.

7.2. Perception of mobile learning

This section deals with the assessment of participants' perception of mobile learning. Teachers were given 20 statements and were asked to rate the statements using a 5-point scale. The statements were adapted from Hussin et al (2011) and were divided into five groups; knowledge, learning method, device, financial and readiness on mobile learning.

Table 10 shows the feedback from teachers on statements about knowledge towards mobile learning. The majority of teachers (55.5%) either disagreed or strongly disagreed that they knew what mobile learning was about. The table also shows that 14% of teachers indicated a neutral response and 30.5% agreed and strongly agreed that they had clear idea about mobile learning. Most of the teachers (87.9%) either agreed or strongly agreed that they wanted to know more about mobile learning. 10.2% of teachers indicated a neutral response and only 1.9% disagreed regarding seeking more information about mobile learning. 90.2% of teachers agreed that mobile learning is good for working adults for self-development. Even though 24% of total teachers thought that mobile learning will make their life difficult, there were 83.4% of teachers who agreed that mobile learning can save their learning time.

Table 10. Perception on mobile learning

No.	Statements	SA (%)	A (%)	N (%)	D (%)	SD (%)
Knowledge on mobile learning						
A1	I know what mobile learning is about	11.7	18.8	14.0	52.3	3.2
A2	I want to know more about mobile learning	28.2	59.7	10.1	1.9	0
A3	I think mobile learning is good for working adults who want to learn new skill for their professional development	32.1	58.1	8.1	1.0	0.6
A4*	Mobile learning will make my life difficult.	5.2	18.8	25.3	45.8	4.9
A5	Mobile learning will save my learning time	17.2	66.2	14.9	1.6	0
Learning method issues						
B1*	I prefer conventional learning than mobile learning	10.4	13.3	34.1	33.8	8.4
B2	I would like my tutor/instructor to integrate mobile learning in my training/course in addition to face-to-face meetings	30.8	58.8	9.1	1.3	0
B3	I would like my tutor/instructor to integrate mobile learning besides online forum in my training/course	18.8	61	18.8	1.3	0
B4	Mobile learning is an alternative to web based learning	17.5	54.9	25.6	1.9	0
B5	Mobile learning is an alternative to conventional learning	17.9	35.4	29.2	16.2	1.3
Device issues						
C1	I don't know how to use 3G facilities in my mobile phone	7.8	46.1	17.2	25.3	3.6
C2	I need to learn how to use my mobile phone for mobile learning	25.0	64.0	8.4	2.3	0.3

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C3	I will upgrade my mobile phone if mobile learning is going to be implemented in my course	17.9	48.4	26.0	7.5	0.3
C4*	I think I am not ready for mobile learning using mobile phone facility.	3.2	8.8	15.9	53.6	18.5
Financial issues						
D1	I don't mind paying extra money for mobile learning	22.4	54.5	15.9	7.1	0
D2*	I am afraid I will spend more money on my mobile phone bill because of mobile learning	6.5	26.6	24.7	39.9	2.3
Readiness on mobile learning						
E1*	I don't think I want to be involved in mobile learning	10.4	14.6	12.7	54.9	7.5
E2	I am not ready for mobile learning now	8.4	48.4	20.8	16.2	6.2
E3	I will be ready for mobile learning after 2 years	18.8	58.1	18.5	3.9	0.6
E4	I am looking forward to engage in mobile learning	20.8	59.7	17.5	1.9	0

*negative statements

Legend: SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree

In terms of learning method, 42.2% of teachers preferred mobile learning over conventional learning. Most participants (89.8%) strongly agreed and agreed that mobile learning should be integrated into the face to face meeting method. 79.5% of teachers strongly agreed and agreed that mobile learning should be combined in their training beside an online forum. More than 50% of participants agreed that mobile learning is an alternative to conventional learning and 74.4% strongly agreed and agreed that mobile learning is an alternative for web-based learning.

There were four statements given to participants in terms of device issues, of which 53.6% of teachers agreed that they did not know how to use 3G facilities in their mobile phone. However, 89% of them had a willingness to learn how to use their mobile phone for mobile learning and 63% of teachers were ready to upgrade their mobile phone to participate in a mobile learning course.

Financial issues is not an obstacle for the participants to engage in mobile learning. The majority of teachers (76.9%) either agreed or strongly agreed that they did not mind paying extra money for mobile learning. The table also shows that 15.9% of teachers indicated a neutral response and only 7.1% disagreed. Furthermore, 43.2% of teachers disagreed and strongly disagreed that they were afraid they will spend more money on mobile phone bills because of mobile learning. 24.7% of teachers indicated a neutral response and 32.5% either agreed or strongly agreed to the statement.

Table 10 also shows that 62.5% of teachers disagreed and strongly disagreed with the statement "I don't think I want to be involved in mobile learning". In terms of implementation time of mobile learning, only 22.2% of teachers felt ready, if mobile learning is implemented now, and 76.9% felt ready if mobile learning is applied in two years.

Overall most teachers (80.5%) were looking forward to engage in mobile learning.

7.3. Cross-tabulation of demography profiles associated with perception on mobile learning

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This study also investigated and identified the individual factors associated with the groups' statements. The mean of all responses from each respondent in a group statement was taken to form an individual mean. Following this, the group mean was obtained from the mean of individuals' means. The respondents who have an individual mean greater than or equal to the group mean were categorized as 'high', while the respondents with individual means lower than the group mean were labeled 'low'. These data were then cross tabulated with the respondent profiles. Table 11 shows the knowledge, learning method, device, financial and readiness issues by each category in teachers' demography profile.

Table 11. Results of cross-tabulation

N = 308	Knowledge		Learning method		Device		Financial		Readiness	
	% High	% Low	% High	% Low	% High	% Low	% High	% Low	% High	% Low
School										
Junior High School	62.86	37.14	70.86	29.14	87.43	12.57	93.14	6.86	56.57	43.43
Senior High School	67.44	32.56	83.72	16.28	90.70	9.30	96.51	3.49	52.33	47.67
Vocational High School	70.21	29.79	70.21	29.79	89.36	10.64	93.62	6.38	59.57	40.43
Gender										
Female	60.87	39.13	74.40	25.60	87.92	12.08	93.72	6.28	57.00	43.00
Male	74.26	25.74	74.26	25.74	90.10	9.90	95.05	4.95	53.47	46.53
Age (years)										
21-30	83.33	16.67	64.58	35.42	79.17	20.83	93.75	6.25	52.08	47.92
31-40	71.08	28.92	85.54	14.46	97.59	2.41	95.18	4.82	62.65	37.35
41-50	62.20	37.80	75.59	24.41	86.61	13.39	95.28	4.72	51.97	48.03
51-60	45.83	54.17	62.50	37.50	89.58	10.42	89.58	10.42	58.33	41.67
>60	50.00	50.00	50.00	50.00	50.00	50.00	100.00	0.00	50.00	50.00
Educational Back-ground										
Diploma	83.33	16.67	70.83	29.17	83.33	16.67	100.00	0.00	50.00	50.00
Bachelor	62.05	37.95	71.88	28.13	88.84	11.16	92.86	7.14	54.91	45.09
Magister	68.42	31.58	84.21	15.79	89.47	10.53	96.49	3.51	61.40	38.60
Doctor	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	66.67	33.33
Years of service										
1-7	80.95	19.05	75.00	25.00	86.90	13.10	94.05	5.95	57.14	42.86
8-14	66.10	33.90	76.27	23.73	91.53	8.47	93.22	6.78	59.32	40.68
15-21	64.10	35.90	74.36	25.64	85.90	14.10	97.44	2.56	53.85	46.15
22-28	49.15	50.85	76.27	23.73	89.83	10.17	91.53	8.47	54.24	45.76
29-35	54.17	45.83	66.67	33.33	95.83	4.17	91.67	8.33	58.33	41.67
>35	50.00	50.00	50.00	50.00	75.00	25.00	100.00	0.00	25.00	75.00
Subject										
Mathematics	54.35	45.65	69.57	30.43	89.13	10.87	93.48	6.52	54.35	45.65
English	54.84	45.16	70.97	29.03	90.32	9.68	100.00	0.00	54.84	45.16
Science	59.18	40.82	81.63	18.37	87.76	12.24	97.96	2.04	59.18	40.82
Social Science	49.09	50.91	80.00	20.00	89.09	10.91	92.73	7.27	49.09	50.91

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Bahasa	56.25	43.75	78.13	21.88	87.50	12.50	90.63	9.38	56.25	43.75
ICT	47.37	52.63	68.42	31.58	100.00	0.00	89.47	10.53	47.37	52.63
Other subjects	61.84	38.16	69.74	30.26	85.53	14.47	93.42	6.58	61.84	38.16

Knowledge on mobile learning was cross tabulated with demography profiles and results show that the percentage of teachers with a positive knowledge of mobile learning was higher than the percentage of them with low knowledge of mobile learning, for all types of school. The results also show that male teachers had a better knowledge of mobile learning than female teachers.

In the term of age, the 21-30 year old group had the highest percentage of teachers with positive knowledge of mobile learning (83.33%), followed by 31-40 and 41-50 year old groups, with 71.08% and 62.20% respectively. The lowest percentage of teachers with a positive knowledge of mobile learning was found in the 51-60 year old group. These features matched with the results of the cross-tabulated areas of knowledge and years of experience. The result reveals that young teachers with experience less than 7 years (80.95%) have better comprehensive knowledge of mobile learning compared to other teachers. Only 49.15% of teachers with 22-28 years of service had positive knowledge of mobile learning.

All teachers, in this study, with doctoral background had good understanding of mobile learning, while 83.33% of teachers with diploma background also had clear idea. Furthermore, 68.42 % and 62.05% of teachers with a Master's degree and Bachelor degree respectively, had an understanding of mobile learning. Interestingly, the lowest percentage of teachers with a positive knowledge of mobile learning, in terms of subject of teaching, was found in the group of teachers with ICT subjects (47.37%).

The learning method of mobile learning was not an issue for most of teachers. The percentage of teachers with positive responses on learning method of mobile learning was relatively high for types of school and educational background categories. Teachers in others categories of teachers' profiles also presented more positive responses on learning method issues of mobile learning.

The results also indicate that the percentage of teachers that perceived device and financial issues as an obstacle for engaging in mobile learning were significantly lower in all categories of teachers' profile than those who did not. The reason for this was that they were financially independent.

When readiness on mobile learning were cross tabulated with the demographic profile of teachers, the results show that the percentage of teachers ready for engaging in mobile learning is higher than those who are not ready in; types of school, gender, and educational background categories. In contrast, only 25% of teachers with more than 35 years of experience were ready for mobile learning. The group of teachers who were teaching ICT subjects were found to be the lowest percentage of teachers who were ready for mobile learning in terms of subject of teaching.

4. Conclusion and future work

The perception of teachers in Indonesia of mobile learning has been presented in this paper. Overall, teachers in Indonesia have a good perception towards mobile learning. Their knowledge of mobile learning was average but they had a willingness to learn more about mobile learning. Financial and device issues were not obstacles for the teachers to participate in a mobile learning environment. Interestingly, the knowledge and readiness of teachers, who taught ICT subjects, of mobile learning were lower than teachers with mathematics, science, and other subjects. Findings obtained from this study are being used as a base for designing and developing a mobile learning system, for ICT training, for teachers in Indonesia

Future work will design a mobile learning system for ICT training using mobile phones. This system will be developed to solve the problem of delivering ICT training to teachers in Indonesia. A training module will be tested using the system.

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Teachers and mobile learning perception: towards a conceptual model of mobile learning for training

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Abstract

Before designing and implementing a mobile learning system, it is important to ascertain the perception of future users towards mobile learning since their perception will influence their willingness and readiness to use the system. This research investigated the perception of teachers in Indonesia of mobile learning to ascertain their readiness to engage in mobile learning for training. This study conducted a survey with 308 high school teacher respondents. The results show that teachers in Indonesia had positive perception of mobile learning and were looking forward to engage in mobile learning. Financial and device issues were not obstacles for the teachers to participate in a mobile learning environment. Interestingly, the knowledge and readiness for mobile learning of teachers who taught ICT subject was lower than teachers with mathematics, science, and other subjects. Findings obtained from this study are used as a base for designing and developing a mobile learning system for ICT training for teachers in Indonesia.

Keywords: teachers, mobile learning, perception, training system

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8. Introduction

With the rapid development of mobile technology and the increasing availability of wireless mobile devices in everyday life, mobile learning can be a solution to the problem of delivering ICT training to teachers in Indonesia. These problems include a lack of opportunity for teachers, geographical challenges and, time and cost problems (Yusri and Goodwin, 2013). Mobile learning is a type of learning model allowing learners to obtain learning materials anywhere and anytime using all kind of wireless handheld devices such as; mobile phones, personal digital assistant (PDA), wireless laptop, personal computer (PC), and tablet (Ozdamli and Cavus, 2011).

The potential of a mobile learning system in a training environment was studied by Sampson (2006) and Tucker and Winchester III (2009). The research suggested that mobile learning is suited to deliver training and provides the benefit of personalized education anytime and anywhere. Another study on mobile learning for training used a Mobile Performance-centered Self-directed System (mPSS) for education and training in engineering education (Martin, Gil, Lopez, Oliva, Monteso, Martinez, & Peire, 2009). This project was implemented in real training settings and users expressed satisfaction with the system.

Mobile learning has proven to be an effective tool for skill training. The Mobile Learning Network (MoLeNET), the largest mobile learning initiatives in Europe, has conducted projects specifically aimed at using mobile technologies for vocational learning in areas such as hair beauty, heating and ventilation,

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plumbing, and wood machining (Douch et al, 2010). The projects were successful and highlighted the key benefits of mobile learning for training, which are engagement with learning, flexibility of learning, learner retention and achievement, personalization of learning, and access to learning resources.

Cisco learning network also develop mobile learning applications for IT training (Cisco, 2012). These applications have been developed specifically for network engineers who wish to take the CCNA certification but they are only available for selected brands of video-enabled mobile devices including Apple, Android, and BlackBerry.

Before designing and implementing a mobile learning system, it is important to ascertain the perception of future users towards mobile learning since their perception will influence their willingness and readiness for using the system (Mahat et al, 2012). Studies about perception and readiness on mobile learning in the literature had mostly university students as their object of research. Research that focuses exclusively on teachers' perception and readiness on mobile learning is very limited

The main propose of this study is to investigate the perception of teachers in Indonesia towards mobile learning in order to evaluate their readiness to engage in mobile learning for training. Information obtained from this study will be used as a basis for designing and developing the ICT training system.

9. Methodology

The participants of this survey comprised teachers from general and vocational high schools in South Sulawesi Province, Indonesia. The reason that teachers from general and vocational high schools were used is because ICT will be integrated into all subjects in the high school curriculum and therefore the data that will be collected will be of use in designing an ICT Training System specifically for them.

The questionnaire comprised two sections; the first section was related to the demographics of the participants and the second section consisted of questions relating to teachers' perception on mobile learning. All questions had a five-point graded response scale. Teachers in this study were recruited directly and the questionnaires were handed out to teachers in their school where they were asked to complete them either before, while waiting for their class, or after the class had finished.

The survey was carried out for a period of 2 months in July – August 2013 with 308 participants from 25 high schools in South Sulawesi Province, Indonesia. Ethical approval for the survey was granted by the Flinders University Social and Behavioural Research Ethics Committee (Project No. 6095). Research permission for the survey was also granted by Regional Government of South Sulawesi Province, Indonesia (No. 0114/P2T-BKPMD/19.36/06/VII/2013).

10. Findings

10.1. Teachers' demography profile

The following section summaries the respondent profile. Table 9 indicates that there were more female than male teachers in this study (67.2% compared to 32.8%) and the majority were aged between 41 to 50 years old, which is 41.2% of the participants.

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Table 12. Teacher demography and background

Teacher demography and background (N=308)	Frequency	Percentage (%)
Gender		
Female	207	67.2
Male	101	32.8
Age range		
21-30	48	15.6
31-40	83	26.9
41-50	127	41.2
51-60	48	15.6
>60	2	0.6
Educational Background		
Diploma	24	7.8
Bachelor	224	72.7
Magister	57	18.5
Doctoral	3	1.0
Years of service		
0-7	84	27.3
8-14	59	19.2
15-21	78	25.3
22-28	59	19.2
29-35	24	7.8
>35	4	1.3
Type of school		
General high school:		
Junior high school	175	56.8
Senior high school		
Vocational high school	86	27.9
	47	15.3
Subject of teaching		
Mathematics	46	14.9
English	31	10.1
Science	49	15.9
Social science	55	17.9
Bahasa	32	10.4
ICT	19	6.1
Other subject	76	24.7

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In terms of academic qualification, the highest level achieved by most of participants was a Bachelor Degree (72.7%), followed by Master's Degree (18.5%). Only 7.8% of teachers had achieved a Diploma. Overall, there were two distinct groups of respondents according to their years of service as teachers, which are 7 years and less (27.3%) and between 15 to 21 years (25.3%).

Of the participants, 84.42% were teaching in a general high school, consisting of 178 junior high schools and 82 senior high schools. The remaining 15.58% respondents were teaching in a vocational high school. Most respondents were teaching Social Sciences, Science, Mathematics, English and Bahasa.

10.2. Perception of mobile learning

This section deals with the assessment of participants' perception of mobile learning. Teachers were given 20 statements and were asked to rate the statements using a 5-point scale. The statements were adapted from Hussin et al (2011) and were divided into five groups; knowledge, learning method, device, financial and readiness on mobile learning.

Table 10 shows the feedback from teachers on statements about knowledge towards mobile learning. The majority of teachers (55.5%) either disagreed or strongly disagreed that they knew what mobile learning was about. The table also shows that 14% of teachers indicated a neutral response and 30.5% agreed and strongly agreed that they had clear idea about mobile learning. Most of the teachers (87.9%) either agreed or strongly agreed that they wanted to know more about mobile learning. 10.2% of teachers indicated a neutral response and only 1.9% disagreed regarding seeking more information about mobile learning. 90.2% of teachers agreed that mobile learning is good for working adults for self-development. Even though 24% of total teachers thought that mobile learning will make their life difficult, there were 83.4% of teachers who agreed that mobile learning can save their learning time.

Table 13. Perception on mobile learning

No.	Statements	SA (%)	A (%)	N (%)	D (%)	SD (%)
Knowledge on mobile learning						
A1	I know what mobile learning is about	11.7	18.8	14.0	52.3	3.2
A2	I want to know more about mobile learning	28.2	59.7	10.1	1.9	0
A3	I think mobile learning is good for working adults who want to learn new skill for their professional development	32.1	58.1	8.1	1.0	0.6
A4*	Mobile learning will make my life difficult.	5.2	18.8	25.3	45.8	4.9
A5	Mobile learning will save my learning time	17.2	66.2	14.9	1.6	0
Learning method issues						
B1*	I prefer conventional learning than mobile learning	10.4	13.3	34.1	33.8	8.4
B2	I would like my tutor/instructor to integrate mobile learning in my training/course in addition to face-to-face meetings	30.8	58.8	9.1	1.3	0
B3	I would like my tutor/instructor to integrate mobile learning besides online forum in my training/course	18.8	61	18.8	1.3	0
B4	Mobile learning is an alternative to web based learning	17.5	54.9	25.6	1.9	0
B5	Mobile learning is an alternative to conventional learning	17.9	35.4	29.2	16.2	1.3
Device issues						
C1	I don't know how to use 3G facilities in my mobile phone	7.8	46.1	17.2	25.3	3.6
C2	I need to learn how to use my mobile phone for mobile learning	25.0	64.0	8.4	2.3	0.3

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C3	I will upgrade my mobile phone if mobile learning is going to be implemented in my course	17.9	48.4	26.0	7.5	0.3
C4*	I think I am not ready for mobile learning using mobile phone facility.	3.2	8.8	15.9	53.6	18.5
Financial issues						
D1	I don't mind paying extra money for mobile learning	22.4	54.5	15.9	7.1	0
D2*	I am afraid I will spend more money on my mobile phone bill because of mobile learning	6.5	26.6	24.7	39.9	2.3
Readiness on mobile learning						
E1*	I don't think I want to be involved in mobile learning	10.4	14.6	12.7	54.9	7.5
E2	I am not ready for mobile learning now	8.4	48.4	20.8	16.2	6.2
E3	I will be ready for mobile learning after 2 years	18.8	58.1	18.5	3.9	0.6
E4	I am looking forward to engage in mobile learning	20.8	59.7	17.5	1.9	0

*negative statements

Legend: SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree

In terms of learning method, 42.2% of teachers preferred mobile learning over conventional learning. Most participants (89.8%) strongly agreed and agreed that mobile learning should be integrated into the face to face meeting method. 79.5% of teachers strongly agreed and agreed that mobile learning should be combined in their training beside an online forum. More than 50% of participants agreed that mobile learning is an alternative to conventional learning and 74.4% strongly agreed and agreed that mobile learning is an alternative for web-based learning.

There were four statements given to participants in terms of device issues, of which 53.6% of teachers agreed that they did not know how to use 3G facilities in their mobile phone. However, 89% of them had a willingness to learn how to use their mobile phone for mobile learning and 63% of teachers were ready to upgrade their mobile phone to participate in a mobile learning course.

Financial issues is not an obstacle for the participants to engage in mobile learning. The majority of teachers (76.9%) either agreed or strongly agreed that they did not mind paying extra money for mobile learning. The table also shows that 15.9% of teachers indicated a neutral response and only 7.1% disagreed. Furthermore, 43.2% of teachers disagreed and strongly disagreed that they were afraid they will spend more money on mobile phone bills because of mobile learning. 24.7% of teachers indicated a neutral response and 32.5% either agreed or strongly agreed to the statement.

Table 10 also shows that 62.5% of teachers disagreed and strongly disagreed with the statement "I don't think I want to be involved in mobile learning". In terms of implementation time of mobile learning, only 22.2% of teachers felt ready, if mobile learning is implemented now, and 76.9% felt ready if mobile learning is applied in two years.

Overall most teachers (80.5%) were looking forward to engage in mobile learning.

10.3. Cross-tabulation of demography profiles associated with perception on mobile learning

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This study also investigated and identified the individual factors associated with the groups' statements. The mean of all responses from each respondent in a group statement was taken to form an individual mean. Following this, the group mean was obtained from the mean of individuals' means. The respondents who have an individual mean greater than or equal to the group mean were categorized as 'high', while the respondents with individual means lower than the group mean were labeled 'low'. These data were then cross tabulated with the respondent profiles. Table 11 shows the knowledge, learning method, device, financial and readiness issues by each category in teachers' demography profile.

Table 14. Results of cross-tabulation

N = 308	Knowledge		Learning method		Device		Financial		Readiness	
	% High	% Low	% High	% Low	% High	% Low	% High	% Low	% High	% Low
School										
Junior High School	62.86	37.14	70.86	29.14	87.43	12.57	93.14	6.86	56.57	43.43
Senior High School	67.44	32.56	83.72	16.28	90.70	9.30	96.51	3.49	52.33	47.67
Vocational High School	70.21	29.79	70.21	29.79	89.36	10.64	93.62	6.38	59.57	40.43
Gender										
Female	60.87	39.13	74.40	25.60	87.92	12.08	93.72	6.28	57.00	43.00
Male	74.26	25.74	74.26	25.74	90.10	9.90	95.05	4.95	53.47	46.53
Age (years)										
21-30	83.33	16.67	64.58	35.42	79.17	20.83	93.75	6.25	52.08	47.92
31-40	71.08	28.92	85.54	14.46	97.59	2.41	95.18	4.82	62.65	37.35
41-50	62.20	37.80	75.59	24.41	86.61	13.39	95.28	4.72	51.97	48.03
51-60	45.83	54.17	62.50	37.50	89.58	10.42	89.58	10.42	58.33	41.67
>60	50.00	50.00	50.00	50.00	50.00	50.00	100.00	0.00	50.00	50.00
Educational Back-ground										
Diploma	83.33	16.67	70.83	29.17	83.33	16.67	100.00	0.00	50.00	50.00
Bachelor	62.05	37.95	71.88	28.13	88.84	11.16	92.86	7.14	54.91	45.09
Magister	68.42	31.58	84.21	15.79	89.47	10.53	96.49	3.51	61.40	38.60
Doctor	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	66.67	33.33
Years of service										
1-7	80.95	19.05	75.00	25.00	86.90	13.10	94.05	5.95	57.14	42.86
8-14	66.10	33.90	76.27	23.73	91.53	8.47	93.22	6.78	59.32	40.68
15-21	64.10	35.90	74.36	25.64	85.90	14.10	97.44	2.56	53.85	46.15
22-28	49.15	50.85	76.27	23.73	89.83	10.17	91.53	8.47	54.24	45.76
29-35	54.17	45.83	66.67	33.33	95.83	4.17	91.67	8.33	58.33	41.67
>35	50.00	50.00	50.00	50.00	75.00	25.00	100.00	0.00	25.00	75.00
Subject										
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Future work will design a mobile learning system for ICT training using mobile phones. This system will be developed to solve the problem of delivering ICT training to teachers in Indonesia. A training module will be tested using the system.

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Teachers' attitudes toward the use of e-portfolios in speaking classes in English language teaching and learning

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Abstract

E-portfolios have been used in English language teaching (ELT) to assess and improve writing skills. They can also be used to assess and improve speaking skills. Though the attitudes of students toward the use of e-portfolios in speaking classes are known to be positive, teachers' attitudes toward this method is unknown. Therefore, this study aims to find out the attitudes and perceptions of teachers toward implementing the use of e-portfolios in speaking classes. As it is a small-scale qualitative study, semi-structured interviews were carried out with four listening and speaking teachers who use e-portfolios in their listening and speaking classes. The interviews were content analysed. The results indicated that teachers, like students have positive attitudes toward the implementation of e-portfolios in speaking classes, though there are some challenges to overcome.

Keywords: E-portfolio; Speaking; English Language Teaching; Speaking Teachers; Teachers' Attitudes

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1. Introduction

E-portfolios have been used in English Language Teaching (ELT) as an assessment and teaching tool to improve students' writing skills, yet e-portfolios have not been commonly implemented in speaking classes (Cepik & Yastibas, 2013). Therefore, Cepik and Yastibas integrated the use of e-portfolios into speaking class in order to improve and assess students' speaking skills and study the effects of e-portfolios on students' attitudes toward speaking at an English preparation department of a Turkish private university. The results of the study indicated that students formed positive attitudes toward the e-portfolio implementation in speaking courses. Meanwhile, the department adopted an e-portfolio assessment policy in speaking courses in addition to midterm and final speaking tests, which had already been the standard for speaking courses at the department. The researchers wanted to find out what speaking teachers' perceptions and attitudes toward the use of e-portfolios in speaking classes are in a second study. This interest formed the aim of the present study.

Writing skills are generally assessed and taught with the use of e-portfolios (Cepik & Yastibas, 2013), and students can improve their writing skills through this process (Erice, 2008). Studies on teaching and assessing writing through the e-portfolio process focus on students' attitudes and perceptions about process. They indicate that students' attitudes and perceptions are positive (see Erice, 2008; Abbaszad Tehrani, 2010). Similarly, speaking like writing can be assessed and taught effectively by using e-portfolios, and students have positive attitudes toward the process in speaking courses (Cepik & Yastibas, 2013). However, there seems to only be a few studies that directly focus on what teachers think about the e-

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portfolio process. The lack of information on teachers' attitudes toward the process may create a contradictory issue because perceptions and attitudes about e-portfolios are generally constructed based on students, so assumptions about it are derived from this focus. The assumptions about e-portfolios may be more comprehensive if teachers' attitudes together with students' attitudes are taken into account during the derivation process. Although this study deals with the attitudes of teachers who use e-portfolios in speaking courses, it will reveal to what extent teachers' attitudes match with students' attitudes. Also, it will help to find out how comprehensive the assumptions built on students' attitudes toward the use of e-portfolios in speaking course are. This study, therefore, can serve as a basis for other studies to test the assumptions regarding e-portfolios from both teachers' and students' perspectives.

There are many studies that focus on the use of e-portfolios in writing courses, but its use in speaking courses has not been dealt with much in Turkey (Cepik & Yastibas, 2013). Cepik and Yastibas (2013) used e-portfolios to improve speaking skills of Turkish EFL students. They have mentioned its effects on the students' speaking skills and attitudes toward the use of them in speaking courses. In accordance with the previous study, the present study deals with teachers' attitudes toward the use of e-portfolios in speaking. The present study will complete the previous study that involves only students' attitudes. As a result, the previous and present studies may help teachers gain more insight about the integration of technology into speaking courses, its effects on students' speaking skills, and assessment of speaking skills through e-portfolios.

2. Literature eview

The literature review is based on the definition of e-portfolios, their benefits and challenges, and students' attitudes toward the use of them for different purposes in various courses. They are mentioned successively. However, the literature review does not include a section on the teachers' attitudes toward e-portfolios due to the lack of studies on the topic.

2.1. E-portfolios

According to Lorenzo and Ittelson (2005), e-portfolios are the personal and digital collection of artefacts of an individual including 'demonstrations, resources, and accomplishments' (p.2) for a variety of contexts and time periods. They have also mentioned that e-portfolios digitize students' works and can use the Internet to store them. In addition, Gray (2008) has stressed that an e-portfolio is "the product, created by the learner, a collection of digital artefacts articulating experiences, achievements and learning" (p.6). Gray has also stated that it is "a purposeful aggregation of digital items – ideas, evidence, reflections, feedback, etc., which presents a selected audience with evidence of a person's learning and/or ability" (p.7). Different definitions of e-portfolios indicate that they are student-centred. They also store students' individual works digitally and help follow students' learning process in different contexts and time periods.

2.2. Benefits of e-Portfolios

E-portfolios are commonly used tools in different areas of education. This commonness has resulted in many studies on its use and its effects. These studies have revealed some benefits of e-portfolios. One of the benefits is having an online virtual environment. Students share their "goals, achievements, and insights with advisors and counsellors" (Goldsmith, 2007, p.31) in this environment. Meanwhile, this gives them a chance to check whether they have met their educational and career goals. It can also indicate their achievements and skills through their e-portfolios to get a job. In other words, e-portfolios are effective

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tools to improve students' marketability, career planning and development since they include learners' achievements, learning experiences, and skills (Lin, 2008; Reese & Levy, 2009).

E-portfolios create a collaborative and communicative learning environment. Bolliger and Shepherd (2010) have integrated e-portfolios in an online course and researched how students' learning would be influenced by e-portfolios by looking as several factors, such as students' perceptions, communication, motivation, and connectedness (the relationship between two people). They have found that communication between peers and between students and instructors have become more effective. The study also shows that students can understand program-level expectations in online courses. The integration of online courses could motivate students to learn (Bolliger & Shepherd, 2010). In another study, Lin (2008) has worked with pre-service teachers and studied the effect of e-portfolios on them in terms of communication. The study indicates that e-portfolios can initiate communication, interaction, and collaboration between peers. Students were able to complete and improve their e-portfolios based on their peers' feedback (Lin, 2008). As a result, this promoted working collaboratively (Kocoglu, 2008).

E-portfolios lead to an improvement in the learning process and authentic assessment of students. E-portfolios make students responsible for organizing and producing material for a specific purpose, evaluating their work, and reflecting on the findings regarding their own learning process, experiences, and skills (Goldsmith, 2007). Consequently, e-portfolios contribute to students' taking control of their own education and this motivates them to study (Akçıl & Arap, 2009). They also facilitate and document their experiences authentically (Reese & Levy, 2009). Additionally, students are in charge of their own e-portfolios, so e-portfolios make students' learning individualized and personalized (Schmitz, Whitson, Heest & Maddaus, 2010). This entire process makes students autonomous because e-portfolios helps them be the directors of their education and makes them aware of important factors, procedures, and attitudes in learning (Gonzalez, 2009).

E-portfolios allow for reflection. They require reflection because reflection makes students think critically, reason analytically, and integrate their critical thinking and analytic reasoning within their learning (Rhodes, 2011). While reflecting, students revisit their learning experiences and start to look at the way they view their learning in a more different way (Lin, 2008). Students develop a sense of purpose and focus while they are reflecting because they compare their work to a standard (Lin, 2008). In this way, they can learn whether their work meet the standard or not and if it is the latter to figure out a way to meet the standard (Lin, 2008). Therefore, they are supposed to participate actively in the presentation and representation of their learning, so they can be motivated and try to do their best as Rhodes mentions. E-portfolios provide individual feedback to them about their learning, experiences, achievements, strengths, and weaknesses (Goldsmith, 2007). Consequently, students can improve their learning through self-reflection and feedback.

E-portfolios also promote academic advising or supervision (Reese & Levy, 2009). They track students' progress through reflection and feedback (Reese & Levy, 2009). According to them, it creates a continuous flow of information about students' own learning process between students and their teachers. According to Bashook, Gelula, Joshi, and Sandlow (2008), e-portfolios help teachers have more meaningful and interactive communication with their students. They have mentioned that teachers understand their students better by discovering insights about their attitudes, beliefs, and problems.

E-portfolios enhance students' technology skills (Lin, 2008). Students are required to collect their work digitally, so they need to be familiar with the use of technology. This process blends students' "information literacy, technology fluency, and domain knowledge" (Reese & Levy, 2009, p.3). E-portfolios require technology skills, such as uploading pictures and using Word so that students can learn, review, and improve their works. This process may require that students revisit their technology skills and could result in improving them (Lin, 2008).

2.3. Challenges of E-portfolios

Despite their benefits, e-portfolios may challenge both teachers and students. For example, students' understanding of technology may affect the e-portfolio process negatively. According to Dalton (2007), how students perceive technology has an effect on the implementation of e-portfolios because some students' familiarity with technology may lead to decisions about what is useful or not for them. Such decisions may affect and lower the efficiency and effectiveness of e-portfolios (Dawn, Smith, Peterson, Cone, Slazar, Bond & Godwin, 2011). Also, the way students evaluate and understand technology affects the way

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they use the e-portfolio system. To illustrate, an e-portfolio system should be flexible. If not, it may impact the learning process negatively as Dalton points out. It is the flexibility that makes e-portfolios more engaging, gives learners more control, and helps students become more active in their own learning. Other challenges include the lack of self-assessment, reflection, technology, and meta-cognitive skills in student's educational background. They may decrease the effectiveness of e-portfolios and bring about being "overwhelmed by the course management system, the portal, and the e-portfolio" (Goldsmith, 2007, p.39). Another challenge may come from inexperienced teachers who implement e-portfolios in their courses. According to Goldsmith (2007), the lack of experience of institutions and educators with the e-portfolio process can cause problems for the implementation of an e-portfolio system, so implementations of e-portfolios require learning how to use the software for the e-portfolio platform and understanding "the assumptions on which an e-portfolio was built" (Goldsmith, 2007, p.38; Gray, 2008).

2.4. Students' attitudes toward e-portfolios

When e-portfolios are implemented in a course for a variety of purposes, it leads to a number of positive and negative changes. The positive and negative changes influence the way students form their attitudes toward the e-portfolio implementation. Akçıl and Arap (2009) have found that pre-service teachers have positive attitudes toward e-portfolios. It is because they think that e-portfolios promote life-long learning, enable them to take the control of their learning, and motivate them to study (Akçıl & Arap, 2009). In another study, Genc and Tinmaz (2010) have worked with pre-service Computer Education and Instructional Technology teachers and found that e-portfolios enhance skill and knowledge development of pre-service teachers. Hung (2012) has emphasized that student ELT teachers can work in a community to practice, integrate their content knowledge with their learning, and improve their critical thinking through e-portfolios. Also, e-portfolios can facilitate peer feedback and promote professional development. On the other hand, Hung has stressed that they can cause learning anxiety and resistance to technology. According to Lin (2008), pre-service teachers can engage more in reflective activities, develop effective learning strategies, gain and review technology skills through e-portfolios. However, they lead to some problems such as frustrations, time consuming, and uncertainty about the knowledge and organizational strategies (Lin, 2008). Kubilan and Khan (2012) have also worked with pre-service English language teachers. They have found that e-portfolios can help pre-service teachers develop an understanding of the teacher's role, their teaching skills and activities. According to them, they can also improve their linguistic and technology skills, and comprehend content knowledge. As a result, they formed positive attitudes toward e-portfolios (Kubilan & Khan, 2012). However, Kubilan and Khan have stated that there are some problems related to the e-portfolio implementation that include interrupted Internet connection, time constraints, and issues related to validity and reliability.

While the main concern of above studies is the perceptions of pre-service teachers from different departments, the studies mentioned here focus on the perceptions and attitudes of EFL/ESL students. According to Baturay and Daloğlu (2010), the students in an online course think that e-portfolios are beneficial and enjoyable. Baturay and Daloğlu have mentioned that e-portfolios are indicators of learning gain because students can keep the track of their learning and get feedback about their work. E-portfolios enable them to identify their strengths and weaknesses by assessing their own learning. As Baturay and Daloğlu have stated, e-portfolios promote self-regulated learning skills of students and improve their critical thinking skills by making them focus on real-life applications of language, problem-solving, and developing creativity. Similarly, self- and peer-based formative assessments are promoted by e-portfolios (Welsh, 2012). According to Welsh, this can foster the self-regulation learning skills of students. Erice (2008) has employed e-portfolios in writing classes. Erice has found out that students can improve their writing skills through e-portfolios. They have also developed positive attitudes toward the use of e-portfolio in writing classes (Erice, 2008). In another study, Abbaszad Tehrani (2010) has used net-folio (another name used for e-portfolio) to improve students' writing skills. The study indicates that students have formed positive attitudes toward the use of net-folio in writing (Abbaszad Tehrani, 2010). Additionally, Cepik and Yastibas (2013) used e-portfolios in speaking classes to improve and assess speaking skills. They found that e-portfolios can help students become responsible, active, and autonomous while studying. In addition, students can assess their own learning themselves, feel less anxious and more self-confident and motivated to speak (Cepik & Yastibas, 2013). In addition, Rizthaupt, Ndoye and Parker (n.d.) have stated that students can identify their strengths and weaknesses and can improve their own learning. In addition, e-portfolios can help students display their knowledge, skills, and accomplishments. E-portfolios are an alternative and authentic assessment tool in evaluating students' learning.

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As understood, whatever the reasons for the use of e-portfolios in courses, e-portfolios engage students in learning and learning activities. They make them active and autonomous. They make them responsible for their own learning. In addition, they motivate students to study, enhance their self-assessment, technology, and critical thinking skills, and build their self-confidence. Owing to the positive contributions of e-portfolios for students' learning, students seem to form positive attitudes toward them.

3. Methodology

3.1. Participants

Twelve EFL teachers who taught listening and speaking courses at the English preparation department of a private university in Turkey participated in the study voluntarily. Five of them were male teachers while seven of them were female. Six of them were native-speakers of English while the rest were non-native speakers. All of the participants experienced the process of e-portfolio implementation in speaking courses since it was required to assess students' speaking skills through e-portfolios.

3.2. Data collection procedure

The study was carried out at an English preparation department of a Turkish private university. First, the researchers took permission from the university to conduct the study. Then the participants were chosen. Twelve ELF teachers accepted to participate voluntarily after being informed about the content and aim of the study. Finally the interview preparation process started. It was prepared in three steps:

- First step: Four of the participants were chosen randomly and asked to write their personal ideas and experiences about e-portfolio implementation in speaking courses. The first four teachers' writings about e-portfolios were analysed with content analysis by the researchers. The researchers identified four major issues: the effects of e-portfolios on students, the effects of them on teachers, and students and teachers' requirements in using e-portfolios in speaking courses.

- Second Step: Four interview questions were prepared based on the content analysis gathered in the first step, and were given to four different teachers who were chosen randomly, but did not join the first step. These new teachers were interviewed and the researchers analysed those teachers' responses to the questions through content analysis. Then the researchers compared the findings of the first step to the findings of the second step.

- Third Step: Before finalizing the interview questions, the researchers also took the following conditions into considerations. One of the researchers was teaching listening and speaking courses and used e-portfolios in his classes to assess and teach students' speaking skills. He continuously talked with other listening and speaking teachers about their experience in their own listening and speaking courses, which helped to share personal ideas, different problems encountered in class, different solutions developed to overcome problems, and suggestions to improve the implementation. Two other instructors contributed to the content analysis. All of these factors were taken into consideration. The questions in the first interview were modified and finalized. Then the final version of the semi-structured interview was given to the last four teachers who did not participate in the first and second step of this study. The researchers analysed the responses of the last four teachers that participated in the present study by using content analysis.

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3.3. Data collection instrument

The present paper is a small-scale qualitative study, so a semi-structured interview was used to collect data. It is preferred because according to Talmy and Richards (2011), it can help 'generate insights' (1), and these insights can be related to matters such as language learning, motivation, and language attitudes. The interview has four pre-determined questions that focus on the effects of e-portfolios on students' speaking skills, the effects of them on teachers' teaching and assessing speaking skills in their courses, requiring students to prepare their e-portfolios, and requiring teachers to implement e-portfolios in their own courses.

In order to make the interview reliable, the participants were grouped randomly and could join only one of the three steps mentioned in data collection procedure at different times. Each of these steps required written responses of each participant. As a result, the following was avoided: (a) that participants might affect each other and (b) that a participant might take part in different steps of the study and repeat his/her ideas. When the three content analyses of the research were compared to each other, the findings were consistent with each other.

The interview was also valid. It had three orientations. First, twelve different teachers joined only one part of the study. They shared what they experienced and examined the implementation of e-portfolios in speaking classes. Second, the researchers evaluated the e-portfolio implementation in speaking courses and looked at the attitudes of students toward the use of e-portfolios in speaking classes. The research also included one of the researchers' own experiences. Third, one of the researchers discussed the e-portfolio system with other instructors. These orientations enriched the scope of the interview. With the knowledge gained, the researchers were able to prepare questions that could measure what the study aimed to find out, which made the interview valid because Kimberlin and Winterstein (2008) defined validity as "the extent to which an instrument measures what is purports to measure" (2278).

3.4. Data analysis

The data collection instrument was totally qualitative, so the content analysis method was applied to analyse it. The qualitative data analysis procedure mentioned by Cabaroğlu (as cited in Köse, 2006) was applied to do content analysis. The model is composed of the following categories: familiarization, coding/labelling, clustering, defining codes operationally, retrieving and organizing data, and looking for interrelationships between categories (Köse, 2006). Yet, familiarization, coding/labelling, clustering, retrieving and organizing data, and looking for interrelationships between categories were used.

4. Findings

Content analysis was employed to analyse and evaluate the semi-structured interviews of the four teachers. Five categorizations were developed depending on the content of the interview questions: benefits of e-portfolios for students, drawbacks of e-portfolios for students, students' requirements, teachers' requirements, and the impact of e-portfolios on teachers. Accordingly, the findings were mentioned in this order.

4.1. Benefits of e-portfolios for students

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Three of the four teachers think that e-portfolios can promote the use of language. An e-portfolio is an individual study of a student, so he/she has to use the target language in order to complete the assignment given to him/her, which results in the independent and communicative use of the language. The following comments illustrate this:

Teacher 1: *The speaking portfolio also forces students to learn how to utilize the target language independently.*

Teacher 3: *In e-portfolios, students find an area to express themselves and use L2 communicatively.*

As seen, Teacher 3 also mentions that students have an area to express themselves. This motivates them to participate in e-portfolio activities actively. E-portfolios engage them in their learning. In the e-portfolio process, they are given time to improve their learning through their own efforts such as researching, organizing their findings, and creating their e-portfolios. As a result, these may help them to be active participants and to be responsible for their own learning. Two comments taken from Teacher 3 below illustrate what is mentioned clearly. The comment taken from Teacher 1 below also supports what is mentioned though it is related to a negative issue.

Teacher 3: *They [students] take it [e-portfolio] really seriously and even the most silent/passive students put effort into their e-portfolios.*

Teacher 1: *Collecting, cataloging, and creating the portfolios were difficult at times. Furthermore, the idea of producing drafts of a speaking portfolio was a new concept for some students…*

Teacher 3: *E-portfolios help them [students] spend time alone to work/research a topic.*

E-portfolios create a collaborative and interactive atmosphere in the classroom. Students may work in groups, so they can share what they have found out and collaborate with each other to prepare their videos. It makes the classroom interactive. The following excerpts indicate this clearly:

Teacher 1: *The speaking portfolio is a great way to promote classroom interaction and collaboration between students.*

Teacher 3: *…They might prepare something in a group…. group works increase their sharing skills and give them chances to learn from each other.*

E-portfolios also enable students to identify their strengths and weaknesses, so students can have a chance to overcome their weaknesses. In their e-portfolios, students can reflect what they have achieved and how they have found and overcome their weaknesses. Namely, e-portfolios improve students' self-assessment and self-reflection skills so that they can improve their learning. To illustrate:

Teacher 1: *Additionally, when structured correctly, [e-portfolios] can promote self-assessment and reflection.*

Teacher 3: *… Individual studies make them aware of their good/strong and bad/weak sides about the language.*

In addition to these contributions of e-portfolios to students' learning, Teacher 4 also believes that students can improve their discussion skills such as questioning.

E-portfolios allow students to make connections between what is learned in the classroom and how what is learned can be used in real life. To understand this better, the e-portfolio system used in listening and speaking courses at the department should be explained. Students are given two assignments in each quarter (there are four quarters in a regular school year). The assignments are given according to the assignments outlined in the listening and speaking course book. The teachers select two e-portfolio topics based on two units. While preparing their portfolios, students need to choose a topic related to the assignment, research the topic, and compose a text by using the target vocabulary of the unit . The excerpt taken from Teacher 4 exemplifies this issue:

Teacher 4: *… However, it [e-portfolio] is a good opportunity for them [students] to create a speaking sample using the vocabulary from the chapters.*

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4.2. Drawbacks of e-portfolios for students

Before e-portfolios are implemented, variables such as cultural context, teachers' ability to promote creativity, and technological elements should be determined and taken into consideration. Otherwise, this may limit the effectiveness and efficiency of e-portfolios, which may make the process difficult for students and teachers. Teacher 1 clearly indicates this:

Teacher 1: *I think the speaking portfolio is BOTH good and bad. Because the speaking portfolio depends on many variables (cultural context, teachers' ability to promote an environment conductive to creativity, technological elements), it can be a hard feat to manage.*

In order to prepare an e-portfolio for a speaking course, many factors are dealt with at the same time. Students are responsible for selecting a suitable topic for the assignments, researching, collecting and classifying what they have found, and finally creating their assignments. In this process, students are also supposed to produce four videos for two assignments. The first and third videos are first drafts of the two assignments and the teacher provides feedback. The second and forth videos are the final edited and reproduced versions of the first and third videos. This is a heavy burden on students and makes their learning more difficult. The excerpt below supports this issue:

Teacher 1: *Collecting, cataloging, and creating the portfolios was difficult at times. Furthermore, the idea of producing "drafts" of a speaking portfolio was a new concept for some students, which made the process more difficult.*

Students researched and composed their scripts to study before recording their videos. They memorized or read their scripts while preparing videos. Therefore, it is not an actual speech, but just a record of memorization or reading, which avoids fluency and spontaneity of speaking. Teacher 2 and Teacher 4 mention this issue as follow:

Teacher 2: *Since it [e-portfolio] is a recorded material, students memorize their speech. There is almost no production in e-portfolios.*

Teacher 4: *… Most of the students write down what they are going to say and then memorize it or read it. In these cases, it is not a true sample of their ability to speak.*

Apart from other participants, Teacher 2 considers e-portfolios in classes as 'a waste of time' because according to her, e-portfolio lacks assessment and process standards. Also, she mentions that e-portfolio is not motivating and beneficial for students because teachers are not well informed about e-portfolios, which also impacts classes negatively.

4.3. Students' requirements

Students' requirements refer to what students need to have or do in order to prepare their e-portfolios. Two of four teachers listed the steps taken to prepare students for the e-portfolio process. The steps include brainstorming about the topic, outlining speech, getting feedback from their peers and teachers, preparing videos and editing them according to the feedback given to them. For example, Teacher 2 lists them as follows;

- *Brainstorm about the topic*
- *Brainstorm about the supporting ideas*
- *Outline their speech*
- *Get feedback from their peers*
- *Make their 1st video*
- *Get feedback from their teachers*

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- Make their 2nd video

This proves that students should use their critical thinking skills when they brainstorm and outline their speech. They should collaborate with other students to work. They should be aware of their learning because when they get feedback from their peers and teachers, they should check their projects and improve them according to peer and teacher feedback.

Teacher 1: *First and foremost, a devotion to and motivation for the project is necessary. Without sincere excitement or motivation to produce a speaking video this project cannot be completed successfully. Especially when taking into consideration the processes of draft education, revision, self-assessment and self-reflection, motivation is a must.*

Teacher 3: *Students need … more importantly motivation.*

The excerpts show that preparing an e-portfolio is really a difficult task to carry out for students because of the requirements. Therefore, it may cause demotivation and frustration among students. But if students are motivated, they can prepare their e-portfolios and be successful.

Another requirement is having technology skills. In order to create an e-portfolio, students are supposed to prepare videos. Therefore, they should know how to use computer programs like iPhoto and iMovie, which are free software used in Apple's IOS operation system. The following excerpts are indicators of this.

Teacher 1: *Additionally, some technological knowledge is necessary (operation of a camera, computer, or a voice recorder.*

Teacher 3: *Students need a camera, a voice recorder, internet for researches, iMovie programme for well-developed projects…*

Teacher 3 emphasizes the need for teacher guidance to produce successful e-portfolios. Teacher guidance helps students comprehend assignments, find out strengths and weaknesses in their e-portfolios, and improve their learning by overcoming their weaknesses. In addition, Teacher 3 points out that student autonomy is another need for students. Students can become autonomous if they are free to choose what to study in their assignments.

4.4. Teachers' requirements

Teachers' requirements refer to what teachers need to have or do in order to implement the use of e-portfolios in their classes. The first requirement is that they have technological skills like their students. During the e-portfolio process, students need technical support in such situations, such as recording their video, uploading pictures to their videos, or the use of a camera or voice recorder. This requirement of students necessitates teachers having technology competence. To illustrate:

Teacher 1: *Technological knowledge is necessary on the teachers' part. Either in operation of a learning management system site for collection of the videos or in assisting the students' with operations of their computer for recording purposes.*

Teacher 2: *[Teachers] help them with computers/programs.*

Teachers should be able to plan effectively and be well organized. They should provide students with the framework that needs to used to produce their e-portfolios. To do this, teachers should have reasonable expectations of what can be achieved by students and have a clear understanding of their students. They should get familiar with their students. They should have a clear standard and a rubric to evaluate students' e-portfolios. In addition, they should provide students with individual, clear, and detailed feedback so that students can be encouraged to discover their weaknesses and strengths and to find solutions to improve their weaknesses. The following excerpts help to understand these matters.

Teacher 2: *[Teachers] provide students with a pack including brainstorming charts, outline pages, feedback pages as well as a rubric…. [Teachers] give clear and detailed feedback.*

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Teacher 4: *First the teacher must present the ideas and topics for the portfolio.*

Teacher 3: *The teacher should plan the activities and be organized. S/he should know his/her students and also know who is working on what topic. S/he should watch/listen to e-portfolios and give individual feedback one by one.*

Though it may seem that the e-portfolio process is teacher-centred, teachers' and students' roles are defined, and priority is on the students. Teachers should be facilitators, observers, and guides when they work with their students in class. To illustrate:

Teacher 2: *[Teachers] monitor students in groups and help them when needed.*

Teacher 3: *S/he [the teachers] should give students suggestions when s/he thinks it is necessary.*

Teacher 1: *When students are given controlled freedom to express themselves, the products are surprising.*

Students are in charge of preparing their own videos. Selecting, organizing, and creating portfolios are their responsibilities. During this procedure, they are the decision makers of their own e-portfolios, though teachers guide them. Therefore, their e-portfolios are individual and different from each other. They reflect their owners' creativity. This makes teachers be flexible and open to creativity. The following excerpt from Teacher 1 shows this:

Teacher 1: *The teacher should be open to creativity. When students are given a controlled freedom to express themselves, the products are surprising.*

Teacher 3: *… Good works should be praised and insufficient works should be encouraged.*

In addition to these requirements, Teacher 3 also emphasizes the need for praise and encouragement. As seen, one of the requirements of students is to be motivated. One way to motivate students is to praise and encourage them as they work. When a student is praised and encouraged by teachers, he/she can have the excitement and motivation that are required to carry out the requirements of the e-portfolio process.

4.5. Influences of e-portfolios on teachers

The impact of e-portfolios on teachers refers to how e-portfolios in listening and speaking courses affect the way teachers teach and assess speaking. Teacher 2 does not think that e-portfolios affect the way she assesses and teaches speaking skills in her classes. On the other hand, the responses of the other three teachers show that they are affected by e-portfolios to some extent. Three of them agree that e-portfolios are good outside classroom activities for students. They force students to learn how to utilize target language by using target vocabulary from their course book in a real-life situation. Also, they encourage students to use the target language not only inside the class but also outside the class. Therefore, students' e-portfolios are indicators of the fact that students improve themselves and master the target language. The following excerpts support this:

Teacher 1: *Seeing how a student uses the language outside the classroom is undoubtedly an indication of mastery.*

Teacher 4: *… the portfolio is a reflection of the sincere hard work of a student to learn and use English effectively.*

Teacher 3: *… E-portfolio gives them [the students] freedom to put their ideas into action. They jump from pages to stages. E-portfolios bring them closer to real life, which means English or a language is not only grammar or not just something that they use in class.*

Teacher 3 also thinks that e-portfolios changes students' understanding of a language. It considers a language only as a classroom subject or a set of grammatical rules. Instead, it shows that the language they learn can be also spoken and used outside the classroom. E-portfolios help students be aware of the real function of the language: communication, because they generally view a language as an in-class activity and a set of linguistic items.

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During the e-portfolio process, students are required to prepare four videos for two assignments and store them on an online language management system. The first and third videos are the first versions of students' works. Students get feedback from their friends and teachers, and then they prepare the second and third videos by improving them according to the feedback given. Therefore, e-portfolios keep track of students' learning, so they enable teachers to follow their students' progress. They also help teachers recognize and identify their students' problems in speaking, so teachers can contribute to students' improvement of their weaknesses. Teacher 3 and 4 point to this issue as follows:

Teacher 3: *It [E-portfolio] can influence how I assess speaking skills in some ways. For example, it can reveal pronunciation problems as well as patterns of mistakes in grammar.*

Teacher 4: *Speaking e-portfolio influences the way I assess speaking in my listening & speaking class…. E-portfolios are helpful to assess speaking; they give you tips about the improvement of the students.*

Apart from them, Teacher 1 states that students prepare and rehearse their scripts before they record their videos. The preparation and rehearsal influence fluency and spontaneity of students' speech. Therefore, alternative classroom activities that promote spontaneity should be used to assess speaking, too. According to Teacher 4, e-portfolios are fun for students to prepare. Also, students have a chance to display their works to others through e-portfolios and are praised and encouraged whatever quality their works are, so students are satisfied with and proud of their work.

5. Discussions

The use of e-portfolios in speaking courses promotes the use of the target language because students are engaged in learning (Schmitz, Whitson, Heest & Maddaus, 2010). According to Goldsmith (2007), e-portfolios require students to be responsible for organizing and producing the material for a specific purpose, evaluating their work, and reflecting on their findings about their own learning process, experiences, and skills. Consequently, e-portfolios contribute to students' taking control of their own education and motivating themselves to study (Akçıl & Arap, 2009; Cepik & Yastibas, 2013). Students who prepare e-portfolios in their listening and speaking courses take the responsibility of organizing and preparing their own portfolios, which enables them to participate in learning activities actively. They become aware of their strengths and weaknesses in their e-portfolios because e-portfolios require self-assessment and self-reflection as Rhodes (2011), Gonzalez (2009), Schmitz et al. (2010), and Cepik and Yastibas (2013) have stated. They try to overcome their weaknesses and reflect on what they have done in their e-portfolios. According to Lin (2008), e-portfolios can promote interaction and collaboration in class, which motivates and encourages students to complete and improve their e-portfolios benefitting from their peers. The use of e-portfolios in speaking courses enables students to collaborate and interact with their peers and teachers during the e-portfolio process. E-portfolios promote working collaboratively (Kocoglu, 2008). As e-portfolio assignments are given from the units studied in listening and speaking courses, the connection between what is learned in the classroom and how it is used in real life is established. Consequently, students can improve their speaking skills (Cepik & Yastibas, 2013).

Though e-portfolios contribute to students' learning in some ways, they also create some challenges for them. There are many factors such as cultural context and teachers' ability to be creative may decrease the efficiency and effectiveness of e-portfolios in speaking classes. According to Dalton (2007), an e-portfolio system should be flexible, so it should enable students to engage in their learning, give them more control over their learning, and enable them to be more active in their learning. However, speaking e-portfolios are very intensive because it requires selecting a topic, researching this topic, organizing the ideas, composing a text, recording a video, and re-recording the video according to the feedback given. As a result, the e-portfolio process makes students spend a lot of time to meet these requirements, so it may demotivate them. Goldsmith (2007) has mentioned that when teachers have no or little experience with the e-portfolio process, some problems during the implementation of an e-portfolio system may occur. Therefore, when e-portfolios are implemented, teachers should learn how to use the software for an e-portfolio platform and to understand "the assumptions on which an e-portfolio was built" (Goldsmith,

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2007, p.38; Gray, 2008). Accordingly, teachers participating in the present study mention that the use of e-portfolios in speaking courses may be demotivating for students because teachers may lack technical skills to carry out the process and may not have clearly stated standards for students' assessment. In addition, students memorize or read their scripts when they record their videos. Though it eases students' job, it affects the fluency and spontaneity of their speech.

In order to produce e-portfolios, students should use their critical thinking skills (Rhodes, 2011) because they need to brainstorm about the assignments, research, combine what they have found out, compose and outline their speech. While they are preparing their e-portfolios, they need to work, interact, and share ideas with their peers and teachers. It makes communication among students and between students and their teachers more effective as Bolliger and Shepherd (2010) have claimed. Teachers only help students when students need help. Motivation is key to encourage students to work and complete their e-portfolios (Bolliger & Shepherd, 2010). Students who prepare speaking e-portfolios should be motivated because the content of e-portfolios is very intensive and requires students to spend a lot of time. This process may be tiring and boring for students, but if they are motivated and excited, then they can complete their e-portfolios. Students should be free to choose what to study and how to prepare their e-portfolios, which encourages them to be responsible for their learning, to join the process actively, and to become autonomous. E-portfolios blend students' "information literacy, technology fluency, and domain knowledge" (Reese & Levy, 2009, p.3). They need to have some technology skills to produce their e-portfolios, which means revisiting the existent technology skills and improving them (Lin, 2008). Likewise, students who prepare e-portfolios for the speaking course should have some technology skills because they are required to record their videos by using a computer and to arrange their videos by using some programs like iMovie when they prepare their e-portfolios.

According to Goldsmith, the implementation of e-portfolios may create some problems because teachers may not have enough or any experience with the e-portfolio system. They also may not have a clear understanding of the assumptions of an e-portfolio system. Therefore, teachers should plan and organize everything related to e-portfolio implementation in speaking courses. First, they should set reasonable objectives that students can achieve. Then they should clearly state standards to implement, assess, and evaluate the e-portfolio process. They should know how to use the learning management systems and how to use programs such as iPhoto and iMovie in order to help students record and arrange their videos. As Lorenzo and Ittelson (2005) and Gray (2008) have stated, e-portfolios are the digital collections of a person's works. As a result, individuals are the focus of e-portfolios and personalize their learning through e-portfolios (Schmitz et al., 2010). Teachers who implement e-portfolios in speaking courses, therefore, should facilitate, observe, and guide students during the e-portfolio process because the main focus of e-portfolios is on students' improvement. They should give clear, understandable, and formative feedback to students about their e-portfolios individually. This can create a continuous flow of information between students and teachers about students' learning progress that can be followed easily because e-portfolios keep track of their learning (Reese & Levy, 2009). In addition, teachers who use e-portfolios in speaking classes should be flexible and open to creativity because each e-portfolio is unique in terms of organization and design. In order to motivate students to produce their e-portfolios, teachers should praise students' works and encourage students to work.

E-portfolios are good activities because they encourage students to use the target language outside the classroom. Students need to utilize the target language in a communicative and independent way because they communicate their ideas about the assignments in a way they design and organize on their own. This indicates that students can improve their use of language and master it as Baturay and Daloğlu (2010) have mentioned. The use of language in this way may change students' point of view about the language. They replace the view that the language is a set of linguistic rules and a classroom subject with the view that the language is used to communicate ideas, as Gonzalez (2009) has emphasized. Teachers keep track of their students' learning process because e-portfolios store their works (Baturay & Daloğlu, 2010; Reese & Levy, 2009). Therefore, they can follow whether their students improve themselves or not. When students complete their e-portfolios, they can also follow their own progress. They have a chance to show their products to their peers and teachers, so this can make them satisfied and motivated. But the preparation of speaking e-portfolios may result in memorization of the speech. Memorization influences the fluency and spontaneity of the speech. Therefore, e-portfolios in speaking course should be supported with activities that enhance spontaneous speech.

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6. Conclusion

There are some problems related to the lack of standardization in the e-portfolio process, in terms of grading rubrics and the lack of understanding the basic principles of the use of e-portfolios in speaking classes and memorization tactics students use in their videos. The teachers generally think that e-portfolios are a good way to encourage the use of the target language outside the classroom. They claim that students improve their self-assessment, self-reflection and language skills. In addition, students can improve their social skills by collaborating and interacting with their friends, and take risks in their learning by participating actively and taking responsibility for their learning. According to teachers, students have a chance to use the target language in real-life situations by making connections with what they learn in the classroom and how they can use their learning in real world. Students can display their works to others, which helps them to be motivated and build self-confidence as well. The teachers' responses indicate that e-portfolios help them to follow their students' progress, to identify their strengths and weaknesses, and to give feedback about their weaknesses to students individually. Therefore, it can be said that teachers' attitudes toward the use of e-portfolios in speaking classes are positive.

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Teaching java programming on smartphone-pedagogy and innovation; proposal of its ontology oriented implementation.

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Abstract

The growth of mobile technologies was evolutionary in the progression of technology, it opened a revolution in computing in a quicker time frame. The easy availability and extreme mobility with rich set of applications made smartphones an inevitable tool for students. This is the high time for academic domain to go for innovative teaching practices with the inclusion of mobile technologies to bridge the gap between academia and industry in a considerable manner. This paper is aimed to introduce an innovative approach of learning computer programming on smartphone platform. The proposed approach intends to introduce a new pedagogy of teaching programming on a platform by developing applications instead of teaching a programming language for creating applications. The main premise of this practice is the introduction of a tailored module to teach Java programming language while developing apps for a leading mobile platform-Android. The proposed module can be an appropriate alternative for the module 'Introduction to programming' of computer science curriculum across the globe. Pilot implementation has been done in one of the premier higher education centres of Gulf Council Country (GCC). An ontology based implementation of the proposed module ensures its consistency in delivery and the future work will focus more in this direction.

*Keywords:*Andorid;ontology;pedagogy;smart device; ontology

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1. Introduction

Mobile devices have started a new era in computing than ever before. The evident reflection of this vital change is there in all domains including teaching and learning sector, at least in the higher education sector. The swift that mobile internet has been explosively done from simple mobile phones to high end smartphones made it to serve as equivalent to a mini computer or more than that with its features for teaching and learning. The easy usage and easy accessibility of smart phones, the interaction that these ubiquitous devices offered with the capability of data transfer with higher data rate made it as an inevitable tool of educators. Quite lot of researches has been done and plenty of methods that can facilitate learning have been developed for the years ranging from traditional to electronic manner. The growth of mobile technologies opened a new horizon called mobile learning (m-learning) not just as an extended version of e-learning but as an extended paradigm. The mobile devices when used for learning purpose can create more active learning experience that improve student engagement, learning and course retention (Jooston, 2010). Besides these, the use of mobile technologies enhance the motivation level of students by offering the scope of applying 'learning by doing' approach instead of learning and doing. In fact, m-learning justifies one of the popular quotes from Chinese philosopher Confucius about learning "*I hear*

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and forget, I see and I remember. I do and I understand". It is a fact that the paradigm of m-learning has to be well supported by appropriate teaching pedagogy for its effectiveness as well as its implementation in curriculum across the globe. Agile pedagogies are more right candidates for m-learning due to their underlying learning approach and learning element. One of the areas where m-learning can go in a deeper manner is computer science/engineering courses. Students from various engineering disciplines are very much keen on developing and even deploying their mobile applications on repositories like play store. In primitive way of teaching and learning, deployment of an application is far away from curriculum and which is considered as one of the reasons for the gap between the academia and ICT industry. Innovative teaching practices with the inclusion of mobile technologies can have the possibility to bridge the gap in a considerable manner.

This research proposes an innovative way of teaching programming on smartphone platform by deriving a tailored course 'Introduction to programming with Java on Android platform'. The derived course has been delivered to a cohort of first level programming learners with an agile pedagogy derived suiting to m-learning. In section 2, review of related works is furnished to specify the background of research. Innovative practice and learning framework is discussed in section 3. Application and Evaluation of practice is presented in section 4. Ontology based implementation possibility is covered in section 5 followed by the future work.

2. Related works and background of research

In recent years, the efficiency of constructivism learning method, the transition from computer based learning to web based learning and the improvement in technologies have made mobile learning one of the most popular learning styles (Yamamoto, Demiray, & U, 2010)(Yamamoto, 2011). The umbrella of mobile learning covers a wide range of its perspectives and it can be represented within any of the learning scenarios ranging from blended learning to spaced learning. Many of the older definitions of mobile learning focused more on the aspect of learner being mobile while the new smart devices and the dramatic increase in data transmission offers a more flexible view of mobile learning considering both learner and devices. The two hypotheses designed for this research and their confirmation by experiments/surveys have led to the core outcomes of this research.

Hypothesis 1: Many designers and mobile learning initiatives are converting existing e-learning courses by only resizing them to smaller screens and user interface differences.
Hypothesis 2: There is no or minimal consideration for optimizing the learning experience by leveraging the capabilities of the mobile platform by utilizing alternative approaches.

Literatures and practices have shown that the growing number of mobile innovations continue to enter the landscape, educators are now interested in to redesigning traditional learning scenarios to mobile ones that leverages the unique capabilities of the mobile platform. Being specific, learning java programming in android platform is an example of one such effort. For historical reasons, the way of learning programming have created a fear in mind of undergraduate beginners and it created unnecessary layers of learning for many students (Tigrek & Obadat, 2012). Researchers believe that the conventional way of learning a programming language from scratch to advanced level for developing applications play a major role in this direction. This makes the learning less efficient to apply in the domain of their interest and time consuming for study. Challenges for learning programming are similar for Computer Science and non-Computer Science beginners. Literatures revealed that tailored courses with examples are always interesting for the novice programmers in introductory programming courses (Forte & Guzdial, 2005).

The motivation of this paper is to create a tailored course in Introduction to Java programming on smartphone platform. This can be done by leveraging the learning curve of a new technology into a traditional programming course. A pilot survey has been conducted among a focus group to identify the mobile device used often for learning. In Fig. 1, the result of the survey represented. The chain of information in learning programming can be migrated to smartphone platform without creating another layer on top of traditional programming module.

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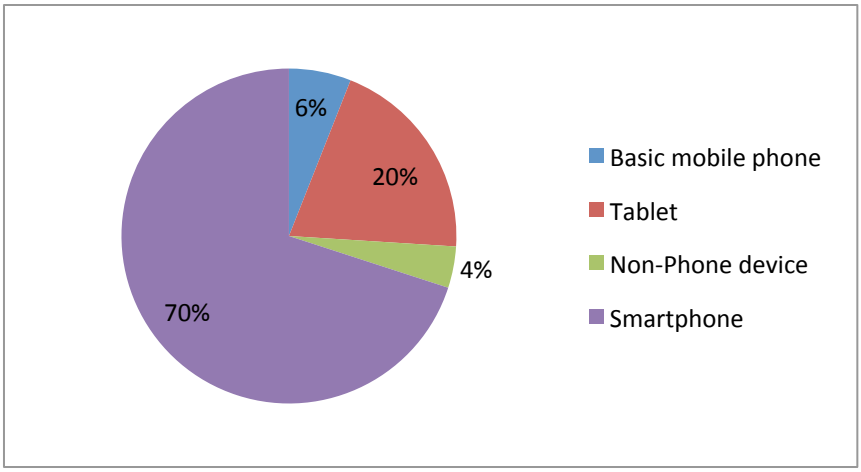


Fig.19. Mobile devices used by the students of pilot study

One of the leading mobile platforms with more apps-Android was chosen as the appropriate platform to introduce this innovative learning approach due to its rapid growth in the domain and acceptance of hand held manufacturers across the globe. ABI Research's updated market forecasts show that "The annual volume of smartphone app downloads will reach 56 billion this year". Of different OS platforms, Google's Android will account for 58% of the total, with Apple's iOS commanding an annual share of 33%. Microsoft's Windows Phone will finish the year with a slice of slightly smaller than 4%, with BlackBerry trailing it with 3%" (ABIresearch).

In a nutshell, the main premise of the proposed tailored modules to teach Java programming language while developing apps for a leading mobile platform-Android on a smartphone platform. The proposed module can be an appropriate alternative for the module "Introduction to programming", currently offered as an introductory programming module to students of various computing specializations. Through this approach, it is expected that learning programming directly on a smartphone platform will motivate the students and becomes enjoyable when they take the phone with what they have learned and share with family and friends.

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3. Innovative Aspect and proposed pedagogy

3.1. Background of practice

The innovative aspect of this research is to introduce a new style of teaching computer programming on smartphone platform. The innovation is applied to teach Introduction to programming with Java on Android platform in Middle East College, sultanate of Oman. The core aspect of this practice is to teach Java programming while developing Apps on android. This can combine two stages of learning into one stage by teaching directly on smartphone platform. The practice introduce a new curriculum under a new pedagogy which covers basic java programming skills on android platform for a novice programmer following with advanced topics which are suitable for higher level engineering and BSc (Hons) courses. The derivation of a framework for the proposed hybrid course's curriculum under an innovative pedagogy is the major deliverable of this approach which ensures the scope for developing subsequent teaching and learning materials in line with the innovative aspect.

3.2. Application of the practice

The practice has been implemented on pilot study basis to a cohort of the level 2 module Internet Programming (COMP 0331.2) of Middle East College. The rationale behind the selection of this cohort and module was its java based nature and the students of the cohort completed the traditional way of learning programming language in their elementary programming module- Introduction to programming. Students were briefed on the innovative approach for their learning paradigm shift. When introduced the concept of learning Java on mobile platform, students started paying more attention to the approach and had shown their enthusiasm especially when realized the scope of transferring their work to smartphones towards the completion. The pilot sessions conducted at one of the software labs where 30 computers with Local Area Network. Students used the computers where Computer Aided Software Tools (CASE) was installed for the smartphone application development platform.

3.2.1. Tools and techniques

Android mobile operating system is exclusively for devices such as smartphones and tablets. Most of the code is released under a free software license. The inclusion of such an open source mobile operating system in the curriculum can make only a positive implication in operational aspects of college. An open source Integrated Development Environment (IDE)-Eclipse is used to develop applications Fig. 2. By plugging Android SDK, Eclipse IDE can be made suitable for programming for android platform. The mentioned was set up created by students with the assistance of Student Technical Leaders (STL) in existing software lab without making any software or hardware implications. Android Development Tools (ADT) is a plug-in for the Eclipse IDE, which extends the capabilities of Eclipse developed Android applications. Tools aid to create application, to design UI (User Interface), and to debug the application. The built in emulator provides a great opportunity for the novice programmer to simulate the real device.

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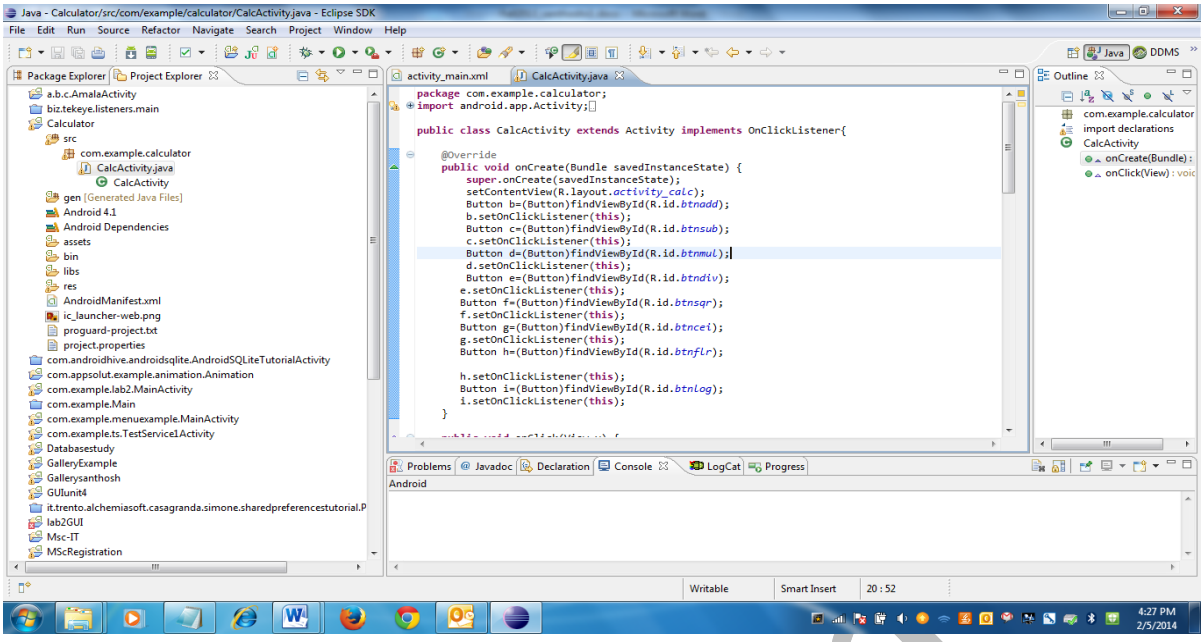


Fig. 2.Eclipse IDE with ADT

A simple calculator mobile application was developed with GUI and functionality in a single lab session on top of their introductory programming concepts. Students simulated their application on the default emulator shown in Fig.3.The students of entire cohort quickly remembered the programming features to be applied when they emulate the functionalities on a prototyping manner. Since paired programming approach was applied as part of the applied pedagogy, one noticed the flaws and missing components of the partner's coding.

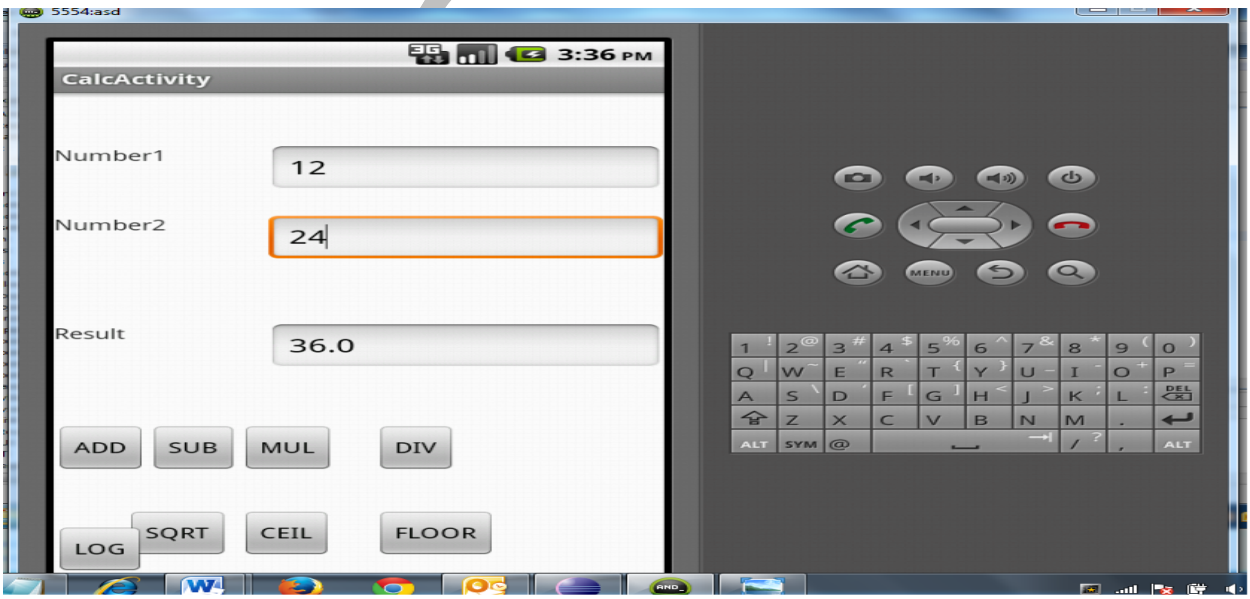


Fig. 3.Simulator view of simple Calculator android mobile application

3.2.2. Proposed pedagogy

The core of the framework of proposed pedagogy is incorporated with two components- learning elements and learning approach. Main stages of both aspects are briefed below which was applied on pilot study.

<table>
<tr><th>Learning elements</th><th>Learning approach</th></tr>
<tr><td>Introduction to programming on android platform

This section includes basic programming constructs such as control structures-sequential, selection, and arrays.</td><td>Extreme programming and paired approach

Agile learning approaches such as structured and guided teamwork will be part of the learning approach. Paired programming, a convenient way for programming will be incorporated. Experience demonstrated that when there is a person behind, team has more tendancy to try new things and realize one’s mistake in coding.</td></tr>
<tr><td>Object Oriented programming with Java

This section covers the core object oriented programming with java on android. Android environment is rich with the libraries available. Plugged in tools that exposure to the objects will be inevitable early when working with a smartphone. It is necessary to cover conceptual material about object oriented programming (OOP) at the same point (Machanik, 2007).</td><td>Blooms taxonomy

Revised Bloom’s taxonomy applied to structure the course outline, classify the exercise problems and surveys (Ari, 2011).
<table>
<tr><td>Remember</td><td>Recognize and Recall</td></tr>
<tr><td>Understand</td><td>Interpreting, Summarizing,
Inferring, Explaining</td></tr>
<tr><td>Apply</td><td>Executing and Implementing</td></tr>
<tr><td>Analyze</td><td>Differentiating and organizing</td></tr>
<tr><td>Evaluate</td><td>Checking and Critiquing</td></tr>
<tr><td>Create</td><td>Generating and Producing</td></tr>
</table></td></tr>
<tr><td>Adequate Java programming

Java APIs that is needed for phone programming is covered in this section by concentrating on the essential patterns and keeping minimum background details. Unlike conventional traditional java courses, topics like applet, file operations, GUI development with API… this approach is pretty much in line with the fact of student’s capacity to learn is limited by the brain.</td><td>Peer teaching

Peer learning with group will be implemented in a unique way. Each team will have a dedicated member for each lecture who is responsible of learning the material and teaching it to the other member. Quizzes and exams will be tracked for each problem whether the student was in teaching role or student role. This technique will be called Share Time Pair Teaching (STPT).</td></tr>
</table>

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Lab tutorial Tools and programming environment for Android Java. Android Development Environment (Eclipse IDE), Android SDK and deployment is the core learning element	**Lab exercises** Programming tutorials with an underlying principle 'How' rather than 'Why' to develop a conceptual model of the tools and programming environment for Android Java.
Case studies Case studies from the Android Developer's site should be incorporated. These examples come with the installation and make it available in the computer for the student.	**Application specification** Application specifications will be assigned to student teams to give a bigger picture of application development in regular basis. This will have many benefits including motivation.

3.2.3. Evaluation of the practice

Qualitative observation based and quantitative questionnaire based evaluation was conducted among the students of pilot study group. It has been observed that students couldn't even believe that platform based program learning can integrate various aspects so quickly. The proposed approach integrated GUI development, business logic development and deployment as separate components. Implicitly the students developed their mobile applications with industry standards such as component based development and application development with 'high cohesion and less coupling'. A questionnaire which investigates feedback on four core aspects was circulated among a focus group and the results are shown in Fig 4. The practice was well accepted and appreciated.

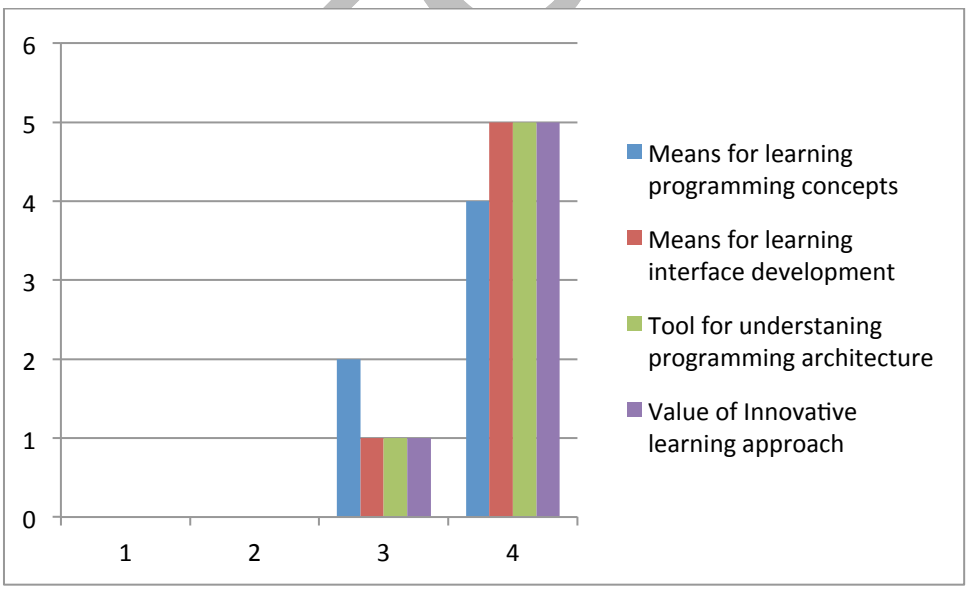


Fig. 4. Feedback analysis of pilot group

3.2.4. Recommendation of the practice

First level module, Introduction to programming offered by the Department of Computing of Middle East College to undergraduate beginners belonging to different specializations is the first full-fledged programming course of curriculum. The same module has been recommended to implement the innovative approach with an intention of introducing new mobile platform into curriculum from the beginning of engineering study. It also intended to update existing higher level engineering modules with a new mobile device and micro controller system. Since the smartphones are equipped with sensors, by connecting a microcontroller board with wireless communication to a smartphone the data acquisition by mobile platform becomes a solution without limit in engineering study and that increases the efficiency in mobile devices which can further take this practice to Augmented Reality (AR). AR technology, having developed in a very short time, has proved to be innovative and efficient technology in order to solve some kind of problems.AR can be defined as interactive device between human and computer, which has been developed by a computer in real world environment (Nee, A.Y.C, Ong, G, & Mouurtzis, 2012)

4. Ontology based implementation

An ontology based implementation of the proposed tailored course will ensure the much needed knowledge sharing and reusability to the education domain. Ontology is recognized as a term referring to the shared understanding of some domains of interest, which is often conceived as a set of classes (concepts),relations, functions, axioms and instances(Gruber, 1993).The growth of e-learning and computer based educational systems should support the import and export of knowledge in a standard format with common semantics. Ontology can be used as a skeletal foundation for a knowledge base. One of the motivations to build ontology for Introduction to Java programming with Android is connected with the attempts to create more effective teaching strategies by unifying the different views on the domain. As of now, different teachers introduce Java programming based on many different parameters of their own, such as the order of topics, emphasis on concepts. Though the order in which the teacher presents the material is up to him/her, the basic hierarchical link structure is not violated provided an ontology based approach is followed. Researcher proposed a hybrid methodology for ontology development derived from traditional software engineering process models and tools (John, 2010)followed in one of his previous publications. Fig 5 illustrates the framework followed for the proposed implementation of the tailored course derived from the innovative approach.

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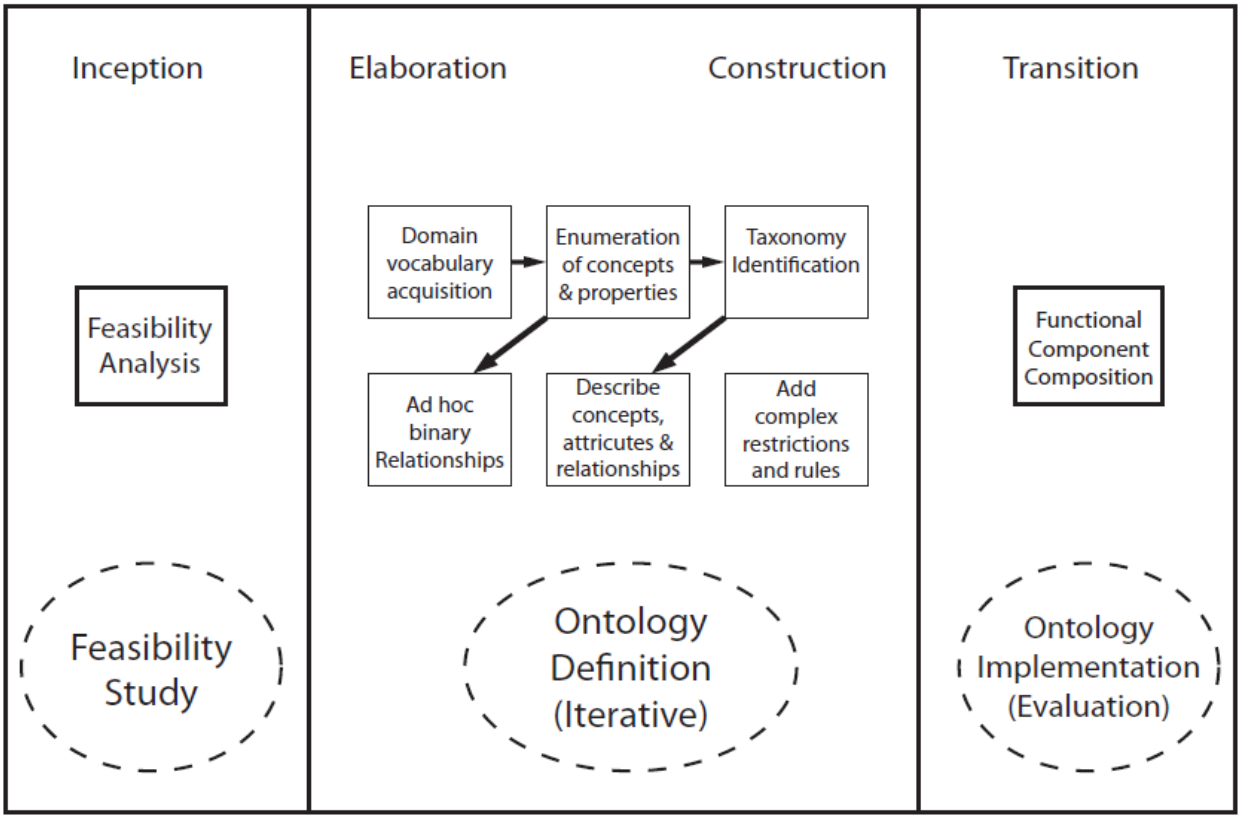


Fig 5. Hybrid Methodology followed for ontology development

5. Conclusions and future work

This research paper applied an innovative approach intending to introduce a new pedagogy of teaching and learning programming by developing applications for a platform instead of learning a programming language for creating applications. The proposed approach gives the opportunity for the students to develop a product in the form of mobile applications while learning their first programming course of curriculum. The proposed teaching and learning approach offers the opportunity for the students to transfer their work to personal handheld devices and then showcase to their friends and parents by making use of mobility. The proposed approach develops peer learning and paired programming approaches in the early stages of curriculum and cater them to follow agile methodologies. The proposed approach implicitly applies good software engineering principles and component based architecture from the first level programming course. The proposed approach can enhance the thoughts of entrepreneurship and product commercialization from student life itself which can inspire their creativity beyond the conventional academic limits. The paper proposed an ontology based implementation for ensuring the consistency by following a skeletal foundation for a knowledge base. Future work will complete the total ontology development of the domain concerned and will integrate with E-learning system (Moodle). The integration will be experimented in Middle East College for evaluating the viability of developed ontology.

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Technological impact on teaching of online managerial accounting

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Abstract

Using technology in teaching college level Managerial Accounting is an inevitable trend as massive open online courses (MOOCs) are proposed as cost saving tools for many entry-level college courses. However, its benefits won't be evident for several years and there is still much debate among experts (Wall Street Journal, May 12, 2014). Our university is no exception and we are trying online teaching on a trial basis. I have been teaching online principle-level Managerial Accounting for more than two years now. From my observations over the past two years, motivated students are doing as well as the face-to-face students are, but non-highly motivated students struggle and failure rates are high. It may be acceptable to use MOOCs for social or humanities subjects, but some technical classes like accounting, do not translate effectively as a mechanism to deliver course content. I tested empirically using a Regression Analysis computer assignment to examine this issue and our class results show online students underperformed on this assignment compared to in-class students. Our college uses Echo360 for recording lectures and I made the recording available for the assignment. I provided face-to-face explanations and help for in-class students, but online students worked primarily by themselves.

Keywords: online teaching, managerial accounting, technological impact on teaching

6. Introduction

Online courses may play a more important role in higher education in the future. Massive open online courses (MOOCs) are popular because they benefit non-traditional students as well as students in remote locations (Wall Street Journal, May 12, 2014). However, how to proctor exams and online security issues are concerns for MOOCs. The University of Nebraska at Omaha, initiated an ad hoc MOOC committee, but not much progress has been made so far. The ad hoc committee is inactive currently because of no budget support from the university.

Online schooling has success stories teaching English in Venezuela, for example (Wall Street Journal, June 18, 2014). However, whether this model will apply to other courses is an empirical question. This paper will examine current issues in teaching online managerial accounting. The next section reviews relevant papers for this research. The following section describes the method I use. The last section summarizes my findings and the limitations of this research.

7. Prior research

There are several models to assess student performance. Crisostomo (2011) uses a static instrument with 60 multiple choice questions with a pre- and post-test to measure student learning. However, for my

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study, I used one computer assignment to compare online student performance with in-class student performance.

The computer and other media affect the learning process of today's students (Jones and Wright, 2010). Basic computer skills are necessary to earn a degree in today's college education, but we do not teach remedial classes anymore because of budget cuts. However, there are huge individual differences in computer mastery levels. Jones and Wright (2010) used the Group Embedded Figures Test in their study. This test is for field-dependence developed by Witkin et al. (1971). Field-independent individuals show greater analytical skills than field-dependent individuals and accounting and engineering attract more field-independent individuals (Hicks et al. 2007). However, managerial accounting classes are required for all business majors and these issues are not clear because this course is taken before they choose their specific majors.

DeBerg and Chapman (2012) used common final exams with several sections of different pedagogical methods and found that performance on the final exam shows that students who learned with the textbook and students who learned in a nontraditional format have no statistical difference. This is the approach I used for my study since this method applied to principles of financial accounting which is equivalent to our managerial accounting. In addition, they emphasized that too much focus on student evaluation of teaching instruments by administrators to determine teaching effectiveness should be avoided.

Wernet et al. (2000) shows that increases in enrollment are due to part-time and adult students. These non-traditional students need online classes to pursue their goals. Online classes provide flexibility and convenience for adult learners (Machuca, 2007). Singh and Pan (2004) propose online classes are as good as in-class learning. However, recent huge student loan defaults from for-profit online institutions show total online class degrees are becoming a questionable value. It also depends on the course content and course delivery method. Managerial accounting needs basic analytical skills to understand the course content. Therefore, teaching online managerial accounting needs to include some basic computer skills as we specified in our course objectives.

8. Methods

We have five learning goals for Managerial Accounting (ACCT2020) at the University of Nebraska at Omaha. These are as follows:

Goal 1: Students are good decision makers.
Objective 1: Students consider alternatives.
Objective 2: Students make appropriate choices.

Goal 2: Students have a knowledge base necessary to function in today's business environment.
Objective 1: Demonstrate knowledge from the business core courses.
Objective 2: Demonstrate understanding in an area of specialization.

Goal 3: Students can appropriately use technology.
Objective 1: Demonstrates the ability to use technology as a tool in problem solving.

Goal 4: Students have the ability to communicate effectively.
Objective 1: Demonstrate the ability to employ clear, concise and effective written communication skills.
Objective 2: Demonstrates effective oral communication skills.

Goal 5: Functions effectively within a work related team.
Objective 1: Demonstrate the ability to contribute to achieving team goals.

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Goal 3 requires three computer assignments. These assignments are worth 100 points out of total of 700 points for online classes. Also, 150 points of the total of 700 includes online homework. One of these three computer assignments is the regression analysis assignment.

The computer project below is an example of regression analysis. I designed this assignment to measure the five traits required by our College of Business Administration last year with the ad hoc committee from each department within the college.

8.1. Computer project # 3

* Using "Excel," do the following problem using "the High-Low Method" and "Regression Analysis" and turn in the Excel file including your recommendation.

* Feel free to ask any questions concerning this project. You can discuss this project with other classmates, but do not copy somebody else's outputs. Remember the due date.

*To run the regression using **the Excel Program, use Tools, Data Analysis, Regression and choose x – cost driver and y – costs we want to predict. If you are using regression for the first time, click Tools, Add-ins, Analysis toolpak, Regression just for setting up the regression program once.**

Problem: The King Corporation is developing a model to explain and predict overhead costs. It produces only one product-line so that a simple count of the number of units produced each month may be a good measure of activity to begin with. The company has collected data for the past twelve months:

Month	Overhead Cost	Production Units
1	$254,500	40,000
2	184,500	24,000
3	165,400	21,000
4	178,000	23,000
5	192,000	25,000
6	225,000	31,000
7	210,000	28,000
8	230,000	30,000
9	195,000	29,000
10	224,000	36,000
11	200,000	32,000
12	240,000	38,000

Required:

1. Open a spreadsheet and enter the data.
2. Create another worksheet and enter the High-Low method formula to calculate variable cost per unit and total fixed costs. Use $y = a + b(x)$ formula. Enter a (total fixed costs) in Cell 20B and b (variable cost per unit) in Cell 20C.
3. Create another worksheet and run regression (Least Squared Method) and save the output.
4. Create another worksheet and save both outputs by linking worksheets. Determine whether the High-Low method or Regression Analysis is better to predict monthly overhead costs. Explain which model is the better? Why or why not?
5. Use absolute cell address in $y = a + b(x)$ formula (Use absolute August X Value) to predict January and December overhead costs. Do you think these predicted overhead costs are reasonable?

Each question measures a task required by UNO CBA as follows:

Task A: Create a spreadsheet from a blank worksheet, using separate data input section
Task B: Write basic math equations
Task C: Link worksheets within a file
Task D: Use absolute and relative cell addresses
Task E: Perform regression analysis

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The following is the results. I teach two face-to-face classes and one online class.

Process For each task:
Y: indicates that student meets expectations
N: indicates that student fails to meet expectations

Summary Assessment Requirements:

# yes Tasks	Rating	
0	**F**	**Fails to meet expectations**
1	**F**	**Fails to meet expectations**
2	**F**	**Fails to meet expectations**
3	**F**	**Fails to meet expectations**
4	**M**	**Meets expectations**
5	**E**	**Exceeds expectations**

Table 1: Overall Results

Student Performance:							
Student group	Task A	Task B	Task C	Task D	Task E	# of Yes	Summary Assess (E, M, or F)
1	y	y	y	n	y	4	M
1	y	y	y	n	y	4	M
1	y	y	y	y	y	5	E
1	y	y	y	y	y	5	E
1	y	y	y	y	y	5	E
1	y	y	y	y	y	5	E
1	y	y	y	y	y	5	E
1	y	y	y	n	y	4	M
l	y	y	y	y	y	5	E
1	y	y	y	n	y	4	M
1	y	y	y	y	y	5	E
1	y	y	y	y	y	5	E
1	y	y	y	n	y	4	M
1	y	y	y	y	y	5	E
1	y	y	y	y	y	5	E
1	y	y	y	y	y	5	E
1	y	y	y	y	y	5	E
0	n	y	n	n	y	2	F
0	y	y	y	n	y	4	M
0	y	y	y	y	y	5	E
	19	20	19	13	20		

SUMMARY:	# Students	% students
Failing to meet - F	1	5%
Meeting - M	6	30%
Exceeding - E	13	65%
Total	20	100%

Student group 1 refers to face-to-face students and 0 refers to online students. Overall 95% meet or exceed expectations. This result satisfies college requirements. However, comparing online and face-to-face student performance show online student performance is lower. Average scores of face-to-face students are 96% compared with average scores for online students which are 77%. These are the results for Spring 2014. I need to collect additional data to do more statistical analysis.

Table 2 reports each student's grade.

Table 2: Individual Scores

Points	Missed	Earned Points	Percentage	Class
50	2	48	96%	1
50	2	48	96%	1
50	0	50	100%	1
50	0	50	100%	1
50		50	100%	1
50	4	46	92%	1
50		50	100%	1
50	4	46	92%	1
50	4	46	92%	1
50	0	50	100%	1
50	4	46	92%	1
50	0	50	100%	1
50	0	50	100%	1
50	4	46	92%	1
50	0	50	100%	1
50	10	40	80%	1
50	2	48	96%	1
50	0	50	100%	1
50	20	30	60%	0
50	12	38	76%	0
50	2	48	96%	0

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9. Summary

I tested empirically using a Regression Analysis computer assignment to examine the effectiveness of online managerial accounting and the class results show online students underperformed on this assignment compared to in-class students. We use Echo360 for recording lectures and I made it available for the assignment. I provided face-to-face explanations and help for in-class students, however, online students worked primarily by themselves.

The limitation of this study was that it was a small sample study. Since this assignment was given as the last assignment of Spring 2014 and I gave 4 weeks to complete it, a lot of students gave up and the sample I collected was only a small portion of total enrolled students. I may need to design a better research method to measure effectiveness of online classes in the future.

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Technology based ınstruction of precipitation titrations

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Abstract

The aim of this study is to investigate the effects of technology based chemistry education on preservice teachers' views related to the role of technology on teaching and learning and achievement in chemistry. To determine preservice teachers' views of science teacher candidates about the roles of technology on teaching and learning in education The Roles of Technology on Teaching and Learning Practices Scale developed by Çil (2008) was used.. As a result of the research it has been determined that preservice teachers' developed positive views towards the roles of technology on teaching and learning practices and the achievement of the preservice teachers' has increased.

Keywords: Chemistry, technology based education, teacher candidates

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1. Main text

In the constructivist paradigm, it is believed that each individual's past experiences, beliefs and perceptions are different and that through them knowledge is constructed in diverse forms by that individual (Jonassen, 1990). This is because learning is an active process and in this process knowledge is handled by means of organisation. Individuals use different channels in order to process knowledge visually and aurally (Mayer, 2001). One of these channels is technology. Technological devices change daily, and like the way it is in daily life, technology can also be used in forms that respond to the needs of education and instruction settings (Van Wyk & Louw, 2008). The more the learners use knowledge the more their usage of it improves (Klauer, 2001). With the inclusion of technology in the field of education, the construction and application processes of knowledge have transformed alongside the process of accessing it.

Technology is constantly changing and improving. The newest technologies also render the teachers' educational instructions more important and interesting. According to Uşun (2000), educational technology is the kind of technology that increases the quality in the learning-teaching process and makes it more productive and efficient for both the teacher and the student. Teachers and trainee teachers, who can choose the most appropriate tools and materials for the students, stand out in the implementation of technology at schools. This is because teachers and trainee teachers are the people who facilitate the use of technology at schools and classrooms (Heinich, Molenda, Russell & Smaldino, 2002).

Hooper and Rieber (1995) propose a model that consists of five stages for the facilitation of new technologies in education: familiarisation, utilisation, integration, reorientation and evolution. At the familiarisation stage, the teachers themselves learn how to use the technology. At the utilisation stage, they begin to use this newly learned technology in the classroom, but since there will be some problems during application, tolerance is necessary. At the integration stage, technology becomes an inseparable part of the teachers in class from instruction to classroom management. At the reorientation stage, the teachers manage to effectively implement the technology as a tool based on the function and the aim of the class. Final-

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ly, at the evolution stage, the teachers, with the help of their gained experiences, can use the technology much more actively and successfully according to the structure of the class and the aims of education and instruction, by reshaping it. However, unfortunately, most teachers may not be able to get as far as the integration stage. Therefore, especially in teacher training, it is of great importance that technology is employed and that the trainee teachers are provided with educational and instructional opportunities for its use. Moreover, when the idea that sciences preoccupied with exploring facts and technology aiming at transforming those facts into application in daily life steer the course of life is considered, the importance of science in life could be better understood. According to Layton (1993), the knowledge acquired with the help of activities used in science education shares similarities with technological knowledge (Hill, 1998). Particularly in fields like chemistry, in which scientific applications are executed, learning is rendered more permanent, productive and effective with the use of technology.

2. Main text

The aim of this study is to examine the effects of technologically supported titration applications in chemistry classes on the opinions of trainee teachers regarding the role of technology in education and instruction activities and their success in chemistry. The study group of the research consists of 31 trainee teachers enrolled at Hacettepe University's Faculty of Education. In the study, participants' opinions on the traditional face-to-face instruction method and the technology-supported instruction that was prepared for their chosen subject of argentometric titration are analysed in detail. The research pattern of pre-test/post-test with experimental/control group is employed in the study. Whilst instruction with chemistry laboratory activities supplemented by technologically supported titration applications is employed in the experimental group, instruction with traditional verification laboratory approach is used in the control group. The opinions of the trainee teachers on the role of technology in education and instruction activities are evaluated by means of the analysis of their replies to the questions in "The Role of Technology in Education and Instruction Activities Assessment." The opinions of the trainee teachers on the role of technology in education and instruction activities are assessed along the lines of how effective technology is in teaching certain skills and how important technological tools are inside the classroom. Furthermore, "The Titration Achievement Test," developed by the researchers, is used in order to determine the success of the trainee teachers.

2.1. Data collection tools

2.1.1. The role of technology in education and instruction activities assessment

The assessment that is used to determine how technology shapes education and that has been conducted with over one thousand participants all over the United States (Crystal, 2006) has been adapted to Turkish by Çil (2008). The questionnaire titled "The Role of Technology in Education and Instruction Activities" is expanded by Çil (2008) with additional items in consideration with the education and instruction activities in Turkey. It consists of two main sections and seventeen questions in total. Cronbach's alpha coefficient for the reliability of the questionnaire came out 0.705.

2.1.2. The titration achievement test

A test is developed as a part of the research in order to measure the trainee teachers' success on titration. Validity and reliability inspections are done on the 15-item multiple choice achievement test with the participation of 250 trainee teachers. As a result of the work done with ITEMAN Windows Version 3.50 statistics software, the Titration Achievement Test with an average difficulty level of 0.5 and Point Biserial Correlation of 0.621 is developed.

2.2. Data analysis

In the first part of "the role of technology in education and instruction activities assessment," how effective the trainee teachers find technology in teaching various skills and applications is explicated. In the

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second part of the assessment, the trainee teachers' opinions on the importance of technological tools in the classroom are examined. Furthermore, the data from the Titration Achievement Test, developed by the researchers in order to determine the success of the trainee teachers, is used.

3. Results

In the research, the pre-test and post-test scores of the participants in experimental and control groups at the "The Role of Technology in Education and Instruction Activities Assessment" and "Titration Achievement Test" are checked to determine whether there were meaningful differences between the groups. As the number of participants in the sample is low, it is decided that using parametric tests might lead to errors in evaluation, and thus, the non-parametric U Test (Mann-Whitney test) is used.

3.1. Findings of the role of technology in education and instruction activities assessment

The Examination of the Pre-Test Results of the Experimental and Control Groups at The Role of Technology in Education and Instruction Activities Assessment The data acquired through "The Role of Technology in Education and Instruction Activities Assessment" used as a pre-test with the trainee teachers is shown in Table 1.

Table 1. The Mann-Whitney U test results on the experimental and control groups' pre-test scores.

	Group	N	Mean Rank	Sum of Ranks	U*	p
How effective is technology in teaching various skills?	Experimental group	15	15.94	255.00	119.00	.984
	Control group	16	16.07	241.00		
How important are technological tools in the classroom?	Experimental group	15	15.84	253.50	117.50	.922
	Control group	16	16.17	242.50		
The Role of Technology in Education and Instruction Activities Assessment	Experimental group	15	15.75	252.00	116.00	.892
	Control group	16	16.27	244.00		

*p> .05

As can be seen in Table 1, it is found that statistically, there is not much meaningful difference between the sub-dimension scores of the trainee teachers in the experimental and control groups at The Role of Technology in Education and Instruction Activities Assessment before the implementation (U=119; 117; 116 p>0.05). In other words, it is established that there is not much meaningful difference between the opinions of trainee teachers in the experimental and control groups on the role of technology in education and instruction activities before the implementation.

3.2. The comparison of the experimental group's pre-test and post-test scores at the role of technology in education and instruction activities assessment

In order to determine whether there is any contribution of technologically supported teaching practices on the opinions of trainee teachers participating in the research on the role of technology in education and instruction activities, the non-parametric alternative to the t-test, Wilcoxon Signed-Rank test is applied to the pre/post-test scores. The results reflecting their effects are seen in Table 2.

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Table 2. The Wilcoxon signed-rank test results on the experimental group's pre/post-test scores at the role of technology in education and instruction activities assessment.

	Group	N	Mean Rank	Sum of Ranks	Z	p
How effective is technology in teaching various skills?	Negative Ranks	9	7.67	69.00	-2.36	.018
	Positive Ranks	3	3.00	9.00		
	Ties	3				
How important are technological tools in the classroom?	Negative Ranks	9	7.33	66,00	-1.44	.149
	Positive Ranks	4	6.25	25,00		
	Ties	2				
The Role of Technology in Education and Instruction Activities Assessment	Negative Ranks	11	8.41	92.50	-2.51	.012
	Positive Ranks	3	4.17	12.50		
	Ties	11				

In Table 2, it can be seen that there are meaningful differences between the pre-test and post-test scores of the experimental group at the Role of Technology in Education and Instruction Activities Assessment along the lines of both the assessment in general after the implementation of technology-supported instruction and "how effective technology is in teaching various skills" [z=- 2.36; -1.44; -2.51, p<.05]. That the differentiation is in favour of the post-test results stand out, when their ranking averages and totals are examined. In other words, the technology-supported teaching of the subject of argentometric titration has affected the opinions of trainee teachers, particularly on the effectiveness of technology in teaching various skills, at a statistically meaningful level.

3.3. The comparison of the control group's pre-test and post-test scores at the role of technology in education and instruction activities assessment

In order to determine whether the scores of the trainee teachers in the control group at the Role of Technology in Education and Instruction Activities Assessment change significantly between the repeated measurement before and after the traditional laboratory instruction, the non-parametric Wilcoxon test is used. The results of the analysis are shown in Table 3.

Table 3. The wilcoxon signed-rank test results on the control group's the role of technology in education and instruction activities assessment pre/post-test scores.

	Gorup	N	Mean Rank	Sum of Ranks	Z	p
How effective is technology in teaching various skills?	Negative Ranks	12	8.46	101.50	-1.73	.083
	Positive Ranks	4	8.63	34.50		
	Ties	0				
How important are technological tools in the classroom?	Negative Ranks	10	8.95	89.50	-1.67	.093
	Positive Ranks	5	6.10	30.50		
	Ties	1				
The Role of Technology in Education and Instruction Activities Assessment	Negative Ranks	11	9.27	102,00	-1.75	.079
	Positive Ranks	5	6.80	34.00		
	Ties	0				

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When the z values in Table 3 are examined, it can be seen that there was not much meaningful differentiation between the pre/post-test scores of the trainee teachers in the control group [z= -1.73; -1.67; -1.75, p>.05]. In other words, the traditional instruction of the subject of argentometric titration without the support of technology did not have meaningful effects on the opinions of the trainee teachers on the role of technology in education and instruction activities.

3.4. The examination of the experimental and control groups' pre-test scores in the titration achievement test

As a part of the research, in order to measure the trainee teachers' success on the subject of argentometric titration, a valid and reliable achievement test is developed. The test, which is prepared to determine the trainee teachers' levels of knowledge on the subject of argentometric titration, is given to the participants before the technology-supported instruction. The trainee teachers' answers to the 15 multiple choice questions in the achievement test are examined and evaluated.

In the research, the pre-implementation titration achievement test averages of the trainee teachers in the experimental group, with whom technology-supported instruction is employed and in the control group, with whom traditional verification laboratory approach is utilised are analysed using Mann Whitney U Test. The results are summarised in Table 4.

Table 4. The results of the mann-whitney u test on the achievement pre-test scores of the experimental and control groups.

Group	N	Mean Rank	Sum of Ranks	U*	p
Experimental group	15	14.34	229.50	93.5	.448
Control group	16	16.82	235.50		

*p> .05

According to the analysis results in Table 4, a statistically meaningful difference between the achievement pre-test averages of the experimental and control group trainee teachers is not seen (U=93.5; p>0.05). This result shows that there are no meaningful differences in the trainee teachers' levels of knowledge on the argentometric titration subject between the experimental and control groups before the implementations.

3.5. The comparison of the pre-test and post-test scores of the experimental group in the titration achievement test

The difference between the trainee teachers' pre-test and post-test scores after the implementation of technology-supported instruction and traditional verification laboratory approach are examined using the Wilcoxon Signed-Rank Test. The findings are summarised in Table 5.

Table 5. The wilcoxon signed-rank test results on the experimental group's achievement pre-test and post-test scores.

Group	N	Mean Rank	Sum of Ranks	Z	p
Negative Ranks	15	8.50	136.00	-3.53	.000
Positive Ranks	0	.00	.00		
Ties	0				

When Table 5 is examined, a statistically meaningful differentiation is seen between the pre-test and post-test scores in the achievement test of the trainee teachers in the experimental group after the technology-supported laboratory implementations [z=-3.53, p<.05]. The mentioned differentiation is determined

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to be in favour of the post-test scores, when the ranking average and the total are studied. Therefore, it could be said that technology-supported instruction of the subject of argentometric titration has improved the success of the trainee teachers in a manner that would statistically make a meaningful difference.

3.6. The comparison of the achievement pre-test and post-test scores of the control group

The results of the analysis to determine whether there has been a significant change in the success of the control group's trainee teachers in the repeated measurements before and after the traditional laboratory instruction are presented in Table 6.

Table 6. The wilcoxon signed-rank test results on the control group's pre/post achievement test scores.

Group	N	Mean Rank	Sum of Ranks	Z	p
Negative Ranks	2	3.50	7.00		
Positive Ranks	12	7.64	84.00	-2.701	.007
Ties	2				

When Table 6 is examined it is seen that the achievement pre-test and post-test scores of the trainee teachers in the control group does not show meaningful differentiation [z=-2.701, p>.05]. In other words, the traditional instruction of the subject of argentometric titration, without technology-supported instruction did not lead to a statistically meaningful increase in success.

4. Conclusion and discussion

Educators are continuously working on new research regarding how technology can be implemented effectively in order to increase the quality of instructional activities. This research is conducted with the participation of trainee teachers in order to add a new study to the field. The aim of this study is to examine the effects of technology-supported titration applications in chemistry classes on the trainee teachers' opinions on the role of technology in education and instruction activities and their success in chemistry. The opinions of the participants on the traditional, face-to-face instruction approach and the technology-supported instruction method prepared to supplement the subject of argentometric titration are examined.

Whilst instruction with chemistry laboratory activities supplemented by technology-supported titration applications is employed in the experimental group, instruction with traditional verification laboratory approach is facilitated in the control group. When the average values belonging to the pre-test and post-test scores of the experimental and control groups are examined in the research, the increase in the experimental group's achievement scores after the implementation of technology-supported instruction practices stands out. Essentially, that the members of the experimental and control groups, who have pre-knowledge on the subject of titration, to gain more information during instruction activities is a natural process. However, when the post-test achievement results of the groups are compared, it can be seen that there is a statistically meaningful differentiation between the students of the experimental and control groups in favour of the experimental group and that there is a greater increase in the achievement scores of the experimental group's students in comparison to those of the control group. This increase in the post-test scores of the experimental group's students could be taken as a sign that the laboratory applications based on technology-supported instruction has positive effects on the achievement of the trainee

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teachers. As the implementation of technology in education and instruction provides students with opportunities to work individually, it is known to improve the success of student learning (Zhao, Wang, Wu & He, 2011; Hsiao, 2012).

In the study conducted by Özmen and Kolomuç (2004), the effect of technology-supported instruction on student success in chemistry classes is examined in an experimental way. At the end of the research, the success was measured to be higher in comparison to the traditional method. In the study, when the average values of the pre-test and post-test scores of the experimental and control groups are examined, it becomes noticeable that the experimental group's success scores and the positive opinions on the role of technology in education and instruction activities show an increase following the implementations of technology-supported instruction. Another important finding of the study is that the post-test scores that reflect the opinions of the trainee teachers in the experimental group on the role of technology in education and instruction activities reveal a statistically meaningful increase. This finding means that the trainee teachers' opinions on the role of technology in education and instruction activities have changed in the positive. There were similar findings in the study conducted by Çil (2006), whereby the trainee teachers were found to deem technology effective in the classroom. This finding of the study was also emphasised in the works done by Atam (2006), Aykanat, Dogru and Kalender (2005). Integrating technology in the education process is not enough on its own to introduce technology to the education and instruction settings, trainee teachers need to receive applied training on using educational technologies before they join the profession (Çoklar et.al, 2007). Therefore, it is recommended that the trainee teachers are made a part of such implementations often before they join the profession and that they should be studied with larger samples on other subjects.

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Technology based counseling: perspectives of Turkish counselors

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Abstract

The purpose of this study is to analyze the Turkish counselors' perspectives about using Internet for counseling purposes in their professional life. The questionnaire prepared by the researchers based on literature review and experts' opinion. It was sent to counselors via e-mail, 542 counselors returned the questionnaire. Findings were analyzed by using descriptive statistics. Counselors' perspectives about online counseling were also examined by content analysis. Results indicated that counselors have positive perspectives about online counseling and think that it is applicable to Turkey, but they need more information about online counseling. Results were discussed in light of current literature.

Keywords: counseling; technology support; online counseling; Internet.

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1. Introduction

The growth of using technology created opportunities for counselors to provide online counseling as an alternative technique to traditional counseling (Elleven & Allen, 2004). Even though the delivery of technology-based counseling continues to grow, questions and critics about distance online counseling has increased (Laszlo, Esterman, & Zabko, 1999; Reimer-Reiss, 2000).

Various tiers are used for technology-based therapy. These are e-therapy or e-counseling (Manhal-Baugus, 2001; Tate, Jackvony & Wing, 2003), cyber therapy or cyber counseling (Maples & Han, 2008; Suler, 2000), online or Internet based counseling (Pollock, 2006; Rochlen, Zack, &Speyer, 2004); e-mail therapy (Murphy & Mitchell, 1998; Shapiro & Schulman, 1996); web counseling (Young, 2003). The term online counseling will be used in this study.

There are so many definitions regarding technology counseling. According to Nickelson (1998) online counseling is a type of technology based counseling in which counselor and clients are not in the office setting and there is distance between them. According to Bloom (1998) online counseling is distance counseling and counselors and clients use electronic resources to communicate. Alleman (2002) states that online counseling is an ongoing, text-based, technological interaction between counselor and clients, which aims to improve the client's behavioral and psychological wellbeing. Another definition of online counseling is a therapy which is not restricted with therapy, may also contain consultation, psycho education for the purpose of behavioral and mental improvement, pursued by licensed counselors through phone, e-mail, synchronous chat, and videoconferencing. As it is seen, there are numerous definitions and different forms of technology based counseling.

Even though Internet counseling has created excellent opportunities for both counselors and clients, it is still a question of debate. Some of them are whether or not the client and/or counselor have

access to online counseling, the result is effective or not, ethic issues and cultural problems. The first advantage of online therapy is ease of access (Pomerantz, 2002) because online counseling can be done any time of the day (Bailey, Yager, & Jensen, 2002) and Internet connection is the only necessity to access; people can easily counsel (Manhal-Baugus, 2001; Maples & Han, 2008). People who have problems in accessing counseling services because of illness, disabilities or transportation problems (Maples & Han, 2008), who has social phobias (Fenichel ve ark, 2002), or who has anxiety to seen by a counselor ((Lange, van de Ven & Schrieken, 2003) and all family members in the family online counseling (King, Engi & Poulos, 1998) may access to online counseling services. The second advantage is the therapeutic power of writing (Murphy & Mitchell, 1998). Because writing is a therapeutic tool (Walker, 2007), it is thought that the client may be more honest and easy to self-disclose (Fenichel & ark., 1992). They may easily say what they really want to say because of the equal relationship between counselor and client (Yager, 2001). Another one is using links or videos (Ainsworth, 2002) in the session because counselor may use related links or videos to help the client in the online counseling session. At last, online counseling has financial advantages (Griffiths, 2001) because it is cheaper than face-to-face counseling. Beside these advantages, online chatting records also help clients to read again and again what they talked about and this may help them overcome their problems. These records also help counselors use them as a means of supervision and consultation (Murphy & Mitchell, 1998).

On the other hand, there are some disadvantages. Loss of human interaction is the first and most important disadvantage (Maples &Han, 2008). The therapeutic relationship may decrease because of lack of verbal and visual communication as well as gesture expression (Manhal-Baugus, 2001). Because of lack of non-verbal cues, counselors may not understand or feel what the client feels or they miss when the client cries therefore counselors may not empathize with the client (Suler, 2000). Thus, misunderstandings may happen between them (Manhal-Baugus, 2001). Other disadvantage is the fact that it is technology-based. Because Internet is a necessity for online counseling, people may not always access it easily (Gingerich, 2007). Some villages may not have Internet or frequent power failure may cause loss of Internet. Thus, it is hard to reach all people. Sometimes people who have limited knowledge of using Internet or people who are very slow to write on computer may not reach out for online counseling services (Maples & Han, 2008). Sometimes technological problems related mail non-delivery (Griffiths, 2001) or camera problems (Maples & Han, 2008) might happen. Lastly, it may be difficult to respond to crisis through online counseling (Childress & Asamen, 1998).

Research about online counseling focuses on different problems related to depression, anxiety disorders, eating disorders, Internet addiction, couple relationship problems, family based problems, or occupational problems (Harry & Issack, 2013; Kirk, 2000; Pollock, 2006; Skinner & Zack, 2004; Tate, Jackvony & Wing, 2003). Most of these research's results show that online counseling help to the clients for decreasing their problems. Some research focused on whether face-to-face counseling or online counseling is effective, the results indicate that both counseling types are effective (Magaletta, Fagan, & Peyrot, 2000). Other research focused of which type of counseling is preferred by clients and results from that study indicate that people prefer online counseling over face-to-face counseling (Schopp, Johnstone, & Merrell, 2000).

1.1 Online counseling in Turkey

In parallel with the technology uses at counseling services throughout the world, technology uses in counseling services have increased in Turkey. Counselors mostly use technology in counseling services such as networking with students, parents and colleagues, preparing surveys and reaching students, as well as finding materials for students (Savaş & Hamamcı, 2010). The first computer based occupational counseling program was used in 1990 for nine years (Kuzgun & Sözalan, 2000). However, this program was focus on choosing the proper occupation and was not about online counseling.

Because online counseling is not common in Turkey, the limited research about online counseling mostly focuses on what counselors, students, or their families think about online counseling. According to Savaş (2006) counselors do not think that online counseling is proper in Turkey's school settings. Even though school counselors have high self-confidence about using online counseling (Basak, Uysal, & Asici, 2010), they have negative thoughts about using it in school setting. Negative perspectives of online counseling may be related to the problems in the counseling profession. For example, quota per capita of students to counselor in a school setting varies between 500-3500 (Hatunoğlu & Hatunoğlu, 2006). It is difficult to provide counseling to all students in these kinds of schools. On the other hand, materials for online

counseling such as computer and Internet connection could not provide for counselors in Turkey's school setting however some private teaching institutions have online individual counseling services. Briefly, the purpose of this study is to describe what Turkish counselors think about online counseling in their professional life.

2. Methodology

The present study was designed with descriptive model. Descriptive model aims to describe relevant cases (Karasar, 2009).

2.1 Sample

Maximum variation sampling strategy for purposeful sampling aims to sample of heterogeneity and aims at capturing and defining the main teams that cut across a great deal of participant or program variation (Patton, 1990) used to select the sample. The sample of this study is consisted of counselors in Turkey. The participants (N=542) 299 were female and 243 were male. Participants were chosen according to counselors who are a member of Turkish Psychological Counseling and Guidance Association. Participants were informed as to the purpose of the study through an electronic format of a questionnaire. Consent was derived via e-mail and google.doc.

Table 1

Sampling of Study

	Female		Male	
	f	**%**	**f**	**%**
Profession				
Counselor	245	45,0	195	36,1
Counselor Expert (MS degree)	33	6,0	29	5,4
Academician	21	3,9	19	3,6
Experience				
0-5	201	37,1	153	28,2
6-10	79	14,6	66	12,1
11-+	19	3,6	24	4,4
Education				
Bachelor	233	42,9	190	35,1
Masters	53	9,8	49	9,0
PhD	13	2,5	4	0,7

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Work setting				
Public School	235	43,4	191	35,3
Private School	28	5,1	23	4,2
University	21	3,9	24	4,4
Other setting	15	2,7	5	0,9

As it is seen on the table, 245 of the participants are female counselors. 33 female counselors are counselor experts and 21 of them are academicians. On the other hand, 195 of the participants are male counselors, 29 male counselors are counselor experts and 19 of them are male academicians. Participants' years as a counselor also varied. 201 female counselors have 0-5 year experience, 79 of them have 6-11 year experience, and 19 of them have 11 and up years of experience. 153 male counselors have 0-5 years experience, 66 of the have 6-11 years experience and 24 of them have 11 and up years experience. 233 female counselors have bachelors' degree, 53 of them have master's degree and 13 of them have PhD degree. In addition to that, 190 male counselors have bachelors' degree, 49 of them have master's degree and 4 of them have PhD degree. At last, participants worked in a variety of setting such as private, public, universities, and other settings. 235 female counselors work in public schools, 28 female counselor work in private schools, 21 of them work in the university setting and 15 of them work in other settings. 191 of male counselors work in public schools, 23 of them work in private schools, 24 of them work in the university setting, and 5 of them work in other settings.

2.2 Instrument

"Counselors' Perspectives about Online Counseling Questionnaire" was developed by researchers for the purpose of analyzing the opinion of counselors about using Internet based counseling in their professional life. The questionnaire consists of 21 items, which has 4 open-ended questions, and 17 scalar items, which were prepared by researcher according to literature review and experts' opinion (Rochlen, Beretuas, & Zack, 2004).

2.3 Process

The questionnaire was formed to online scale and google.doc. The links were sent to counselors via the Internet because present study focuses on online and Internet based counseling, online questionnaires were used to collect data.

3. Results

Table 2

Items on the Questionnaire 1-17

	Agree		**Undecided**		**Disagree**	
	f	**%**	**f**	**%**	**f**	**%**
Item 1: Counselors should do counseling over the Internet.	344	63,5	93	17,1	105	19,3
Item 2: It is beneficial to send e-mail from clients to counselors	268	49,5	101	18,6	173	31,9

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Item 3: Clients should only online contact with their counselors for the purpose of cost or appointment.	91	16,7	110	20,4	431	62,9
Item 4: It is beneficial to apply online test, questionnaire or scales to clients by counselor.	386	71,2	81	14,9	75	13,9
Item 5: Online counseling should be given as a course to students in counseling education.	402	74,2	71	13,1	69	12,7
Item 6: It is useful to give simultaneous psychological support to multiple clients by online support group.	203	37,5	64	11,8	275	50,7
Item 7: Online counseling services are for only clients who cannot able to get face-to-face counseling.	205	37,8	43	7,9	294	54,3
Item 8: Not to be in same environment or office reduces the effectiveness of therapy.	274	50,6	96	17,7	172	31,7
Item 9: Online counseling services are at risk of violation of privacy.	351	64,7	94	17,4	97	17,9
Item 10: To online meet with parents about students is appropriate	238	43,9	104	19,2	200	36,9
Item 11: Online counseling services are playing an influential role in crisis intervention	247	45,5	111	20,4	184	34,1
Item 12: It is easier to access online counseling services than face-to-face counseling services.	413	76,2	35	6,4	94	17,4
Item 13: Online counseling services are only for clients who have a big concern about sharing their problems (such as LGBTQ related topics, sexual problems or relationship problems)	127	23,4	111	20,4	304	56,2
Item 14: Online counseling services are financially advantageous for clients	375	69,2	63	11,6	104	19,2
Item 15: Online counseling services are financially advantageous for counselor	251	46,3	147	27,1	144	26,6
Item 16: It is easier to express what clients want to tell to the counselor over online counseling.	322	59,4	74	13,7	146	26,9
Item 17: Online counseling has applicability possibilities to our country	310	57,3	113	20,8	119	21,9

As seen on Table 2, 63% of the counselors think that Internet based counseling should be done by counselors. The rates of counselors who are undecided was 17% and those who disagree are at 19%. 49% of counselors think that clients can send e-mail to counselors. However, 31% counselors do not agree to receive the e-mails from their clients. 62% of the counselors do not agree to contact their clients for the sole purpose of cost or the appointment. 16% of them agree to get e-mail from their clients for the purpose of costs or appointments. 20% of the counselors are undecided about contacting the counselor for these purposes. Most of the counselors (71%) agree about applying online tests, questionnaires or scales. On the other hand, 13% of them do not agree to apply tests, questionnaires or scales online. 14% of them are undecided. The biggest portion of counselors (74%) agrees that online counseling should be a course or lecture in counseling education at universities. However, 13% of the counselors are undecided and 12% of them disagree. More than half counselors (50%) do not agree about simultaneous psychological support group program. 37% counselors agree but 11% of them undecided. 37% of the counselors think that online counseling services are for only those who are not able to get to face to face counseling. On the other hand, 54% of them do not agree with the aforementioned statement. 7% of them are undecided. Most of the counselors (50%) think that not psychically being in the same office reduces the effectiveness of therapy. The rates of counselors who disagree about it are 31%. Counselors (64%) think that online counseling services are at risk of violation of privacy. Undecided rate (17%) and disagree rate (17%) are also similar. 43% of the counselors agree positively about online meetings with parents, 36% of them disagree and %19,2 of them are undecided. 45% think that online counseling has an important role in crisis intervention but 34% of them disagree. 76% of the counselors agree about it is easier to access online counseling than face-to-face counseling. 17% of the disagree about it and 6% of them undecided. Most of the counselors (56%) disagree that online counseling services are not only for clients who have big concerns

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about sharing special problems. On the other hand, 23% of them agree and 20% of them are undecided. 69% of the counselors think that online counseling are financially advantageous for clients. 19% disagree and 11% are undecided. In contrast the item 14, most of the counselors (46%) agree that online counseling services are financially advantageous for clients. 27% of them are undecided and 26% of them disagree. 59% of the counselors agree that clients may easily express what they want to talk about, 26% of them disagree and 13% are undecided. 57% of the counselors think that online counseling has applicability possibilities to our country. On the other hand, 21% of them think that it is not applicable and 20% of them are undecided.

The result of content analysis for four open-ended questions (listed 18-21) listed below.

"What are the positive sides of online counseling services?" was asked to counselors.

Table 3

The positive perspectives of counselors toward online counseling services.

	f
Financial advantages	96
Easy to access	87
Feel more comfortable about telling the problem	83
Help clients who have psychical disabilities	56
Feel more confident	49
Easy to express feeling	36
Saving of time	24
Time management	13
Accessing abroad	6
Help to crisis intervention	5
The power of writing	5
Reading chat records again and again	3

As seen on Table 3, the highest frequency statements are financial advantages, easily accessible, feeling more comfortable about telling problems to the counselor, helping clients who have psychical disabilities and feelings of increased confidence.

"What are the negative sides of online counseling" was asked to counselors.

Table 4

The negative perspectives of counselors toward online counseling services.

	f
Reducing effectiveness of therapy	205
Required to Internet access	189

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Required to have a good use of technology	114
Lack of empathy because of not to be in the same physical environment	108
Lack of non-verbal behaviours such as gestures.	76
Have a difficulty about paying attention on the therapy	34
Lack of psychical support when client need (such as hug, holding hands)	28
Security or privacy problems such as reading chat records by others	24
Calling or emailing counselors after termination	13
Cyber bulling to counselor	9

As seen on Table 4, the highest frequency statements are reducing the effectiveness of therapy, requirement of Internet access, requirement of to ability to use technology, and lack of empathy from not being in the same physical environment.

"Which topics are appropriate for online counseling?" was asked to counselors.

Table 5

The topics which are appropriate for online counseling services

	f
Disability	365
LGBTQ problems	289
Sexual problems	255
Social phobia	78
Relationship problems	67
Partner violence	34
Lack of self-confidence	28
Aimlessness	23
Problems related to body image	15
Identity problems	8
Career planning	5
Family pressure	5
Cultural issues	4
Conflict resolution	3
Social support between related problems	1

As seen on Table 5, the highest frequency statements are disability, LGBTQ problems, sexual problems, social phobia, and relationship problems.

"What skills does a counselors need for counseling?" was asked to counselors.

Table 6

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Ability that online counselors should have

	f
To have a knowledge of high technology	346
To be trustable	224
To accept client with all kind of problems	173
To have license of online counseling	159
To have an experience about online counseling	146
To be competent of his/her job	127
To have a high level of communication skills	110
Have a high skill of problem solving	94
To be open to listen	78
Have high skill of writing ability	76
To have a high self awareness	53
Open to criticism	45
Do not judge the clients	34
To open to give and take feedback	21
To have a high skill of interpersonal relationship	16
To be tolerant	13
To have high motivation	9
Open to change	7
To have a humor	5
To be well-planned	5
To focus on problem solving	2

As seen on Table 6, the highest frequencies of statements are to have a knowledge of high technology, to be trustable, to accept clients with all kind of problems, to have a license in online counseling, to have experience in online counseling, to be competent in his/her job, to have high communication skills, and a high skill of problem solving.

Discussion

In recent years there has been an increased amount of study addressing technology based counseling as an alternative technique in the counseling profession. Even though there is limited research about it in Turkey, the results of this study show that Turkish counselors think that online counseling has applicable in Turkey. Because of the questionnaire that was used for this study have different dimensions, counselors' positive and negative perspectives toward online counseling and counselors' perspectives of technology usage will be discussed. At last, counselors' positive and negative opinions about online counseling, topics that are appropriate for online counseling, and the abilities online counselors should have are discussed.

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According to the results, more than half of the counselors think that online counseling is a necessary technique and is applicable in Turkey. Hence, the biggest part of counselors think that online counseling should be given as a course in counselor education. Counselors state that the positive sides of counseling are easier to access than face-to-face counseling, easy to express feelings, and financial advantages. According to Andersson (2010) the most important advantages of online counseling is to increase the accessibility to mental health services. On the other hand, the negative sides of online counseling stated by counselors is not being in the same environment reduces the effectiveness of therapy and has a risk for potential privacy violations. The reason for these negative opinions can be explained with the lack of ethical standards, insufficient techniques, and the existing negative thoughts about effectiveness of online counseling (Murphy & Mitcheell, 1998). Counselors' perspectives about technology usage in their profession are also positive because counselors think that scales, questionnaires, or surveys may be applied online. Other results, which were obtained in this study, are counselors' indecision about online counseling. Most of the counselors think that they do not have enough knowledge about online counseling and support of online counseling courses in counselor education.

According to the results obtained from the open-ended questions, counselors think that online counseling is financially advantageous. Counselors also think that clients' easy access to counseling services allows them to open themselves easily. They also think that online counseling is advantageous for clients who have difficulty accessing counseling because of a disability. Studies about online counseling also support these opinions because online counseling is financially advantageous for clients (Anderson, 2010), clients can easily access and open themselves (Pomerantz, 2002), client can access counseling services despite of illness, disabilities or transportation problems (Maples & Han, 2008). On the other hand, counselors indicate that online counseling decreases the effectiveness of therapy; a required knowledge in using the Internet and a substantial degree of technology knowledge, and not being in the same environment decreases empathy. Literature also supports that online counseling may decrease empathy (Suler, 2000), because the Internet is a necessity, people may not always access it (Gingerich, 2007) and limited knowledge of technology can be a cause of difficulty (Maples & Han, 2008). Counselors also indicate that the topics or problems which are appropriate for online counseling are disability, LGBTQ, relationship problems and social phobia but researches show that depression, anxiety disorders, eating disorders, Internet addiction, couples relationship problems, family based problems, or occupational problems (Harry & Issack, 2013; Kirk, 2000; Pollock, 2006; Skinner & Zack, 2004; Tate, Jackvony & Wing, 2003) may be appropriate for online counseling. At last, counselors state that the abilities online counselors should have are high technology knowledge, trustworthiness, accepting clients and having a license in online counseling.

Online counseling is increasingly extending into counseling accompanied by significant benefits and challenges. Research has been implemented on counselors and clients concerns about online counseling services. The findings from this research suggest that counselors are willing to implement online counseling but they do not know how to do it. There are some practical implications for counselors and researchers. First, counselors who want to make online counseling more popular should implement it more. Second, professional associations should provide more information related to online counseling to counselors students. Third, online counseling should be given as a course on counselor education. At last, because Internet use continues to increase, more research needs to be placed on the emphasis of online counseling and its policies, ethical codes and techniques.

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Tendencies of engineering students on applying technological innovations

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Abstract

As Information and Communication Technologies (ICTs) infuse more into our daily lives, their effects and significance become more visible for everyone. On the other hand, not all ICTs are welcomed by everyone. Some technologies or tools are more preferable whereas some people totally ignore some ICTs. In that sense, diffusion of any innovation is significant to implement research studies. Therefore, this study aimed to reveal current situation on diffusion of innovation tendencies for Faculty of Engineering (92 students from Computer, Industry and Mechatronic engineering, and departments) who will be the prospective adapters of ICTs into different sectors in their jobs. Tendency on adapting and implementing current ICTs could be listed within the most important competencies of any engineering department. The study instrument which was adapted by researchers starts with 10 demographic questions (gender, department, what social media tools they use, and etc…) one question asks for possible barriers, 20 questions on 5-point-Likert scale focusing on unfolding their tendencies on diffusion of innovations. The concept of time and administration gained prominence made a statistically significant difference among participants in revealing current situation on diffusion of innovation tendencies for students from faculty of engineering.

Keywords: Diffusion of Innovation; Adoption of Innovation; Technology Acceptance; Technological Innovations; Innovation Tendencies

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5. Introduction

Since technological innovation is important for an economic boost, conception of diffusion of innovation has been one of the central construct to be researched. As Pantano and Di Pietro (2012) noted people's psychological traits are one of the main factor in their decision of new technology acceptance. That is why many attitude-behavior models have been developed and used to reveal these determinants in the literature. To illustrate, Rogers (2003) tried to explain differences in diffusion of innovations via user characteristics by defining diffusion innovation as a process occurring among the members of a social system over time with certain channels. More specifically, innovation attributes such as relative advantage, compatibility, complexity, trialability, and observability play an instrumental role in potential adopters' evaluation regarding innovations (Rogers, 2003). Other related factors have been asserted in the literature such as adoption costs, network effects, and usage behavior (Ryan & Tucker, 2012). Zarmpou, Saprikis, Markos and Vlachopoulou (2012) explained this phenomenon in a general manner via using the theory of reasoned action that personal in nature (attitude) and social influence (social or subjective norm) are major elements for users' intention to adopt a technology.

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In general, personal attitude towards applying technological innovations becomes a prominent factor. Zarmpou et al. (2012) suggested that personal innovativeness covering motivational elements has the strongest effect among other factors to adopt new technologies. Beside personal factors, social influence and contextual influences drive individuals' intention to adopt or continue the innovation, most notably in the later stage of the new technologies (Sun & Jeyaraj, 2013). When time as one of the components of the process is taken into consideration, the actual adoption period becomes even more important. In general, adoption of a new technology has been considered as a slow actualization process (Smith & Ulu, 2012). Khanagha, Volberda, Sidhu and Oshri (2013) stated that adoption is a process occurring step by step and gradually. Similarly, adopting and applying contemporary technologies in education have happened relatively at slow pace (Harrison, Tomas, & Crook, 2014).

Although the impact of individuals' intention on applying and adoption of technological innovations have been extensively tested and validated through empirical researches in the literature, there has been little research in this area highlighting present situation of students enrolled in university level in terms of their innovation dispositions. Therefore, this study aimed to reveal current situation on diffusion of innovation tendencies for Faculty of Engineering who will be the prospective adapters of ICTs into different sectors in their jobs. The following research questions guided this study:

- What are the possible barriers for students to accepting new technologies?
- Do male and female engineering students differ in terms of their perceptions regarding technological innovations?
- Do second and third grade students enrolled in engineering departments differ in terms of their perceptions regarding technological innovations?
- Is there any significant difference in students' perceptions regarding technological innovations across three engineering departments?

6. Methodology

2.1. Participants

This study included 92 students (72 male and 20 female) from Department of Computer Engineering (N=25), Department of Industrial Engineering (N=28), and Department of Mechatronics (N=39) of one private university from Turkey. 44 second grade and 48 third grade students participated voluntarily in the study. The demographics of the participants are represented in Table 1. From the table, it seems that 90% students use Facebook whereas only 61% use Twitter. Students mostly have a laptop and only very few have their blogs or personal websites.

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Table 1. Demographics of participants

	Gender		Grades	
	Female	Male	2nd Grade	3rd Grade
Having a Facebook account	17	66	38	45
Having a Twitter account	13	43	30	26
Having a mobile phone with internet connection	18	52	35	35
Having a tablet	5	23	14	14
Having a laptop	17	62	38	41
Having a personal website	1	9	3	7
Having a personal blog	4	8	5	7

Having a Skype account	13	43	33	23

2.2. Design of the study & instrumentation

In general, the main purpose of the survey research is to delineate the characteristics of a population (Fraenkel & Wallen, 2009). Since the study aimed to disclose current situation on diffusion of innovation tendencies for Faculty of Engineering students, non-experimental survey research method was employed. Administration of the survey instrument to the participants was chosen as the mode of data collection. Therefore, a questionnaire which was adapted from the study of Savery (2005) was firstly scrutinized to suite Turkish language, and after administration a reliability analysis was conducted. According to the Cronbach's Alpha value with .85, the questionnaire had high internal consistency reliability.

Aside from demographic questions, the questionnaire was composed of three main sections addressing students' social media and technological tool usage, the factors preventing them from accepting new technologies, and their perceptions regarding technological innovations. The last section of the questionnaire was consisted of twenty one items on a 5-Likert scale (from strongly disagree to strongly agree).

The data obtained was analyzed with PASW Statistic 18 package. As for data analysis, non-parametric techniques were used throughout the study due to the violation of normal distribution assumption. While the differences between genders, grade levels and perceptions regarding technological innovations were statistically checked by Mann-Whitney U Test for each item, The Kruskal-Wallis Test was used to determine whether there was a difference between departments in which students enrolled and students' perceptions in terms of technological innovations for each item.

7. Results

The descriptive statistics were used to find out the possible barriers to accepting new technologies. Table 2 demonstrates these main factors.

Table 2. Possible barriers of accepting new technologies

Barriers	n	%
Cost	62	67.4
Security problems	31	33.7
Privacy problems	26	28.3
Necessity of follow new versions	23	25
Need for technical support	20	21.7
Being under stress	12	13
Necessity of training to learn	8	8.7

According to the results, 67.4% of the students state that cost of the new technologies is main barrier to accepting these technological innovations. Security problems (33.7%) and privacy problems (28.3%) are considered as other factors which have an effect for the acceptance. Lastly, 25% of the students believe that following new versions of the technologies can be considered as another barrier.

As for main instrument which was administered to determine students' perceptions of the technological innovations, Table 3 presents the item descriptions, item means and standard deviations for each item.

Table 3. Survey Items

Item No	Item	*M*	*SD*

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1	I am eager to be the first to try new technological innovations	4.07	1.16
2	I adopt technological innovations into my life.	4.15	0.82
3	I offer my adopted technological innovations to the others as well.	4.33	0.69
4	I am willing to follow the lead of others in adopting technological innovations.	3.08	1.21
5	I need to be convinced of the advantage of technological innovations by others.	2.83	1.30
6	I am suspicious of technological innovations.	2.56	1.26
7	I am always following technological innovations.	4.06	1.01
8	My opinion about technological innovations is respected by others too.	3.76	0.95
9	I adopt technological innovations but do not attempt to influence others to do so.	2.86	1.31
10	I go along with technological innovations out of necessity.	1.84	1.15
11	I am resistant to change.	1.67	1.13
12	Technological innovations I use have a relative advantage than what I used before.	3.92	0.98
13	Technological innovations I use are better than what I used before.	4.08	0.80
14	Technological innovations I use are consistent with my existing values.	3.97	0.93
15	Technological innovations I use are consistent with my needs.	4.03	0.95
16	Technological innovations are difficult and complex to learn.	2.10	1.11
17	I need more time to experiment with technological innovations before they are implemented.	3.69	4.09
18	The technological innovations I use are visible to others.	4.05	0.83
19	The results of using technological innovations are visible to others outside of close friends (such as school, work and etc…).	4.06	0.73
20	Using technological innovations has enhanced my image or status in my life.	3.56	1.09
21	I think that I do not have enough time to implement new ideas into my life	2.55	1.38

It is good to reveal that students are recommending others to use technological innovations like innovation agents (item 3, M=4.33) while adapting these innovations into their lives initially (item 2, M=4.15) and following innovations all the time (item 7, M=4.06). Moreover, the students perceive that technological innovations are bringing goodness to their lives (item 13, M=4.08) and are in harmony with their current needs (item 15, M=4.03). On the other hand, there seems to be a moderate level of suspiciousness regarding technological innovations (item 6, M=2.56) and having time for putting them into practice (item 21, M=2.55).

The differences in perspectives to perceptions regarding technological innovations between gender variable were statistically checked by Mann-Whitney *U* Test for each item. Table 4 depicts only the significant items.

Table4. The differences between items in relation to gender

Item No	N	*U*	Mean Rank		*Z*	*p*
			Female	Male		
4	92	505.5	57.23	43.52	-2.086	.037
21	92	362.0	28.60	51.47	-3.48	.000

A Mann-Whitney *U* Test revealed significant differences in the item 4 and item 21 for males (*Md* = 3.00, *n* = 92) and females (*Md* = 4.00, *n* = 92), *U* = 505.5 (item 4) and *U* = 362.00 (item 21), *z* = -2.086 (item 4) and *z* = -3.48 (item 21), *p* = .037 (item 4) and *p* = .000 (item 21). It seems that male students are more enthusiastic about tracking the steps of a leader for newer technologies.

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Nonetheless, mean rank of the female (Mean Rank=57.23) was higher than male (Mean Rank==43.52) for item 4, mean rank of the male (Mean Rank==51.47) was higher than female (Mean Rank==28.60) for item 21. Thus, the female students look more reluctant to adapting technological innovations due to the time constraints.

Similarly, A Mann-Whitney *U* Test was used for each item to determine whether there is a significant difference in students' perceptions regarding technological innovations for second and third grades students. Table 5 demonstrates only the significant items.

Table 5. The differences between items in relation to grade level

Item No	N	*U*	Mean Rank		*Z*	*p*
			2nd Grade	3rd Grade		
4	92	649.50	37.26	54.97	-3.264	.001
21	92	751.50	39.58	52.84	-2.448	.014

A Mann-Whitney *U* Test revealed significant differences in the item 4 and item 21 for second grades (*Md* = 2.00, *n* = 92) and third grades (*Md* = 3.50, *n* = 92), *U* = 649.50 (item 4) and *U* = 751.50 (item 21), *z* = -3.264 (item 4) and *z* = -2.448 (item 21), *p* = .001 (item 4) and *p* = .014 (item 21). Moreover, mean ranks of the 3rd grade (Mean Rank=54.97 for item 4 and Mean Rank=52.84 for item 21) were higher than mean ranks of the 2nd grade (Mean Rank=37.26 for item 4 and Mean Rank=39.58 for item 21) for both significant items. It might be concluded that due to the more loaded curriculum in third grade, they have less time to realize and adapt technological innovations.

The differences in perspectives to perceptions regarding technological innovations between departments variable were statistically checked by Kruskal-Wallis Test for each item. According to the test result, there is no statistically significant difference in students' perceptions regarding technological innovations across three different departments that students enrolled.

8. Conclusion

In revealing current situation on diffusion of innovation tendencies for students from faculty of engineering, two important items from the questionnaire made a statistically significant difference among participants. The concept of time and administration gained prominence in this research to answer research questions.

In the literature, three prototypical models (simple NPV model, single-purchase model, and repeat-purchase model) have been asserted to ascertain the impact of ambiguity regarding technological improvements on adoption decisions (Smith & Ulu, 2012). Regardless of model considered or followed, time as a factor has played an instrumental role for the decisions. Under the lights of the findings obtained thorough this study are consistent with this theoretical models. Therefore, it can be concluded that creating enough time to adopt new technologies into daily life has been one of the main factors of individuals' adoption processes.

Diffusion of innovation through a population has been dominated by two types of effects – mass media communications and interpersonal relationships (Sun & Jeyaraj, 2013). Taking innovation attributes (relative advantage, complexity, and compatibility) proposed by Rogers (2013) into account, these attributes have an impact on the person's intention to adopt and use an innovation. More specifically, personal innovativeness covering individuals' willingness to use new technologies might be considered as one of the key factors for applying innovation (Sun & Jeyaraj, 2013). That is why some indirect components having an effect on personal adoption of new technologies play an important role. Social influence; to illustrate, can be given as a characteristic or disposition for this understanding. In general, technological administration

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has an effect on triggering the adoption of technological innovations (Khanagha et al., 2013). Therefore, obtaining try to follow the lead of others which is one of the statistically significant items for this research is consistent with both theoretical and practical research evidences highlighted in the literature.

Although the results of this research are limited to a small number of students from specific engineering departments, these findings confirms the theoretical arguments. On the basis of these findings, this study contributes to growing empirical diffusion of innovation research. More scientific investigations regarding adoption of technological innovations could be useful for field research for the field.

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Tertiary level EFL college students' opinion toward computer-based concept mapping in English writing

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Abstract

This study investigated tertiary level EFL university students' attitudes toward computer based concept mappings in a six-week writing program. Based on the pretest and posttest design, twenty freshmen constructed their computer-based concept maps collaboratively. The 24-item instrument was revised from Lee's questionnaire (2010), in which the participants' attitudes, the perceived usefulness of computer-based concept mapping were investigated, and their opinions toward collaborative concept mapping were collected on a five-point scale. Results showed that students did not have any significant attitude change toward concept mapping. However, higher rating of their perceptions toward the usefulness of computer-based concept mapping, and toward collaborative construction of concept mapping was found.

Key words: computer-based concept mapping; collaborative

1. Introduction

Computer concept mapping, based on the theory of constructivists, who proposed that learning environments were most effective when learners were actively involved in constructing their own meaning and doing so within authentic learning environment (Brown, Collins & Duguid, 1989) where concept mapping supported the construction of knowledge via analysis, inferences from texts through elaboration with prior knowledge (Pearson & Johnson, 1978) and synthesis (De Simone & Schmid, 1998). It was a widely used instructional and pre-writing tool, which helped teachers and students visually represented their knowledge and depicted relationships among concepts. Concept mapping also allowed the learners to abstract information, related ideas, and represented them by enclosing the concepts in nodes and attached by links. It also improved ESL and EFL students' writing by helping them generate better compositions, richer contents, and better organizations across different proficiency levels (Conklin, 2007; Lee, 2010; Lee, 2013; Liu, 2011; Ojima, 2006; Zaid, 2011).

Based on the theory of scaffolding of Vygotsky (1978), the studies of collaborative learning have been the focus of recent research. In collaborative learning, students constructed their cognitive structures by representing concepts and their ideas socially (Stoyanova & Kommers, 2002).

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The separate benefits of collaborative learning and concept mapping suggested that the combination of these two approaches were effective in improving learners' knowledge construction (Carnot, Feltovich, Hoffman, Feltovich & Novak, 2003; Stoyanova & Kommers, 2002), lectures listening (Czerniak & Haney, 1998), and text readings (Amer, 1994). Possible explanations may be related to that fact by collaboratively constructing a concept map, students needed to discuss concept arrangements and their interconnected relationships, negotiate meaning, and construct knowledge (van Boxtel, van der Linden, Roelofs & Erkens, 2002).

Collaborative mapping as a pre-writing strategy has been the focus of research. Studies related to teaching students to construct concept maps collaboratively or individually had different results. For instance, Lee (2010) explored the effects of individual concept maps constructions versus collaborative concept maps constructions used by 75 Korean students' writing. Results showed that collaborative mapping group had slightly higher scores than its counterpart. However, Liu (2011) investigated 94 freshmen computer-assisted concept mapping construction on their writing, and no significant difference in compositions between individual and collaboratively mapping was found.

Mixed results were also reported in the studies of the participants' attitude and opinions toward concept mapping. For instance, Conklin (2007) investigated eighty-two 9 graders' attitudes toward using concept mapping in expository essay writing in their Biology classes. The participants perceived concept mapping was a useful tool to visualize, plan, organize, think creatively. Kwon and Cifuentes (2009) introduced concept mapping to 160 seventh graders, including 74 boys and 87 girls. They all agreed that concept mapping helped them organized information leading to better understanding and the ability to answer questions easily. It also assisted them in memorizing the science concepts and retained the learned concepts to prepare for exams.

On the other hand, Ojima (2006) investigated three Japanese English as a second language writers' attitude toward concept mapping. Results showed that collaboratively planning might not have been effectively applied to learners. Some of the participants had trouble to changing their writing habits, and expressed uncertain feelings toward the need for using this strategy. One thought they could cope with current writing tasks without maps. In line with the studies, Lee (2010) examined the effects of concept maps constructions used by 75 Korean students' writing, and the participants' opinions toward concept mapping. The findings showed that the participants' attitude did not have any statistically change.

In order to clarify the issue and fill in the gap in the literature, this study attempted to explore the participants' perceptions toward collaborative computerized concept maps as a pre-writing strategy before and after a six weeks writing program.

2. Method

2.1 Participants

Twenty tertiary level EFL university students participated in a six-week writing program by self-selecting their partners. The average of their TOEIC (Test of English for International Communication) test scores was about 762. The average age of the students was 18 years old, and the proportion of female participants was 75% while the male participants were 15%.

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2.2 Instruments

The instrument was revised from Lee's questionnaire (2010), in which 24 items were designed to evaluate participants' attitude toward computer-based concept mapping (7 items), their perceptions of the usefulness of computer-based concept mapping (7 items), and their experiences and opinions toward collaborative concept mapping (10 items). Students rated the items on a five-point scale ranging from strongly agree (5) to strongly disagree (1). The questionnaire was validated by the researchers as appropriate for this study. The reliability was established at .83 (Cronbach's α).

2.3 Procedure and data analysis

Before the writing program, the participants completed the pretest of attitude toward computer-based concept mapping questionnaire. Furthermore, to examine the effect of the computerized concept maps on the learners' writing, the researchers introduced VUE (Visual Understanding Environment) to the students for its ease of manipulation. The software was designed by Tufts' Academic Technology department and was commonly used in computerized concept mapping experiments (i.e., Kumar & Saigal, 2005; Kumar, Saigal, Chavez & Schwertner, 2004). Writers can create their nodes with different symbols, and display the relationship between each node with the connecting arrowed lines.

The formal study was conducted during a weekly two-hour writing class period. During the six-week writing program, the researchers chose several topics for the 6-week writing assignments including "An unforgettable memory about _____", "A memorable social event in the past", "Too much stress on teenagers?" and "How do you feel about the lottery fever in Taiwan?" respectively. The topics were chosen because they were related to students' daily experiences.

Each topic was introduced with one or two sample paragraphs to activate their background knowledge before writing. The length of each composition was required to be at least 300 or 400 words. All of the students were asked to compose their own writings according to their maps, and the writing assignments were to be finished during the two-hour class period. At the end of this program, the same attitude questionnaire was administered as the posttest to the participants. Descriptive statistics and pair sample *t*-tests were conducted to evaluate the participants' attitude change between the pretest and the posttest.

3. Results

Three constructs were designed to evaluate the participants' attitude toward computer-based concept mapping, their perceptions of the usefulness of computer-based concept mapping, and their opinions toward collaborative concept mapping. Pair sample *t*-tests showed that even though they had significantly positive increase in the construct of computer-based collaborative concept mapping (p=.004), students did not have any significant attitude change toward concept mapping in their overall performance. The finding was in agreement with Chiu (2004), who explored the use of concept mapping by 96 students. Attitudes toward concept mapping did not have any significant differences after the program. Detailed analyses were illustrated as follows.

3.1 Attitude toward concept mapping activity

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Generally speaking, no significant overall attitude change was observed in the first construct. Specifically, item 2 and item 6, designed to elicit learners' self-perceived interest and fun toward using computerized concept maps, declined after six weeks of writing program. With regard to the three reverse items, the means of item 5, "Creating concept maps was time consuming." and item 7, "Drawing concept maps was difficult for me." increased while the means of item 3, "The concept maps I developed were useless to me in writing an article." declined. Overall, students showed moderate agreement toward the statement that using concept maps can facilitate writing (pretest mean = 3.32, posttest mean = 3.25); however, as shown in the data, drawing concept maps was regarded as time consuming and difficult, resulting in the decline of students' interest even though they thought concept maps were useful.

Table 1. Attitude toward concept mapping

	Questions	***Pretest***		*Posttest*		*p*
		Mean	*SD*	*Mean*	*SD*	
1	I was interested in concept mapping as it was discussed in class.	3.55	.904	3.55	.677	1.000
2	I enjoyed drawing concept maps to help me create an article.	3.60	.928	3.53	.716	.628
3	*The concept maps I developed were useless to me in writing an article.	3.38	.667	3.30	.758	.584
4	I want to know more about the use of concept maps.	3.68	.764	3.53	.816	.083
5	*Creating concept maps was time consuming.	2.68	.917	2.73	.784	.743
6	Concept mapping was fun.	3.50	.716	3.38	.667	.230
7	*Drawing concept maps was difficult for me.	3.05	.714	3.20	.723	.309
	Subtotal	3.32	.382	3.25	.392	.158

*reverse items

3.2 Perception of the usefulness of concept mapping strategy

Although no significant differences were observed on learners' perception in the construct (see Table 2), students' had positive attitudes and higher rating in their perception toward the usefulness of computer-based concept mapping. The means of 7 items all increased after six weeks training. Specifically, the means between the pre- and post-survey of item 12, "I think that concept mapping helps me plan a more creative writing." increased from 3.18 to 3.43. It showed the participants' had an increasing agreement toward the usefulness of concept mapping in writing.

Table 2. Perception on the usefulness of concept map

	Questions	***Pretest***		*Posttest*		*p*
		Mean	*SD*	*Mean*	*SD*	
8	I think that concept mapping helped me organize my ideas in writing.	3.65	.700	3.78	.577	.303
9	I think that concept mapping helped me summarize my understanding of the topic.	3.63	.740	3.68	.616	.736
10	I think that concept mapping helped me recall more vocabularies and expressions for the given topic.	3.25	.776	3.33	.656	.596
11	My writing is easier when I use a concept map than my writing when I do not use a concept map.	3.28	.599	3.48	.679	.146
12	I think that concept mapping helps me plan a more creative writing.	3.18	.712	3.43	.781	.031*

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13	I felt that concept mapping improved the quality of my writing.	3.45	.597	3.65	.622	.058
14	I use all the components in my concept map (e.g., nodes, links, hierarchical orders) to write my article.	3.45	.815	3.58	.781	.430
	Subtotal	3.41	.462	3.56	.470	.086

3.3 Experience on collaborative concept mapping

In terms of the participants' rating toward collaborative concept mapping, a significant increase can be found in the construct ($p < .001$). As reflected in the 10 item rating, the students had high satisfaction toward concept mapping and enjoyed constructed their concept maps collaboratively. The means of all of the items increased after six weeks of writing training. Specifically, the participants' perceptions for item 17"Our group concept map was closely related to my final composition." and item 18 "During group concept mapping, I learned different connotations of English words" reached statically significant. These findings provided evidence that students considered collaborative mapping did help them in language learning and writing. It was in line with the studies of Ojima (2006), who proved that concept mapping have positive effects on learners' perceptions.

Table 3. Experience on collaborative concept mapping

	Questions	***Pretest***		*Posttest*		*p*
		Mean	*SD*	*Mean*	*SD*	
15	Our group actively discussed the given topic while collaboratively creating our group concept map.	3.55	.887	3.80	.616	.234
16	I learned new words / expressions during our group concept mapping activity.	3.05	.887	3.35	.745	.163
17	Our group concept map was closely related to my final composition.	3.30	.733	3.65	.587	.005**
18	During group concept mapping, I learned different connotations of English words.	2.85	.671	3.30	.733	.004**
19	During group concept mapping, each group member took equal responsibility in developing our group concept map.	3.75	.716	4.00	.562	.096
20	During group concept mapping, I actively participated in discussions to develop our concept map.	3.95	.605	4.10	.447	.267
21	During group concept mapping, our group members discussed the meanings of concepts and their relationships.	3.60	.821	3.95	.605	.149
22	I feel that concept mapping facilitated our group discussion.	3.55	.686	3.90	.641	.069
23	In my writing, I used new vocabularies that I had learned from our group concept mapping activity.	3.35	.745	3.45	.826	.541
24	Our group concept map represents our group's effort very well.	3.55	.686	3.60	.754	.804
	Subtotal	3.45	.496	3.71	.348	.004**

Note. ** $p < .01$

4. Conclusion

This research explored EFL learners' perceptions toward computerized concept maps as a pre-writing strategy. While there were no significant differences in the attitude between the pretest and the post test, the participants had significantly more positive attitude toward collaborative mapping in langu-

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age writing after the writing program. The result was in agreement with other studies which reported that constructing concept mapping collaboratively was a helpful and enjoyable activity in learning (Chiu, 2004; Kwon & Cifuentes, 2009; Lee, 2010). Collaborative mapping engaged students in discourse and provoked interaction (van Boxtel, van der Linden, Roelofs & Erkens, 2002), which may trigger learners' learning effectiveness and process of knowledge acquisition (Stoyanova & Kommers, 2002).

There were several limitations of this study. Firstly, even though the participants found concept mapping beneficial and useful, they had increasingly negative attitude toward concept mapping activity in the 6 week writing program. This factor, along with other possible issues of academic workload, and motivation, represent limitations on the use of concept maps. In addition, no comparison group was employed in this study, and the training last only for 6 weeks. Therefore, using a control group and longer training duration were strongly suggested for future studies.

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The Applicable Strategy for the Courses Alliance in Regional Universities Based on MOOC Platform

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Abstract

Massive open online courses is a kind of learning phenomenon which has just emerged in recent years. MOOC are popular in all countries by its virtues especially it can help students to learn from high quality resources. Now more people hope to establish the course alliance among colleges or universities. This presentation will discuss connotation of course alliance and analyze its current situation in China. In the end we design the direction of Technology & Art of TV Shooting course alliance made up of some universities in Jilin Province. The aim is to produce best learning resources and opening up new way of thinking in classes. So it can give students full exploratory learning with communication, cooperation and also supported by expert guidance. This approach can make the best of combination of virtual reality and true reality. We hope learning will no longer just to accept knowledge and information, but it can enhance people to explore the unknown knowledge and acquire pleasant experience in cooperative context.

Keywords: MOOC platform; Course alliance; Teaching method

Introduction: With the increasing maturity of network communication technology and massive open Online Courses (MOOC - Massive Open Online Courses) in the global boom, teaching organization form is breaking through the long tradition of class , the Massive walls of colleges and universities are trying to be pushed down, a new community of curriculum is forming. So we decide to establish a new model that can promote efficiency and quality of teaching. Based on the analysis of the situation of colleges in Jilin Province, our four colleges found an alliance to teach students together.

- Main point

1. The connotation of course alliance

According to Wikipedia, alliance is a joint by two or more natural persons, companies, organizations or governments (or any combination of above) to participate in joint activities or to achieve results together and share each other's resources as the goal of professional groups. (Wikipedia， 2012) Alliance of course can be understood as courses, two or more teachers or teaching groups form a professional group. The word "course alliance" can be traced back to 2001, the Massachusetts Institute of technology (MIT) to carried out the open courseware plan, with the concept of "knowledge of public welfare, free sharing" .and many universities have responded actively and positively. In July 2002, the workshop held in Paris of France the Educational Association of United Nations agreed to expand the Open courseware to Open education Resources (Open Educational Resources, OER), and put forward the Open education Resources is "through information and communication technologies for educators, students, the scholars, based on a non-commercial use, can be free to consult the various education Resources, reference, or applications." and in 2005 set up the Open courseware union (Open Course Ware Consortium, OCWC) (Matthew,2013) ,

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the prototype of this can be thought of as Course alliance. The institutional development has nearly more than 200 Universities members of resources sharing and some cooperation alliance, such as Spanish open courses in colleges and universities alliance (OCW - University), African network University (substitutes Virtual University, AVU), Japan open courseware alliance (JOCW), south Korea open courses alliance (Chesapeake OCW Consortium), and China's open courseware alliance (CORE), each league has attracted many hundreds of courses. Languages such as Spanish open courses in colleges and universities alliance (OCW - University) already has 111 universities in 23 countries opened 1407 courses, the universities mainly come from Europe and Latin America Spanish-speaking countries (Jinzhong Yang, 2013). The purpose of the alliance is to take advantages of strong courses instead of the weak unit, promote education development fairly. Course alliance can be further understood as in order to better improve the quality of teaching, to a greater degree to realize education fairness and cultivate more talents by different colleges and universities teachers or groups of different regions in the organization. Regional courses alliance is mainly involved in the region on the connected economy, culture are similar, facilitate unified organization, coordination and management of space (Bing Gao, 2011), the regional this paper studies mainly refers to the group of universities in Jilin province.

2. **The necessity and feasibility of course alliance**

2.1 the necessity

2.1.1. Promote the education fairness. It is people that caused the imbalance of education resources allocation and led to the unfair of education, talent cultivation and teacher's professional development have formed a huge gap. As far the per capita possession of education funds, colleges affiliated by province were more less than affiliated by MOE; From the perspective of the teachers, high quality schools have a lot of doctoral tutor, but the poor schools may be a handful. For the experimental conditions, the scientific research funds is sufficient in the colleges affiliated by MOE, but some colleges affiliated by province have not used any kind of network teaching platform. Obviously it is an indisputable fact.

Alliance of course can make students to share the best, most high-quality learning resources of teachers and better communication environment, it can effectively promote education fairness, improvement of students' learning experience, so as to improve the quality of personnel training.

2.1.2. Improve the students' autonomous learning abilities and interests. Reform on the way of teaching has always been education advocated by the topic and the behavior, since the 1980 s, which ranges from the computer assisted instruction (CAI) to the use of large screen projection, video booth, electronic whiteboard multimedia teaching, and the teaching way in continuous development and progress, but always can't get out of the small classroom, fails to break through the thick walls, and knowledge update is too lag, student learning is still more to accept knowledge in a passive state. Weariness truancy phenomenon, college students employment and recycled phenomenon (undergraduate course graduation after returning to training in vocational education institutions), and so on are problems. Alliance of course allows students to expand field of vision, wider students exchange, access to the guidance of high quality teachers, flexible approach to learning. Hence students' learning interest, independent learning ability will be strengthened, the learning effect will be greatly improved.

2.2 The feasibility

2.2.1. Policy support. In March 2012, the ministry of education issued "development plan of educational informatization decade (2011-2020)", emphasized that further strengthening the construction of infrastructure and information resources, focus on promoting the depth of the integration of information technology and higher education, promoting education content, teaching means and methods of modern, innovative talent training, scientific research organizations and social service model, pushing forward the innovation of cultural heritage, and promoting higher education quality improving.(Document of MOE,China,2012) this gives policy support on education informatization. In the past two years, the funding for college education informatization is almost millions of yuan, education informatization environment has been improved significantly, many schools have their own network teaching platform. State advocates national class quality and provincial class quality construction. Meanwhile it advocates the Pub-

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lic Class of Video, Video Resources Sharing. Love Course website has been uploaded which provides high quality thousands courses of universities.

2.2.2. The formation of large-scale online courses concept and environment. As MOOC comes like tide, MOOC platform concept and role have been increasingly in front of the general education workers. Since 2012, with Coursera and Udacity and edX as the forerunner and representative of the rapid development of Internet teaching platform MOOC , this kind of teaching model has been open and accessible (Xibin Han,2012). By the "troika" MOOC platform, Edx.org, Coursera.org, Udacity.com have attracted more than 100 world famous universities to participate in in just half a year , more than 500 courses online registered learners of millions. (Laura Pappano, 2013) MOOC main part is the teaching video, supplemented by a various means of interaction and communication space, design concept consider the learners as the center, pay attention to the participation and exploration of students, MOOCs via the Internet creating a virtual space, but create a real learning space, with the help of technical means, it break the limitation of time and space. MOOCs are an important innovation, that is, through the application of social networking services such as Facebook, Wiki, Blog, Twitter and so on in order to establish the direct contact between students and teachers, creating similar to professionalization and specialization of immersion learning community, makes the social learning process and to meet the learners based on the knowledge to pursue personalized needs(Ruolong Ma, Songhe Yuan2013).Talking about MOOC operation mode, the real pioneer of MOOC, Stephen Downes had ever divided the MOOC into cMOOC and xMOOC, "c" refers to the correlation study of socialism theory (Connectivism), which emphasizes learning communities (community) and connect (connection), foothold is learning mode change. "X" is derived from the Massachusetts institute of technology MITx and later the edX, emphasizes the scalability (scalability), foothold is the exploration of business model (Ruolong Ma, Songhe Yuan2013). In fact, you can see more MOOC is in the sense of "x", means of higher education under the impact of the new type of network course will use commercial operation mode, and can reduce costs and then becomes free. From this perspective, we can conclude that relying on the inherent walls surrounding the campus of higher education teaching model will likely be completely overturn, university may reshuffle. Therefore, via MOOC platform, the emergence of the courses league and development provides a good technical foundation and good digital environment.

2.2.3. Opening MOOC platforms in China. On October 10, 2013, Tsinghua University launched a first domestic massive open online course MOOC platform "school online xuetangX.com", to provide online courses worldwide. In April 2014, Shanghai Jiaotong University launched a platform independent research and development of course - good university online (cnmooc.com), which is representative and super star lesson for guokr.com, mooc.chaoxing.com, zhihuishu.com wisdom tree, fruit shell etc., some of these platforms transplant the foreign practices, but also has different degree of innovation, which can accommodate the curriculum resources and the corresponding function such as teaching, evaluation, interactive communication which opened the prelude of Chinese MOOC, for a number of courses in the same alliance cooperation between colleges and universities to provide the powerful guarantee, and promote the schools of high quality courses open to other students. The chief of education higher education department chief Da-liang Zhang holds that compared with traditional network teaching, MOOC has following characteristics, the first is adapting mixed teaching method. The second is a large scale. A classroom capacity is limited, but the scale of the MOOC is very big, which may also be tens of thousands of people. The third is personalization, which is suitable for every learners personalized learning. The fourth is discussion in community, which can have more and more people to participate.

Comprehensive research at present, in brief, Chinese MOOC is putting courses on a sharing platform, many colleges students learn the same curriculum, the combination of online learning and classroom teaching form the mixture of teaching methods. It is different from previous blended learning, and that scope covers many colleges and universities, shows the characteristics of large-scale teaching, also in a larger extent, the advantage of high quality resources. It is also different from NetEase Public Class, from that open platform course is not a one way, but it is the interactive, sharing, evaluation, etc. Since the emergency of the first Chinese MOOC, the Wisdom Tree and the good university online and Love Course Net has opened on May 8, 2014.It is China universities MOOC platform. It has 56 courses online first, at this point, Chinese MOOC is beginning.

3. The league of curriculum in China

In October 2013, represented by China University of Science and Technology China's first batch of 985 schools (C9) had established alliance with AAU of the United States , the European Union for research

universities (LERU), head of the Australian eight school alliances (Go8).This is called the Declaration of Hefei, the core of the alliance means the high quality course of sharing agreement, which symbolize China's higher education will establish cooperation relationship with the development universities of the world. [10] After that the United States has had eight universities of the LVY league, Australia has G8 coalition, domestic also in October 2009, C9 league, which consist of Beijing university, Tsinghua university and other 9 domestic universities , Warsaw Pact alliance headed by Tsinghua university and so on a dozen intercollegiate alliance, but these have not formed a substantial union course. Course alliance should be considered in the true sense in China is in April 2012, initiated by Shanghai municipal education commission and more than 30 colleges joined to "Shanghai university curriculum center" (http://www.ucc.sh.edu.cn) platform, the object only provide to the union of college students in Shanghai universities, which offered in March 2013. Professor Liu Jing ,the director of Shanghai municipal education commission says, there are more than 2400 students in 7 classes run for learning in the first semester, and now the second semester course volume doubled, nearly three thousand students for the classes. [11] This is the first union organization aimed at teaching. Since then, China's East-West University Course Sharing Alliance was formally established in April 2013 in Chongqing University, its members including China Renmin University, Beijing University of aeronautics and astronautics, Beijing institute of technology, Harbin industrial university, Fudan University, Shanghai Jiaotong University, Sichuan University, Chongqing University, Lanzhou University, etc. 62 colleges and universities. East-west University course sharing alliance helps to solve the problem of insufficient elective courses, and each college campus from across schools, cross-regional, cross-border, cross-cultural education teaching, focus more on professional ability and creativity, high level talents with international vision(Baidu Pedia). In July 2013, the online education development international BBS held in Shanghai Jiaotong Uiversity, Shanghai Jiaotong University and other C9 colleges and part of the "985" will be set up to some high level online course platform, which realized the online sharing high quality courses, the first attempt to Chinese teaching mode reform, explored the cross-school joint minor professional training mode, and took the lead in exploring and implementing the open courses online resources open to the public.In August 2013, Shanghai Jiaotong University, Xi 'an Jiaotong University, Beijing Jiaotong University, Hsinchu jiaotong University, Southwest Jiaotong university, launched a "association of online learning", as the five school open courses of learning platform, offering free courses for Chinese learners learning opportunities（ Jianbo Yu,2013). As a result, it opened the prelude of alliance of courses in colleges and universities.

4. The design of the regional university curriculum alliance

There are more than 40 major colleges and universities in Jilin province. For an instance by the terms of the TV Camera Technology, there are more than 10 colleges and universities has opened this course. For decades, various universities have different versions of textbook, and experimental conditions, speaker teachers also have different level. The course in the Northeast Normal University is the high-quality curriculum in the school, but it is just regular classes in other colleges. Based on this, we made a sampling survey in the four colleges of Jilin province about this course , there are four aspects to be consider, one is a teacher qualifications, the second is the experimental conditions, the third is learning materials and resources, the forth is the ability of final work independently, winning the prize. Survey results shows that the colleges affiliated by MOE teachers is strong, the experimental condition is superior, rich teaching resources, student work in the national award-winning number is more, Based on this, we combined four colleges teachers to established courses alliance . The preliminary design is based on the domestic existing MOOC platform.

4.1. The league goal:

Aiming at domestic and international frontier, gather together of university teachers, break the wall type closed school, produce high-quality learning resources and open.

4.2. Methods:

(1) The teaching way transformation. Draw lessons from domestic colleges and universities curriculum alliance experience, through the way of sharing resources, based on the existing domestic MOOC platform, choose a combination of online learning and classroom learning based hybrid learning model, discussion of students' autonomous learning, cooperative learning, instructional learning motivation factors and rules of operation, forming alliance operation mechanism of the development of the course. Course teachers union discuss teaching material selection, teaching outline, teaching content, teaching form design,

creation, learning resources, the teaching video recording and publishing platform. The schools teachers teaching at the same pace and adopt tilting classroom teaching mode. Live online classes are offered two times each semester, which lets the students understand the latest developments in camera technology. (2) The assessment mode diversification. The use of the platform is to provide large data evaluation and behavior evaluation of the school and many other kinds of evaluation, the combination of which makes the evaluation more objective and more focused on development.

Leaving off the low level and low efficiency of education, holding on an open mind, ideas, the design of a new learning mode in the teaching of new thinking, new methods and course alliance maybe a good break-through point. To explore new pattern of higher school teaching organization form still has long way to walk for us.

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The Attitudes of Blended Students Towards Social Networks Facebook (Thesis Article)

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Abstract

In this study, the attitudes of blended students of Sakarya University Education Faculty over social networks, Facebook; has been analyzed in terms of gender, having internet access, log in to Facebook from mobile phone, class, places where the family lives, mother's education level, father's education level, the frequency of daily Facebook, the frequency of weekly Facebook variables. The resarch has been conducted with blended learning students, studying with the department of computer education and instructional technology of sakarya University Education Faculty. The sample of research consist of a total of 145 people 50 of which are females and 95 of which are males. Distributions of blended learning studens who took part in the research according to their genders were as follows: %34,5 of females and % 65,5 of males. Second, third and fourth grade blended learning students from computer education and instructional technology has taken part in this research. The research has been conducted according to scanning model. A set of data has been formed depending on the answer of the blended learning students to the attitudes towards Facebook survey. The data collected through the survey has been analyzed with the help of exploratory factor analysis, Cronbach alpha reliability, frequency and percentage, t-test, ANOVA and the correlation coefficient techniques.
At the end of the research, according to the t-test results, it has not been found the significant differences with the gender, having internet access, log in to Facebook from mobile phone varibles towards Facebook. Also with the ANOVA analysis carried out significant differences in terms of class, frequency of daily Facebook, frequency of weekly Facebook variables. In addition, it has not been found the significant differences with places where the family lives, mother's education level, father's education level.

Keywords: Social Network, Facebook, Attitude.

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1. Introduction

Changes in human life occur constantly. Ages of people must keep pace with these changes in life. The information society that we are also in it, information and technology is changing rapidly every day. One of the changing information and communication technology is internet. With the development of the internet, there have been recent developments in Web technology. After from Web 1.0, Web 2.0 technologies where users are active, entered our lives. The most widely used in the developments of Web 2.0 technologies are undoubtely Social Networks. Social networking sites are software that support collaboration, information sharing, interaction and communication of people in different environment and have their own interests, needs and allows them to come together in pursuit (Pettenati ve Ranier, 2006:334). Social networks are based on the principle that create a profile and share with communicating others.

Between social networking sites, the most important of the network that actively serves users with these features is Facebook. It is an online social networking software that each users creates several groups for communications by private or public writings as a community according to the permission of the net-

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work and that interacts with them and that allows information to be shared with other users. Users on Facebook promote themselves in an online profile, make friends with other people and can write comments under the typewriters and photos of other users's photos, videos, information, status updates etc. (Peluchette ve Karl, 2010). Included with the application on Facebook that allows users to participate in and active way and continuity, it can be also widely used in education (Genç, 2010). For being used effectively on education, students must be of the positive thoughts against Facebook. Therefore it is important for students to determine what their attitudes toward Facebook. Attitude is a psychological variables which give directions the learning results of an individual's behaviour and cause a bias in decision-making (Ülgen, 1995). Attitudes are not only actually behaviour, but it also drive on behavior and behavior behind psychological variables. Gagne ve Briggs (1979) point out that attitudes should take in the process of learning (Akt. Pala, 2006:179). Therefore concept related to attitudes in education must be known. Küçükahmet (2003) supports this perspective with ''students that have attitudes and habits effect their achivements''. For instance if students have positive attitudes against Facebook, using it on lessons can be increased their achivements. Because of using effectively Facebook on education nowadays, the requirements of this research present that attitudes of students' thoughts against Facebook is significant.

Nomanclature

EFA	Exploratory Factor Analysis

2. Method

2.1. Research model and Sample Selection

The research planned and conducted screening model. The research of sample constituted 145 blended learning students who education Sakarya University Faculty of Computer Education and Instructional Technology in 2012-2013 academic year. Sakarya University student affairs according to information from the official database; the research of system constituted 193 blended learning students. So this study research represents a large proportion of the system.

2.2. Data Collection Tools

The research was developed by Yixin Zhang for students and in 2007 publishes " Computers and Education Journal, Internet Attitude Scale modeled 5s against Facebook Likert Attitude Scale was developed.

3. Process

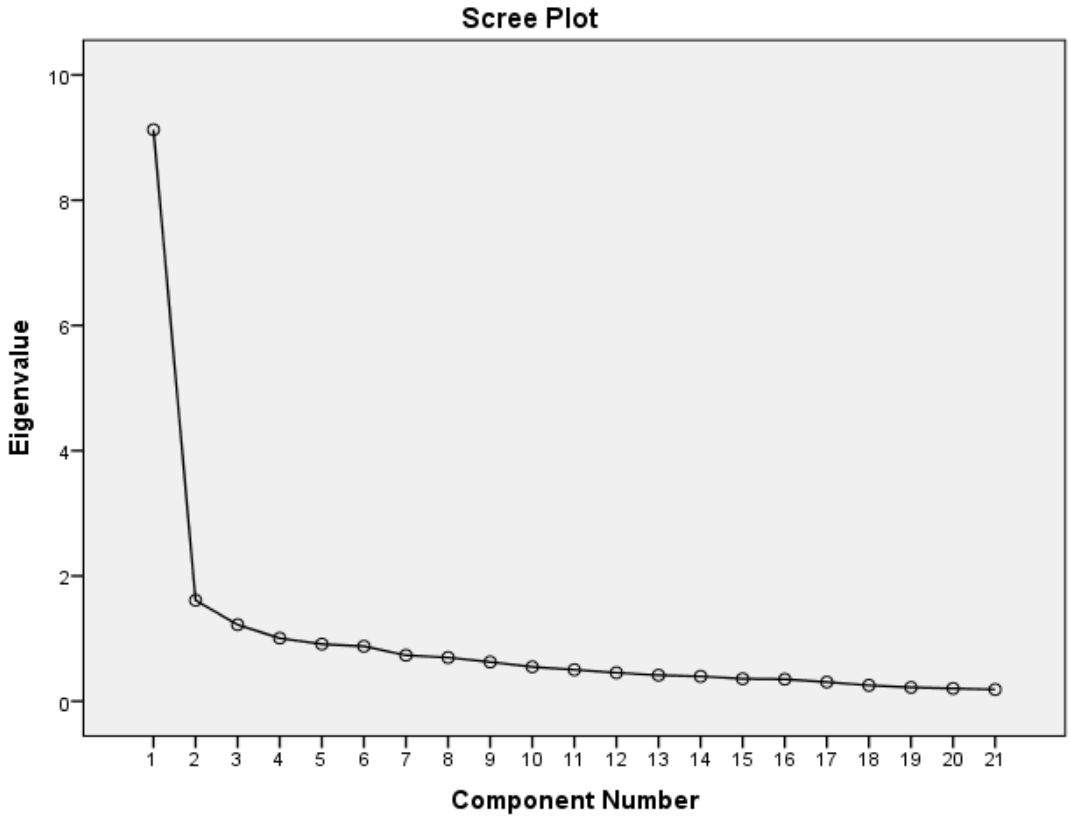
3.1. Facebook Attitude Scale

Facebook towards the attitude scale with an extensive literature review by researchers and consultants, attempted to establish the theoretical basis of the scale. Situated in the literature regarding the attitude of the Internet, developed by Zhang Yixin "Development and validation of an internet use attitude scale" is article 40-item Internet Attitude Scale samples were taken after obtaining the necessary permits. First, the sample scale "Internet" instead of the word "Facebook" was changed by typing the word. Then by 2 experts who know English at a good level Turkish 'had been translated and Turkish forms back translate firstly the scale's English then its Turkish applied to know English-Turkish 34 people in Sakarya University. The scale's of items edited to Facebook attitude scale and Considering the results performed on linguistic equivalents; correlation of 0.5 with skin removed 1 item from small scale item pool was created. Examined based on expert opinion and necessary corrections were made. And then take into account national, local, cultural, Turkish form was examined and done back correction and Turkish form was obtained for pre-application. The scale of items were examined to adapt Facebook and were reduced 36. The remaining 36 items, five scale Likert ("1" strongly disagree, "2" disagree, "3" undecided, "4" agree, "5" strongly agree) written in the grading scale.

After this adaptation / development process in order to make the validity and reliability study this scale was applied 153 pilot students who educate Sakarya University Faculty of Education Department of Computer Education and Instructional Technology. According to this pilot study Facebook attitude scale reliability analysis results; the scale's of 36 items internal consistency coefficient to calculate with Cronbach Alpha was found .93.

Construct validity was examined attitude scale of Facebook as a validation study. Exploratory factor analysis for construct validity (EFA) is made. Conducted in order to examine the validity of the scale exploratory factor analysis (EFA) According to the results the scale's eigen values are removed from the other 15 substances that the scale is larger than one factor damaging the structure. The core values of a structure consisting of 21 items scale greater than one single factor explains 43.45% of the total variance. This explained variance ratio is above 30% is regarded as sufficient tests in development work in the behavioral sciences (Büyüköztürk, 2004). Results of this analysis in Table 1, the eigenvalues-factor scatter diagram is presented in Figure 1. When these findings examined, that can said the scale is valid. From the validity study the scale of 21 items internal consistency coefficient to calculate with Cronbach alfa was calculated again and was found .94. The reliability of the examination said that Facebook Attitude Scale was developed in a consistent structure of its own. SPSS 19.0 for validity and reliability analysis (Statistical Package for Social Sciences) program was used.

Figure 1. The Eigenvalues-Factor Scatter Diagram



3.2 An Exploratory Factor Analysis (EFA)

Exploratory factor analysis was conducted for the construct validity of the scale. Exploratory factor analysis of the test results will take place in the determination of material, the core values of factors consisting of items 1, they have at least .30 worth of load factor of substances, take part in only one factor among the factors involved in the matter and was sure that at least two factors .10 difference (Büyüköztürk, 2011). This criteria has been decided to remove unsuitable material from the scale. Common factor variance obtained from the exploratory factor analysis and factor loadings were reporting. After the factor analysis, internal consistency coefficient of the scale was examined. All analyzes were

performed using the SPSS program in research and in the analysis; level of significance was accepted as .05.

Firstly for the construct validity of the scale with the data obtained from the scale exploratory factor analysis was conducted. In order to perform this analysis to test the adequacy of the sample primarily the Kaiser-Meyer-Olkin (KMO) test was examined. KMO value was found to be .909.This value's 70 is greater due to factor analysis can be performed on these data it was concluded. Secondly, looking at the Bartlett Sphericity test (x ^ 2 = 1438.536, p = .000) showed significant differences in the data obtained and was found to be suitable for factor analysis. As a result validity Figure 1 as seen single factor has been found that the scale has a structure.

Table 1. Result of EFA

Item	The Common Factor Variance	Load Factor Value
i3	0,437	0,661
i4	0,541	0,736
i6	0,367	0,606
i8	0,568	0,753
i11	0,451	0,672
i13	0,290	0,538
i14	0,473	0,688
i15	0,580	0,761
i17	0,449	0,670
i21	0,490	0,700
i22	0,319	0,565
i23	0,422	0,649
i24	0,362	0,602
i31	0,401	0,633
i35	0,430	0,656
i28	0,433	0,658
i16	0,395	0,629
i10	0,464	0,681
i29	0,493	0,702
i5	0,512	0,716
i1	0,250	0,500

Eigenvalues (Tot. = 8,33)
Explained Variance % Total = 43,45

When Table 1 is examined, Facebook attitude scale structure consists of a single factor. Load values of the 21 items in the scale factors ranged from 0.50 to 0.76. Located in the scale factor explains 43.45% of the variance. It was found that exploratory factor analysis of the scale revealed a total of 21 items and consists of a single factor. These values of the scale shows the blended learning student attitudes toward Facebook that a good way to explain. While, minimum point that can be developed from the Facebook Attitude Scale is 21, maksimum point is 105.

3.3 Reliability

Total internal consistency coefficient of the 21-item attitude scale of Facebook was found .94 as Cronbach alfa. This value is considered to be an acceptable value for the reliability of the Facebook Attitude scale.

4. Data Collection

Attitude scale against Facebook was planned in the screening model. Screening studies are studies aimed at collecting data to determine the specific characteristics of a group (Büyüköztürk, Çakmak, Akgün, Karadeniz ve Demirel, 2010). In this study, was filled by 145 blended learning students who education Sakarya University Faculty of Computer Education and Instructional Technology. These forms filled out by the researchers collected data set was created.

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5. Data Analysis

Facebook Attitude scale, with data collected for analysis were transferred to SPSS 19.0 package program and datas were analyzed.The data's analysis was examined with frequency and percentage values, t-test, ANOVA, Scheffe Post Hoc test. Level of significance in the analysis of the data is .05.

6. Findings

Table 2. BLSATF according to gender variable

Factor	Gender	N	$\bar{x}$	S	sd	t	p
Attiude of Facebook	Female	50	71,42	14,49	143	1,109	,269
	Male	95	68,20	17,61			

Table 2 shows that there is not significant differences on blended learning students according to gender variables on Facebook attitude. It is observed that p-value is larger than .05 (t = 1.109, p> .05).

Table 3. BLSATF according to having internet access variable

Factor	Having internet access	N	$\bar{x}$	S	sd	t	p
Attiude of Facebook	Yes	109	70,49	15,98	143	1,500	,136
	No	36	65,72	18,20			

Table 3 shows that there is not significant differences on blended learning students according to having internet access variables on Facebook attitude. It is observed that p-value is larger than .05 (t = 1.500, p> .05).

Table 4. BLSATF according to accessing with mobile phone to facebook variable

Factor	Use mobile phone while login to Facebook	N	$\bar{x}$	S	sd	t	p
Attiude of Facebook	Yes	77	71,87	13,95	143	1,993	,048

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No	68	66,41	18,89

Table 4 shows that there is significant differences with accessing to facebook on mobile phone variable. It is observed that p-value is smaller than .05 (t= 1,993, p<.05). It means that the students attitudes on facebook who accessing with mobile phone ($\bar{x}$ =71,87) is higher than the others (x =66,41).

Table 5. BLSATF according to Class Grade variables (ANOVA)

		Sum of Squares	sd	Mean Square	F	p	Differences
Attiude of Facebook	Between Groups	3630,44	2	1815,22	7,12	,001	3-2
	Groups inside	36170,59	142	254,722			4-2
	Total	39801,03	144				

Table 5 shows that there is significant differences with class grade variables. It is observed that p-value is smaller than .05 (F(142, 2)= 7,12; p<.05). It is observed that the differences are between 4th-3rd and 2nd classes. According to the Scheffe test it can be say that ;

*Students of studying in 3rd grade ($\bar{x}$=73,60), have more positive attitudes towards facebook to the in 2nd grade students ($\bar{x}$=63,27).

*Students of studying in 4rt grade ($\bar{x}$=73,27), have more positive attitudes towards facebook to the in 2nd grade students ($\bar{x}$=63,27).

Table 6. BLSATF according to the family's place of residance variables (ANOVA)

		Sum of Squares	sd	Mean Square	F	p	Differences
Attiude of Facebook	Between Groups	1009,35	3	336,450	1,223	,304	
	Groups inside	38791,68	141	275,118			
	Total	39801,03	144				

Table 6 shows that there is not significant differences on blended learning students on Facebook attitude, according to the family's residence place variables . It is observed that p-value is larger than .05 (F(3, 141)= 1,223; p>.05).

Table 7. BLSATF according to the mother's education level variables (ANOVA)

		Sum of Squares	sd	Mean Square	F	p	Differences
Attiude of Facebook	Between Groups	1655,02	3	551,67	2,039	,111	

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	Groups inside	38146,01	141	270,53		
	Total	39801,03	144			

Table 7 shows that there is not significant differences on blended learning students on Facebook attitude, according to the mother's education level variables . It is observed that p-value is larger than .05 ($F(3, 141) = 2{,}039$; $p>.05$).

Table 8. BLSATF according to the father's education level variables (ANOVA)

		Sum of Squares	sd	Mean Square	F	p	Differences
Attiude of Facebook	Between Groups	370,77	3	123,59	,442	,723	
	Groups inside	39430,26	141	279,64			
	Total	39801,03	144				

Table 8 shows that there is not significant differences on blended learning students on Facebook attitude, according to the father's education level variables . It is observed that p-value is larger than .05 ($F(141, 3) = ,442$; $p>.05$).

Table 9. BLSATF according to "how often spending time on Facebook in a day "variables (ANOVA)

		Sum of Squares	sd	Mean Square	F	p	Differences
Attiude of Facebook	Between Groups	5298,58	3	1766,19	7,218	,000	7-up and never
	Groups inside	34502,45	141	244,69			4-6 and never
	Total	39801,03	144				

Table 9 shows that there is significant differences with spending time on Facebook in a day variables. It is observed that p-value is smaller than .05 ($F(3, 141) = 7{,}218$; $p<.05$). According to the scheffe test result, it can be say; the students who spends longer time on Facebook have more positive attitudes towards to Facebook.

Table 10. BLSATF according to "how often spending time on Facebook in a week "variables (ANOVA)

		Sum of Squares	sd	Mean Square	F	p	Differences
Attiude of Facebook	Between Groups	6512,68	3	2170,89	9,195	,000	11-up and 1-5
							11-up and never

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Groups inside	33288,35	141	236,08	6-10.and never
Total	39801,03	144		

Table 10 shows that there is significant differences with spending time on Facebook in a day variables. It is observed that p-value is smaller than .05 ($F(141,3) = 9,19$; $p<.05$). According to the scheffe test result, it can be say; the students who spends longer time on Facebook have more positive attitudes towards to Facebook. This result is similar to, as indicated on Table 9.

Conclusion

6.1. Results, Discussion and Recommendations

In this study, Facebook Attitudes levels of blended learning students were examined. To serve this purpose, blended learning students from Sakarya University Computer Education and Instructional Technology department, studying in 2nd, 3rd and 4th grade, views are investigated.Facebook Attitude levels of blended learning students were analyzed with t-test and ANOVA; according to gender, class level, having internet access, login to Facebook with mobile phone, residence of family place, mother's education level, father's education level, frequency of using Facebook in a day and in a week, variables. The results show that there is a significant difference according to the class level, login to Facebook with mobile phone, frequency of using Facebook in a day and in a week, variables.

The ANOVA test results show that there is a significant differences between 2nd and 3rd class students and 2nd and 4th class students. To check out the differences reason, Scheffe test results determined that students, studying in high grade have more positive attitude towards Facebook than studying in 2nd class. The reason of that may be say, experimention on Facebook is increasing by their class level. There is also a significant differences with frequency of using Facebook in a day and in a week. To check out the differences reason, Scheffe test results determined that students who spends over 4 hours on Facebook in a day have more positive attitude than other cases. And also, frequency of week has the similar result. The t-test results, show that there is a significant differences between login to Facebook with mobile phone and in other case.

In the light of the survey results, the students views show that Facebook is useful to; " communicate with a remote person, communicate with friends and share course materials." Charnigo ve Ellis (2007) observed that Facebook is an important tool to communicate in the campus, which has a difficult physical facilities. Students have some instability about the items which related about professional business and studying on Facebook. This findings show that they do not use more often Facebook to academic purpose. Junco and Cotton's (2012) results are similar to this findings. The students also represent that, "Graphics and hyper links on Facebook draw my attention ."

The high grade students have more positive attitude towards Facebook may be associate with the using of Facebook more often in the courses in 3rd and 4th classes. This finding is also related about spending time and experience on Facebook have effect the attitude towards Facebook. Tiryakioğlu and Erzurum (2011), have some related findings that Facebook effects the educational experiences, teachers have positive attitudes and they use to communicate and to share.

To summarize the results, it is observed that students use Facebook actively by sharing courses materials and communicating with each others. In this view, to have an attention on the students, a course modul may be add on Facebook. In this manner, the educational activities may be provide on Facebook. Creating a group and sharing course materials on Facebook may be an other idea, to have effective activities and learnings. Facebook can be use actively in educational environment especially in distance education. The researcher may take care of this idea and may search the reason of not using Facebook for academic purpose by using the qualitative method.

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Acknowledgements for my colleagues and my thesis advisor for helping me to complete this master thesis. And also thanks for Zhang Yixin to let me oriniginate to compose this survey from his article.

Appendix D. An example appendix

A.4. Example of Facebook Attitude appendix

Bu ölçekte bireylerin Facebook'u kullanırken neler hissettikleri ile ders amacıyla kullanırken ki tutumunu belirlemek amacıyla oluşturulmuş maddeler yer almaktadır. Lütfen bu maddelerle ilgili olarak size en uygun seçeneği işaretleyiniz.

Cinsiyet : ( ) Kız ( ) Erkek

Sınıf : ( ) 2. Sınıf ( ) 3. Sınıf ( ) 4. Sınıf

Ailenizin yaşadığı yer : ( ) Köy ( ) Kasaba ( ) İlçe ( ) İl –Merkez

Ailede Annenin Eğitim Düzeyi : ( ) İlkokul ( ) Ortaokul ( ) Lise ( ) Üniversite ( ) Lisansüstü

Ailede Babanın Eğitim Düzeyi : ( ) İlkokul ( ) Ortaokul ( ) Lise ( ) Üniversite ( ) Lisansüstü

Evde internet var mı ? : ( ) Var ( ) Yok

Facebook ' a günde ne kadar sıklıkla giriyorsunuz ? : ( ) Hiç ( ) Her gün 1-3 saat

( ) Her gün 4-6 saat ( ) Her gün 7 saat ve üzeri

Facebook ' a haftada ne kadar sıklıkla giriyorsunuz ?: ( ) Hiç ( ) Haftada 1-5 saat ( ) Haftada 6-10 saat ( )Haftada 11 saat ve üzeri

Cep telefonunuzdan Facebook'a giriyor musunuz ? : ( ) Evet ( ) Hayır

	Hiç Katılmıyorum	**Katılmıyorum**	**Kararsızım**	**Katılıyorum**	**Tamamen Katılıyorum**
1.Facebook'ta vakit geçirmekten **sıkılmam**.					
2.Facebook'un, uzaktaki bir kişiyle iletişim kurmak için kullanışlı olduğunu düşünürüm.					
3.Facebook'u kullanarak arkadaşlarımla iletişim kurmaktan hoşlanırım.					
4.Facebook başkalarıyla iletişim kurmada kullanışlı araçlar sağlar.					
5.Facebook'ta başkalarıyla konuşurken kendimi rahat hissederim.					
6.Facebook'ta araştırma yapmaktan zevk alırım.					
7.Facebook'ta rahatça çalışabilirim; çalışırken kendimi rahat hissederim.					
8.Facebook'ta konu üzerinde başkalarıyla rahatça tartışabilirim.					
9.Facebook kullanmak mesleki işimi çabuklaştırır.					
10.Facebook'ta gezinmenin tedirgin edici olduğunu **düşünmem.**					
11.Facebook'tan rahatlıkla mesaj gönderebilirim.					
12.Facebook'ta çalışmaktan hoşlanırım.					

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13.Facebook'ta işime yarayacak bilgilerinin yerini belirlemek kolaydır.					
14.Facebook'tan dersle ilgili materyalleri arkadaşlarımla daha kolay paylaşırım.					
15.Facebook bana korkutucu **gelmez.**					
16. Facebook ile başkalarıyla rahatlıkla iletişim kurabilirim.					
17.Facebook'un ara yüzü bana hitap etmektedir.					
18.Facebook'taki grafik ve çoklu bağlantılar benim dikkatimi çeker.					
19.Facebook bilgiye ulaşmamda verimli bir şekilde yardımcı olur.					
20. Facebook'ta kendi profilimi rahatlıkla oluşturabilirim.					
21.Facebook'taki bir uygulamayı rahatlıkla kullanabilirim.					

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The case study of team-based learning methodology with teachers of four domains in the senior high school

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Abstract

Chang Jung Christian University and National Hsin-Feng Senior High School cooperated in hosting a series of teacher training camps, teaching module design discussions relating to Team-Based Learning (TBL) and green geothermal energy in 2012. The teaching program began in September 2013, focusing TBL on "green energy". Coupled with field visits, guest lecturers, and participation in competition, the teaching program aims to strengthen the learning effectiveness of students, and emphasize digital technology and hands-on module experience. Four cross-disciplinary senior high school teachers were invited to apply TBL methodology in innovative teaching and learning of geothermal energy. The teachers raises questions to trigger group discussion and in-class discussion on the principle and practice of energy use in daily life, as well as the establishment of energy-saving facilities. After self-learning, students then shared their learning experience with other students. Finally, the feedbacks and suggestions by the students and teachers on the TBL methodology are provided for a reference for TBL in the future.

Keywords: Team-Based Learning (TBL), green geothermal energy, cross-domain teaching and learning

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1. Introduction

The "Whitepaper on Innovative Education" proposed by the Ministry of Education of Taiwan points out that innovation capability broadly includes creativity, innovation and entrepreneurship mechanisms. The outcome of innovation is the creative performance of the general public in various fields. Science and technology education has an emphasis on "learning by doing", expecting that students can learn in practice with stimulus of new experiences and knowledge, and strengthen their problem-solving ability (H.C. Wang, 2004). In the knowledge based economy, there is a high demand for talents with creative and innovative thinking. However, in the current educational system of Taiwan, when students face problems, teachers and parents tend to help them solve the problems or directly give answers. Under the traditional teaching methodology for science education, students can only passively accept the knowledge in class, while unable to apply their knowledge in daily life, thus lacking problem-solving and learning migration abilities (C.H. Wang, 2009)(M.Y. Shih, 2012).

Although there are diverse teaching methods, students still learn passively as they follow the traditional pattern of "do as the teacher teaches". The two problems of the current teaching and learning methods, namely "team spirit" and "self-learning" can be solved by team-based learning (TBL). Hence, this paper presents the case study of National Hsin-Feng Senior High School, which uses emerging technology (geothermal energy) as the content of school course or non-standard educational activity, develops innovative curriculum or teaching activity modules, and designs scientific inquiry-based teaching strategies or activities. By using geothermal energy as the teaching theme and developing merge-integrated teaching, the

teaching methodology aims to enhance the emerging technology literacy and learning effectiveness of high school students in off-shores island of Taiwan.

2. Literature review

2.1. Team-based learning (tbl)

TBL is a method of carrying out group discussion in a large class, and encouraging active learning of students (Y.W. Wang, Y.W. Wang, and J.-G. Hsieh, 2010). There are two approaches: the educational strategies for the development of academic environment, and the development and educational process at workplace. During employee recruitment, companies not only concern about professional ability, but also expect the employees to have the ability to work in teams. However, this ability is neglected in school education of Taiwan. Moreover, students in Taiwan still follow the traditional pattern of "do as the teacher teaches", which is passive learning (M.Y. Shih, 2012). Therefore, to enhance students' teamwork and self-learning abilities, the learning method should be re-designed.

In recent years, another popular teaching method is flip teaching, which flips the content and time of classroom teaching with those of assignments outside of class. TBL incorporates flip teaching with group learning, in order to make learning more effective and cultivate the teamwork spirit of students. Compared with the teacher-oriented didactic teaching, TBL is a dialectic teaching, which allows students to go through the thinking process and reflect whether the students can apply the knowledge. It is student-oriented. Unlike the team-oriented learning method, which only adds group projects in the curriculum, TBL is an integrated, systematic teaching strategy, which includes changes in the curriculum design. It requires students to spend classroom time on applying the knowledge rather than absorbing the knowledge. Under TBL, the personal learning effect is closely related to the overall formation, development and performance of the team. The comparison results of traditional teaching methods and TBL are as shown in Figure 1.

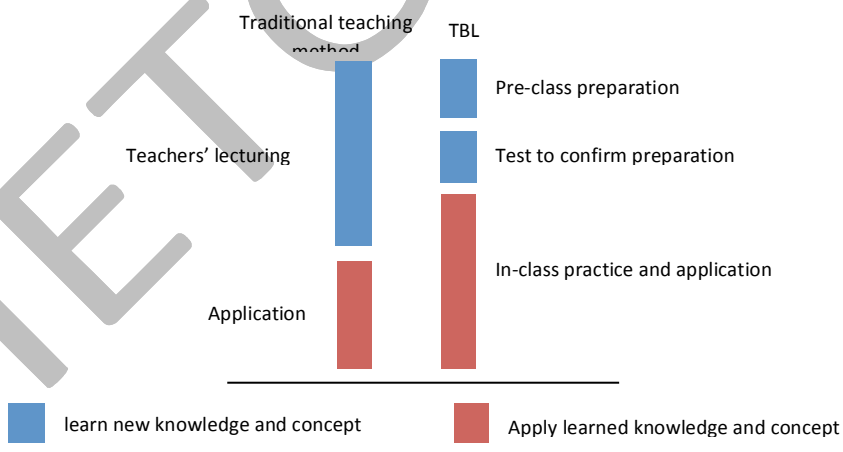


Fig. 1. Comparison of the traditional teaching methods and TBL (L. K. Michaelsen, 2004)

2.2. Cipp evaluation

CIPP, proposed by Stufflebeam et al., represents the four evaluation items of context, input, process and product (D.L. Stufflebeam, and T. Kellaghan(Eds.), 2003). C represents context evaluation to provide the basis for determining the target, which is the most basic evaluation; I represents input evaluation to determine how to use resources to achieve goals, including the selection, design and development of curriculum resources; P represents process evaluation, which starts after the completion of curricular resource

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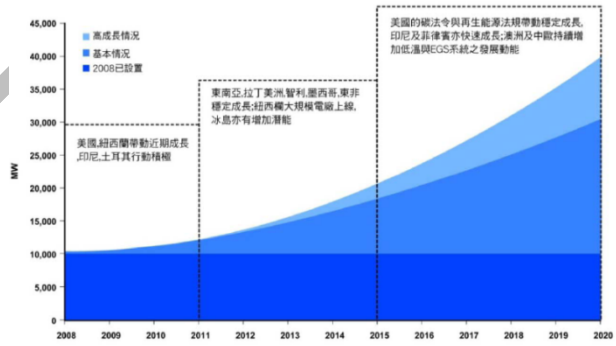
design to provide regular feedback to the people in charge of the curricular courses; P represents the cause evaluation to understand the results of the educational system to help decision-makers determine whether the curricular courses should be terminated, modified or continued (C.C. Huang, 2011). CIPP evaluation is an evaluation system mainly applied in the entire program or project, focusing on the overall process evaluation. It suggests that "the main purpose of evaluation is not to prove improvement, but deliver a professional judgment" (C.T. Wu, 1993) (Y.L. Hsieh, 2010). Therefore, it integrates both qualitative and quantitative research methods, and expects to provide the most needed information for evaluators by objective and realistic observations (C.H. Wang, 2009) (D.L. Stufflebeam, and T. Kellaghan(Eds.), 2003).

This study applied the CIPP model to evaluate the students' learning attitude, teaching objectives, and teachers' needs under Context; to evaluate the problem orientations, learning strategy, and teaching design under Input; to evaluate the content, strategies, teacher-student interaction, and learning assessment problems during the teaching process under Process; and evaluate the effectiveness of problem-oriented learning under Product. The CIPP model was used to correct and improve the teaching method, in order to achieve the optimal results.

2.3. Green geothermal energy

Geothermal energy is a green energy with many characteristics. It is a clean and environmentally friendly energy. The infinite energy dissipated by the earth can be directly used for power generation or as renewable energy, without the impact of depletion, climate changes, or the development of other energy sources. The land use surface area is very small, thus, it is less likely to damage the natural environment.

The traditional geothermal energy requires low cost. Although the cost of the newly developed EGS is relatively high, it is still cost effective if compared with fossil fuel carbon sequestration, nuclear waste disposal costs of nuclear energy, wind energy and solar power grid problem. The cost of EGS can be substantially reduced after the technology is mature. Therefore, many countries have invested in the exploration and development of geothermal energy, including those with rich geothermal energy sources, such as the United States, New Zealand, Japan, Iceland, the Philippines and Indonesia, as well as those lack rich geothermal energy sources, such as France, Germany, Australia and South Korea. According to the statistics from the Emerging Energy Research, by 2008, the total amount of geothermal power worldwide was about 10.5 GWe (1 GWe=1,000 MWe=1 billion watts). It is estimated that the total worldwide geothermal power amount by 2020 will increase by 3 to 4 times to reach between 31.5 GWe to 40.5 GWe, as shown in Figure 2.



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Fig. 2. Global geothermal energy use: current status and future outlook (ITRI, 2008)

After the enactment of the Renewable Energy Development Act on July 8, 2009, the development of renewable energy has been booming in Taiwan. Solar power and wind power are the major power sources, but they are subject to climate changes. Geothermal energy is a sustainable and stable source of power supply. Due to the technical limitation in the early stage of development, the site selection must be at hot spring geology, thus resulting in disputes with the hot spring hotels in terms of water rights and water usage amount. Moreover, the limitation of water output restricted the power generation amount; hence, the cost of geothermal energy power generation was high. At present, the geothermal energy power plants in operation, such as those in Iceland, New Zealand, Italy, and the United States, are mostly in regions with volcanic activity or on geological fault zone, and hot spring is used for thermal energy power generation.

This study used emerging technology (deep geothermal energy) as the content of school course or non-standard educational activity, develops innovative curriculum or teaching activity modules, and designs scientific inquiry-based teaching strategies or activities. By using geothermal energy as the teaching theme and developing merge-integrated teaching, the teaching methodology aims to enhance the emerging technology literacy and learning effectiveness of high school students in off-shores island of Taiwan.

3. Application of smart life into senior high / vocational high school curriculum

The teaching program was implemented by the team of Chang Jung Christian University. It carried out TBL, discussed the acceptance of the students and teachers of TBL, guided the students to collect and analyze data through the project-based learning, and develops the problem-solving and self-learning abilities of the students. Finally, the CIPP model was used for evaluation, and proposal of suggestions and improvement methods. The team also introduced the college student TA into the high school classes, and further promoted the teaching method to other courses. The major tasks include:

(1) To assist teachers in junior and senior high school to prepare and gather relevant information on green geothermal energy and low-carbon energy;
(2) To assist observation of in-class curriculum and course activities;
(3) To regularly organize summer and winter camps and model-making activities, to hold "Energy-saving Green Map" on May 16, 2014 and "Green Energy Science Summer Camp" from August 20 to 21, 2014, to plan and design activity lessons;
(4) To assist high school teachers establishing good channels of communication with the university teams.

Finally, the feedbacks and suggestions by the students and teachers on TBL were discussed for the reference of future application of TBL.

The specific objectives of this study are as follows:

(1) Applying TBL on the course development and merge-integrated teaching of "high school earth science": in the high school earth science courses, the team-oriented focus is on "sightseeing tourism". The teachers raise questions concerning daily life problems, such as the relationship between the environmental development and topography, the impact of volcanoes and earthquakes on the environmental use. The students are encouraged to participate in group discussion and in-class discussion. Then they conduct self-learning and share their learning with other students. They then discuss the methods of geothermal energy development and utilization.
(2) Applying TBL on the course development and merge-integrated teaching of "high school geography": in the high school geography courses, the team-oriented focus is on "sightseeing tourism". The teachers raise questions concerning daily life problems, such as the relationship between landscape conservation and environmental development, the impact of landscape planning and environmental use, the combination of the community building and geothermal energy industry. The students are encouraged to participate in

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group discussion and in-class discussion. Then they conduct self-learning and share their learning with other students. They then discuss the methods of geothermal energy development and utilization.

(3) Applying TBL on the course development and merge-integrated teaching of "high school physics": in high school physics courses, the team-oriented focus is on "green energy", emphasizing "eyes, hands and brains". The teachers raise questions concerning daily life problems, such as energy units, energy generation, energy conversion, energy consumption and energy conservation. The students can conduct self-learning, participate in group discussion, and discuss with the teacher. Then they share their learning with other students to train the observation ability and creativity.

(4) Applying TBL on the course development and merge-integrated teaching of "high school biology": in high school biology courses, the team-oriented focus is on "biotechnology". The teachers raise questions concerning daily life problems, such as the relationship between plant growth and the environment and temperature. The students are encouraged to participate in group discussion and in-class discussion. Then they conduct self-learning and share their learning with other students. They then discuss the methods of improvement.

4. TBL module

To achieve TBL in learning green geothermal energy, experimental teaching was conducted from September to November 2013. The subjects were the top 5% freshmen students of high school. The 44 students were grouped for teaching. In mid-November, formal teaching was conducted on 44 students in one class. Under TBL, group discussion and individual learning were carried out simultaneously, in order to guide students to understand the content of geothermal energy, and cultivate their abilities to think about geothermal energy-related issues from the geographical, biological and physical aspects. They also learned geothermal energy related knowledge and abilities that can be applied in daily life. To design the TBL course outline, the team from Chang Jung Christian University held a number of workshops on the principles and application of TBL for the teachers of National Hsin-Feng Senior High School. After the curricular modules were developed for TBL courses, the student underwent individual test (iRAT) and team test (tRAT). Then, team assignments, reports, and peer evaluation (P-E) were conducted for evaluation. The TBL approach changed the learning and teaching mode of the students and teachers. Besides learning new knowledge and broadening the vision, the students have more time for discussion, take initiative for peer interaction, have higher learning participation, achieve effective peer communication, and gain thinking ability.

5. Product benefits

The environmental improvement, academic achievement, technological innovation, economic benefits, social impacts, evaluation of academic or practical values, and major contributions are described as follows.

(1) Environmental improvement: This project focuses on integrating green geothermal energy technology into teaching outline, and highlights the characteristics of TBL, and how to develop creative and suitable teaching material teaching aids for students to enhance the emerging technology literacy of diverse ethnic groups. With the equipment and resources provided by universities (National Quemoy University and Chang Jung Christian University), the perceptions of high and medium-end low-carbon buildings and geothermal energy can be strengthened. Through training of high school seed teachers and implementation courses, the green geothermal energy technology is integrated into the design of teaching aid and lesson plan, so that the university and high school can establish the cooperation partnership.

(2) Academic achievement: through resource introduction, to assist high school teachers in the construction of the basic knowledge and capabilities of teaching and learning design, develop relevant curriculum design and explore methods of emerging energy technologies. The design challenges the traditional lecturing of teachers. Under the leadership of expert lecturers, the learning of knowledge and capabilities of emerg-

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ing technology was enhanced. The initial design of teaching was changed into the student-oriented explorative teaching, team-oriented learning, problem-oriented learning model. Four TBL teaching plans were developed. Table 1 shows the design of biology teaching and learning.

(3) Knowledge innovation: In the first year, under the guidance of experts and scholars, the teachers' learning of knowledge and capability of emerging technology was enhanced. Resources were introduced to assist high school teachers to build the basic knowledge and ability of teaching and learning design. Teachers adjusted the design of teaching and learning into student-oriented innovative learning. In the second year, the green geothermal energy and TBL were introduced into curricular content and programs of teaching and learning.

Table 1. Design of biology teaching and learning.

Course theme	The geothermal energy in Taiwan	
Teaching objectives and course outline	. To understand the techonology of geothermal energy application around the world . To discuss the emerging technology of geothermal energy application . To cultivate the confidence and enthusiasm in facing the challenges of technilogical development	
Units	Unit 1: Technology of geothermal energy application Unit 2: The emerging technology of geothermal energy application	
Teaching design	Activity 1: Usage of geothermal energy in Taiwan Question by the teacher: What are the ways of using geothermal energy in Taiwan? Teaching guideline: To guide the students answer (hot spring, boiling egg, hot spring vegetables)	Activity 2: The limiations and problems of using geothermal energy (Transport of hot spring water) (Difference between hot spring water and regular water) Activity: usage of geothermal energy
Teaching design	Activity: Usage of geothermal energy Transport of hot spring water (materials, distance, piping positions) Hot spring vegetables (weight, size, results; growing rate and concentration in soil)	
Teaching effectiveness evaluation	. Knowledge: students' understanding and application of the knowledge . Affective expression: students' learning attitude, teamwork . Thinking ability: in-class discussion, homework . Problem-identifying and solving abilities: the problems identified by the students and solutions . Information ability: the ability of the students to collect and use information . Skills: students' skills and the ability to present the skills . Creation expression: the learning portfoil and presentaiton of learning results	

Source: Chang Jung Christian University, National Hsin-Feng Senior High School.

6. Conclusion

This project constructed the high scope courses by using the CIPP model in a stable and pragmatic manner. In the first year, capability building activities were held to verify the directions, content integration and teaching approaches of the high school courses. Then, the teachers discussed about the selection of teaching material, collaboration of teaching method, cross-disciplinary and cross-grade coordination, in order focus on TBL model. Diverse teaching and learning evaluation methods were adopted, including paper-based test, learning sheet, and observation report. The goal of the first year, namely building the foundation for curricular design, has been reached. In the second year, the preliminary evaluation will be conducted on the course effectiveness, which is the third stage of the second phase of CIPP model (input evaluation and process evaluation). In the third year, the overall performance evaluation on the students in the high scope course will be conducted, in order verify whether the overall curriculum design is appropriate and learning effective is enhanced, specifically whether the students' understanding of green geothermal energy can be demonstrated in their daily life. This project complies with the spirit of the high scope program, and guides high school teachers in the design of teaching and learning evaluation. The

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evaluation not only assesses the knowledge, but also the participation and gain in the learning progress. It is believed that the evaluation model can provide students an opportunity to demonstrate their abilities, enhance learning success, learn about the low-carbon life and green geothermal energy.

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The development model of knowledge management to strengthen Thai ict community learning center

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Abstract

The objectives of this research were to: 1) study the problems, obstacles, and best practices in Local Wisdom Knowledge Management for strengthening Thai ICT Community Learning Centers (ICT-CLC) in various areas of Thailand; 2) develop Local Wisdom Knowledge Management Model to strengthen Thai ICT-CLC; 3) construct a training operation plan for administrative committee members and staff to strengthen the center; and 4) evaluate the KM strategic operation plan for strengthening ICT-CLC.

The research sample included 49 administrative committee members and staff of 8 ICT-CLCs in the central provinces of Thailand. Five experts were also included as part of the focus group who critiqued the strategic operation plan for strengthening ICT-CLC. The research instruments composed of a questionnaire on ICT-CLC and strategic plans, training operation plan, and an evaluation form for strategic operation plan assessment. The data were gathered using a survey on basic information of ICT-CLC in the central provinces. Based from this, the strategic plan was developed and tried out with the target group. Finally, the assessment of the plan was conducted.

Findings showed that most of the small, medium, and large ICT-CLCs had problems and obstacles in terms of center management and services. Moreover, most of the small centers did not have long-term plan activities and maintained the local wisdom study and collection. The result of the strategic plan development revealed that the first strategic plan included issues on human development, efficiency in services, and availability of training services for administrative committee members. The second strategic plan involved the improvement of the quality of life, issues in the environment, community, sociality, and capability in enhancing the learning of the people in community through electronic media.

The results of the strategic plan utilization found that the suitability of the plan was at a high level. The assessment of the ICT-CLC involving the plan revealed that the community participated in local wisdom collection with the team and bring about the indigenous knowledge to construct online media on two websites: **www.donpingdad.ictlearningcenter.org** and **www.khemasampun.ictlearningcenter.org**. The Local Wisdom Knowledge Management Model in strengthening ICT-CLC had been tried out and tested. The result showed that the model was applicable at a good level. This could be also applied to the other centers.

Keywords: Knowledge Management, Thai ICT Community Learning Center, Strategic Planning , Learning Center strengthening

Chapter 14 Nomenclature

A	Knowledge Management
B	Thai ICT Community Learning Center
C	Strategic Planning
D	Learning Center strengthening

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1. Introduction

The concept of Thai ICT Community Learning Center was founded in Thailand in 2001-2002. Since then, many organizations have supported their activities. The Ministry of Information and Communication Technology (MICT) emphasized the development of Thailand as a Knowledge Base Society. Projects on One Temple One Learning Center (OTEC) and Information Community (i-Community) were established. After a short period of development, Thai ICT Community Learning Center was then established in 2007 with the support of MICT.

From 20 centers in the beginning, the centers expanded throughout the country with almost 1,887 centers in 2013. The Thai ICT Community Learning Centers are generally managed by the CEO of the organization where the centers are located in the various places (e.g. school, temple, Local Administrative Bureau etc.). A community board is also created to help advice the ICT center management on lead policies and to increase the transparency of the center's activities.

The management team intended to strengthen the role of the community board to be more concrete and participatory, which is expected to improve operations. Thai Community ICT Learning Centers were established to develop the lifelong learning of people in the community by using ICT as tools. However, there were limitations and issues in the management and services. Almost all of the centers could not integrate ICT applications in enhancing the potential in the community development.

Another significant limitation include the community's inability to search, collect, and gather knowledge, content or other local wisdom. Therefore, ways to manage their learning about ICT to support their daily lives should be enhanced by the ICT Community Learning Center (Sompong, 2014). The community contents such as the specific knowledge and local wisdom should be collected and put into websites and other kinds of electronic media. The center administrator should encourage the organization to gather data and put them in a database or website for sharing and learning with other members. The services should be planned and worked out with short and long – term strategic plans. In doing so, potential of the center could be strengthened.

Therefore, to enhance the ICT potential into the knowledge-based society, this research investigated and developed the KM model for strengthening ICT Learning Centers in the future. This can be used in reinforcing the competencies of the staff and the indigenous people in the remote communities. This can eventually create an impact to community development using ICT- based learning under the strategic plan implementation of the center committee. Moreover, the outcome can decrease the gap of digital divide as well.

Some studies showed that ICT Community Learning Centers (ICT-CLC) in Thailand experienced many problems in the operation. The centers need to enhance their potential to serve other ICT learning centers. Findings of this research could be used to strengthen the capacity in improving teaching and learning ICT utilization in the community through training and allowing them learn how to operate their own centers using the strategic plans.

2. Objectives

The objectives of this research were to:

1) study the problems, obstacles, and best practices in Local Wisdom Knowledge Management for strengthening Thai ICT Community Learning Center (ICT-CLC) in various sizes of Thailand;

2) develop Local Wisdom Knowledge Management Model to strengthen Thai ICT-CLC;

3) construct a training operation plan for administrative committee members and staff to strengthen the center; and

4) evaluate the KM strategic operation plan for strengthening ICT-CLC.

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3. Review of related literature

When people use computers to help them complete tasks which they regard as problems, they are likely to have a more positive attitude towards the use of computers, and are likely to look for further tasks which can be completed using a computer. However, if people use a computer to complete what they regard to be an unnecessary task or in using the computer and the task is made more difficult or less satisfying, then they are less likely to use

computers in the future. One way to bring ICTs to indigenous communities is to develop digital community centers that should be considered in implementing such centers (Newhouse, 2002).

This emphasizes the need to create an enabling environment for sustainability through public policy, careful planning, creation of local content and most importantly through direct involvement of the indigenous people being served. Therefore, the involvement of the information society is embedded in their use and adoption of ICTs. It is clear that the "digital divide" can turn into a "digital opportunity". Moreover, infrastructure and technology are generally the most dominant factors in the ICT development practice. These are also essential elements that need to be considered to match any given locality. Therefore, the ICT development stage should enable the analysis of needs and conditions in the selection of appropriate technology to match the community's circumstances. The selection and deployment of the technology to be used has to be tailored to benefit indigenous communities.

ICT Learning Center in the community can achieve success if it carries out intensive reflection and organizational work of the team. These concerns the organization leader and the committee members who have high leadership competencies which could be developed to the good performances by training. Therefore, training strategies may be one of the ways to develop the skills of ICT Learning Center's members in the communities.

4. Scope of the study

1) The study area included the lower central provinces of Thailand. The target centers were sampled from 8 provinces namely, Nakorn Prathom, Ratchaburi, Karnjanaburi, Supanburi, Samut Songkram, Samut Sakorn, Petchaburi, and Parjeob Kheereekhun. The sample was composed of ICT Community Learning Center in 3 sizes: small, medium, and large centers. Best practices were analysed at Klong Ban Keing (small) in Ampawa District, Samut Songkram Province; Ban Rang Mai Dang (medium) in Muang District, Rachaburi Province; and Ban Pluk Mai Lai (big) in Kampang Sean District, Nakorn Prathom Province. The administrator and staff of each centers in these 3 provinces were then selected as respondents of the study.

2) The strategic plan for strengthening ICT-CLC was used and assessed by 2 centers located in Petchaburi Province. Five experts in the field of Agriculture, Educational Technology, and Knowledge Management were involved in critiquing the model. Then, the KM model was developed and verified.

3) The Knowledge Management 5- Step Model was developed in terms of: Step 1 - Explore & Capture; Step 2 - Identify & Organize; Step 3 - Exchange & Apply; Step 4 - Transfer & Share; and Step 5 - Collect & Store. The model was modified and tested after the assessment.

5. Methodology

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5.1 Population and sample of the study

The respondents of the study came from the central regions of Thailand. In determining the number of samples, the centers were classified by location, management, and size (small, medium, or large). The respondents included: 1) 34 administrator and staff of the ICT-CLC committee from 3 groups in 3 selected centers; 2) 15 members of ICT-CLC committee in Petchaburi Province chosen purposively from 2 centers for the implementation of the strategic plan, and 3) 5 experts in agriculture, educational technology and ICT for the focus group meeting.

5.2 Research instruments

1) Structured questionnaire used in the survey of the best practices of the centers' administrators: Part 1 - general information for ICT-CLC, Part 2 - problems and obstacles in services, and Part 3 - best practices and needs.
2) Evaluation questionnaire for the centers' training course for participants.
3) Strategic plan for strengthening the 2 centers which involved activities from training to practice.

5.3 Data collection

1. The researcher gathered data about the problems, needs, and some administration issues in the Thai Community ICT Learning Centers. Three centers in the central regions of Thailand (small, medium, big) were studied.
2. The researcher gathered data from the 3 centers about their best practices, problems, and needs, and some administration issues in the ICT Community Learning Centers.
3. The training course was arranged for 15 participants by the researcher. This training focused on the knowledge and practice potential enhancing plans to improve the ICT Learning Centers. The training courses were evaluated by the researcher.
4. The activities of the strategic plans were implemented on the remote area.
5. Strategic plans and operation for strengthening two ICT-CTC were launched at the center namely, Khemasampun and Donpingdad in Petchaburi Provinces.
6. The community participation were followed up and evaluated using five steps.

   Step 1 Study of local wisdom

   Step 2 Knowledge capture of the center

   Step 3 Follow up and monitoring

   Step 4 Media production for communication

   Step 5 Evaluation

7. Model revision of KM in local wisdom to strengthen for ICT Community Learning Centers
8. Modify and test the model of KM in local wisdom
9. Conclusion and report writing

.

5.4 Data analysis

Data were analyzed using SPSS for windows. Descriptive statistics such as means, standard deviation, and percentage were used. Qualitative data analysis using thematic approach and photo and video recording analysis were employed.

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6. Research findings

Part 1 The basic information and practices of ICT-CLC about local wisdom

Most of the problems and obstacles of three ICT-CLCs were found at moderate and high levels in terms of personnels (3.51), infrastructure and ICT facilities (3.27), and administration (3.22) which could be divided into the following issues:

1. **Training.** The problems were at a moderate level (2.99). The training service for community was not conducted regularly. The training curriculum was not formulated in the beginning so the training program was not sustained.
2. **Administration.** This problem was at a moderate level (3.22). There were no the reports to community, no operation plan or prior plan for activities, and sometimes, the center closes the service.
3. **Equipment.** The problem in infrastructure and facilities was at a moderate level (3.27). The computer sets, especially in the small size centers, were not enough for services and training. Some buildings of centers lacked aircons.
4. **Location.** This problem was at a moderate level (2.30). The centers were far from the downtown and were difficult to reach. Some areas were located in the church and school. Some were located near internet cafés so users prefer to use the computers in these shops rather than in the center.
5. **Staff.** The problem involving center's staff was at a moderate level (3.51). This include the insufficient number of service staff who are knowledgable in using ICTs, and the number of nonpermanent staff and part-time staff.
6. **Networking.** The problem was at a moderate level (2.96) in terms of lack of human networking, no connection in the centers, and ICT issues in government offices.
7. **People participation.** This problem was at a moderate level (3.30). The people in community did not see the significance of the ICT-CLC.

Part 2 The strategic plan for strengthening ICT-CLC

The strategic plan was developed based from the survey data gathered from the ICT Community Learning Centers. In general, this included 2 strategies.

2.1 Opportunities to increase capacity and enhance the learning standard of people with electronic media (e-Learning).

1. Making policy to promote media creation for learning community plan

Planning	Project/Activity	Output/Indicator
1. Making policy to promote media creation for learning the community plan	1. The workshop training for video on demand in local wisdom documentary project 2. The development of local wisdom database for continuing the learning project	1. Satisfaction of trainee 2. Efficiency of local wisdom database

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2. Promotion of staff & volunteers to develop & use electronic media (e-Content) to continue community learning plan	1. The organization of ICT knowledge bank	1. Efficiency of organization of ICT knowledge bank 2. Satisfaction of customer services in organization of ICT knowledge bank
3. Promotion & cooperation of public & private sector to e-Contents co-creation for community learning plan	1. The development of e-Learning media to increase capacity in agro-industry project 2. The development of e-Training in the occupations course for the people project	1. Efficiency of e-Learning media & e-Training 2. Satisfaction on e-Learning media & e-Training

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2. Development of the quality of life, community, environment, and national stability strategy.

Planning	Project/Activity	Output/Indicators
1. Enhancing the stability of economy and occupations for people plan	1. The ICT based learning & sharing for wealthy project 2. The promotion of leadership & administration project 3. The promotion of local wisdom & occupations for the people project	1. Percentage of occupations & employment 2. Percentage of increasing benefit for people 3. Value of overall economy
2. Developing the quality of life, community, healthy, and security in life and property plan	1. The enhancement of ICT knowledge for quality of life project 2. The knowledge enhancement of community network for quality of life development project 3. The promotion of alternative energy use & production project	1. Percentage of ICT use via community network system 2. Percentage of happiness in people & community 3. Number of alternative energy use & production in household
3. Conservation of Thai identity for ASEAN community plan	1. The promotion of knowledge conservation for historic and cultural purposes in 4 regions of Thailand project 2. The promotion of basic English language skills project 3. The promotion of learning for culture in ASEAN community project	1. Percentage of people knowledgeable in Thai history 2. Percentage of people with basic English language skills 3. Percentage of people with of culture in ASEAN community

2.2 The evaluation of strategic plan

Findings of the focus group discussion in the Strategic Plan for strengthening ICT-CLC Capability revealed 6 issues. These were as follows:

1. The suitability of the strategic plan for strengthening ITC-CLC

The suitability of the plan was at a high level. It can be used in the training course with the objectives matching their size. The consideration for the strategic plan focused on the motivation to participate in the center, develop the structure of the center organization, and the training curriculum compatible with ICT skills.

2. The suitability of work plan and activities of ICT-CLC

The center activities should be planned with emphasis on computer skills, specifically on using the internet in their daily lives and on the identities of the community.

3. The suitability of the project under the workplan of ICT-CLC

The plan should be used after the community recognition of the significance of the center. This could inform the people, motivate, and encourage them participate in the activities. Available media in the village may be used to match their needs.

4. The suitability of the product and index under ICT-CLC

The product showed in the plan maintained the ICT application to the basic IT literacy and devices, develop the website and simple computer software for community use.

5. The suitability of the financial requirements under project of ICT-CLC

The budgetary requirement of the project need not be equally distributed but should depend on the level of the project significance. Some projects were capable of requesting financial support from the ICT Ministry.

6. The opinion and suggestion toward the strategy

The priority of the plan should train the staff and provide assistance to develop some media in the internet. This could support the people to learn more about their knowledge wisdoms and the ways to apply the web for major occupation development. This may also be good for outsiders to learn about the products and services of the community.

The ICT-CLC committee and staff worked as volunteers so they need to have compassion for the community. In order to uplift their morale more, their sacrifices must be recognized may be by MICT.

The network collaboration among the nearby ICT-CLC should be included in the plan in terms of exchanging the knowledge and products of each community. The electronic commerce may be developed and worked out together by the community members, involving the private sectors.

In conclusion, the following strategies can be used as suggested by the experts:

1. The recognition strategy or the paradigm shift on how to use ICT in ICT-CLC focusing on knowledge access and sharing. The operation plan would not only be used just as "the Internet Café".
2. The participatory strategy of the community to emphasize the perception, accessibility and participation in the center development such as center management structure and people services through the various communication.
3. The enhancing potential strategy for center staff and people in the community.

Part 3 The evaluation of the action plan

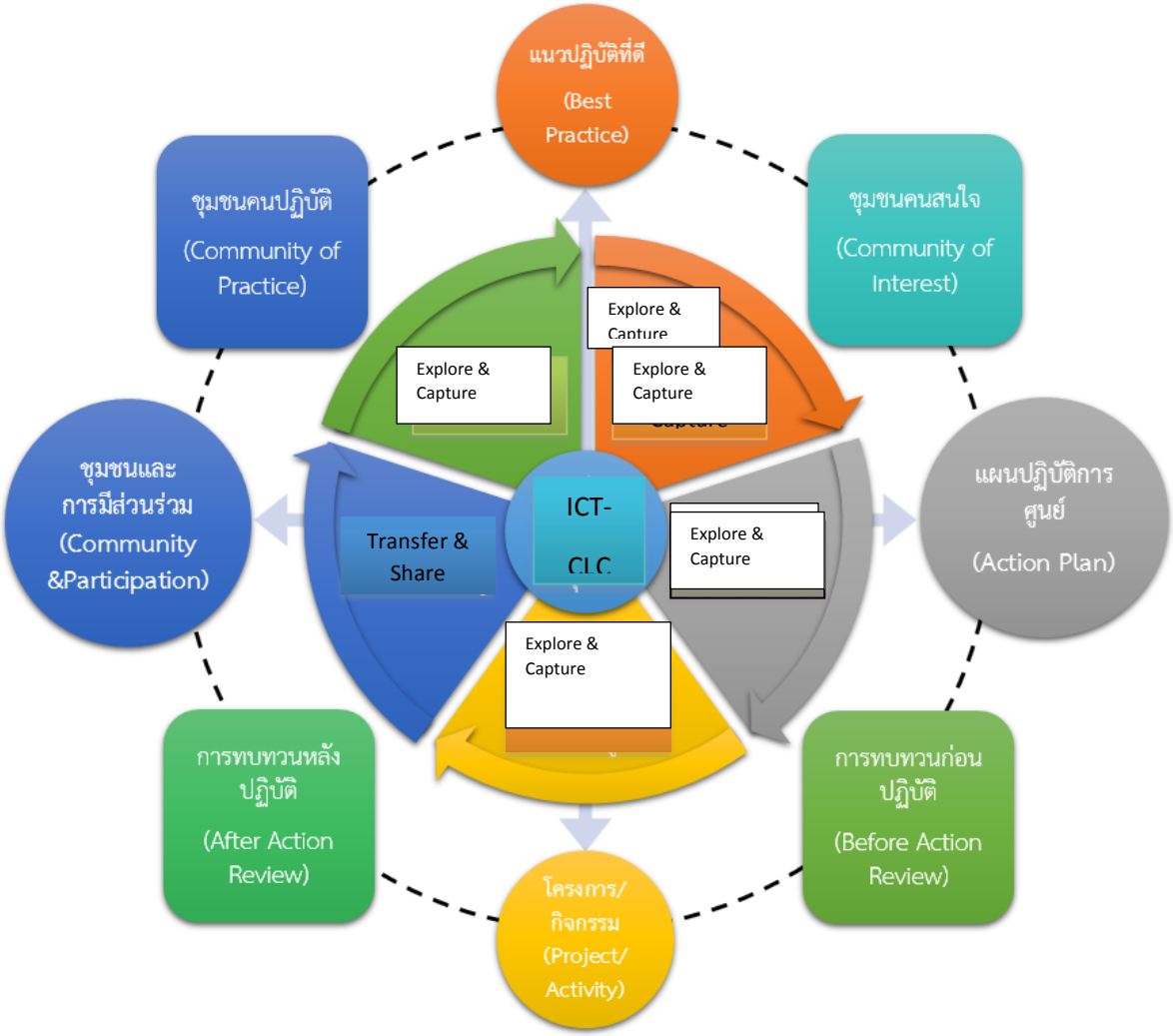
Findings in the implementation of strategic plan revealed that the suitability of the plan was at a high level (4.11). The assessment of the ICT-CLC involving the plan also found that the community participated in local wisdom collection with the team and bring about the indigenous knowledge to construct the online media on two websites: http:// donpingdad.ictlearningcenter.org and http://khemasampun.ictlearningcenter.org.

The Local Wisdom Knowledge Management Model in strengthening ICT-CLC was tried out and tested. The result showed a good level. This implies that it could be applied in the other centers. The target center staff had the skills and the ability to workout (4.57), and could bring about the knowledge to utilize with the network.

Part 4 The evaluation of the KM Model for strengthening ICT-CLC

The output of the model was modified after the researcher implemented the strategic plan and the experts' verification. The evaluation showed that the KM Model for strengthening ICT-CLC has high efficiency level for use in other centers. The final KM 5-Step Model was verified as follows:





7. Discussion and conclusion

The investigation of the practice of the ICT-CLC in small, medium, and big – size centers in the central regions of Thailand showed that there were some aspects in the training, management, equipment, location, personnel resources, human network, and participation that are required to improve and strengthen the service potentials. These finding bring about the strategic planning by the researcher and the target centers in the remote area in the lower central region of Thailand. The strategic plan had been implement at 2 centers in Petchaburi Province.

The strategic plan implementation showed that the center and staff were satisfied. They could use the knowledge gained from the training program to develop their website and use in disseminating their local wisdom to the community and outsiders, as well. They could share their capabilities by using ICT knowledge under the strategic plans. This may come from the outcome of strengthening the potentials of the center administrator and staff with the participation of the people of the community.

This research recommends the following: 1) the administrator should have a policy on public relation about the center services in collaboration with other centers as networks; 2) the administrator of ICT-CLC should plan the budget for the long-term activities to implement the program effectively. They should be open for other sectors to participate in the projects, especially the private sector; 3) the center administrator should prepare the operation plan for the important project in ICT teaching and learning of the community; 4) the development of the internet infrastructure and the stability of the network by continually providing service facilities; 5) the center staff should develop their knowledge management for

local wisdom, improve their online learning media production techniques, show compassion, and strengthen the service for the center care officer, and upgrade the capability in equipment services from time to time.

8. Author acknowledgements

The authors would like to acknowledge the Kasetsart University Research and Development Institute for the research grant and the Kasetsart University Department of Educational Technology for the facilities and equipment used in this research.

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The development model of learning though virtual learning environments (VLEs) for graduated students, department of educational technology, faculty of education, Kasetsart University

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Abstract

This research aims to develop the model of learning though Virtual Learning Environments (VLEs) for graduated students that study in Department of Educational Technology, Faculty of Education, Kasetsart University which divide into two stages: the first stage is to study the appropriate model of learning though Virtual Learning Environments (VLEs) and the second stage is to develop the model of learning though Virtual Learning Environments (VLEs) for graduated students. The participants are master degree students (regular and special program) that study in Department of Educational Technology in 2014 academic year and divide into 2 groups (control and experimental group). Research tools are: analysis and synthesis data form, student's satisfaction questionnaire, self-directed learning skill measurement. Data are analyze by Arithmetic mean, Standard Deviation (S.D.) and T-test.

Research finding show that the model of learning though Virtual Learning Environments (VLEs) for graduated students that study in Department of Educational Technology are include the 4 main elements: 1) Learner, 2) Collaborative Learning, 3) Self-Directed Learning skill, and 4) Online Learning Environment. Finally, in the first stage show the appropriated model which is the "Prototype" that can be develop into the system of Virtual Learning Environments (VLEs) in the next stage.

Keywords: Virtual Learning Environments (VLEs), Self-Directed Learning skill, Graduated student

Chapter 15 Nomenclature

A	Virtual Learning Environments (VLEs)
B	Self-Directed Learning skill
C	Graduated student

1. *Introduction*

The graduated student quality is the needs factor to student achievement development. Quality ongoing professional development contributes to student growth and success. The student's learning style has been changed: from Gen. X to Gen. Y and to Gen Z. The quality content and resources that are available to teachers from any place and any time, and the diversity channel of learning that can help student to get their knowledgethat can deliver relevant, accessible, and ongoing support has stimulated the development of online teacher professional development programs. The limited learning environment to let student to get opportunity to exchange and share knowledge is decreased between them in real situations. Online teacher professional development programs make it possible for educators to communicate, share knowledge and resources, and reflect via asynchronous interactions. Online learning courseware and Virtual world programs can make it possible for student to learn has no limit and to communicate, share knowledge and resources. Moreover, Dabner (2011) suggest that the many current ICT-supported reform

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efforts demand teachers to assume the role of epistemic facilitator of knowledge construction supported by technology. In addition, Davis et al. (2011) explored the characteristics of such technology training programs were discussed to help students learn how to use technologies as instructional tools to enhance their teaching and students` learning. The condition of education in Thailand today still has several problems. Especially, the quality of learners seems shortages (Secretariat of the Council of Education, 2010: 53). Along with the lack of pedagogy skills that is not match in the actual practical needs for higher education. Particularly, the lack of the self-directed learning skill of graduate students to use that knowledge management let the opportunity to exchange and share knowledge is decreased between them and focuses on the upstream of training from real situations process furthermore, Lee, et al (2010) have suggests that the common difficulties and limitations regarding the implementation of knowledge management into classrooms cultures. In addition, Erkunt (2010) exhibited that students' collective inquiry relied on socially distributed cognitive resources that were generated by their social interactions in class and online using technology. The concept of social media that based on the appropriate tool and the medium to deliver knowledge, and helps learners can communicated with each other (Catherall, 2008) especially in teaching and learning using the potential of internet network to access with various sources of learning. The main purpose of this study is to research and develop activities to be appropriate with the learners that integrated with the concept of knowledge management and social media. The question then becomes, "How to develop the appropriate model of Learning though Virtual Learning Environments (VLEs) for Graduated Students, that study at Department of Educational Technology, Faculty of Education, Kasetsart University". More over the results of quality assessment of model that is body of knowledge to develop the learning skill of graduated students. In addition the results can be the information to support the higher education systems policy maker.

2. Objective

This research aims to study, develop, and evaluate the appropriated model of Learning though Virtual Learning Environments (VLEs) for Graduated Students, Department of Educational Technology, Faculty of Education, Kasetsart University.

3. The review of related literature

This research focus to review of related literature that divide into 5 main parts:

1. Educational Technology Department environment
2. Online learning (MOODLE-LMS Courseware)
3. The learning styles
4. The virtual world (virtual/ reality environment- Second Life)
5. The student's learning outcome

4. Methodology

The first phase focus to study the model of Learning though Virtual Learning Environments (VLEs) for Graduated Students.

1.1 Analyzing the elements of online learning are included the learning and teaching online learning activities management system (MOODLE).

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1.2 Analysing the elements of virtual learning environment are included the virtual environment tools and channels to learning and teaching (Second Life). The second phase: Developing the model of knowledge management via web-based learning to enhance graduate student's self-directed learning skill and assessment tools.

1.3 Integrating the elements of online learning and virtual learning environment (SL+MOODLE=SLOODLE) by the matrix analysis technique.

1.4 Studying the appropriate quality of model by the 3 experts in the educational technology and virtual learning environment field

The second phase go for develop system of Learning though Virtual Learning Environments (VLEs) for Graduated Students and assessment tools.

2.1 Developing the system of Learning though Virtual Learning Environments (VLEs) based on the model and quality evaluated by the 3 experts (educational technology and virtual leaning environment field).

2.2 Developing the student's learning outcome form by the 55-60 graduate students who study in first semester, 2014 for study the research tools quality (try-out methods). The third phase: Evaluating the model of knowledge management via social media to enhance graduate student's self-directed learning skill.

2.3 Studying the efficiency of system of Learning though Virtual Learning Environments (VLEs) for Graduated Students.

2.4 Preparing the all of research tools which using in the next phase.

The third phase is to evaluating the model of Learning though Virtual Learning Environments (VLEs) for Graduated Students.

3.1 Population and samples:

3.1.1 Population are the graduate students who study in second semester, 2014 academic year at Faculty of Education, Kasetsart University

3.1.2 Samples are 60 graduate students that collected by random sampling technique and learn with the system of Learning though Virtual Learning Environments (VLEs).

3.2 Research tools:

3.2.1 The model of Learning though Virtual Learning Environments (VLEs).

3.2.2 The graduated student's learning outcome form.

3.2.3 The graduated student's satisfaction form.

3.3 Data analysis:

3.1 Descriptive statistics (mean and S.D.) are used to describe the basic features of the qualitative data.

3.2 Qualitative data were analyzed by category group and issuing data technique.

5. Results

The model of Learning though Virtual Learning Environments (VLEs) for Graduated Students was appropriated with the criterion of quality, detail are as follow:

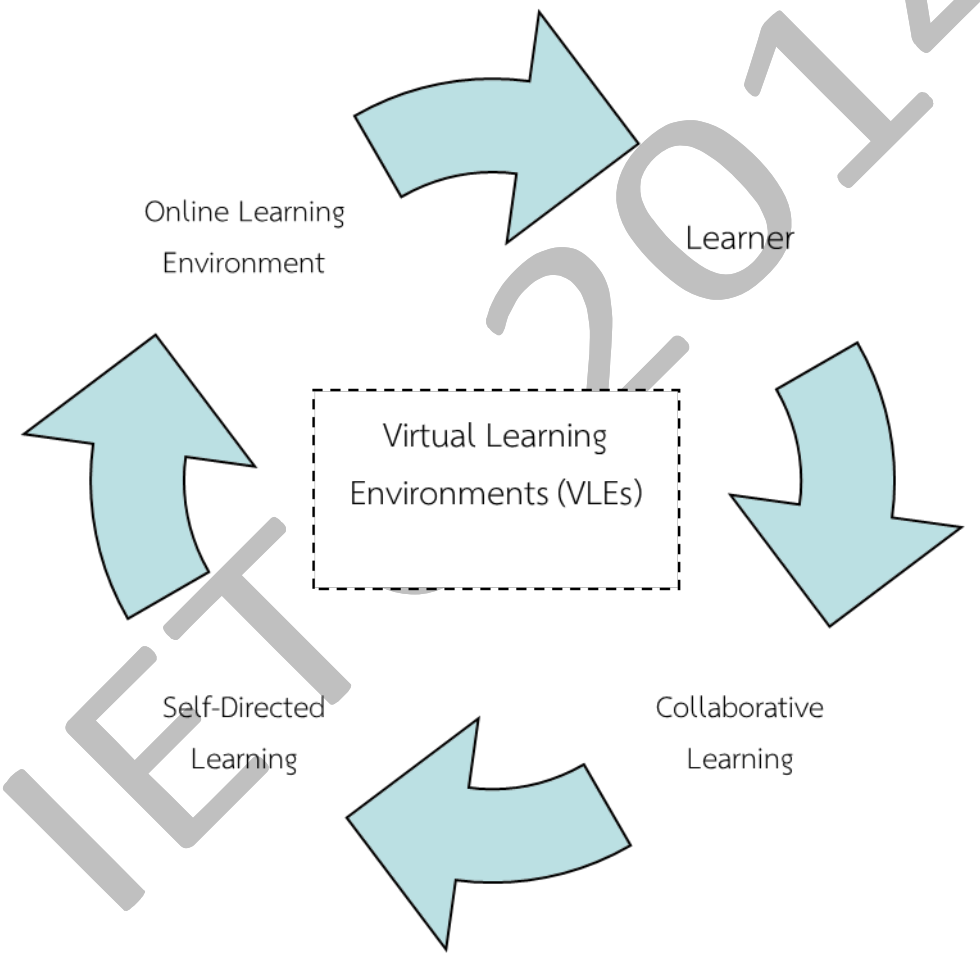
1.1 Learner who are graduated student with different learning styles (Kolb Learning Styles, 1984)

1.2 Collaborative Learning that approaching to learning and teaching online learning activities management system (MOODLE-LMS Courseware).

1.3 Self-Directed Learning that focus on the student's learning outcome including the Self-Directed Learning skill test and Attitude test (satisfaction).

1.4 Online Learning Environment including the elements of virtual learning environment especially in virtual environment tools and channels to learning and teaching (Second Life). Details see in fig-1

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Fig-1. Model of Learning though Virtual Learning Environments (VLEs) for Graduated Students

6. Conclusions

The result of research in the first phase showed that the Model of Learning though Virtual Learning Environments (VLEs) for Graduated Students was appropriated and fit to the quality of educational media, this is because;

1. Online learning skills development is an emerging trend it is still a "new frontier". Educators around the world experience many demands on their knowledge, time, and professional development.
2. Developing and sustaining an effective online learning community can be challenging even in the midst of an era of much technological advancement.
3. The online learning technologies have the potential to transform the professional development of students; penetrate cultural, discipline, and other barriers; bring educators together to learn, share successes and challenges; and co-construct and transfer learning.
4. The results of the training and simulation program have led to significantly improved grades on students' critical skills tests, taking scores from a 56% success in 2007, to 95% at the end of 2008 after the simulation was instituted.

7. Acknowledgements

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The development of English computer aided education program for acquisition of color, number and shape concepts in preschool children without foreign language education background

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Abstract
The impact of computers on children is seen as visual and audial. Visual effects on the screen is made by shapes and writings. Each new image on the screen carries a novelty for the child. Thus they act as a stimulator. Children, keeping up with the flow of information on the screen constantly intensify their attention and have to be warned in each new screenshot. Computer training lets the children learn through the play. Also it's an attractive tool for the children (Arıcı ve Demir, 2009). By reviewing the literature it can be said that small children can learn faster by the help of computer-assisted education. Therefore this study's purpose is to prepare a computer-assisted training programme to teach colors, numbers and shapes names in English to 60-72 months children who do not have any foreign language education and also do not know anything about foreign language. This study also aims to examine the impact of the prepared programme on the acquisition of basic foreign language concepts. The computer aided education programme includes basic English concepts like colors, numbers and shapes. A further objective of the study is to arouse curiosity of the children to different languages and to improve the children's awareness to other languages. 160 children participated in the research. "Color, Number, Shape Names English Evaluation Form" used to examine the children's knowledge about the color, number, shapes names in English before the programme and after the programme. As a result of the analysis, the developed computer-assisted training programme in English (color-number-shape) has been found effective in teaching English names of colors, numbers and shapes to the children who doesn't have any prior English knowledge.

Keywords: Computer aided language learning, english basic concepts,

1. Introduction

Last improvements in the education technologies necessitate implementation of modern approaches such as learner autonomy in foreign language learning and teaching fields (Can, 2012). Fast, scientific and technologic developments in information era create new possibilities for educational practices by increasing flexibility in education. Accordingly, computer which is the most prevelant technological tool used in education field turns to be a necessity rather than a luxury (Kozikoğlu, 2013). Computer, with its importance for both social life and education practices, differs from traditional educational apprehension by representing an alternative which addresses diverse senses. Taking advantage of information technologies for increasing efficiency in language teaching and offering different solutions to students is crucial for our country's problematic foreign language education which is far beyond desired success (Kozikoğlu,2013).

Effect of computers on children can be observed as visual and auditory. Visual effect is formed by the shapes and writings on the screen. Every new image on the screen is a new experience for the child. That is why it is a stimulator at the same time. Child has to focus his/her attention on information flow constantly and be stimulated by each new screen image. Computer aided education enables child learn through play. It is also an interesting tool for child (Arıcı & Demir, 2009).

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Computer aided education method, whose effect on academic success is being studied, can be used successfully with many learning methods (Tomakin &Yeşilyurt,2013). Then, it would be inevitable to make use of computer for teaching children in preschool period which is the most rapid development period. Computer has many benefits such as representing different alternatives and materials in language learning, adjusting in line with student's learning speed, individualization of the teaching, enabling student to have selfcontrol in the process, promoting the motivation, increasing student's success and making education interesting (Kozikoğlu,2013).

Effect of computers on children can be observed as visual and audio. Visual effect is formed by the shapes and writings on the screen. Every new image on the screen is a new experience. That's why it is a stimulator at the same time. Child has to focus his/her attention on information flow constantly and be stimulated by each new screen image. Computer aided education enables child learn through play. It is also an interesting tool for child. Child gets different shapes and results by using different buttons and by changing images on the screen. For example, finding out two same shapes among many options and placing one shape into another are perceived as play by children whereas they are actually learning to distinguish different geometric shapes (Arıcı & Demir, 2009).

Foreign language teaching is a long term and consistent phenomenon which has impact on child's brain development. Computer aided education (CAE) not only creates fast and high level interaction but also enables students learn foreign language in a shorter time period. CAE is an interdisciplinary field CAE is used in the fields such as foreign language teaching, second language acquisition, linguistics, semantics as well as in researches about teaching listening, speaking, reading and writing skills (Tomakin & Yeşilyurt, 2013). A meta-analysis study conducted by Nicholas Vernadakis, Andreas Avgerinos, Efi Tsitskari and Evridiki Zachopoulou (2005) found out that computer is more accessible for children and they can learn faster because of the fact that children learn better with images and sounds. McCarrick and Xiaoming (2007) claimed that playing with computer increases child's social, cognitive, language developments and their motivations as opposed to general assumption that computer disrupts the communication. In Demir's (2007) research that compared traditional and computer aided education for three and four years old children, it was found that children who had computer aided education are more successful in acquisition of color concept. Kaçar and Doğan (2007) also put forward that, in a sample of 6 years old children attending preschool institutions, the children who had computer aided education are more successful in acquisition of number and shape concepts compared to those had general education methods. Moreover, the opinions of the participants' families were also evaluated. According to all of the families, computer aided education is necessary in preschool period.

Clements (2002) claimed that children's interaction with computer in the early period improves their critical thinking, problem solving and decision making skills. When related literature was examined, on the basis of previous researches on computer aided education and researches supporting the results related to importance of language education, it would be put forward that young children experience rapid learning with computer aided education and early introduction to foreign language education improves children's cognitive development and awareness. For this reason, the aim of this study is to create a computer aided education program that would teach the concepts of color, number, shape in English to 60-72 month old children who are not aware of another language and did not have any foreign language education previously, and to analyze the program's effect on children's foreign language learning.

Problem : Is computer aided foreign language education program effective on preschool children's acquisition of color, number, shape concepts in English?

2. Material and method

2.1. Population and sampling

In Anatolian side of İstanbul province, Fikirtepe and Yenisahra districts in which low income families reside were chosen as sampling of the research. One school was chosen from each district by purposeful sampling method. After interviews with school manager and educators about children's economic conditions, it was confirmed that parents are from low socioeconomic status, All of the children from three different kindergartens in these two schools participated in the research. In total, 160 children participated in the research, 78 (48,8%) of the participants are girls whereas 82 (51,2%) are boys. The participants have an age mean of 5.68 years with standard deviation of 0.46. There is no computer in the classrooms of children. 134 of children have computers at home whereas 26 of them do not. When looking at the number of children in the families, it was found that 53 (33,1%) of children have one, 56 (35%) of them have two, 41 (25,6%) of them have three, 7 (4,4%) of them have four, 3 (1,9%) of them have five siblings. When looking at the education levels of the parents, it was found that 65 (40,6%) mothers are primary school and 21 (13,1%) mothers are high school graduates, 51 (31,9%) mothers have university and 23 (14,4%) mothers have master degrees. On the other hand, 58 (36,3%) fathers are primary school and 29 (18,1%) fathers are high school graduates, 59 (36,9%) fathers have university and 14 (8,7%) fathers have master degrees.

2.2. Data collection tools

English Instrument for Color, Number and Shape Concepts : Instrument for color, number and shape concepts designed by Dağal, Balat, Kamburoğlu and Şallı was used in the research. The instrument consists of 27 items. 10 items test color, 10 items test number and 7 items test shape concepts' names in English. Assessment is done as "1" for correct answers and "0" for incorrect answers. Total score or each concept group can be evaluated separately. This research is based on total score.

Information Form: It includes questions regarding children's gender, date of birth, number of children in the family and education levels of the parents.

Education Program of Color, Number and Shape Concepts in English in the Computer: Four different programs were designed to teach children color, number and shape concepts in English. Firstly, colors, numbers and shapes were introduced in each part of the program. Afterwards, students listened the songs about the concepts. Then, they practiced color, number and shape concepts in the computer. At the second week, children played computer games, designed by researchers, about color, number and shape concepts taught previous week. Different pictures in the Adobe Flash program were used to depict the 27 different concepts. Program gives the child chance to repeat with a feedback that has an appropriate voiceover. Child can repeat as much as he/she desires. Within Community Service course, the undergraduate students contributed to the current study in part of the pre implementation regarding evaluation of the program with children. The program aims to teach these concepts: colors; red, yellow, blue, green, orange, purple, brown, black, white, pink, numbers; 1-10 and shapes; circle, triangle, square, rectangle, heart, star, ellipse.

Data Collection Procedure: Implementation of the research lasted ten weeks. In the first week, researchers got acquainted with the children and implemented **'English Instrument for Color, Number and Shape Concepts'** individually. Researchers carried out all the evaluations, program development and implementation with Community Service course students. Beginning from the second week, the program was introduced to children and the first program was put into practice. Four laptop mice that will be used in the study with children were introduced and children were allowed to use them freely. All program implementations were carried out individually with each child and it took between 15 and 20 minutes on average for children to use the program. Educator made child watch the program, made him/her repeat when needed and repeated the question on the screen at the last part of the program when it was necessary. Child tried to find correct answer by clicking with mouse and was given feedback with phrases such as "You did fine, very well" for correct answers. Four different programs were implemented for eight weeks. The program used in the first week was implemented in the second week by redesigning it to use only questions. Four week program was designed in a way that each week will be repeated with the questions next week. **English Instrument for Color, Number and Shape Concepts** was re-implemented with children as post-test at the last week.

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3. Findings

The findings about the development of english computer aided education program for acquisition of color, number and shape concepts in preschool children without foreign language education background presented below.

Table 1. Arithmetic mean and standard deviation results of participants' scores regarding pretest and posttest of English color, number, shape concepts

N=160	X	Ss	Sh
Pretest	10,67	5,96	0,47
Posttest	22,72	4,30	0,34

Table 2. T-test analysis of participants' pretest and posttest scores regarding English color, number, shape concepts

	x	Ss	Sh	t	df	p
pretest- posttest	-1,21	6,10	0,48	-24,972	159	0,000

It was found that there is a significant difference between the pretest and posttest scores of children in the English color, number, and shape concepts. (p<.05).

Table 3. Arithmetic mean and standard deviation results of participants' pretest and posttest scores in English color concept

N=160	X	Ss	Sh
Pretest	4,09	2,66	,21
Posttest	8,88	1,77	,14

Table 4. T-test analysis of children's pretest and posttest scores in English color concept

	x	Ss	Sh	t	df	p
pretest- posttest	-4,78	2,90	0,23	-20,932	159	0,000

It was found that there is a meaningful difference between children's pretest and posttest scores in English color concept (p<.05).

Table 5. Arithmetic mean and standard deviation results of participants' pretest and posttest scores in English number concept

N=160	X	Ss	Sh
Pretest	4,69	3,32	,26
Posttest	9,11	1,65	,130

Table 6. T-test analysis of participants' pretest and posttest scores in English number concept

	x	Ss	Sh	t	df	p
pretest- posttest	-4,42	3,26	0,26	-17,153	159	0,000

It was found that there is a meaningful difference between children's pretest and posttest scores in English number concept (p<.05).

Table 7. Arithmetic mean and standard deviation results of participants' pretest and posttest scores in English shape concept

N=160	X	Ss	Sh
Pretest	1,89	1,65	,13
Posttest	4,72	1,83	,14

Table 8. T-test analysis of participants' pretest and posttest scores in English shape concept

	x	Ss	Sh	t	df	p
pretest- posttest	-2,84	2,29	0,18	-15,692	159	0,000

It was found that there is a meaningful difference between the children's pretest and posttest scores in English shape concept (p<.05).

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Table 9. Arithmetic mean and standard deviation results of participants' pretest and posttest scores in English color, number and shape concept

		X	Ss	Sh
Girls	Pretest	4,36	2,44	0,28
	Posttest	9,14	1.46	0,16
Boys	Pretest	10,24	6,46	0,71
	Posttest	21,80	4,80	0,83

Table 10. T-test analysis of participants' pretest and posttest scores in English color, number, shape concept

		x	Ss	Sh	t	df	p
Girls	pretest- post-test	-4,78	2,73	0,31	-15,424	77	,000
Boys	pretest- post-test	-1,156	6,42	0,70	-16,293	81	,000

Children's pretest and posttest scores in English color, number and shape concepts were analyzed in terms of gender and it was found that there is a meaningful difference between pretest-posttest scores of boys and girls (p<.05).

Table 11. Arithmetic mean results of the participants' pretest-posttest scores in terms of their mothers' level of education

Mother's level of education	N	Mean score of pretest	Mean score of posttest
Primary School	65	8,7231	21,8308
High School	23	12,0476	22,8095
Undergraduate	21	12,5686	23,1765
Graduate	51	10,7391	24,1739

Table 12. Variance analysis of participants' pretest-posttest scores in terms of their mothers' level of education

	Source of variance	Kt	Sd	KO	F	p
Pretest	Between groups	470,188	3	156,729	4,723	,003
	Within groups	5176,912	156	33,185		
	Total	5647,100	159			
Posttest	Between groups	110,807	3	36,936	2,035	,111
	Within groups	2831,093	156	18,148		
	Total	2941,900	159			

The children's mean scores regarding English color, number, shape concepts were analyzed in terms of their mothers' level of education and it was found that there is a meaningful difference (p<.05) in the pre-test scores, whereas there is no a meaningful difference (p>.05) in the posttest scores in terms of their mothers' level of education. When children's mean scores were analyzed in terms of their mothers' level of education, it was found that the children of mothers with undergraduate and high school degree have higher scores in the pretest. In general, absence of a meaningful difference between posttest scores can be interpreted as computer aided education program removes the difference which is the result of mothers' different level of education, in other words it is an indication of the positive effect of the program.

Scheffe test was used because of the fact that there is a meaningful difference in the pretest results. Analysis of Scheffe test is presented in the Table 13.

Table 13. Scheffe Test for participants' pretest scores in terms of their mothers' level of education

		Mean differ-ence	Standard devia-tion	Sig.
Primary school	High school	-3,32454	1,44596	,157
	Undergraduate	-3,84555*	1,07761	,006
	Graduate	-2,01605	1,39764	,557
High school	Primary school	3,32454	1,44596	,157
	Undergraduate	-,52101	1,49364	,989
	Graduate	1,30849	1,73870	,904
Undergraduate	Primary school	3,84555*	1,07761	,006

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	High school	,52101	1,49364	,989
	Graduate	1,82950	1,44690	,660
Graduate	Primary school	2,01605	1,39764	,557
	High school	-1,30849	1,73870	,904
	Undergraduate	-1,82950	1,44690	,660

Children's mean scores of English color, number and shape concepts in terms of their mothers' level of education were examined with scheffe test according to variance test result. It was found that there is a difference between the pretest scores of children of mothers with primary school degree and children of mothers with undergraduate degree. The difference is in favor of children of mothers with undergraduate degree.

Table 14. Arithmetic mean results of participants' pretest-posttest scores in terms of their fathers' level of education

Father's level of education	N	Mean score of pretest	Mean score of posttest
Primary School	58	7,9828	21,8621
High School	29	14,3448	22,7586
Undergraduate	59	11,6102	23,1017
Graduate	13	10,6923	24,6923

Table 15. Variance analysis of participants' pretest-posttest scores in terms of their fathers' level of education

	Source of variance	Kt	Sd	KO	F	p
Pretest	Between groups	862,354	3	287,451	9,375	,000
	Within groups	4752,338	155	30,660		
	Total	5614,692	158			
Posttest	Between groups	101,898	3	33,966	1,855	,140
	Within groups	2838,366	155	18,312		
	Total	2940,264	158			

Participants' mean scores of English color, number, shape concepts in terms of their fathers' level of education were analyzed and it was found that there is a meaningful difference ($p<.05$) in the pretest scores, whereas there is no a meaningful difference ($p>.05$) in the posttest scores related to fathers' level of education. When children's mean scores were analyzed in terms of their fathers' level of education, it was found that children of fathers with high school degree have higher scores in the pretest. Absence of a meaningful difference between posttest scores of children in terms of their fathers' level of education can be interpreted as a success of computer aided education program. The difference between posttest scores in terms of mothers' level of education was not meaningful in the same way.

Table 16: Scheffe Test for participants' pretest scores in terms of their fathers' level of education

		Mean difference	Standard deviation	Sig.
Primary school	High school	-6,36207*	1,25932	,000
	Undergraduate	-3,62741*	1,02386	,007
	Graduate	-2,70955	1,69915	,470
High school	Primary school	6,36207*	1,25932	,000
	Undergraduate	2,73466	1,25575	,196
	Graduate	3,65252	1,84817	,276
Undergraduate	Primary school	3,62741*	1,02386	,007
	High school	-2,73466	1,25575	,196
	Graduate	,91786	1,69651	,961
Graduate	Primary school	-6,36207*	1,25932	,000
	High school	-3,62741*	1,02386	,007
	Undergraduate	-2,70955	1,69915	,470

Children's mean scores for English color, number, and shape concepts in terms of their fathers' level of education were examined with scheffe test according to variance test result. It was found that there is difference between the pretest scores of children of fathers with primary school degree and children of

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fathers with high school degree. The difference is in favor of children of fathers with high school degree. It cannot be made any evaluation for the comparisons of other groups due to absence of difference.

4. Discussion and suggestions

Computer increasingly takes place in lives of children. In the region where the research took place, most of the children have a computer in their homes despite the fact that they are not aware of existence of another language. Keeping this in mind, the aim of this study was to design an English computer aided education program that would teach concepts of color, number, shape in English to 60-72 month old children who are not aware of existence of another language and did not have foreign language education previously, as well as to analyze its effect on children's foreign language learning. Results of the research show that computer aided foreign language education program has an effect on children who did not have foreign language education previously.

In Chude and Miksad's (1997) research, children aged from 2 years 10 months to 5 years 0 month were given computer aided education. Then, computer aided education was compared with traditional education and it was found that level of cognitive development of children who participated to computer aided education improved more. In Schetz's (1989) research done with 22 students that were not good at concepts, articulation and language, training was given to children about amount, quality, time/sequencing, names and verbs through computer aided education. According to their teacher's opinions, there was 41% improvement in the performances of the students.

Peng, Wah and Ishak's (2009) research results also put forward that computer aided education has huge impact on young children's literacy education.

In the computer aided education program used in this research, games also took place for English word teaching. Likewise, Chuang and Chen's (2007) research indicated that video games increased 3rd grade students' cognitive development.

It is seen in the literature that computer aided education is used in many education models. In general, every computer aided education program is found to be more effective than other education programs. Although computer is usually used in the foreign language education, researches about foreign language education with computer aided education were not found in the literature. It is known that foreign language education in young ages is very important and learning with computer aided education is faster. In this context, frequent use of computer aided education program in foreign language education, making research about effectiveness of computer programs which are being already used in foreign language education or being designed for the same purpose, contributing to the literature through designing new and advanced programs can be suggested as the results of this study.

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Examples from the "Color, Number and Shape Concepts Computer Aided Programme"

"Click the purple balloon"
"Click the blue balloon…."

"Put number ten on the table"

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The effect of computer aided education program on the development of concept in 48-60 months children

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Abstract

Children gain the most important basic concepts which help them understand and know about life, during preschool education. According to Manocha and Narang (2004) "concepts" are the basic units of all types of learning. Human beings from the infancy to old age learn new concepts and use old concepts in new situations of their daily life. Individuals differ in their level of concept formation depending on their age, intelligence and experience.
The aim of the present study was to examine the effectiveness of the computer aided education (CAE) in making 48-60 months children who attend preschool education institutions to gain the concept of "position in space". 109 children, who were 48-60 months of age and who attended four different classes in two different primary schools in Istanbul, have participated to the study. In the study, a pre-test post-test control group design was used. Computer-aided education training program for teaching the concepts of position in space prepared by Uyanık Balat and Kanburoğlu (2009) was applied individually to each child in the study. To measure the development of concepts of position in space, BOEHM Test of Basic Concept (BOEHM-3) was applied to both groups before and after the computer-aided education program.
The study revealed significant difference between the pre-test and post-test scores for both of the experimental and control groups. The difference between the post-test scores of the experimental and control group are seen to be significant in favor of the experimental group. Accordingly it can be said that the computer aided education (CAE) is effective in making 48-60 months children to gain the concept of "position in space". Results are discussed in line of other related researches.

Keywords: Computer aided concept education, preschool, position in space concepts.

1. Introduction

In the preschool period, concept development of children is quite fast. Ministry of National Education's education program aims to develop the basic concepts of color, geometric shape, dimension, amount, direction, number/counting, sense, emotion, opposite concepts and time in children (MEB, 2013). Concept development of children aged 3-6 is considered to be an important indicator of both their language and cognitive development. Concept development is also crucial for children to identify and make sense of the world.

According to Üstün and Akman (2003), concept is an inner process symbolizing common feature of objects and events. This symbolization is generally done with a word or a noun. Therefore, children begin to learn the concepts when their abilities to regulate the perceptual stimulus improve. Even though concepts can be both concrete and abstract, children's concept development develops from concrete to abstract. According to Hougland (2000), children aged 3-4 years are developmentally ready to discover computer; therefore educators can create computer corners as learning corner. In the preschool and primary school period, a library created by appropriate software programs must be set up and making use of it should be encouraged.

Edwards (2005) mentioned that computers increasingly take place as teaching tools in preschool classes. Nonetheless, making use of computer in the class is a choice of the teacher because his/her competen-

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cy in computer is one of the most influential factors in integration of computers to their preschool class. According to Arı and Bayhan (1999), first point related to computer aided education that should be paid attention by educators is "programs".

Computers are very useful in accessing to and transferring information. However it does not seem possible for computers to completely change the instructor-learner model which is implemented successfully to date. In other words, computerization is going to make accessing to and transferring information easier but for active use it cannot replace the instructors. Information society needs individuals who access to information easily, use this information in an effective way and produce information at the same time. Educating such individuals required by information society can be possible only if education environments guided by educators capable of using information and communication technologies are created (Büyükduman, 2002). Computer aided education is a teaching method in which students interact through using programmed teaching materials on computers, learn through computer programs and evaluate themselves by keeping track of their own learning (Senemoğlu, 2009).

Varol (1997) put forward that using computer for education purposes has many benefits. Some of these benefits for preschool period children can be stated as:

- Computers provide students opportunity for interaction.
- Computers help to maintain the quality standards in teaching through package programs.
- Computers provide flexible teaching for each student's individual learning needs. By doing so, they eliminate learning differences due to students' different needs, capacity and perception. Students can repeat computer programs as many as they want.
- Computers enable learning to be fast and permanent by using equipment (multimedia) such as sound, animation, color and drawing.
- Computers can be used as an educational environment.
- Computers enable their users to develop personal practices and teaching materials through appropriate software programs.
- Computers motivate students for the topic they study.
- Computers reinforce students' knowledge.

Individual differences among preschool children are quite diverse. Reducing the differences among development levels of children can be aimed by making use of software programs appropriate for children's age and their developmental characteristics in classrooms as part of computer aided education.

Nowadays, information technology is used by children actively in a controlled or uncontrolled way. Computed aided education is a good example of using these technologies in a controlled way. Use of software programs created for sophisticated development of children under guidance of educators in a classroom environment should be become prevalent as one of the efficient use of information technology. There are not computer corners as learning center in Turkish public preschools. Computer aided education in preschool classrooms does not take place in the last preschool educational program of the ministry (MEB, 2013). When previously mentioned benefits of using computer in preschool classrooms are taken into consideration, it is clear that it can be benefited from using computer aided education programs in preschool education institutions. In the present study, it was aimed to examine the effectiveness of the computer aided education (CAE) in making 48-60 months children who attend preschool education institutions to gain the concepts of position in space.

2. Method

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Population and Sampling: Sample of the research was chosen from the public schools of Ministry of National Education on the Anatolian side of Istanbul city. All children of three different preschool classrooms in two schools were included and 109 children participated to the research. The participants have an age mean of 4,94 years with standard deviation of 0.32. 56 of the children were in the control group and 53 of them were in the experimental group. There were 30 (56,6%) girls and 23 (43,4%) boys in the experimental group while there were 29 (51,8%) girls and 27 (48,2%) boys in the control group. All of the children were 5 years old. When looking at the education levels of the parents in the experimental group, it was found that 5,7% of mothers are primary school and 49,1% of mothers are middle school graduates, 5,7% of mothers high school degrees, 34,0% of mothers university degrees and 5,7% mothers have masters degrees. On the other hand, 43,4 of fathers are middle school, 17% of fathers have high school, 35,8% of fathers have university degrees and 3,8% of fathers have masters degrees. When looking at the education levels of the parents in the control group, it was found that 7,1% of mothers are primary school and 17,9% of mothers are middle school graduates, 5,4% of mothers high school degrees, 42,9% of mothers university degrees and 26,8% mothers have masters degrees. On the other hand, 7,1% of fathers are primary,25,0% of fathers are middle school, 23,6% of fathers have high school, 50% of fathers have university degrees and 14,3% of fathers have masters degrees. When looking at the number of children in the families in experimental group, it was found that 7 (5,2%) of children haven't any siblings, 17 (12,6%) of them have one, 10 (7,4%) of them have three, 1 (0,7%) of them have four siblings. And also when looking at the number of children in control group, it was found that that 23 (41,1%) of children haven't any siblings, 25 (44,6%) of them have one, 8 (14,3%) of them have three siblings. Every child in the experimental group has computer at home while only one child in the control group does not have computer at home and 55 (98,2%) of them have computer at their home. In the experimental group, 23 (43,4%) children have a computer in their rooms whereas 30 (56,6%) children do not have one in their rooms. In the control group, 53 (94,6%) children have a computer in their rooms while 3 (5,4%) children do not have one in their rooms.

3. Data collection tools

Boehm Test of Basic Concept (BOEHM-3, 2000): The test was developed by Ann. E. Boehm and Boehm-3, 2000 revised version was used in this study (Boehm, 2001). The test can be applied to all children from preschool to primary school second grade (60-96 months). It consists of small booklets which include 50 basic concepts and aims to assess children's level of qualitative, spatial, quantitative concepts related to their language and cognitive development. During the attempts to translate the test into Turkish, the validity of E Form was found to be .002 and test repetition and test accuracy was found to be .879 (ICC); moreover, Croncbach Alfa was calculated as .862 and Spearman–Brown accuracy was calculated as .829 (Uyanık Balat, 2003; Uyanık Balat & Artan, 2004). To assess children in this study, "position in space" part of the test was used.

Information Form: In this form, there were questions related to parents' level of education, family's income level, children's gender, age and number of siblings, having or not a computer at home and in children's rooms.

Computer Aided Education Program for Teaching the Concepts of Position in Space: Three different programs, which are included in the BOEHM-3 test (2000) and created for teaching position in space concepts necessary for writing and reading skills of children, were developed in the study. Different pictures in Adobe Flash program presenting 25 different concepts were used. The program gives children chance to repeat as much as they want and give feedback with appropriate voice over. As part of their Community Service course, students whose names were provided below contributed to the present study by helping to develop the program, conducting pre-implementation to evaluate the program with children and implementing the program to children individually in the schools. The concepts aimed to be taught in the program are: top, middle, side, end, top right, corner, last, far, above, separated, sequential, next to, under, in front of, furthest, similar, over, back, top left, between, bottom, jump, forward, backward…

Data Collection Procedure: Implementation of the study took eight weeks. At the first week, the educators met with children and the first implementation was conducted by using BOEHM-3 test's parts related

to relevant concepts. In addition, the laptop mouse that will be used in the implementation was introduced to children and was provided to the children for their free use. All program implementations were conducted individually and children spent an average of 5-7 minutes in the program. Educators asked children the question related to the concept on the screen and wanted them to identify it. Children tried to find the correct concept by clicking the mouse and encouraged with voice and video responses of the computer such as "well done, very good, would you like to try again?". Examples are provided below. Three different programs were implemented throughout six weeks in which the first week's program was repeated at the fourth week, the second week's program was repeated at the fifth week and the third week's program was repeated at the sixth week. Post-test related to relevant concepts was implemented to the children at the last week.

4. Results

Findings related to the effectiveness of the computer aided education (CAE) in making 48-60 months children who attend preschool education institutions to gain the concept of "position in space" are represented in Table 1 to Table 4.

Table 1. Pre-test results related to comparisons of experimental and control groups' scores of position in space concept (BOEHM-3)

Group	X	N	S	t	sd	p
Experimental	,6875	53	,18828	-1,257	105,789	,212
Control	,7312	56	,17530			

As seen in Table 1, there is not a significant difference between the pre-test scores of children in the experimental group and those in the control group (t(105,789)=-1,257; p>0,05). Therefore, it can be stated that the experimental and control groups were equivalent in terms of their mean scores in concept of position in space before the study.

The mean scores of the position in space concept were calculated for children in both control and experimental groups. The comparisons between two groups' pre-test and post-test scores were calculated by using dependent t-test; the comparisons of two groups' post-tests scores were calculated by using independent t-test. Both results are presented in the tables below.

Pre-test and post-test mean scores of children in the control group were compared with dependent t-test and the results are represented in Table 2.

Table 2. T-test results related to comparison of pre-test and post-test scores of children in the control group for position in space concept (BOEHM-3)

Control	X	N	S	T	Sd	p
Pre-test	,7286	56	,17572	-8,725	55	,000
Post-test	,9550	56	,07076			

As seen in Table 2, there is a significant difference between the pre-test and post-test scores of children in the control group (t(55)=-8,725; p<0,01). This difference is in favor of post-test scores.

Due to the fact that the control group experienced a teaching process, an increase in the scores for the concepts of position in the favor of the post-test was expected.

Mean scores of the pre-test and post-test of children in the experimental group were compared with dependent t-test and the results are represented in Table 3.

Table 3. T-test results of comparisons between pre-test and post-test scores of the experimental group for the concept of position in space (BOEHM-3)

Experimental	X	N	S	T	Sd	p

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Pre-test	,6875	53	,18828	-12,217	52	,000
Post-test	,9879	53	,02429			

As seen in Table 3, a significant difference is observed between the pre-test and post-test scores of children in the experimental group (t(52)=-12,217; p<0,01). This difference is in favor of post-test scores. As in the control group, due to the fact that experimental group also experienced a teaching process but with computers, an increase in success and a significant difference in favor of post-test scores was expected.

Mean scores of the post-test of children in the experimental and control group were compared with independent t-test and the results are represented in Table 4.

Table 4 . T-test results of the comparisons between post-test scores of experimental and control groups for concept of position in space (BOEHM-3)

Group	X	N	S	T	Sd	p
Experimental	,9879	53	,02429	3,153	108	,002
Control	,9558	56	,07038			

As seen in Table 4, a significant difference is observed between the post-test scores of children in the experimental group and those in the control group (t(108)=3,153; p<0,01). Increase in the scores in favor of both experimental and control group is observed in the pre-test/post-test comparisons within the groups. This increase was expected due to the fact that both groups experienced a teaching process. Since determining effect of intervention to the experimental group is considered to be the main purpose of the study, independent t-test comparison results between groups have more importance. These results indicate an increase in favor of experimental group when mean scores of both groups after training were compared. In other words, computer aided education implemented to the experimental group enabled children to learn concepts of position in the space more successfully.

5. Discussion and suggestions

The present study aimed to examine the effectiveness of the computer aided education (CAE) in helping 48-60 month old preschooler gain the concept of "position in space". A pretest posttest control group design was used in the study. The study revealed significant differences between the pre-test and post-test scores for both experimental and control groups. An expected significant difference was found in the scores of concept of position in space for the control group who did not receive computer aided education of concepts but education of concepts of position in space. The post-test scores of the experimental and control group were significantly different with experimental group having higher scores. Accordingly it can be said that the computer aided education program for position in space is the indicator of the effect in children's concept development. Similarly, Aral and Bütün-Ayhan also examined the effectiveness of computer aided education on six year old children's concept development by using the programs available on the market. They found meaningful differences in children's concept of "position in space". Kaçar and Doğan (2007) compared general education and computer aided education methods in terms of their effects on the development of the concepts of numbers and shapes with six-year-old children and they found out that children who had computer aided education were more successful in concept development. Moreover, data gathered from the families of children in the study revealed that families whose children participated in the research supported that computer aided education in preschool period is useful for their children.

In addition to increasing children's successes, computer aided education helps higher level thinking skills which in turn enables them to learn by comprehending instead of memorizing (Renshaw & Taylor, 2000). Clements (2002) claims that the interaction of children with computer in early ages develop their critical thinking abilities, problem solving and decision making skills. In his research comparing the effectiveness of traditional and computer aided education in teaching children aged 3-4 the concept of color, Demir (2007) found out that children who had computer aided education were more successful in developing the concept of color.

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In conclusion, findings of the present study demonstrate that computer aided education can be utilized in the preschool education programs. Educators can be encouraged to utilize computer aided education based on children's age and development levels. Moreover, preschool practitioners should improve themselves in computer aided education and they should be able to maximize their use of education technologies.

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The Examples From The " The Concept Of Position In Space" Computer Aided Programme

"Find shoes under the chair?"

Find the caterpillar on the leaf?

Find the duck in the middle of the lake?

Find the ant behind the vase?

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The effect of computer games on speed, attention and consistency of learning mathematics among students

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Abstract

This study examined the effect of computer games on increasing speed, attention and consistency of students in learning mathematics. The population of the study comprised of all first year male students of public schools of district one of Urmia City in the academic year of 2012-2013. Using multi-stage cluster sampling, at the result, one class was selected randomly to form the experimental group and other class as the control group. Toulouse – Pieron. (1986) attention test and a test of speed, endurance and mathematics achievement tests was used to assess research variables. The results indicated that computer games had a significant effect on increasing the speed and attention of the experimental group in mathematical calculations compared to the control group; however, the effect of computer games on math learning and stability of math learning was not significant. Results suggest that computer games can be used as training aid alongside teacher training.

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1. Introduction

Today, advances in science and technology influence our life style to a great extent. They have imposed numerous changes in all aspects of life. In the field of education, clearly a new generation of technological tools has been designed to transform the traditional methods of education and help students improve their learning. Most modern classrooms have computers giving an opportunity for teachers and professors who take advantage of ICT to enhance teaching and learning. The idea of using computers in education dates back to the late 1960s. Since then a number of different theories on the use of technology in learning environments have been proposed, and it has been attempted to use computer as a tool for educational and training purposes (long, 2007).

Computer games have become one of the most important entertainment tools for children, teenagers and even adults all around the globe. Allowing access to the virtual world with unlimited possibilities, computer games compulsively attract many people. In fact, they have become an integral part of human society. In other words, by providing virtual fun and entertaining environments (Demirbileka & lema Tamer, 2010), and having characteristics such as being interesting and exciting, computer games stimulate motivation and create a sense of enjoyment of learning. They not only have become one of the most significant recreations for all age groups, but also they have potentials to be used for educational purposes as a new strategy (Prensky, 2003; Tuzaun & et al., 2009; Grimley & et al., 2011, among many others). Therefore, video games can no longer be seen as mere entertainment tools. Today the positive effects of video games are emphasized more than ever. As Games have become a tool to communicate, teach, and influence attitudes and behavior, numerous studies have suggested that they have positive effects on problem

solving, achievement as well as creating interest and commitment in learning (Tuzaun & et al., 2009; Kim, Park, & baek, 2009). Therefore, it can be assumed that computer games are useful for learning purposes. Although researchers have found little evidence which supports this proposition, and some insist that video games are ineffective for learning purposes (Kreijns, Kirschner, & Jochems, 2003) and some other highlight the negative effects of exposure to the media, especially television, such as reduced cognitive performance in children and adolescents (Miller et al., 2007), but what is certain is that the beneficial effects of video games in learning cannot be simply denied; Despite the fact that designing and studying educational games is a multi-faceted process, there is a general agreement among teachers and educators on the effectiveness and usefulness of computer games in learning environments (Rastgar Pour, & Marashi, 2012).

Mathematics is an important subject in school education. The complexity of the act of thinking and learning as well as the relatively difficult and abstract nature of mathematics (Lowire, & Jorgensen, 2011) makes learning this subject more challenging in comparison to theoretical and empirical sciences. Researchers consider overreliance on traditional practices, absence of modern methods of teaching (Sadiq, 2007) lack of equipment and training aids, low cognitive stamina, and affective factors as the main reasons for academic failure and lack of motivation among students (Natasha et al., 2010). One of the best ways to generate interest and motivation among students is using computer games to improve the skills required for learning a subject. Computer games simulate similar-to-real-life situations and induce thinking and problem-solving, and through internal processes, help the learner successfully engage discovery in a new situation. Therefore, success in completing a task generates interest and inclination toward the subject (Kebritchi, 2010).Thus, the most effective way to help the development of these elements is designing situations that compel students to think and solve problems and as a result increase the attention and speed of learning. In this regard, Abrams. (2008) emphasizes that computer games are one of the most powerful motivational tools and an aid for learning mathematics. Similarly, Ke. (2008) argues that video games motivate students to learn math more effectively than pencil and paper methods. Therefore, we can say that educational computer games are a new method to create a suitable environment for active learning since not only will the students be able to learn materials with enjoyment and without fatigue, but also they will be able to understand abstract concepts well in an electronic environment (Çankaya & Karamete, 2009). Çankaya and Karamete. (2009) studied the effect of educational computer games on students' attitudes towards mathematics, and reported a positive attitude as the achievement of the study. Demirbileka and Tamer. (2010) aiming at developing a theoretical framework on the use of educational computer games in mathematics teaching, conducted a qualitative study and investigated the views of thirteen math teachers in Turkey and came to the conclusion that computer games have a significant positive effect on students' academic success. Grimley & et al. (2011) also studied the effect of video games on learning performance compared to the method of presentation, and concluded that students who have been trained in the use of computer games, experience increased emotional intelligence and higher alertness, are more active, have more participation, and develop a sense of competitiveness.

However, some researchers have pointed to the negative effects of computer games (Kronenberger et al., 2005; Miller et al., 2007, among many others). Kronenberger et al. (2005) for example, consider computer games as addictive and contributive to disorders such as attention deficit which undermines cognitive functions in children and adolescents and their solving skills. Considering that a review of the literature of the effect of computer games on mathematics learning brings to light contradicting and polar results, and considering the significance of learning mathematics as an academic subject, the present research intends to use the computer game "Ocean Express" to study the effect of computer games on speed, accuracy, and persistence in learning mathematics among secondary school children.

1.2. Research hypothesizes

1. Video games have positive effect on increasing the attention of math students.
2. Video games have positive effect on increasing the speed of math students.
3. Video games have positive effect on increasing the learning ability of math students.
4. Video games have positive effect on increasing the learning consistency of math students.

2. Methodology

2.1. Research design

This study has pre-test – post-test quasi-experimental with control group design, sample consisted of all first year male students of public schools of Urmia City in the academic year of 2012-2013. Using the multistage cluster sampling method, four schools and out of which two classes were randomly selected, one class was selected randomly to form the experimental group and other class as the control group. First, both the experiment group and the control group were pre-tested. After an initial instruction on «Ocean Express», the experiment group played the game for ten 45-minute sessions. Meanwhile, the control group took part in regular traditional math classes after the designated period, both groups were post-tested. The intervention took place twice a week for an overall of five weeks. Then, after another three weeks, the subjects were tested for learning consistency.

2.2. Measurement instruments

Toulouse-Pieron Attention Test: The Toulouse-Pieron Test (1986), quoted by Iravani, (2008), was used to measure the attention the reliability and validity of the test proved satisfactory based on the Pieron Study.

Learning Test: The researchers designed the learning test using the entire content of the first-grade math book in accordance with Table D (Content - Target). The test comprised of 50 multiple-choice questions, and the participants had 60 minutes to answer them. Each question had 2 scores, and no negative score was considered for wrong answers. The validity of the test was evaluated based on its correlation with academic performance index scores ($r = 0.81$, $p < 0.01$), and the significance confirmed the validity of the test.

Learning Speed Test: To calculate the speed of learning, the response time of each student was recorded separately (in minutes) using a stopwatch. The learning speed of each individual student was then calculated based on the time of providing correct answer to each question. To assess the validity of this test, the rate of learning speed in a different school was first evaluated. The results in the present study were also evaluated by experienced mathematics teachers, and its criterion validity was calculated to be 0.73.

Learning Stability Test: The test was aligned with the math learning test whose validity and stability had been established, and was held three weeks later than the post-test. The validity of the test was assessed based on its correlation with academic performance index scores ($r = 0/79$, $p < 0.01$), and the results confirmed its validity and reliability.

Raven's Progressive Matrices Test: Raven's Progressive Matrices test for 9-18 year-old students was used to measure the participants' IQ. The convergence of the reliability and validity of the Raven's Progressive Matrices in Iran (Rahmani, 2007) with the WISC-R total score has been reported to be standing at 0.73. Also its test-retest reliability has been reported to be 0.91.

3. Results

The Analysis of Covariance (ANCOVA) was used to compare the effects of computer games in increasing attention, speed and consistency of learning mathematics in the experimental and controls groups. The

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result of the Levine's test for homogeneity of variance in attention, speed and consistency of math learning was (F = 1.08, p = 0.30), (F = 2.28, p = 0. 26), (F = 0.25, p = 0.62) and (F = 0.95, p = 0.31) respectively. Thus non-significant results indicated that variance of control and experimental groups were homogeneous. In addition, the result of the homogeneity of regression slope test for speed and attention in mathematical calculations was (F = 0.003, p = 0.95) and (F = 0.20 p = 0.66), respectively and for the learning components of mathematics and stability were (F = 0.53 p = 0.47)) and (F = 1.59, p = 0.21), respectively. Non-significant results indicate that there is no interaction between covariant variables and experimental manipulation. Table 1 indicates the ANCOVA results.

Table 1: Tests of Between-Subjects Effects

Variable	Group	Mean	S.D	*F*	*d.f*	*p*	Eta squared
Attention	experiment	51.28	9.34	210.83	1,47	0.001	0.82
	control	43.80	8.70				
speed	experiment	45.04	9.34	15.26	1,47	0.001	0.24
	control	36.12	8.70				
Learning	experiment	48.92	13.35	1.17	1,47	0.28	0.02
	control	52.84	12.91				
Stability	experiment	67.92	19.90	2.15	1,47	0.15	0.04
	control	57.56	23.11				

According to Table 1, the mean scores of experimental group in attention were more than that of the control group. F-test results shows that the difference is significant (F = 210.83, p = 0.001). Experimental intervention significantly increased the attention of the students. In addition, group membership explains 82 percent of the variance. According to Table 1, the average of the experimental group in speed was more than that of the control group. F-test results shows that the difference is significant, (F = 15.26, p = 0.001). Experimental intervention explains 24 percent of score variations in the math leaning speed post-test. This indicates that computer games have a significant effect on accelerated math calculations in the experimental groups. ANCOVA results in Table 1 also shows that experimental intervention had no significant effect on math learning (F = 1.17, p = 0.28) and learning stability (F = 2.15, p = 0.15). This indicates that computer games have no significant effect on increasing math learning and learning stability.

4. Discussion & Conclusions

Base on the role of computer games in increasing the speed and attention of mathematics learning, it can be proposed that students are naturally oriented toward computer games because computer games are enjoyable (Demirbileka, & lema Tamer, 2010). With characteristics such as being interesting, exciting and emotionally stimulating, and considering the joy of learning concepts in video games (Prensky, 2003; Tuzun et al., 2009; Grimley et al., 2011, among many others), computer games can be quite effective in increasing the level of motivation and emotional stimulation of students (Prensky, 2003). This relationship can be expressed using Hebb's (1995) arousal theory. In his theory, Hebb's (1995) explains the relation between the level of arousal and cognitive functioning. Emotional behavior is implicitly associated with accelerated performance in line with the emotional excitability (Hebb, 1995). It can be proposed that through increasing the level of motivation and excitability (Prensky, 2003; Tuzun et al., 2009), computer games excite students cognitively activating their RAS. Considering that RAS is responsible for the brain's arousal in response to external stimuli (Reeve, 2009), it increases the student's awareness and interest in

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solving mathematical problems. However, some studies (Grimley et al., 2011), have reported no effect of computer games on mathematics learning. The findings of the present study regarding the effect of computer games on mathematics learning and stability of mathematics learning is consistent with these researches as well.

According to Grimley et al. (2011) this lack of effect is because of: (1) the complexity of computer games which may prevent the student from having a clear understanding of the objectives and content, (2) irrelevant parts of a computer game which may unnecessarily prolong the time of learning, (3) the game may not be interesting for all student to the same degree; thus motivation may decrease and the learning may fail. Some researchers also believe that there is no clear causal relationship between mathematics achievement of students and using computer games (Shafie, Wan, & Wan, 2010). These studies divide this lack of relationship into two categories of instrumental and cognitive. Among the instrumental factors, mismatch between a computer game and the goal of learning, generality of the content of the game, the teacher's limited familiarity with the method of learning through computer games compared to traditional methods, and temporal limitations in familiarizing students with the games have been mentioned. Regarding cognitive factors, these studies suggest that cultural differences between students' cognitive structures and game's characters and consequently the inability of students to adapt their cognitive structures to the games' content and characters leads to their lack of understanding of the game's concept. In this regard, some studies (Kronenberger et al., 2005; Miller et al., 2007), discuss the negative effects of exposure to the media, especially TV, on cognitive performance especially in children and adolescents. Kronenberger et al. (2005), for example, proposes that exposure to the media and computer games lead to violence and cognitive disorders. Also, Christakis et al. (2004) says that computer games bring addiction because of the plasticity of brain neurons, leading to attention deficit disorder (ADHD) in children and adolescents.

Limitation of the study sample to first grade secondary school students prevents extension of the results onto students of other grades and schools. Also, lack of complete control of nuisance variables including the students' previous experience with computer games may reduce the internal validity of the study. However, regarding the established effect of computer games on enhanced speed and attention in mathematics learning, teachers and instructors are advised to use computer games along with educational classes and traditional methods. Considering the different performance of the right and left hemispheres and the different mathematical abilities in male and female students, the moderating effect of gender merits further research.

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The effect of using English story books in English courses by adapting them to different activities on the foreign language success of the students

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Abstract

This research is realized as an experimental study on fifth grade students and related to present the effect of using English story books in English language education success of the students. The research has been realized in Controlled Last Test Model which has been a model of control group that takes place in experimental studies. The working group is formed of first grade students of Turgut Reis Secondary school which is located at Sultanbeyli Province of İstanbul. The data taken from experiment and control groups have been transferred to SPSS and the analysis of the data has been made by using t-test in order to compare the average of the groups. It has been determined that using English story books in English courses by adapting them to different activities increased the success when compared with traditional methods and techniques according to the findings..

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Keywords: English story books, foreign language success, English teaching, foreign language teaching

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1. Introduction

As it can be understood from the definition of education as formation of a requested and intentional change in the lives of the individuals (Ertürk, 1982), education has a dynamic structure because of human being's taking place as a social entity at the basis of it. The dynamic structure of education has been formed of needs and expectations which can be differentiated according to the periods. Effecting of the human being as a source of the developments in science and technology has been inevitable with the effect of these needs and expectations. The learning wish provided firstly meeting the human beings' with books and written sources then audial and visual materials by the development of educational technology.

The educational developments which appeared as a reflection of scientific and technological developments brought many innovations in foreign language education, the richness of the content in foreign language education simplified the adaptation of the developments which have been lived in education to language education. As a result of this, the teachers can use different technics and materials which are being developed every day and can find effective methods to establish meaningful learning on their students Different learning methods are put forward with the researches by taking the individualistic differences into account. In these studies, learning strategies of the students and learning styles have been tried to be determined (Demirel, Başbay and Erdem, 2006: 51). The findings of these researches which have been valid in foreign language education make the student the focus point of education. "Multiple

Intelligence Theory" as a basis of the studies which have been made on this field also defends the same reality. According to this theory, intelligence is not one dimensioned, on the contrary it is multiple dimensioned (Sönmez, 2012). Every child has a potential for the development in one field or more than one field (Gardner, 1993). The teachers, as a result of difference between the individuals, face with students who have different kinds of intelligence in foreign language classrooms. Every student has a field in which he can be better, this situation can be determined by observing their classroom performance. Whereas some students are observed that they are good at on verbal fields such as poetry and composition, some of them have the ability on music and arts. In case of teachers' making their plans according to these learning differences, meaningful learning can be provided for students and also the quality of education can be increased. Providing permanent learning can only realize by selecting relevant techniques and contents to learning levels, learning styles and strategies and intelligence types of the students.

As learning-teaching preparation process belongs to the teachers in the frame of published curriculum, foreign language teachers should provide relevant learning environments for the students by taking their readiness level, wishes and expectations. The teachers should be careful about the differences between the students and individualize the teaching and evaluation (Demirel, 2007). They should adapt different techniques, resources and materials which will provide permanent learning by taking the students' needs analysis and intelligence types instead of using traditional techniques and materials in their classrooms. Songs, games and stories from different sources which have been prepared with this idea are being used in foreign language education and their positive effect on education is being observed. Games and songs in these resources provide younger students to exhibit a positive attitude towards foreign languages by transforming the learning environment to an entertaining situation for the students, these are entertaining activities which have been effective to take attention of the students and provide their contribution to the course (Ara, 2009). The story books which simplify understanding of the foreign language and state themselves for the students are being used in the classroom for a long time. The stories are educational materials which provide effective learning with their reality, recognition and entertainment (Rossiter, 2002). The stories provide the development of conscious, communication and culture by adapting them to courses in addition to providing effective learning (Georgiou and Verdugo, 2011). The teachers who use stories in their courses can organize teaching aims, concepts or ideas around a story (Saban, 2005: 106). The placement of the stories in foreign language courses in this way provide them be equipped learners by providing them thinking (Erkaya, 2005).

The stories also effect foreign language success by providing contribution to understanding skills (Haven and Ducey, 2007: 38). The stories which address to the students with dominant verbal intelligence can also establish meaningful learning environments for the students with visual, audial and kinesthetic intelligence by the way of adapted different techniques and activities .For example; whereas the stories are being used as a material to develop reading and understanding skills at the basis , they can be transformed to a speaking text which will develop listening skill , a source which will develop his creative writing skill and drama activities which will provide the students physical participation with planning. The students enter an effective learning environment by providing individualistic and participant interaction with storytelling activities (Aiex, 1988). So, their monotonous learning lives will become environments which reply to the interest, request and skills of the students. This will provide every student to find an activity relevant for himself in a part of the course and active participation in the course and these will all bring success together.

1.1 The aim of the research

The aim of this research is to present the effect of story books in foreign language education on the success of students in English courses.

1.2 The importance of the research

When the success ranking of our country is examined in international foreign language exams, it is seen that there are many factors underlying the failure of the students, the most important factor in failure is that the students do not have any interest and wish about the course. When the learning environments,

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which have been planned without taking interest, need and wish into account, are associated with prejudices which can be formed against learning a different language, the expected success cannot be realized. The effect of story books which will be used with different technics in foreign language education will be determined with this study. It is important in the context of presenting the direct effect of story books on foreign language education.

1.3. Limitations

This research is limited with secondary school 1st grade students who are being educated in Turkey in 2013-2014 educational period.

2. Method

2.1. Research model

Research model of experiment and control group taking place in experimental methods of quantitative research methods has been used in this research in which the effect of story books on the success of secondary school students. To determine the difference between experimental group and control group, whereas story books have been used in courses in experimental group, classical teaching method has been used in control group.

2.2. Working group

The working group is established from 1st grade of secondary grade students in Turkey, İstanbul Sultanbeyli Prvince , Turgut Reis Secondary School which has been determined by aimed sampling method. Two groups have been preferred in which English course time has been longer and communication could be provided easily with the aim of providing sustainability in the research. 48 students who take place in the research are from experiment group, 48 of them are from control group. 21 students from the experiment group are girls , 27 of them boys, 22 students from the control group are girls , 26 of them boys. All students in the groups started to learn English in 4th grade. Because of this reason, there is not a difference between experiment and control groups in the frame of English learning past .Also a pre-test has been applied with the aim of providing validity after the groups had been determined. The data related to the test results has been given in Table 1. There is not a meaningful difference between the averages of the every two group.

Table 1. T-test results related to the scores of experiment and control groups before the application

Time	Groups	$\overline{X}$	N	sd.	t	p
Pre- application	Experiment group	52,7	48	23,9	0,544	0,589
	Control group	50,15	48	24,5		

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T-test results of success test are seen in Table 1 before starting with two groups. According to this table, as "t=0,544"and "p=0,589" values have been taken, there is not a meaningful difference between the knowledge or success situation of two groups at "p<0,05 meaningful level. In other words, the data related to pre-application test shows that there is not a difference between the success levels of experiment and control groups.

2.3 Data collection instruments and data collection

Two test instruments as pretest and last test as data collection instrument have been used in the research. The items requiring twinning and short answers have been preferred instead of multiple choice answers in these tests which have been developed for measuring skills at "comprehension" level. The questions which have been asked at the level of knowledge and comprehension in two tests are the questions related to measuring the acquisitions in 1st grade of secondary school English curriculum in Turkey. At the same time, the results of two pilot tests which include multiple choice questions and have been applied by a private publishing house have been evaluated with the aim of determining the effect of story books at central plot exams on success. The exam data of November exam which has been realized three times in some cities in Turkey generally in a significant period and other exam data has been taken together for one student and statistical procedures have been applied by using these averages. Also at the end of April 2014, the tests under the name of "last test" which has been applied to two groups have been applied again with the name of permanence test.

The study started on November 12, 2013; it ended on December 23, 2013 by making 12 course hours of application in total, 2 hours in elective English courses in every week. While going on studies in experiment group, education went on relevant to the yearly curriculum in elective English courses in control group.

2.4. Analysis of the data

The data which have been taken at the end of the application has been transferred to SPSS 15 statistical program. "Last test" results have been benefited with the aim of determining the difference levels between experiment and control group. Last tests which have been applied after the study in the groups have been analyzed by using t-test (Paired Sample Test). Also, after a permanence test has been applied in April 2014, "t-test" statistical analysis procedure has been realized for the twinning groups while comparing last test averages of every group with permanence test averages.

3. Findings

The effect of story books on the student success which have been adapted to different activities in foreign language courses (English) in the research is being tested. According to the last test results which have been realized in the research in Table 2, "t-test " results of the twinning groups and some descriptive statistics take place.

Table.2. "T-test" results of experiment and control groups after the application

Time	Groups	$\overline{X}$	N	sd.	t	p

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After the application	Experimental group	70,83	48	19,44	2,33	0,024
	Control group	60,04	48	21,90		

p<0,05

According to the results of t-test which have been realized between experiment and control groups determining effect of English story books on student success, "t=2,33 and p=0,024" values have been taken. As these values provide the condition of being below "p<0,05" meaningful level, it shows that there is a meaningful difference between the last test results of experiment and control group. In this situation, when the averages of every two groups have been examined, it is observed that the average of experiment group has been "70, 83", the average of control group has been "60, 04". According to these values, the success average of the students in experiment group is 10, 79 points higher than the students in control group. In other words, English story books which took place by adapting to different activities in English courses increase the success of students in English.

Table. 3. Last test and Permanence test "t-test" results of the groups

Groups	Tests	$\overline{X}$	N	sd.	t	p
Experimental group	Last test	70,83	48	19,44	6,55	0,000
	Permanence test	65,33	48	19,96		
Control group	Last test	60,04	48	21,90	3,65	0,001
	Permanence test	51,08	48	21,87		

p<0,05

When "t-test" results which have been realized between last tests and permanence tests of experiment and control groups in Table 3 have been examined, there is a meaningful difference between the average of last test and permanence test of experiment group (t=6,55 and p=0,000). Whereas last test average of experiment group is "70,83" its permanence test average has been "65,33". When the results of "t-test" of control group is examined, as "t=3,65 and p=0,001" has been , it has been determined that there is a meaningful difference between the averages at that point. Also, it can be seen from the table that last test average of control group has been "60,04" and permanence test average has been "51,08" .According to these findings, it cannot be told that English teaching with story books by adapting them to different activities increases the permanence of the knowledge learned much. But, when the average of two groups have been examined, there is a "5,50" points difference between the last test and permanence test of experiment group , "8,96" points difference between the last test and permanence test of control group. According to the findings taken, it can be told that forgetting rate of experiment group is less than the control group.

4. Discussion, result and proposals

4.1 Discussion

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The story books and activities contribute to the foreign language education by increasing foreign language success of the students according to this experimental research findings in which the effects of activities which have been adapted from English story books on English course success have been examined. The studies made on foreign language education in or out of the country have the qualification that the findings of this research on English course success is supported. Rossiter (2002) asserted that the stories have been educational materials providing effective learning with their remembrance, realism and joy aspects. The observed students during the research lived different learning lives by the way of stories and adapted activities and these differences motivated them to the courses. As a result, success in foreing language of the students has been observed. Haven and Ducey (2007) and also Aiex (1988) reached the same findings which support Rossiter's (2002) ideas. Whereas Haven and Ducey (2007) think that the stories effect success by contributing foreign language skills of the students directly; Aiex (1988) defended that the students had effective learning lives by entering individualistic and participative interaction with story activities . Morrow (1985) examined the effect of explaining story on understanding the read document in his study, according to his findings he stated that explaining a story is an active process which provides analyzing the events, verbal language development and helps the students understand what they listen. Saban (2005) stated in the research he made that the stories can be used in organizing the teaching aims, concepts and ideas and this will decrease the workload of teacher and the student.

Georgiou and Verdugo (2011) and also Erkaya (2005) took the stories in a different concept in their studies and they tried to demonstrate that the stories not only effected foreign language success but also the life of the student as a whole. Whereas Erkaya (2005) states that the stories provide the students to be equipped learners by making them think with the integration of story books to foreign language courses, Georgiou and Verdugo (2011) states that the stories provide the students to be equipped by making the students think and also providing effective learning by adapting the stories into courses.

The students on foreign language education field showed that usage of English story books and adapted activities effectively in foreign language courses helped learning the foreign language actively. In this research, the students on whom foreign language education has been realized with the help of English story books and activities adapted from the books have been more successful than the students who have been taught with traditional methods and techniques.

4.2. Proposals

If the teachers want to increase their English success, they should give place to English stories and activities related to these stories in their courses. The teachers can use the activities such as reading stories, listening the recorded stories, video watching actively in their courses to use the stories in the development of reading, listening, writing and speaking skills which have been four basic factors in the development of foreign language.

The teachers can present the required structures and words in a context as a force of the subject by adding short stories in the activities in English course books.

English teachers can present alternatives to their students by establishing an English story library in their classrooms. So, they can make the students gain habit of reading English story books.

Proposals to the researchers

1. The relationship between the usage of story books and developing four basic skills in foreign language courses can be searched for.
2. The contribution of storytelling can be examined on the student's understanding and concept development.

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The effectiveness of an interactive multimedia courseware with cooperative mastery approach in enhancing higher order thinking skills in learning cellular respiration

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Abstract

The main objective of this study is to integrate mastery and cooperative learning approaches together with an interactive multimedia to enhance students' high order thinking skills in the learning of Cellular Respiration. A multimedia interactive courseware was developed and applied in three different strategies, namely the Multimedia-assisted Mastery Learning (MML), Multimedia-assisted Cooperative Learning (MCL) and Multimedia-assisted Cooperative Mastery Learning (MCML). The MML used a self-learning approach while MCL and MCML involve learning in groups. This study involved a quasi-experimental design whereby the domain scores of analysing, evaluating and synthesizing were the three dependent variables. The independent variable was the interactive multimedia courseware with the three approaches. Eighty-four, 88 and 90 pre-university students went through the MML, MCL, and MCML respectively. The MANCOVA was applied to analyse the performance scores of each of the three higher order thinking skills based on the three approaches with the implemented courseware. The result revealed that the MML and MCML students performed significantly better in the creating domain score compared to MCL. Overall, the findings of this study suggest that the multimedia interactive courseware with the combination of mastery and cooperative learning approaches brings a positive effect in the learning of Cellular Respiration.

Keywords: multimedia learning, learning biology, multimedia-assisted learning, mastery learning, cooperative learning

1. Introduction

Biology education involves studying living organisms and how they interact with each other and their physical environment. Rice (2013) reported that biology was an abstract area which existed in unorganized structures and, therefore, it often results in students' learning difficulties. Complex processes and the use of technical terms made it difficult to learn some topics such as cellular respiration (Patro, 2008; Rice, 2013). This subject contains many abstract concepts that are difficult to understand. As such students must be able to conceptualise and construct abstract concepts in biology in order to understand and make sense of them. Many students' demonstrate common misconceptions concerning biology, including their understanding of topics such as cellular respiration, photosynthesis, ecology, genetic, classification and the human circulatory system (Tekkaya, 2002). Furthermore complex processes and the use of technical terms such as in the topic of cellular respiration, make them difficult to learn (Patro, 2008). Hence, it is important to design a high quality instructional system to enhance the teaching and learning of difficult and abstract topics as part of the subject of biology.

Cooperative learning and mastery learning are two of the most used learning strategies which focus on different aspects of the teaching and learning processes. Since both strategies require the assessment of student learning to be criterion referenced, learning becomes non-competitive. Both strategies emphasize the teacher's role as a facilitator by working with students closely to accomplish students' learning goals. At the same time, these strategies are flexible in their applications. One the other hand, cooperative learning and mastery learning have been found to yield positive results in many studies (Grant, Fazarro, &

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Steinke, 2014; Guskey, 1997; Kulik, Kulik & Bangert-Drowns, 1990). Although each has its own characteristics, the aim of this study is to incorporate these two strategies to produce and enhance an effective learning environment. As suggested by Guskey (1990), the sum of its part (mastery learning and cooperative learning) creates a greater whole (cooperative mastery learning). Hence in this study, the researcher tries to embed the three learning strategies in a multimedia interactive courseware and seek the effectiveness in the learning of cellular respiration (Fig. 1).

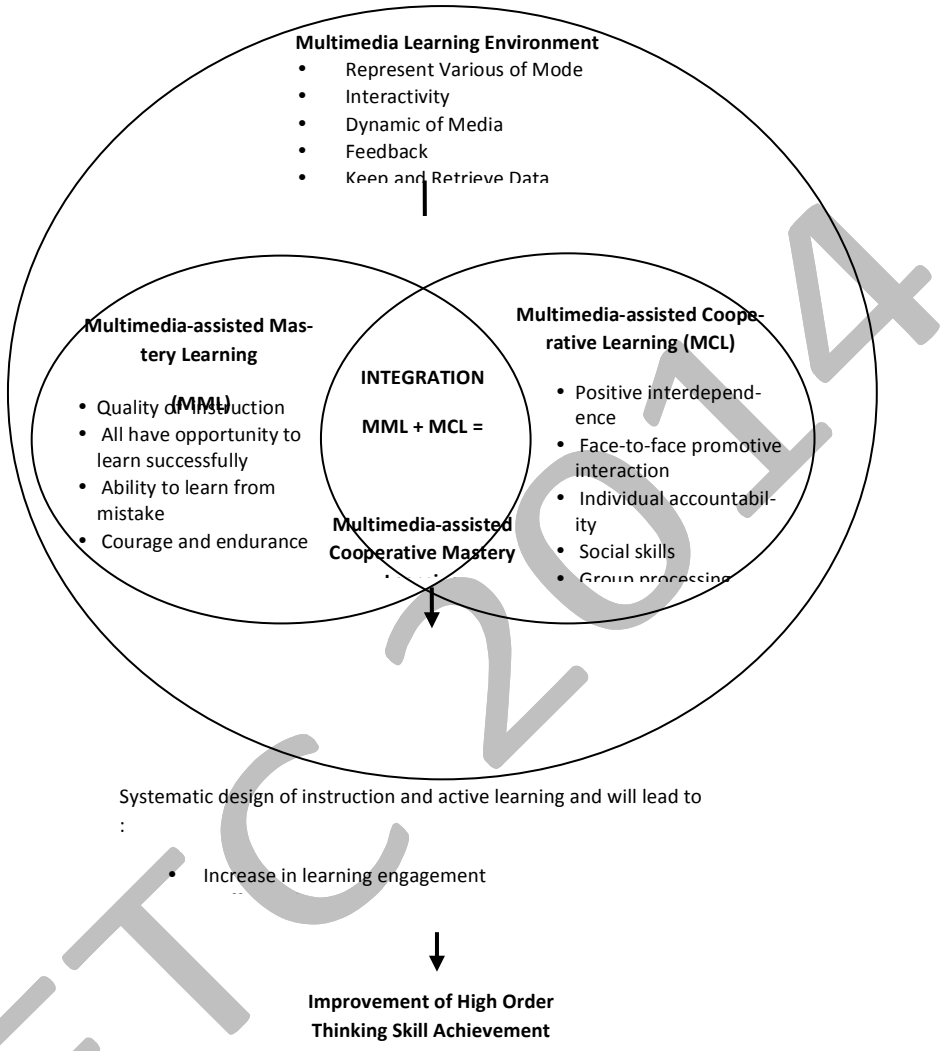


Fig. 1. The Features of the MML, MCL and MCML Approaches in Multimedia Learning Environment

The cooperative structures could meet various needs of students by positive interdependence, positive interaction, accountability, social skills and group processing through three main processes. First, they gathered students in teams in where interpersonal interaction and cooperation were rewarded. Second, they provided the teacher with opportunities to concentrate on diversity in composing teams. Lastly, they allowed students from diverse backgrounds to contribute in a unique and individual way. In team activities, students are fully engaged to help each other by clarifying misunderstandings and correcting learning errors to achieve criterion-referenced standard. More importantly, students should be presented with the well-designed mastery learning instruction within a cooperative learning situation (Guskey, 1990; Zimmerman & DiBenedetto, 2008). Therefore, cooperative learning will be well coupled with mastery learning in where students in cooperative learning groups are guided through well-designed instruction.

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2. Research objectives

This research is mainly intended to integrate mastery and cooperative learning approaches in an interactive multimedia learning environment. The innovation used aimed to improve students' biology achievement score for high order thinking skills in Revised Bloom's Taxonomy, specifically on the topic of cellular respiration. The combination of all elements in mastery and cooperative learning within the interactive multimedia environment would offer a comprehensive learning experience needed for an effective and efficient teaching and learning of biology concepts. In this study an interactive multimedia courseware was systematically designed in three different approaches namely the Multimedia-assisted Mastery Learning (MML), Multimedia-assisted Cooperative Learning (MCL) and Multimedia-assisted Cooperative Mastery Learning (MCML). Students in the three learning approaches used the same instructional materials. The MML used a self-learning approach while both the MCL and MCML learned in groups. The mastery learning elements were embedded inside the MML and MCML courseware while the MCL omitted the mastery learning elements. The effects of the three learning approaches on achievement score of higher order thinking skill were investigated. Specifically the research question is:

- Do students who receive MML, MCL and MCML strategies differ in terms of their achievement score for analyzing, synthesis and creating domain?

3. Research hypothesis

Based on the research question, the hypotheses were therefore presumed as follows:

H_0 : There are no significant differences in the achievement score of Bloom's high order thinking skills domain among students in the MML, MCL and MCML strategies

H_{01}: There are no significant differences in the achievement score of analyzing domain among students in the MML, MCL and MCML strategies

H_{02}: There are no significant differences in the achievement score of evaluating domain among students in the MML, MCL and MCML strategies

H_{03}: There are no significant differences in the achievement score of creating domain among students in the MML, MCL and MCML strategies

4. Methods

In this section, the population, sampling and the multimedia interactive courseware are elaborated.

4.1 Subject

This study adopted a quasi-experimental design. The sample of this study consists of Pre University students from three Matriculation Colleges in Malaysia. Their ages ranged from 18 to 19 years old. A total

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of 262 Matriculation Biology students participated in the research. Eighty-four students were assigned in the MML group, 88 students were in MCL group and 90 were in MCML group.

4.2 Multimedia interactive courseware context

The methodologies of mastery learning and cooperative learning were chosen because decades of research indicated both to be successful methodologies when employed with elementary, secondary, and undergraduate students (Guskey, 1997). Evidence indicated that both the cooperative learning and mastery learning gave positive results for cognitive outcomes (Guskey, 1997; Mevarech & Susak, 1993).

The approach to design the interactive multimedia courseware was based on Bloom's proposed mastery learning strategy, Mayer's Cognitive Theory of Multimedia Learning, Alessi and Trollip's instructional systems design, and Gagné's nine conditions of learning. The content of the Cellular Respiration in the courseware embraced the Bloom's revised taxonomy. Fig. 2 shows an example of the integration of the Cellular Respiration content within the cognitive domain respectively.

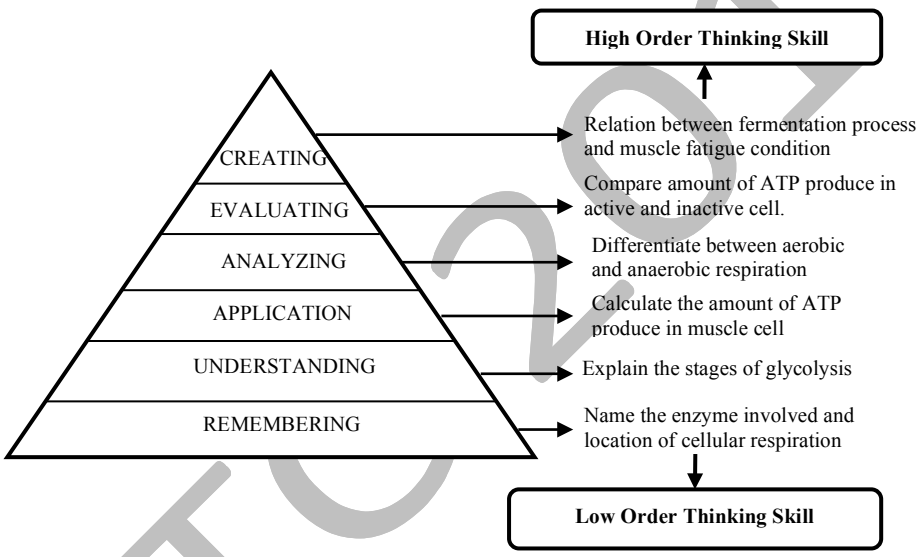


Fig. 2. Example of Cellular Respiration Content Related to the Revised Bloom's Taxonomy Domain

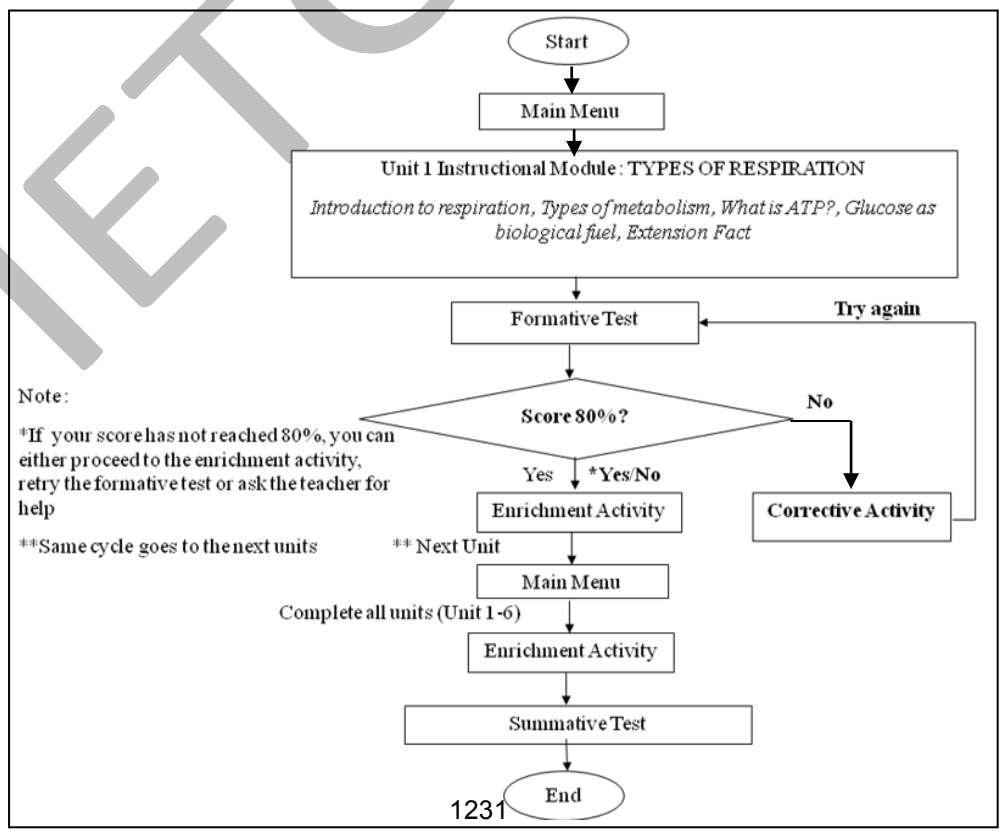
The researcher developed the multimedia interactive courseware entitled "Cellular Respiration" by using Adobe Flash CS4 as the main authoring tool. A series of templates were created through rapid prototyping. The courseware was designed with mastery learning elements, which was used in the MML and MCML strategies. Conversely, during the MCL approach the mastery learning elements in the courseware were hidden and deactivated. Before conducting the experiments, the courseware was field-tested. These

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field tests served as an evaluation in which the courseware was revised through formative evaluations (beta and alpha test) and pilot test. Table 1 shows the comparison between the components in MML, MCL and MCML. Meanwhile Fig. 3 illustrates the flow chart of the courseware.

Table 1. Comparison Between Components in MML, MCL & MCML

Strategy	Component										
	Self Learning	Group Learning	Instructional Module	Formative Test A	Score ≥ 80	Corrective Activity	Formative Test B	Enrichment Activity	Summative Test	Score Feedback	Group Reward
MML	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	×
MCL	×	✓	✓	✓	x	x	x	x	✓	✓	✓
MCML	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓



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Fig. 3. Flow chart of Multimedia Interactive Courseware

5. Result and discussion

As seen in Table 2, the descriptive statistic shows that the achievement mean score of the creating domain (Pre Test – Post Test) for students who used the MML (M=10.94) and MCML (M=10.67) was higher than the achievement mean score for the students using MCL (M= 9.06).

. Descriptive statistics on achievement score of analyzing, evaluating and creating domain for MML, MCL and MCML

		Strategy			Total
		MML	MCL	MCML	
Achievement Score of Analyzing Domain	n	84	88	90	262
	M	4.14	4.08	3.98	4.06
	SD	1.20	1.17	1.19	1.87
Achievement Score of Evaluating Domain	n	84	88	90	262
	M	4.36	4.35	4.43	4.48
	SD	1.38	1.50	1.37	1.41
Achievement Score of Creating Domain	n	84	88	90	262
	M	**10.94**	**9.06**	**10.67**	10.21
	SD	1.88	2.19	2.12	2.23

A multiple analysis of covariate (MANCOVA) was performed to investigate students' achievement score (posttest) of the higher order thinking skills in the Revised Bloom's Taxonomy. Three dependent variables were used (1) achievement score of the analysing domain, (2) achievement score of the evaluating domain, and (3) achievement score of the creating domain. The independent variable was the multimedia interactive courseware. Students' achievement score of the analysing domain, the evaluating domain, and the creating domain on the pretest that was administered were used as the covariate in this analysis. Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices and multicollinerity, with no serious violations noted. The results of the MANOVA test (Table 2) showed that the Wilk's lambda of 0.89 was significant, F = 5.02, p <0.05. Thus, hypothesis one (H_{01}) , which stated that the population means on achievement score of Bloom's higher order thinking skill domain variables (i.e., analyzing, evaluating and creating domain) were the same for the three groups, was rejected.

3. Multivariate test of the effect of learning strategies on the achievement score of Bloom's high order thinking skill domain

Effect		Value	F	Hypothesis df	Error df	*p*	Partial Eta Squared
Strategy	Pillai's Trace	.09	3.02	8	514	.00	.05
	Wilks' Lambda	**.89**	**5.02**	**6**	**508**	**.00**	**.06**
	Hotelling's Trace	.09	3.04	8	510	.00	.05
	Roy's Largest Root	.08	4.90	4	257	.00	.07

When the results for the dependent variables were considered separately (Table 4), using a Bonferroni adjusted level of .017, the mean score of the analyzing domain was not significant, F = 0.49, p > 0.025. Likewise, the results for the mean score of the evaluating domain was not significant, F= 0.15, p > 0.025.

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Both results showed that there were no significant differences of the analyzing and evaluating domain scores among the groups. Therefore, H_{01} and H_{02} were accepted. The only difference to reach statistical significance, was the mean score of creating domain, $F = 14.48$, $p > 0.025$. The result showed that there were significant differences of the creating domain score among the groups. Therefore, H_{03} was rejected.

Table 4. Test of Between Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	*p*	Partial Eta Squared
Strategy	Analyzing Mean Score	1.39	2	.69	.49	.61	.004
	Evaluating Mean Score	.61	2	.303	.15	.86	.001
	Creating Mean Score	**123.72**	**2**	**61.86**	**14.48**	**.00**	**.10**
Error	Analyzing Mean Score	362.11	256	1.42			
	Evaluating Mean Score	510.39	256	1.99			
	Creating Mean Score	1094.71	**256**	4.28			

An inspection of the creating domain mean difference in Table 5 indicated that two groups differ significantly, (1) Group MML and MCL ($p=.00$, $p<.05$) and (2) Group MCML and MCL ($p=.00$, $p<.05$). The MML and MCML groups did not show any significant difference ($p=.90$, $p>.05$).

Table 5. Comparison Mean Difference of Creating Domain for MML, MCL and MCML groups

					95% Confidence Interval	
(I) Strategy	(J) Strategy	Mean Difference (I-J)	Std Error	p[a]-Value	Low Bound	Upper Bound
1 MML	**2 MCL**	**1.67***	**.34**	**.00**	.91	2.82
	3 MCML	.23	.32	.90	-.59	1.11
2 MCL	**1 MML**	**-1.67***	**.34**	**.00**	-2.82	-.91
	3 MCML	**-1.44***	**.33**	**.00**	-2.37	-.84
3 MCML	1 MML	-.23	.32	.90	-1.11	.59
	2 MCL	**1.44***	.33	**.00**	.836	2.38

In summary, although mastery learning, MML (conducted systematically) was the most vital instructional method to make students succeed, it was better when supported by cooperative learning. This finding suggested that the advantages in cooperative learning were not obviously shown in the achievement scores without mastery learning, (MCL). This study showed that mastery learning plays a primary role and when incorporated with cooperative learning, the students will learn more in the cooperative environment. Some students may be weak in the socialization and interaction skills and may need guidelines when using the mastery learning approach. Likewise, some students need peer guidance during the learning process to achieve the higher order thinking skill. The slower learners need confidence in their ability to reach higher mastery standard. Based on that reason, students are not motivated to correct their learning problems in order to attain mastery. Through the use of cooperative learning, students can be provided with high quality corrective activities, assisted through their peers immediately following any forma-

tive test without waiting for the teachers' help. Thus, students are highly engaged in their learning and are able to diagnose their weaknesses to solve higher order thinking problem. The students also learned the skill of seeking out help cooperatively and confidently. Also, learning in teams accelerates important incentives that will strengthen motivation and reduce anxiety. Furthermore, the use of student learning teams serves not only correctives but enrichment purposes as well.

6. Conclusion

In conclusion, this study demonstrates that that the MML and MCML strategies are superior compared to the MCL strategy to enhance higher order thinking skills especially for the creating domain. The findings of this study propose an easy but powerful approach through the use of a multimedia integrated learning courseware with a series of high quality instructions in mastery learning and cooperative mastery learning. Students that used MML and MCML are more capable to developing potential solution to solve high order thinking skill problem. We hope the results of this study can encourage more sciences teachers to incorporate cooperative mastery learning to enhance higher order thinking instruction.

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The effectiveness of integrating somatosensory technology into nuclear energy education learning

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Abstract

Introductory video games have become an attractive form of entertainment and have surpassed television viewing as a preferred sedentary activity choice for users. Introductory video games are more and more popular for users studying E-learning topics. Atomic energy is important in the fields of science education, industry and research. However, the lack of a thorough understanding of nuclear energy and radiation, and the attitudes towards the safety of nuclear power are important issues. This paper discusses the teaching of the fundamental knowledge of nuclear power to students, to enhance their understanding of including nuclear power and safety concerns. This objective was achieved by means of e-learning which contains a variety of information about general science. This plan established a Nuclear Energy 3D eBook by integrating an eBook and TV devices, using the Tsing Hua Open-pool Reactor (THOR) as an example. We employed a nuclear energy education design in a serious game. We recruited N users to participate in THOR nuclear energy education learning. The present study examines the usage pattern of electronic game devices among university students in Taiwan. A survey was conducted among 31 students in a university, with 17 males and 14 females in the age range of 19–21. The results showed students can clarify their ideas about nuclear power by using the materials. The impact of nuclear energy 3D eBook on users who learn using the 3D teaching materials was also examined.

Keywords: Nuclear education, THOR, 3D ebook, somatosensory technology, serious game

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1. Introduction

Today, computers and electronic games have become an important part of education and this is a worldwide trend (Anderson et al., 2008; Christakis et al., 2004; Iannotti et al., 2007; Jaruratanasirikul et al., 2009; Phillips et al., 1995; Donald et al., 2011). Many different game devices have been developed in the last two decades. The Nintendo DS (NDS) and Portable PlayStation (PSP) are two commonly used devices. Mobile phones with touch-sensitive screens, such as the iPhone, offer thousands of games available to download from digital stores (Chandler & Chandler, 2011).

People display more persistence and motivation in seeking information on the Internet than when using traditional online sources (Bilal, 2000). There are more and more eBook multimedia online sources. Therefore, the main aim of this study is to examine the pattern of video games. The objective is to identify the current pattern of university students. We focus on a nuclear energy 3D eBook and its learning advantages, as well as the design and construction of a somatosensory technology. A TV video game environment to assist teachers observe and analyze student learning behaviors using a nuclear energy 3D eBook was proposed.

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2. Literature review

Previous studies developed rich functionalities to support reading on the Web, PCs, tablets, mobile phones, and e-book devices. With the popularity of e-book devices such as the Kindle and iPad, various e-book software companies have developed applications such as annotation, search, navigation, dynamic representation of contents, and e-book management. Several e-book systems support shared annotation (Rau et al., 2004; Wolfe, 2008), collaboration (Wei & Chen, 2006), content visualization (Hornbæk & Frokjær, 2003) and the construction of cognitive maps (Liang et al., 2013). The concept of the e-book system must achieve three major goals. First, it must provide basic annotation functions such as highlighting, commenting, and bookmarking, which are the most necessary functionalities for e-book readers. Second, the system must support students in creating a visual cue map. Third, the system should motivate readers to create contextual cues (Thayer et al., 2011). Some issues were encountered at the initial stage of e-book design for students. For example, Hourcade et al. (2003) revealed commercial e-books are likely to be insufficient to satisfy students' diverse needs. They concluded the use of e-books to support literacy leads to problems resulting from lack of choice. In addition, there are features of e-book functionality that support students' development of literacy and provide them with access to stories. They include book processing, multimedia additions, the interactivity of the story, etc. However, the legibility might be beyond a student's reading level (De & Bus, 2003). Revelle et al. (2002) developed a visual search interface to support students in data searching with a hierarchical information structure. With the support of a visual query interface and scaffolding for Boolean concepts, students were able to perform searches and construct search queries that surpassed their previous search techniques.

Moreover, some researchers examined a series of new user interface paradigms which serve to mediate the collaborative learning among students, with a sociocultural aspect (Kerawalla et al. 2008; Yuill et al. 2009). The results suggest additional features are still needed to improve the content of collaborative conversations that support joint understanding and individual comprehension development. In addition, Tung and Deng's (2006) ''computers are social actors" paradigm asserted human-to-computer interactions are fundamentally social responses, and they suggested enhancing the interactivity of an e-learning environment can stimulate the presence of social actors, which can promote a student's learning experience and increase their motivation. Considering the social constructivism in learning with e-books, Larson (2009) investigated how the collaborative online learning communities featured in e-book reading can provide students with equitable opportunities to share their thoughts and voice their opinions about literature. The findings suggested the students' engagement in online literature discussions promoted socially constructed learning, and the students' skillful and in-depth communications reflected their prior experiences in both real and virtual environments. These studies revealed social interactivity and scaffolding instruction are both crucial for learning with e-books, just as Blewitt et al. (2009) argued shared book reading and scaffolding procedures could enhance students' vocabulary learning.

A basic requirement for building a somatosensory technology is the combination of the real and the virtual. Many studies have minimized the virtual objects registration error and increased the realness of virtual objects (Ronald & Bishop, 1994). Drastic and Milgram listed a number of cues that can be used to interpret depth, including image resolution and clarity, contrast and luminance, occlusion, depth of field and accommodation (Drastic & Milgram, 1996). The 3D information is calculated at the point where there is an occlusion problem for a moving virtual target, using the proposed method (Hee et al., 2009).

There are more than twenty-three million players are registered for massively multiplayer online games in the MMOData.net and where popular commercial video games generate more money than movies, one could argue that it is time for education to embrace the potential of video games. With the prevalence of game playing among children and young people, the potentials of using digital games to facilitate learning have been suggested by researchers and educators alike (e.g., Gee, 2007; Oblinger, 2004; Prensky, 2001; Squire & Jenkins, 2003; Li & Tsai, 2013). Since digital games were used to achieve various learning outcomes (Connolly et al. 2012), what learning outcomes were stressed by researchers is also the interest of this current review. Therefore, this study aims to integrate somatosensory technology with nuclear energy education to improve function and allow innovation using the Tsing Hua Open-pool Reactor (THOR).

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3. Nuclear energy education learning in thor research reactor

The following explains the nuclear energy environment of THOR shown in figure 1. The aim of the nuclear energy 3D e-book is to provide user interfaces that allow inclusive design, enabling greater interaction for users.



Fig. 1. The environment of THOR

This study is divided into four modules, as shown in figure 2, including the History of THOR, Nuclear Theory, an outline of the THOR Structure and THOR applications. The finger 3 shows the nuclear energy 3D eBook interface design.

(1). History of THOR (Since 1961~): the history, the evolution, the present status and the major achievements and applications of THOR.

(2). Nuclear theory: the nuclear fission reaction, the reaction types for neutrons, the utility and application of a research nuclear reactor, i.e. THOR.

(3). THOR structure: the important parameters of THOR, the control system, the reactor core, the cooling system, the regional radiation detection and monitoring system, etc.

(4). THOR applications: the major applications of THOR, such as for neutron radiography, neutron scattering, neutron activity analysis, isotope production and boron-neutron capture therapy (BNCT).

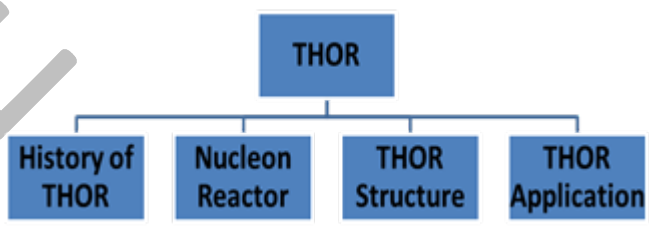
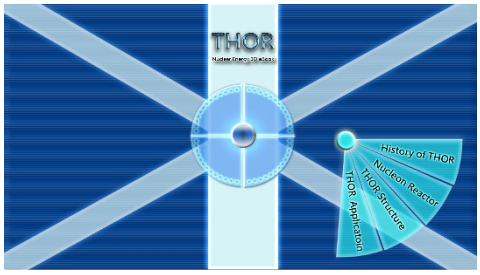


Fig. 2. The nuclear energy 3D eBook modules design



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Fig. 3. The nuclear energy 3D eBook inferface design

4. Experimental evaluation

The study process involved three programming language classes of 31 students, consisting of 17 males and 14 females aged 19-21 years old at a university of information management department in Taiwan. The experiment time was 2 hours per week for a total of 3 weeks.

A quasi-experimental research method was used in this study. The Cronbach's Alpha value is 0.932. The architecture is developed using Java, Open Ni, ASUS Xion sensor, Android 4.2 and Maya software. In this section the system structure and the operational environment are described. To test the effectiveness of the nuclear energy 3D eBook, figure 4 shows the nuclear energy 3D eBook with somatosensory technology operational results. Figure 5 shows the nuclear energy 3D eBook, using somatosensory technology on a mobile platform. It shows the video, the 3D model and 3D animation.



Fig. 4. The nuclear energy 3D eBook.

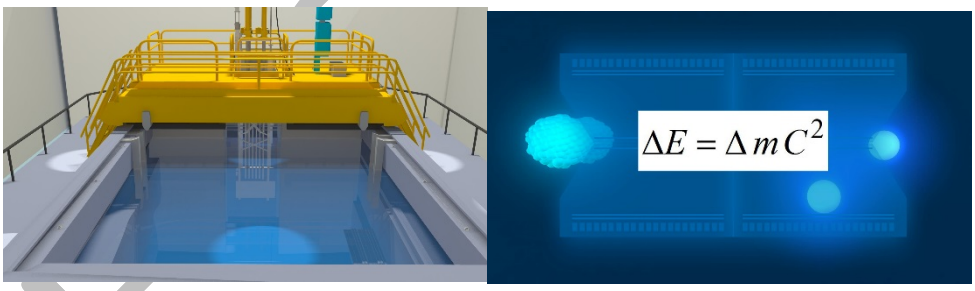


Figure 5. The nuclear energy 3D eBook operation results.

Table 1 presents the mean and SD values of the pretests and posttests for the experimental group. The test of homogeneity of within-class regression was conducted for nuclear energy course, the pretest and posttest mean values (standard deviation value) in were 31.29(22.322), 66.13(20.765).

Table 1. Mean (SD) values of pretest and posttests for THOR somatosensory technology.

	Pretest Mean(SD)	Posttest Mean(SD)
Experimental Somatosensory Technology group	31.29(22.322)	66.13(20.765)

Independent t-tests indicated the flow experience score was significant in the experimental group. The results show the pretest and posttest scores increased significantly in the experimental group in table 2. Significant differences existed between the posttest of the experimental group (t =-7.233, p = 0.000). That

is, teaching the THOR 3D e-book digital material for strategy helped decrease the differences between the pretest and posttest among students.

Table 2. Summary data of experience from t-test.

	T	df	P
Pre-Post	-7.233	30	.000**

** p<0.05

5. Conclusions and future work

The present study examined the effectiveness of nuclear education in a serious game among users. Users may be highly attracted to the game and frequent playing can affect their nuclear knowledge. Our results showed use of the 3D ebook by integrating an eBook and TV devices is effective. As a strategy to increase knowledge of nuclear processes, this study established a nuclear energy 3D eBook by integrating an eBook and TV devices, using the THOR research reactor as an example. The benefits of this study are it provides 3D eBook processes and somatosensory technology. It also provides proper knowledge of atomic energy and improved the 3D multimedia digital content and development capabilities.

Future study will focus on the standardized processes and a digital storage system in service, emphasizing data management, stability and security. The increasing use of computers and electronic media within the education system and its potential effect of encouraging a sedentary lifestyle need to be further addressed by both the family and the education sector.

Acknowledgments

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The examination of prospective teachers' information and communication technology usage and online communication self-efficacy levels in Turkey

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Abstract

The concept of readiness to e-learning necessitates students possess a number of competencies, two of which are their ICT usage and online communication self-efficacy levels. Thus, in current research prospective teachers' ICT usage and communication self-efficacy levels with respect to some demographic variables were explored. 1693 volunteer prospective teachers constituted the sampling of the study. In present study, there were two scales, whose reliability coefficients are respectively .894, and 846. With regard to findings, it appeared that solely grade level has no statistically significant influence on prospective teacher' online communication self-efficacy levels. Further findings are discussed in the full paper.

Keywords: ICT self-efficacy; online communication self-efficacy; prospective teachers

1. Introduction

It is an undeniable fact that the face of education is being changed by the rapid advancement of Information and Communication Technologies (ICT). Today, it has become almost impossible to envisage education without ICT. Hence, using computer, internet and other technological devices and/or capabilities effectively are of paramount importance for teachers with the goal of being able to keep up with current pedagogical approaches and incorporate modern technologies into education successfully. Aside from ICT usage self-efficacy, online communication self-efficacy is another indispensable asset to which today's teachers must definitely possess. It goes without saying that along with the change of medium where communication takes place the way people communicate to each other also changes. Since learning has much thing to do with communication, the way people learn changes too. As well known, McLuhan and Fiore (2001) puts forward that medium influences people and the way they act a great deal. Palloff and Pratt (as cited in Hung et al.,2010) revealed that shy students engage in online environments more than non-shy ones do compared to traditional environments. What is more, in the famous debate between Kozma and Clark, Kozma (1994) asserted that medium affects our learning. In short, as there are a number of media involved in e-learning environments like content management or learning management systems, it could be expected that that relating medium might have some impact on people, the way they communicate, and consequently the way they teach and learn.

There is a benefit of giving definitions of concepts investigated in current study before further discussing these concepts in that in some studies these concepts might mean quite different things. The first concept handled in this study is ICT usage self-efficacy. There is use in giving definition of self-efficacy first in order to comprehend what ICT usage and online communication self-efficacy are. The concept of self-efficacy was first added to literature by Bandura (1977) in the social learning theory. Bandura defined self-efficacy as an individual's own perception regarding organizing required activities and his/her being able to complete them successfully in an attempt to show a certain performance. Subsequently, by making use of Bandura's definition, Akkoyunlu, Orhan and Umay (2005) defined it as an individual's believe in

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his/her abilities rather than these abilities themselves. In this regard, Hung, Chou, Chen, and Own (2010) defined internet self-efficacy as follows: It is an internet user's trust towards his/her own ability to use internet. Under the lights of all above definitions, we may define ICT self-efficacy in a similar way. It is an individual's own believe towards how much he/she is good at using internet, computer and other related ICT technologies. As far as online communication self-efficacy is concerned, it might be defined as an individual's own perception regarding how much they understand the language and the culture peculiar to e-learning environments and how well they can express themselves in these kind of environments.

Above defined concepts have been examined in the literature great many times especially in the scope of readiness to e-learning or online learning. In a model developed to measure students' readiness to e-learning, Akaslan ans Law (2011b) covered the component of competency of technology, which is alike ICT usage self-efficacy. Likewise, Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, and Marczynski (2011) encompassed a similar component in their model. Similarly, there are many other models pertaining to readiness to e-learning incorporating alike components in the literature (Hung et al., 2010; Mercado, 2008; Tubaishat and Lansari, 2011; Watkins, Leigh and Triner, 2004). On the other hand, there also appears to be a substantial body of research in which models concerning readiness to e-learning including online communication self-efficacy component or a similar one were proposed (Dray et al., 2011; Hung et al.; Watkins, Leigh and Triner, 2004).

Within the scope of present study, it was aimed to study prostective teachers' ICT usage and online communication self-efficacy levels with referance to some demographic variables such as gender, department, and grade level. Thus, it was determined how much prospective teachers trust themselves in both ICT usage and online communication. In this manner, it was ascertained with the combination of these two concepts how much ready they are for e-learning as teachers of the future even though readiness to e-learning is not limited to these two concepts, yet had to be limited due to space restrictions obligated in current study.

2. Method

2.1. Sampling and population

The sample of the study consisted of 1693 volunteer prospective teachers enrolled in any program at Faculty of Education of Hacettepe University, whereas the population of the study was Faculty of Education of Hacettepe University. The data were gathered during spring term of 2013-2014 academic year. Convenient sampling method was employed. The distribution, mean, and standard deviation of sample with regard to some demographic variables are illustrated in Table 2.

2.2. Data collection tool

In order to collect data, two scales were utilized in current study. First scale used to measure the construct of ICT usage self-efficacy is comprised of twelve items, while second scale used to measure the construct of online communication self-efficacy is comprised of five items. The sample items are given in Table 1.

Table 1. Sample items from the measurement tools

ICT usage self-efficacy
I can easily use windows operating systems
I can easily use office programs (word, excel, and power point)
I can easily use web browsers (Internet Explorer, Google Chrome etc)
I can easily reach the information I seek for on the internet
Online communication self-efficacy
1) I can easily express myself in written communication (emotions, jokes etc)

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2) I can easily pose questions in online discussion environments

After the scales were administered to participants, the obtained data were analyzed based on structural equation modeling. In order to determine fit between empirical and hypothesized model, four goodness-of-fit indices, which are NFI, NNFI, CFI, and lastly IFI, were reported for supporting the factorial validity of the scales. The values of these are respectively as follows: .96, .95, .96, .96. On the other hand, Cronbach Alpha reliability coefficients of ICT usage and online communication self-efficacy scales were respectively found as .89 and .85. These values are satisfactory in accordance with the recommendation of Nunnally and Bernstein (1994), Schermelleh-Engel and Moosbrugger (2003). The standardized solution screen of the measurement tool is provided in Figure 1.

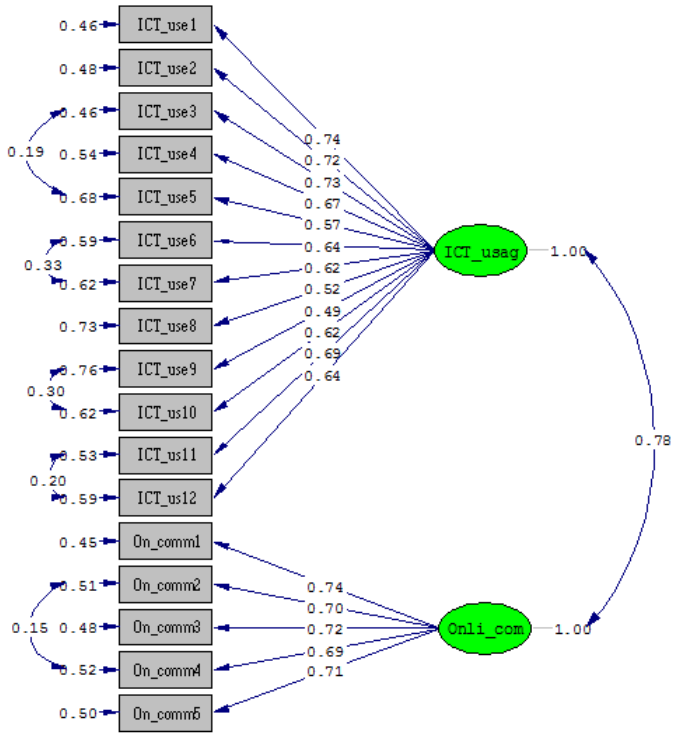


Figure 1. Construct validity of the measurement tools (Standardized Solution Screen)

2.3. Process

First, a project application was made to Scientific Research Projects Coordination Unit of Hacettepe University. Subsequently, required ethical permission from Hacettepe University Ethics Commission and administrative permission from the deanship of Faculty of Education were obtained. After that, an optical form was prepared to facilitate the data collection process. Moreover, a ball point pen and a lead pencil were given to participants as present.

2.4. Analysis

In this study, with the aim of determining differences in prospective teachers' ICT usage and online communication self-efficacy levels, overall scale scores and descriptive statistics were respectively obtained and the differences with reference to independent variables were examined. For a detailed descriptive statistics of the sample, please see Table 2.

Table 2. The distribution, mean, and standard deviation of sample with regard to gender, grade level, and department

Demographic variable	Frequency	ICT Usage Self-efficacy	Online Communication Self-

				efficacy	
		Mean	Std. Dev.	Mean	Std. Dev.
Gender					
Male	336	5.93	.86	5.98	1.03
Female	1322	5.58	.89	5.59	1.18
Grade level					
Freshman	407	5.45	1.02	5.54	1.09
Sophomore	416	5.66	.84	5.76	.75
Junior	343	5.76	.84	5.65	1.17
.	493	5.71	.85	5.71	1.14
Department					
German Language Teaching	93	6.02	.83	6.21	.94
Com. Edu. and Ins. Tec.*	147	6.30	.71	6.14	.91
Biology Education	44	5.64	.93	5.81	1.32
Science Education	197	5.73	.81	5.66	1.08
Physics Education	29	5.99	.90	6.01	1.09
French Language Teaching	58	5.74	.93	6.00	1.06
Prim. Math. Education**	128	5.44	.80	5.27	1.02
English Language Teaching	192	5.73	.92	6.05	1.03
Chemistry Education	56	5.74	.83	5.95	.96
Mathematics Education	110	5.40	.82	5.59	1.13
Preschool Education	115	5.46	.93	5.40	1.17
Psyc. Coun. and Guidance ***	208	5.29	.84	5.37	1.24
Classroom Teaching	227	5.51	.94	5.28	1.31

* Computer Education and Instructional Technologies
** Primary Mathematics Education
*** Psychological Counseling and Guidance

In this study, means obtained with respect to levels of independent variables were aimed to be compared in terms of a linear model such as ANOVA. However, such linear models are based on a number of assumptions, the most important of which is the normal distribution of data set. That is why, first, Kolmogorov-Smirnov test was performed to check if data is normally distributed. Since the data show a non-uniform distribution, Kruskal-Wallis Test instead of ANOVA was performed to determine as to whether there is a statistically significant difference or not. Significance level was set as .05.

3. Finding

In this part, findings regarding prospective teachers' ICT usage and online communication self-efficacy levels were reported.

3.1. Findings regarding prospective teachers' ICT usage self-efficacy levels

In this part, findings concerning prospective teachers' ICT usage self-efficacy levels were adverted (See. Table 3).

Table 3. Demographic findings regarding prospective teachers' ICT usage self-efficacy levels

Demographic variable	Chi-Square	Asymp. Sig
Gender	46.70	.000
Grade level	20.94	.000
Department	184.78	.000

As it is illustrated above in Table 3, there was concluded to be a significant difference between female and male prospective teachers in ICT usage self-efficacy levels (p=.000,χ^2=46.70). The difference is in the favor of male ones. When it comes to the finding about grade level, it was revealed that there is also statistically significant difference among grade levels (p=.000,χ^2=20.94). Prospective teachers' ICT usage self-efficacy levels are noted to rise steadily until senior year where it diminishes a little. Lastly, like two prior variables it was seen there is statistically significant difference in the prospective teachers' ICT usage self-efficacy levels with reference to department in which they are enrolled (p=.000,χ^2=184.78). It was concluded that the department of Computer Education and Instructional Technologies (CEIT) has the highest score, while the department of Psychological Counseling and Guidance has the lowest.

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3.2. Findings regarding prospective teachers' online communication self-efficacy levels

In this part, findings regarding online communication self-efficacy levels were touched upon (Sea.Table 4).

Table 4. Demographic findings regarding prospective teachers' online communication self-efficacy levels

Demographic variable	Chi-Square	Asymp. Sig
Gender	33.03	.000
Grade level	7.01	.072
Department	141.64	.000

First, as shown in Table 4 there was found to be a statistically significant difference pertaining to prospective teachers' online communication self-efficacy levels with regard to gender (p=.000,χ^2=33.03). Male prospective teachers are noted to have much greater online learning self-efficacy levels than female ones do. As far as prospective teachers' grade levels are concerned, in contrast to gender, statistically non-significant difference was obtained (p=.072,χ^2=7.01). Finally, with regard to prospective teachers' departments it was concluded there was a significant difference at the level of .05 (p=.000,χ^2=141.64). It was revealed that prospective teachers of language education departments (English, French, and German) and the department of CEIT have a great deal higher online communication self-efficacy levels than prospective teachers of other departments do.

3.3. The relationship between prospective teachers' ICT usage and online communication self-efficacy levels

Together with other aforementioned finding, it was also revealed that there is statistically significant positive strong relationship between prospective teacher' ICT usage and online communication self-efficacy levels (r=.78)

4. Discussion

In this part, findings regarding prospective teacher' ICT usage and online communication self-efficacy levels were discussed in term of some demographic variables, which are gender, grade level, and department.

4.1. Discussion regarding prospective teachers' ICT usage self-efficacy levels

In the present study, a statistically significant difference was found in terms of gender in the ICT usage self-efficacy construct. More specifically, males were found to have greater ICT usage self-efficacy levels than female counterparts did. In a study conducted with university students Hung et al. (2010), on the contrary, found that there is no significant difference with respect to gender in the factor of computer/internet self-efficacy. Likewise, in Bunz, Curry and Voon's (2007) study there is no gender difference in computer competency component. Unlike two above studies, Moftakhari (2013) revealed that the use of technology readiness of males is higher than that of females. Conversely, Shen, Cho, Tsai, and Marra (2013) revealed that female students have greater self-efficacies to handle tools in a Content Management System (CMS). As exemplified above, there is no strong agreement in the literature as to whether there is an impact of gender on prospective teachers' ICT usage self-efficacy levels.

When it comes to discussion of grade level with respect to prospective teachers' ICT usage self-efficacy levels, it was concluded that there are statistically significant difference. The difference is in the favor of more experienced students. This finding is contrary to that of Hung et al. (2010) where no difference exists. In a study carried out with prospective teachers Akkoyunlu and Kurbanoğlu (2003), on the other hand, found that the prospective teachers' computer self-efficacy perception levels boost as grade level

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promotes. As seen, in the literature it is not clear whether grade level affects prospective teachers' ICT usage self-efficacy levels or not.

As far as prospective teachers' ICT usage self-efficacy levels in terms of department are concerned, it was revealed that there is a statistically significant difference. As expected, the department of CEIT has the highest score. Akkoyunlu and Kurbanoğlu (2003) were seen to reach a congruent result in a study. They found that students of CEIT had higher computer self-efficacy levels compared to those students from other departments. Additionally, Moftakhari (2013) concluded that university students' use of technology readiness levels vary depending on their departments with English Linguistics, Turkish Folklore, and Information management having the highest scores while Philosophy, and French Language and Literature having the lowest ones. To sum up, there is an evident consensus that department influences university students' ICT usage self-efficacy levels. Expectedly, CEIT students have greater ICT usage self-efficacy levels than students of other departments do in that there are many courses teaching how to utilize ICT technologies in the curriculum of the department of CEIT.

4.2. Discussion regarding prospective teachers' online communication self-efficacy levels

As it is in ICT usage self-efficacy construct, researchers concluded that prospective teachers' online communication self-efficacy levels vary with respect to gender. Furthermore, the results of present study show that males possess greater online communication self-efficacy levels compared to females. This finding is inconsistent with that of Hung et al. (2010). On the other hand, Caspi, Chajuta, and Saportaa (2008) revealed that women prefer written communication more than men do. Similarly, Shen et al. (2013) came to the conclusion that female students have higher self-efficacy levels to interact with both instructors and classmates for academic purposes. In contrast to the findings of Caspi et al (2008) and Shen et al (2013), the finding of Bernard, Brauer, Abrami, and Surkes (2004) is seen to be consistent with that of Hung et al (2010). In conclusion, in the literature there appear to be a number of contradicting findings pertaining to prospective teachers' online communication self-efficacy levels with respect to gender; therefore, it is rather hard to draw a precise conclusion about it.

The only non-significant difference attained within current research is that there is no statistically significant difference in the prospective teachers' online communication self-efficacy levels with reference to grade level. On the contrary, in a study carried out by Hung et al. (2010) whose related finding is not in line with present one, junior and senior college students exhibit significantly greater readiness in online communication self-efficacy construct than freshman and sophomore ones do. Since there being no adequate research pertaining to the previously mentioned construct, to conclude something precise and meaningful is quite hard. On the other hand, it was found that there is a statistically significant difference in the prospective teachers' online communication self-efficacy levels according to department in which those students are enrolled. The difference was expectedly in favor of language education departments (English, French, and German) and CEIT inasmuch as language education departments by their nature deal with language, which is a communication tool in essence. As far as CEIT is concerned, within present study "online" communication self-efficacy construct was examined instead of just verbal, written or other communication ways or patterns, which do not entail ICT usage skills or competency, so given that CEIT students take great many courses and consequently get accustomed to those online tools and doing things in online way much more than students of other departments do. Nonetheless, there seems to be no study in the literature neither supporting nor disapproving this finding.

4.3. Discussion regarding the relationship between prospective teachers' ICT usage and online communication self-efficacy levels

The findings of the current study suggest that there is statistically significant positive strong relationship between prospective teachers' ICT usage and online communication self-efficacy levels. In contrast, Hung et al. (2010) reported that there is almost no relationship between mentioned constructs. On the contrary, Yurdugül and Alsancak-Sarıkaya (2013) indicated that there is strong relationship between above-mentioned constructs.

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As it might be inferred from the findings above, it is vague as to whether there exists a statistically significant relationship between above-mentioned constructs. Some findings of current study are different from those of some other ones cited in this study and this situation may stem from the fact that the sample of some studies is comprised of university students while that of current study is exclusively comprised of prospective teachers.

5. Implications

There appears to be very few studies regarding prospective teachers' ICT usage and online communication self-efficacy levels and the consequences of these studies seem to be contradictory; therefore, more study should be conducted in order to obtain results that are more consistent. Besides, more courses related to integration of technology into education could be added to curriculum of all departments in order that students will have higher levels of ICT usage self-efficacy and become better at communication via online tools.

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The impact of international student mobility on subsequent employment and professional career: a large-scale survey among polish former erasmus students

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Abstract

The Erasmus programme contributes to quality improvement in higher education at 3 levels: system (policy), institutional, and individual, and thus enhances employability of university graduates who have taken part in Erasmus mobility. This paper aims to present selected results of a large-scale empirical study on the impact of international student mobility on subsequent employability and professional career. We addressed our questionnaire to 14705 Polish alumni, including all Erasmus programme participants in 2007 and 2008. We have received 2450 completed questionnaires. As the survey was conducted in 2012, the respondents could report their professional career over 5-6 years after the return from a study period abroad. Only 1.6% of the former international student mobility participants mentioned they had never worked, with a vast majority having a white-collar job or even a managerial position. As much as 68.6% reported they had ever worked abroad. We wanted our respondents to estimate the importance of selected factors for their career development and job position. Higher education and proficiency in foreign languages were judged very important by the majority of our study subjects. 1/3 of former international student mobility participants considered international experience to have a very important influence on their professional development and position.

Keywords: international student mobility; Erasmus; Poland; employability; professional career

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1. Introduction

One of the principal tendencies in current university education is the internationalization process (Bryła, 2012), which includes international student mobility. Poland, next to Turkey, is one of the most dynamic participants of the European student exchange programme Erasmus, even though certain obstacles to international student mobility persist (Bryła & Ciabiada, 2014).

Temporary study in another European country has remained an exceptional and professionally highly rewarded experience for students from Central and Eastern European countries (Teichler & Janson, 2007). The Erasmus programme enhances the employability of graduates by enabling them to participate in an international collaborative project without the need to extend their degree length (James, 2013). The concept of mobile learning encompasses three dimensions: mobility of the technology, learner mobility, and mobility of the learning process and the flow of information (El-Hussein & Osman, 2010). This paper will focus on the second and third dimensions, as it aims to examine the impact of international student mobility on subsequent employability of Polish former Erasmus students on the basis of a large-scale survey. Certain elements of intercultural education may be achieved within international online learning communities (Xiaojing et al., 2010; Taras et al., 2012; Taras et al., 2013), but it seems justified to argue

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that participation in international student mobility programmes, like Erasmus in Europe, allows to obtain a much wider and more intensive educational and social experience, which will have strong implications for the subsequent professional career. A recent study based on data from 48 countries and regions concludes that countries aiming to attract talents from other countries should pay more attention to attract international students and encourage them to seek working opportunities in local employment markets after finishing study (Wei, 2013).

The Erasmus programme contributes to quality improvement in higher education at 3 levels: system (policy), institutional, and individual, and thus enhances employability of university graduates who have taken part in Erasmus mobility. According to the literature review reported in the European Commission (2008: 38) Erasmus impact study, the Erasmus experience has an effect on the nature of the career but not so clearly on the success of the career. Erasmus graduates are more likely to have jobs that have visible international remits, but the jobs are not necessarily higher in status or income. Employers seem to be more positive about the career effect of the Erasmus than the students themselves. The career effect is, however, not homogenous across the regions. Erasmus has a stronger effect on the careers of students from Central and Eastern European (CEE) countries compared to students from Western Europe. The long-term effects of participation in the Erasmus programme include the establishment of an international network of former Erasmus friends, which may have both private and professional character, and is usually maintained by activities in online social media, especially Facebook (Bryła, 2014).

2. Literature review

A Dutch study confirmed that learning environment is important for students' learning as well as their involvement in extra-curricular activities, and that these two elements of university education are determinants of career success (Vermeulen & Schmidt, 2008). In a survey among Erasmus students from the University of Oviedo, it was found that job prospects are an important motivating factor to engage is international student mobility, and the overall assessment of the planned stay is acceptable, good or excellent in most cases (Fombona et al., 2013). In a study quoted in (*Internationalisation…,* 2010: 11), it appeared that in the long run (more than five years after graduation), differences start to become measurable: mobile students on average were found in better-paid jobs than non-mobile students; of course, this may have been caused by self-selection, i.e. 'potentially better' students are more mobile.

On the basis of a project called VALERA (VALue of ERAsmus mobility), which focuses on establishing the impact of mobility on the mobile students' and teachers' careers within the Erasmus programme, Oliver Bracht et al. (2006) presented to the European Commission a Final Report on 'The Professional Value of Erasmus Mobility'. There were 5 target groups asked to share their perceptions of the impact of Erasmus mobility: national Erasmus agencies, ministries of education, conference of rectors/presidents/vice chancellors, umbrella organisations of employment agencies, and companies. For the questionnaire's needs Poland was grouped into Eastern Europe country group (together with Bulgaria, Hungary, Czech Republic, Latvia, Estonia, Lithuania, Slovakia, Romania, and Slovenia). The survey shows that formerly mobile students are considered by most experts to be superior to non-mobile students with respect to various competences. On average, in all 9 mentioned competences Erasmus students are better rated than non-mobile students. Many experts agree that former Erasmus students are in a better situation when it comes to job search. 68% of experts surveyed in East Country Group think that mobile students have a better chance of being taken into consideration as one of the final candidates by employers. More than a half of surveyed (58%) believe that former Erasmus students spend less time on job search than their non-mobile fellows. According to ½ of Erasmus experts, former Erasmus students will get employed sooner than non-mobile students. The interviewed experts believe that participation in Erasmus improves the characteristics of employment and work.

Apart from expert opinions, Bracht et al. (2006: 50-51) investigated mobility from the perspective of students. The questionnaire addressed primarily the career of former Erasmus students after graduation, i.e. the transition to employment, the early employment history thereafter and the actual employment and work situation at the time the survey was conducted. A broad range of indicators of professional success was employed: (a) graduation and job search, (b) initial employment, (c) present activity, (d) employment

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situation and status at the time of the survey, (e) links between study and work assignment, (f) links between orientations and assessment of the professional situation, (g) international aspects of employment and work (working in an international context, international tasks, European and international mobility).

Furthermore, an employers' survey was undertaken in the study on the professional value of Erasmus mobility (Bracht et al., 2006: 84). The following themes were addressed in it: basic information on the employing organisation and their staff, including their international activities; actual numbers of university graduates recruited and former Erasmus students and other internationally mobile students among them; modes and criteria of recruiting university graduates; perceived competences of former Erasmus students; positions and assignments of former Erasmus students; demands of the organisations with respect to competences potentially fostered by study in another country; perceived match or mismatch with supply and suggestions for the change of European and international activities of the universities. Employers from Central and Eastern Europe attach more importance to their candidates' international experiences than their Western European counterparts. 48% of the surveyed employers in Central and Eastern Europe said that work experience abroad was an important recruitment criterion, compared to 27% in Western Europe. 41% of respondents in Central and Eastern Europe expressed such an opinion regarding a study abroad period, whereas it was shared by only 25% of employers in Western Europe. The most important recruitment criteria in Central and Eastern Europe included: personality (indicated by 89% of respondents), foreign language proficiency (87%), and computer skills (87%) (Bracht et al., 2006: 90). It is worth noting that all these competences are likely to be improved during student mobility. Employers from Central and Eastern Europe appreciating study periods abroad in their selection among candidates were asked to rate the importance of different characteristics of the study period abroad. Actually, they emphasised: the language spoken Turing the study period abroad (83%), the subject area (67%), length of the study period abroad (58%), the specific host country (55%), and reputation of the host higher education institution (49%).

Over 90% of Polish outgoing Erasmus students believe that the study period abroad may be helpful in their future professional careers (Kolanowska, 2008a: 85). In a study of Kolanowska (2008b: 13), only 14.3% of Polish universities reported they collected information on the impact of the Erasmus study or placement on the employability of graduates. Only 7 universities provided more detailed information on this question. They mentioned that they collected this kind of information with the use of surveys conducted by university career offices, e-mails and talks with alumni, and individually obtained information from former Erasmus grant holders. Unfortunately, the quoted study asked only about the way of collecting the information, and not about actual findings concerning employability of former Erasmus students.

In an article for *Dziennik Gazeta Wyborcza,* Prof. Barbara Kudrycka, Polish Minister of Science said: "*Studies at another university, in another city or country allow to get rid of complexes, believe in yourself and get to know your own value. A better educated and more mobile students are beneficial to themselves and the economy*" (Grabek, 2011). Mr Jan Truszczyński (General Director for EU Education and Culture in the European Commission since October 2009*)* in the interview with Mr Roman Gutkowski from EurAactiv said: "*Scientific studies have shown that students who went on scholarships abroad, after completing their studies are more likely to find a good job quickly, and a few years after graduation they earn more than their fellows who had no contact with other than their own university, with a different foreign language, with a different culture than his/her own. Even young people who learn in vocational schools and had the opportunity to participate in a few-week internship abroad, take advantage of it, which pays off in the future*" (Truszczyński, 2011).

In a case study developed by Vossensteyn et al. (2010: 102), there are some interesting opinions of Erasmus participants from Poland. One of the perceives the participation in Erasmus mobility as a kind of investment in the professional career: "*Students that are motivated to take part in the Erasmus programme know that they are investing in their careers and that is the great drive and incentive for them to go to study abroad. They are aware of the fact that they are investing in themselves*". The relationship between participation in the Erasmus and the financial benefits acquired is stressed by a participant who claimed that: "*We found that internships of all kinds are highly valued by potential employers, and an internship abroad is definitely an 'added value' to a graduate's diploma*". According to Bótas & Huisman (2013), Polish students' participation in the Erasmus programme has a positive impact on their academic achievement, cultural, social and linguistic capital, but, at the same time, it has a negative impact on degree completion as they get highly paid jobs, which prevent them from fully developing their cultural capital.

3. Sample characteristics

We invited to take the survey all Polish students who had filled in their evaluation forms on the website of the Foundation for the Development of Education System regarding their Erasmus mobility for studies in 2007 (5942 study subjects) and 2008 (6635 study subjects). We added to the sample all graduates from the Faculty of International and Political Studies of the University of Lodz (2128 study subjects) in order to create a control group of internationally immobile students and some representatives of various age cohorts. Thus altogether we addressed our questionnaire to 14705 Polish students through the Internet professional survey service called moje-ankiety.pl in November and December 2012. We received 2450 completed questionnaires. Therefore, the response rate amounted to 16.7%, which may be considered a very good result for this kind of research methodology, taking into account the length of the questionnaire and the associated time and effort required to fill it in.

2369 of our study subjects studied abroad for at least a semester or trimester, whereas 81 did not take part in such mobility. Out of the 2369 study participants who had had a study period abroad, 82.6% studied abroad once, 14.5% twice, 2.1% three times, and 0.7% more than 3 times.

27.7% of our respondents in the former international student mobility sample were males, and 72.3% were females. In the control group, there were 79.0% of females and 21.0% males. This result may be due to several factors, including the higher participation of women in university education and their higher propensity to take part in surveys.

We have obtained answers from former Erasmus students representing 115 Polish higher education institutions. Therefore, our sample is very diverse and resembles very well the general population of all Polish outgoing Erasmus students. Unsurprisingly, the ranking is led by the biggest state-owned universities. The top 5 include: University of Warsaw, Adam Mickiewicz University of Poznan, University of Lodz, University of Wroclaw, and the Jagiellonian University of Cracow. The third rank of the University of Lodz stems partly from its remarkable performance within the Erasmus programme and partly from the extension of our sample to other age cohorts from the Faculty of International and Political Studies. It is also worth noting the high positions occupied by technical universities, including the Technical University of Lodz, which was the 6th regarding the number of respondents. We were unable to identify the home university of almost 6% of our respondents due to incomplete data, ambivalent abbreviations, mistakes, and deliberate refusal to provide the information.

22.3% of the internationally mobile Polish students in our sample took part in their mobility at the Bachelor level of studies, 78.2% at the Master level, 4.6% at the doctoral studies level, and 4.1% said it was another level of studies (including 5-year studies leading to a Master, engineer studies, medical studies, non-degree studies, postgraduate studies, MBA, MFA, after completing studies in Poland, study sessions/certificates, a language course, a college, secondary school, a thematic Socrates course, a summer school, a research scholarship).

Our respondents reported having taken part in international student mobility, which lasted (for the first time) usually a semester (62.9% of answers). Less than 1/3 of the study subjects studied abroad for a year, and only 2.2% spent there more than one year. As far as the second and third-time mobility is concerned, its duration tends to be longer, but these are relatively rare cases.

The main destination countries for the student (first-time) mobility of our study subjects were: Germany, Spain, France, Denmark, UK, Portugal, Finland, Belgium and Italy (**table 1**). In total, 37 host countries are represented in our sample, as it concerns not only Erasmus mobility, but all kinds of student mobility. Nevertheless, Erasmus accounts for a vast majority of destination countries mentioned by our respondents.

Table 1. Our respondents by international student mobility host country

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Host country	Rank	Number of respon-dents	%
Germany	1	261	11.02
Spain	2	181	7.64
France	3	173	7.30
Denmark	4	150	6.33
UK	5-6	108	4.56
Portugal	5-6	108	4.56
Finland	7	100	4.22
Belgium	8-9	95	4.01
Italy	8-9	95	4.01
Sweden	10	81	3.42
Netherlands	11	78	3.29
Czech Republic	12	69	2.91
Turkey	13	60	2.53
Austria	14	52	2.20
Greece	15	42	1.77
Slovakia	16	39	1.65
Hungary	17	29	1.22
Norway	18	28	1.18
Lithuania	19	21	0.89
Slovenia	20	20	0.84
Bulgaria	21	19	0.80
Ireland	22	13	0.55
Latvia	23	8	0.34
Estonia	24-25	6	0.25
USA	24-25	6	0.25
Cyprus	26	5	0.21
Canada	27-29	3	0.13
Romania	27-29	3	0.13
Russia	27-29	3	0.13
Iceland	30-32	2	0.08
Malta	30-32	2	0.08
Switzerland	30-32	2	0.08
Belarus	33-37	1	0.04
China (Hong Kong)	33-37	1	0.04
Japan	33-37	1	0.04
Syria	33-37	1	0.04
Ukraine	33-37	1	0.04
Not identified	x	502	21.19

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Total	x	2369	100.00

Source: own research

4. Selected results

We wanted to know the current job position of our study subjects who had taken part in international student mobility. It turned out that a vast majority of them (almost 2/3) had a white-collar job, with additional 8% holding managerial positions. There were 7% of self-employed in our sample. Blue-collar workers constituted 2.2%, which stems from the fact that we investigated only university graduates who were highly qualified and attractive on the labour market. There were 2.4% of trainees. Less than 5% reported unemployment, which is a very good result taking into account the situation of their age cohorts on the Polish labour market. Almost 6% were not active on the labour market as students or full-time parents, and 5% considered their job situation did not fall in any listed category, but taking into account their detailed answers, they could usually be added to the remaining categories, especially white-collar workers, self-employed, and not active on the labour market. A few performed voluntary jobs or reported working on the basis of civil law contracts instead of classical labour law arrangements (usually because of the desire of employers to avoid high obligatory social security contributions). The professional situation of respondents from the control group turned out to be even slightly better, which might be a bit surprising, but we must take into account their high competencies, including proficiency in foreign languages.

Only 1.6% of the former international student mobility participants mentioned they had never worked (compared to 2.5% in the control group). Therefore, most of those who were unemployed or inactive at the time of our survey had had some professional experience, which may be considered a very positive phenomenon. The most dangerous is long-term unemployment and lack of activity. Some spells of these are inevitable.

Which may be a bit surprising, as much as 68.6% reported they had ever worked abroad. This may be an indication of the link between international student mobility and international professional mobility. Perhaps, a considerable share of the responses concerned simultaneous working and studying abroad. In the control group, this figure was also rather high – 53.1%, probably because it comprised only graduates of international studies, who had a much higher command of foreign languages than the average Polish student.

Table 2. The duration of fixed-term job contracts among former Polish international student mobility participants (in months)

Descriptive statistics	Value
Mean	21.334
Standard Deviation	18.593
Variance	0.872
Minimum	1
1st quartile	12
Median	12
3rd quartile	24
Maximum	120
Skewness	1.887

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Kurtosis	4.734

Source: own research

Among those who worked, 50.8% had a permanent job contract, 28.1% a fixed-term contract, and 21.1% another type of contract. The average duration of fixed-term contracts amounted to 21 months, and the median was 12 months (**table 2**). The duration of fixed-term contracts ranged from 1 month to 10 years. However, ¾ of the respondents with such a contract had it for 2 years or less. The other types of contract included: contracts to perform a task (civil law contracts), temporary job agency, research grant, medical traineeship, doctoral scholarship, self-employment, freelancing, apprenticeship, traineeship, teleworking, probation period, substitute job, undeclared work. In the control group, the share of those with permanent job contracts was a bit lower at 43.2%, which indicates a lower level of job stability than among former international student mobility participants. The average duration of fixed-term contracts in this group was 18.8 months (a bit less than in the main sample), while the first quartile, median and third quartile were the same as among former international student mobility participants.

We asked our respondents to define the scope of operations of their organisations (where they worked). It turned out that the majority of former international student mobility participants were engaged in organisations with an international remit of activities (53.6% compared to 17.1% having a national scope, 9.5% - regional, 11.0% - local, and 8.8% - not applicable). This may suggest certain association between the international student mobility and the selection of the future career path. There may be some additional factors influencing this result, especially the self-selection bias. Those students who take part in international mobility tend to know foreign languages better, and therefore, are more attractive for companies having an international scope of operations. Nevertheless, we may infer certain connection between these two elements. If former Erasmus students do not work abroad, they may still make use of their skills in an international organisation located in their country of origin. In the control group, the respondents who had not engaged in international student mobility defined the scope of operations of their organisations as follows: local – 13.6%, regional – 12.3%, national – 22.2%, and international – 48.1%. Even though the control group was composed of former students of international relations, it turned out their organisations were less international compared to former international student mobility participants representing all possible field of studies. If we examined graduates from other fields of studies who had not taken part in international student mobility, this difference would probably be much more pronounced, which suggests a link between the international student mobility and the level of internationalisation of the future employer.

We were interested in the self-perceived congruence of the respondents' work with their education level. Over 2/3 (67.1%) of the study subjects believe the most appropriate education level for their job is Master, whereas only 6.1% consider that higher education is not appropriate for the job they perform. It is worth mentioning the relatively high share of doctoral qualifications felt as the most appropriate (8.7%), which suggests good quality, highly demanding jobs in our sample. The relative share of Bachelor (11.9%) and Master requirements may result partly from the Polish tradition of university education. Only recently was the division into two levels of studies introduced. Previously, we had the model of continuous 5-year university education leading to a Master degree (with some minor exceptions like medicine, which lasts 6 years). In the control group, there were following perceptions of the appropriateness of education level for the current job: below higher education – 11.1%, Bachelor – 11.1%, Master – 65.4%, doctoral – 9.9%. Therefore the distribution of answers was quite similar to that in the main sample.

We wanted to get to know if the field of studies of our respondents was congruent with their job. The majority of the study subjects (52.6%) felt that their own or related field of studies corresponded well with their work. 1/6 (17.9%) believed that exclusively their own field of studies was appropriate. 12.2% reported that a completely different field of studies would be better, and 11.6% considered there was no particular field of studies appropriate for their work. These results indicate a rather strong congruence between the field of studies of our respondents and their subsequent professional career. It confirms a generally traditional view of one's career path, where early specialisation choices matter. However, there is also a considerable segment of respondents who either had difficulties in finding an appropriate job or perhaps got a job on the basis of other competencies than formal university education. The share of jobs with strictly predetermined education requirements turned out to be rather low, which suggests a certain level of flexibility on the part of employers and the importance of additional criteria in the recruitment

process. In the control group, 6.2% of respondents indicated that only their own field of study was the most appropriate for their current job, which was significantly less than in the main sample. It may suggest that proportionately more former Erasmus students perform jobs dependent on their university education choices. 45.7% replied that it was their own field of study or a similar one, 25.9% believed that it should be a completely different field, and 19.8% thought there was no particular field of studies necessary for their current job. The share of answers in the last two categories was much higher than among former international student mobility participants. It may indicate a weaker fit between the university education profile and current professional career among those who did not engage in international student mobility.

The former international student mobility participants were asked how many times they had changed their jobs. 29.8% reported no changes, because either they kept the same job throughout their career or they were not employed at all. More than ¼ (25.9%) said they had changed their job once, 18.3% twice. More than 1/5 had already changed their job three times or more (11.2% - 3 times, and 12.2% more than 3 times). Therefore, we observed a significant level of professional mobility in our sample, especially that the respondents were fairly young. The link between student mobility and subsequent professional mobility is not clear, but our results confirm the co-existence of both phenomena in our sample. As far as graduates who did not take part in international student mobility are concerned, almost 1/5 (19.8%) mentioned they had never changed their job. It was a smaller share compared to the main sample, which may support the hypothesis that Erasmus (and other kinds of international student mobility) leads to a higher level of job security in future careers. In the control group, 30.9% of the respondents reported having changed their job once, 19.8% - twice, 16.0% - three times, and 12.3% - more often.

We wanted our respondents to estimate the importance of selected factors for their career development and job position (**table 3**). Higher education and proficiency in foreign languages were judged very important by the majority of our study subjects. 1/3 of former international student mobility participants considered international experience to have a very important influence on their professional development and position. Almost 1/5 specified Erasmus mobility for studies as a key factor in this regard. Objective qualifications were much more important than informal support from one's family or friends in obtaining the job position. Other mobility programmes and Erasmus mobility for a work placement had a smaller influence, partly because of our sampling method. The respondents were free to provide additional determinants of their career. They mentioned: activity in student organisations; ambition; good quality secondary school; willingness to continue a family business; personality traits; self-confidence; professional experience; chance; thirst for experiences; interests; passions; proficiency in Excel software; qualifications as an accountant; working abroad for a few months several times; contact with the employer during one's studies; contacts established during one's studies; professional skills; marriage which led to emigration; situation on the labour market – the employers look for those who stay in Poland and are faithful to their company; self-learning; negative experiences from one's previous job; traineeship; money; joining one's partner; field of education; persistence in reaching one's goals; testing oneself; postgraduate studies; interpersonal abilities; additional trainings; improving one's competencies; specialisation as a legal advisor; voluntary jobs; technical skills; participation in the Work&Travel programme in the USA; respect from the employer abroad; knowledge of the industry. The other factors were considered very important by less than 3% of the study subjects.

Table 3. The self-reported determinants of one's career or job position in our sample (fractions)

Reason	R	7	6	5	4	3	2	1	NA
Higher education	1	0.579	0.165	0.095	0.064	0.012	0.007	0.033	0.017
Foreign language proficiency	2	0.560	0.157	0.108	0.065	0.014	0.012	0.046	0.013
International experience	3	0.332	0.198	0.173	0.149	0.017	0.014	0.068	0.023
Erasmus mobility for studies	4	0.194	0.191	0.203	0.198	0.030	0.027	0.095	0.029
Family/friends	5	0.116	0.097	0.137	0.149	0.035	0.030	0.176	0.202
Other mobility programmes	6	0.064	0.039	0.051	0.098	0.019	0.013	0.074	0.538
Erasmus work placement mobility	7	0.060	0.039	0.050	0.092	0.013	0.011	0.072	0.556

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Other factors	8	0.027	0.005	0.001	0.016	0.003	0.000	0.011	0.191

Notes: R – rank; 7 – very important; 1 – not important, NA – not applicable; fractions of all those who took part in international student mobility (2369 study subjects)

Source: own research

5. Conclusion

The results of our large-scale survey among Polish former international student mobility participants confirm certain implications of this element of university education on their subsequent employability and professional careers. It concerns both the quality of their jobs and the scope of operations of their organisations. Erasmus mobility contributes to the acquisition of multiple skills and competencies, which are highly valued by future employers, but also constitutes a valuable social and cultural experience. The utility of international student mobility in the university education process is hard to overestimate, not only from the perspective of subsequent transition to work.

Acknowledgements

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The importance of computer-aided courses in architectural education

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Abstract

Intensive technology usage in education has been increasing in every field recently. Because computer based visual technology has been developing and becoming the most popular trend in the recent years. In addition to these decreasing prices of the computer based systems make this trend more attractive. Architectural education is one of the most difficult and expensive education and based on visual material. That's why computers and complicated software usage in architectural education has increased dramatically. Using these software, an architecture student can perform his/her project design spending less energy-time but more realistic. But the disadvantage of these systems is to make students computer addicted and design their project without creativity. This paper aims to study advantages and disadvantages of this trend and to find a balance level. According to this concept, courses in architectural design are investigated. What kind of computer systems and software use in education is searched? Based on response of students, the advantages and disadvantages of this trend are studied.

Keywords: Type your keywords here, separated by semicolons ;

1. Main text

Computing technology has achieved in the last two decades a tremendous advance; for example processing speed and circuit density have increased by order of magnitude. The software field has also progressed considerably, with new software development tools, programming languages and methodologies. This new powerful computing environment is packaged and made available to individual users in the form of 'Personal Computers', and to engineers or designers in the form of the new generation of 'Graphical Workstations'. During the same period, continuous research and development in the computer aided design field, has enabled to harness this computer power, and provide designers with new tools. Computer based design tools offer significant advantages over traditional design practice. In fact, they allow performing design operations in ways that have never been possible before. The process of architectural design since its first inception has aimed at the production of 'good' buildings. The process itself, the teaching of design, and the evaluation methods and criteria, are subject to change and depend on the state-of-the-art in research and technology. The concept of abstraction (or modelling) in architectural design is historically linked to the level of complexity of the design product. It involves the representation of existing structures and can be described as an attempt to recreate reality. Developments in the field of computer modelling, computer graphics and more recently in cognitive psychology and artificial intelligence provide the theoretical basis to build fundamentally new tools to support the architectural design process, in particular for design abstraction and evaluation. The first generation design tools that have emerged from the early computer technology development have mainly concentrated on model building for drawing production, with the exception of few design evaluation systems. These were underpinning the graphic characteristics of traditional architectural representation, where generally the abstraction hides most of the meaning of the drawing -not to the designer, but to the computer. It is the ability of a

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computer aided design system to 'understand' the implicit information contained in a drawing, that gives it the 'competence' to support 'intelligent' modelling and evaluation (Belhadj, 1989).

The future of architectural education has been at the forefront of architectural debate, particularly since the recent increasing computer base education. The technological and scientific development, particularly during the last century, had a decisive role in the evolution of the construction industry. The result of this progress has been the dependence of building constructions from any climate conditions and at the same time the use of heating systems, cooling, air and lighting systems (Jencks, C., Kropf K. (eds.),2006, Klotz, H., Cook, J.W.,1981, Lampugnami, V.M., Hanisch, R., Schumann, U.M., Sonne W. (eds.), 2004).

Information technology and computer aided education have been playing more important part of the life for the recent years. The computers and information technology are widely used to develop teaching possibilities. Although education is a complex process in which human and technical resources should be used and planned very carefully, teaching and learning concepts have changed radically. Computer aided virtual education and distance learning methods might replace the classical education methods in close future. Regarding this new concepts the education on all disciplines needs evaluation and development. Computer aided techniques and courses are one of the important factors of these developments

In discussing architecture education it is important to make clear first of all how one understands architecture. Because architectural education completely different than engineering education (Guney, 2011). The making of architecture involves political, social, technical, economic, aesthetic, ethical and ecological questions: to what extent are all of these relevant to education? The problem remains even if one defines architecture as an art, for the art of building and planning certainly requires a broad understanding that at least does not exclude any of the dimensions just mentioned. Yet the best way to make people sensitive to the aesthetic qualities of architecture may not be to start with economy. From this point of view, during architectural education, student should has to have enough background for technique, mathematic, engineering, art, technology, economy, law, sociology and psychology.

Architectural education has been heavily criticized. “Architectural pedagogy has become stale” (Colomina, 2012). Education, its underlying rituals and processes, has not really changed over the past 20 years and this is one of its biggest weaknesses. Schools of architecture are struggling to keep up with the current issues that are transforming architecture practice, and students are not educated to meet the industry and wider market needs (RIBA, 2005).

Advances in technology are continuing to place new demands on the construction industry. These include advances in computer software, construction and assembly methods, and materials. Architecture practices must adapt to the changing context of technology, to work more efficiently and effectively. Building information technologies present new opportunities and challenges to the architectural profession (Andenas, Livingston and Nelson, 2012). The increased use of Building Information Modelling (BIM) programs is altering the way in which many architectural practices are working. As sustainable design advances, the search for computer software that can exchange information continues. BIM introduces an alternative form of design process, procurement and construction, and changes the responsibilities of different consultants within the design team. Stakeholders, including the client, architect, engineer, contractor and subcontractor, will be able to access the building information model. It will require ‘adaption, investment and greater teamwork between the core trades’. The BIM model is a jointly developed design process, enforcing a collaborative and interdisciplinary way of working that ensures that all parties involved record all modifications to the design and build.

2. Trends of architecture education

According to a report by The Scientific and Technological Research Council of Turkey (TUBITAK), the percentage of computer ownership among Turkish households is 12.3% in 2000. A similar research made in 1997 reports this amount as 6.5%, thus it is seen that the amount of computer ownership at homes doubled in three years. When computer ownership percentages are investigated for different income groups, it is observed that computer ownership percentage reaches to 64.7% in the high income group,

while it is 8.2% in the lower-middle and 2% in the low income group (TUBITAK 2001). According to this data, technology using is rapidly increasing. Today almost all students in department of architecture has their own lab top computer.

Rapidly developing virtual education and distance learning methods are replacing today the classical education methods. The rapid growing visualization techniques are one of the important factors of these developments. With the help of visualization techniques we are able to create computer graphics that display data, particularly multidimensional scientific data, for human interpretation. This technology becomes today an integrated part in the education and used to develop attractive presentations especially for three-dimensional cases, which the students have difficulties to understand.

2.1. Goals of computer aided education (cae)

The use of computer networks and information technology are becoming an important part of the everyday work on almost any profession, especially in the scientific areas and changed education concepts and many universities and education organizations decided to plan new strategies concerning computer based technologies. As a result of these developments Computer Aided Education (CAE) methods came out. These methods have been utilized and developed more than for fifteen years in many universities and organizations. The goal of CAE is to develop the learning capacity of students and increase the teaching productivity and effectiveness of instructors with the help of advanced computer based technology. This technology should be an integrated part in the education. It is also desirable to use this technology to develop attractive courses for distance education. Another area of interest is to use computers, information technology and equipment to develop attractive and understandable demonstrations of basically tasks and typical projects in the field of architectural education.

2.2. Advantages of cae

Using CAE methods students can state and explain the basic concepts in the subject easily and are able to participate in discussions of advanced concepts related to the subject content. With the visualization techniques computer graphics images are created and these images display the data and the mathematical relations of the interested subject for the interpretation, particularly of multidimensional cases. CAE provides also the substructure for interactively communication possibilities with international colleagues and presentation of the subject interested worldwide.

3. Design process and computer aided education in architecture

3.1. Computer aided architectural design (caad).

When generating models of buildings on computers, the only aspects that can be modeled are those which can be quantified, it is on these quantifiable elements that the evaluation will take place. Generally, it consists of three operations;

1. Measuring the model,
2. Performing calculations on those measurements and then
3. Comparing the results with targeted performances.

The building 'prototype' would be a three-dimensional building model, either computer generated or human generated. The computer aided architectural design process would then consist of evaluating the design solutions by comparison with computer models of existing buildings as shown in Fig. 1.

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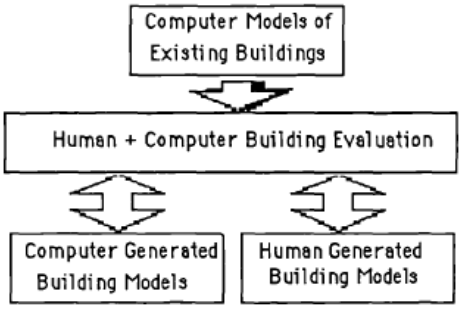


Fig. 1. Human/computer architectural design interaction.

According to Shaviv (1987), alternative design solutions should be generated automatically; according to design requirements formulated as constraints and as objective functions. Then, the generated alternative would be evaluated and appraised by means of automatic programs. Finally, the deficiencies of the proposed solution, identified by the evaluation, would be rectified through the automatic or manual generation of new and better design alternatives.

3.2. Computer aided architectural education concept

The first step of analyzing CAAD education is to understand "why" it is important. We believe that the increasing importance of CAAD is largely due to the new possibilities and modes of design thinking that it brought to architectural design. Earlier conception of the use of computers in design was the vision of a tool which "assists" existing design processes (Mitchell, 1994). During the 1980s, computers have been increasingly used for drafting purposes, a design activity which is now almost completely computerized in architectural offices. If the role of computer in architectural design remained merely as a drafting tool, its effect on architectural education would not be much different than that of pencils and drawing papers. However, beginning from the 1990s, developments in CAAD opened up new perspectives and challenged existing processes. Due to new visualization software, forms once were difficult to imagine became easy to produce and the "virtual" established as a legitimate architectural object. The next important change was the implementation of network technologies which gave rise to CSCW (Computer Supported Collaborative Work) and e-commerce. CSCW enabled collaboration of geographically distributed design professionals and formation of "virtual teams" (Tasli, 1999). All of these events have affected traditional architectural design practices, although the impact was less far-reaching compared to large industries such as aerospace and automotive. The reason for this is probably the peculiar characteristics of the building industry. The building industry is more fragmented, project-specific and culturally diverse compared to the other industries (Pektas and Pultar, 2006). These factors hindered transformation of conventional practices in some extent, however, the incremental change is still in progress.

A key topic for CAAD education is the content. "What" should be taught as CAAD, the theories, the methods, or the skills? Is CAAD an essential part of architectural thinking or just another skill that can be sought for competitiveness in the job market? Two opposite ends can be defined with respect to this question. Some view CAAD simply as a skill (Novitski, 1999) and others advocate that CAAD teaching should be related to the theories of architecture and/or should develop its own "digital design theory" (Oxman, 2006). Because of the wide diversity of the approaches to CAAD, categorizing the domain of digital design is a difficult task and of course, many interesting approaches are somewhere in between. Design ability is based on imagination. However CAAD supports architect to improve and visualization of his/her imagination as shown in Fig. 2.





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Fig. 2. Hand sketch and CAAD drawing.

The conception of CAAD as a skill has been promoted mostly by practitioners and pragmatists due to the fact that CAAD has already become a driving force for architectural market. In a recent survey, practicing Turkish architects were asked to identify the factors that have been most influential in architectural practice within the last ten years. Following the developments in construction materials, computer technologies ranked second in a number of factors. Moreover, the factors ranked third and fourth in the survey were also related to computers; namely, Internet and communication technologies and CAD technology (YEM, 2006). Under the demanding market conditions, architects seek for competence in the production of digital renderings, animations and construction documents while employing new graduates. Due to these developments and to the massive increase in architecture graduates, manual drafters with no architectural education have disappeared in recent years. They have been replaced by CAAD operators probably about half of whom are qualified architects (Stevens, 1997). Regarding these issues, schools are forced to shape the content of their CAAD curriculum to provide necessary skills and a competitive advantage for their graduates.

3.3. Computer aided architectural education in turkey

CAD teaching is now a part of curricula in almost every architectural school; however, it seems that the rapid implementation of computers in design education has caught academia unprepared to develop a pedagogy for a digital practice. Studies which focus on the use of CAD in design education are mostly theoretical and/or descriptive in their research approach. Few empirical studies – which test their hypotheses statistically – have been reported in the literature (Hanna & Barber 2001). Attitudes of students toward the use of computers in design are one of the neglected issues in that respect. Most of the descriptive studies in this field imply that students have positive attitudes toward computer usage in design, however, a systematic examination of this attitude and its correlates is lacking.

The relation between the students' and teachers' attitudes toward computers is one of the controversial issues in computer attitude research. Some researchers have suggested a relation between the student and teacher attitudes toward computers. For example, Downes (1993) reported that a good role model, in the form of a classroom teacher who uses computers, leads to more positive attitudes toward computers for secondary school students. On the other hand, there are often differences between students and teachers in their attitudes to information technology (Zoller & Donn 1993). Smith (1986) showed that teacher computer efficacy scores are significantly and negatively related to that of students. Then, she commented that as students' confidence went up with more exposure to computer classes, apparently teachers' confidence went down. Previous research revealed that studio instructors of the Department of Interior Architecture and Environmental Design (IAED) are not very willing to use computer technology in their professional studies (Erkip et al. 1997).

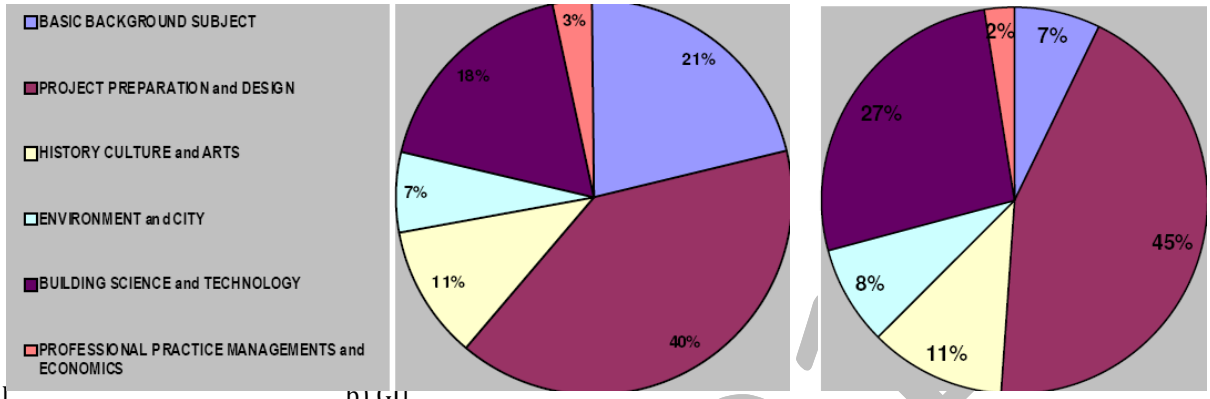
Istanbul Technical University (ITU), Department of Architecture is one of the oldest (university established in 1773) in Turkey. Gazi University Department of Architecture is other well-known department (university established in 1982) in Turkey. The distribution of the courses in ITU and GU according to groups is shown in Fig. 3a and 3b.

CAAD courses are evaluated as "Building science and technology" group. According to ITU, the focus of education in ITU Department of Architecture is % 15 vocational, % 25 arts oriented, %35 academically oriented, %25 technique oriented. Among the 1441 students, 788 (%55) student of the total number is receiving education in bachelor phase, while 457 (%32) students in master and 196 (%14) in PhD phase.

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Regarding the student involvement in research process, students of GU Department of Architecture in bachelor is %82, in master %12, and in PhD %6.

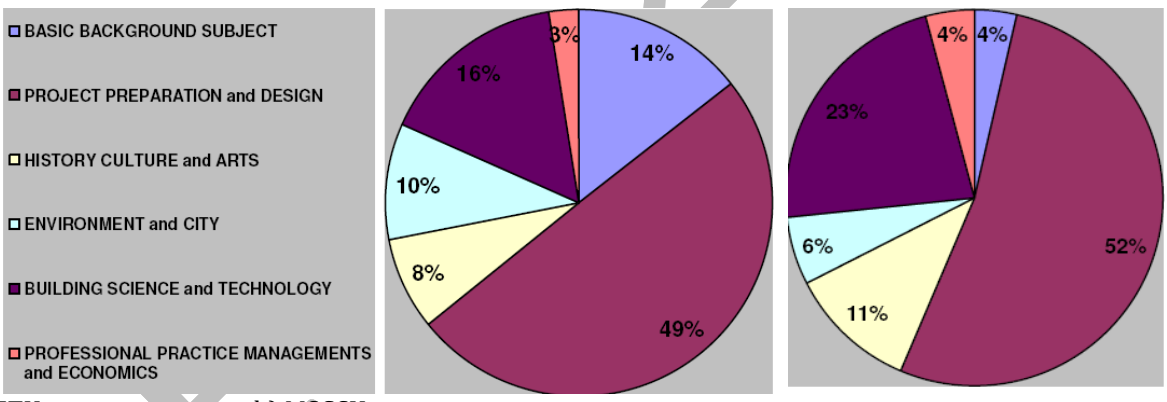
Middle East Technical University (METU), Department of Architecture is another important department (university established in 1956 with the support of Pennsylvania University (USA) and United Nations (UN)) in Turkey. . Regarding the student involvement in research process, students of METU Department of Architecture in bachelor is %57, in master %27, and in PhD %16.



a) ITU b) GU

Fig. 3. Distribution of courses in ITU and GU Department of Architecture.

Mimar Sinan Fine Arts University (MSGSU), Department of Architecture is another oldest department (university established in 1883) in Turkey. Regarding the student involvement in research process, students of METU Department of Architecture in bachelor is %88, in master %8, and in PhD %4. The distribution of the courses in METU and GU according to groups is shown in Fig. 4a and 4b (Ozelgul, 2009).



a) METU b) MSGSU

Fig. 4. Distribution of courses in METU and MSGSU Department of Architecture

Five well known architectural departments' curriculums are studied. These departments are ITU (Istanbul Tech. Univ.), METU (Middle East Tech. Univ.), Gazi University (GU), MSGSU (Mimar Sinan Güzel Sanatlar Üniversitesi), YTU (Yildiz Technical University). According to their curriculum, compulsory technology courses (CAAD based) are investigated and details are given below:

The comparison of the weight of CAAD courses credits distribution is given in Table 1. Of course there are more elective course related with CAAD subjects. This table (Table 1) just gives us an idea about existing situation based on compulsory courses.

Table 1. Weight of CAAD courses distribution according to universities in Turkey.

Name of the university	Total Credit	CAAD Credits	Percentage (%)
ITU	153	8.5	5.6

METU	154	16	10.4
GU	144	13.5	9.4
MSGSU	176	9	5.1
YTU	180	14	7.8

3.4. Analysis of advantages and disadvantages of caad.

Similar to all technology intensive courses, CAAD courses have positive and negative effects to the architectural student education. Generally if technology is properly used and effectively organized the consequences are very useful. However, if technology is replaced with education in this case results are maleficent to the student education.

Advantages:
Easy storage and sharing
Faster design stages
Easy to make revisions on the design
Drawing more alternative designs
More precise and accurate design
Better understanding, evaluation and reproducing for design environment and purposes
Remote control and sharing
3D visualization
Time saving
Better and faster communication with following projects (structural, mechanical, electrical, landscape, interior etc. design)
Avoids coincidences of improper structural, mechanical and electrical equipment

Disadvantages:
Decreasing design and imagination ability of students
Negative impact of CAD on contemporary design creativity
Low quality design
Technology addiction
Less personal contact and interaction between students and advisors
Instead of better design, better visual outputs are preferred
Inadequate literature follow

As show above, CAAD has both advantages and disadvantages. The most import thing is how to balance these positive and negative effects of technology intensive education. In this stage, university, faculty and advisor vision and behavior is too important.

There is plenty of evidence that CAD is now widely used in the profession. The most worrying recent evidence regarding CAD is that of student work. There is a growing feeling that a worrying trend is developing. Many students' project and design have been controlled and examined. In each case, I found examples of students combining impressive and convincing computer presentations with poor design which is the worst negative effect of CAAD. Of course, the software cannot intend anything, and certainly the developers did not intend such results, but the effect remains. This phenomenon can also be illustrated with reference to the graphic design (Lawson, 2002).

A small but significant and growing proportion of student work all seems to exhibit similar common characteristics. Because it is possible to produce a certain kind of 3D form in a CAD package, the student does so, bypassing that critical visual editing faculty that we try to inculcate in design schools. Even worse, some of these forms are relatively easy to generate in CAD but are hard to represent in manual perspective—for example, shell forms based on ellipsoidal sections, rotations of curved parabolic forms and so on. Perhaps this encourages students to believe that because they have drawn something infrequently seen, they are being creative. Another problem is that the software is usually a generic 3D package that can only handle form in the abstract—it does not address or comprehend the construction or materiality of the objects represented. Contrast this again with the work of Santiago Calatrava. Many of his original design drawings are freehand watercolors, but are approximately to scale. His staff, after they have applied all

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their sophisticated engineering software to these forms, often calculates them to be very near the size his original sketch showed. Calatrava knows about materials and their strengths, weaknesses and structural characteristics. Now, it is quite possible today to take a position about architecture that relegates structure to a purely supporting role. The negative effects should be minimized; the positive effects should be maximized by applying correct assumption.

4. Conclusions

In this paper, a framework for addressing most of the important aspects of computer aided education in architecture is analyzed. In architectural education, computers and visualization software are creating interesting opportunities for design experimentation and less energy-time consuming for designer. However, it is increasingly observed that, such experimentation is not well connected to building real-life projects. Parametric 3D modelling and dynamic simulation in virtual environments enable students to evaluate future performances of designs and developments in this area seem promising for bridging the gap between the fantasies of digital world and the materiality of the real-life. As costs of such systems decrease and their compatibility with modelling software increase, more educators will be able to utilize them and we may have a better understanding of how to teach students to design digitally. CAAD education research has already established with its own knowledge base and research methods. It is suggested that CAAD education should focus more on better interaction between real and virtual environment to better respond to the demands of the market and students personnel progress. Otherwise students CAAD operation capability will increase however their creativity and project quality will decrease. We will have very presentable, colorful, charming projects and drawings but these projects will probably distant from execution and real life. When these unsatisfactory projects would be executed, builders on site would experience serious troubles caused by insufficient projects.

Many famous architects do not themselves use computers or CAAD directly. Thus, while Ian Ritchie creates innovative structural form with CAAD, Santiago Calatrava also creates highly original structural form, but does not use CAAD directly. He uses CAAD for finite element (FEM) structural analysis but uses physical models for form generation. This is remarkable for two basic reasons. First, Santiago Calatrava is not only an architect but also an engineer and is clearly highly numerate and used to working with computers. Second, he creates adventurous forms that are too complicated and difficult to draw by hand, but he prefers making physical models to using computers namely CAAD. Many architects who would be viewed by their peers as creative contributors to the field have expressed concern about using CAAD for design.

Finally, it should be emphasized that the concept and meaning of the use of CAAD in design is subject to rapid change due to developments in computer technology. Researcher explains that in the studies on computer attitude, 'computer use' have been defined loosely without discriminating and categorizing different uses and purposes. They criticize this approach for not responding to expanded CAAD applications. In view of this problem, my study has attempted to focus on use of CAAD in architectural education. Considering the lack of appropriate tools for attitude measurement in this particular field, it is expected to contribute in that respect. I hope that this study will form a basis for future studies, which will aim at a deeper analysis of students' attitudes toward different computer applications in design. In addition to this, more studies and researches should be carried on this subject in order to balance positive and negative effects of CAAD (namely intensive computer use) in architectural education.

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The importance of ethics in the teaching profession

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Abstract

Speaking about the profession of teacher, it is necessary to consider contemporary global ethical issues in education and educational research. There is an opportunity for students to develop a critical stance towards some of the most pressing ethical issues in education and educational research in contemporary societies. In a school context and with the support of school polices, programs and practices, ethical education helps students to develop for example in depth knowledge and awareness of their own and other cultures.

Keywords: ethics; teaching profession; human dignity; teacher;

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1. Introduction

I state that one of the principal goal of teacher's work is to help remove the hurdles that teachers face every day in order to do their jobs. There are numerous ethical dilemmas that educators face on a daily basis. Michael, G. Gunzenhauser provided some background on ethical theory to explain the extent to which ethics as we have traditionally understood it in education has helped – but not completely – how educators respond to the challenges of being a professional educator. But first, the author very briefly summarized the various ways that educational theorists have approached these issues in the most recent literature on ethical teaching and ethical leadership. I will mention some essential works that centers the importance of ethics for educational practice, and all are especially recommended as resources for making ethics central to educational practice: Gert Biesta (2006) argues that we should go "beyond learning" in how we think about educational practice; Felicity Haynes (1998) draws from a broad range of ethical theory to argue for an ethics of consequences, consistency, and care; Robert Nash (2002) explains how "three moral languages" – rules and principles, character, and basic beliefs – can be brought to bear on ethical issues and professional practices; Ken Strike (2006) bases his ethics for school leadership partly on John Rawls' social ethics. When students define *ethics*, they connect the term to specific expectations that society has for professionals in professionals settings, such as codes of ethics. When students define *morals*, the term (or its variant morality) is usually reserved for prescriptive standards of behaviour imposed by some powerful entity. For these students, they consider the latter term to be outdated and dogmatic. According to Gunzenhauser moral principles are the basis of deontological ethics, and rules and duties are the basis for moral actions. Deontological ethicists consider these principles to be universal and categorical, and in ethical conflicts, deontological ethicists argue over which rule or principle should be more prominent. From the consequentialist ethics, the educator can draw the importance of the consequences of one's actions and the justification for a public education that serves all children to the best of their abilities. A moral actor can make the notion of consequences as complicated as she would like, considering even what kind of society she helps to create by acting the way she does in a certain situation. In that sen-

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se it can form the basis for a social ethics. Concerning the virtue ethics the most important set of virtues in the school are the ones that are being cultivated in the students. What virtues are the adults modelling for the students and encouraging through curriculum? To what extent are the difficulties the teachers having with the curriculum affecting the students? What is it they are learning? Virtue ethics can be more helpful if we could get a handle on those effects (Gunzenhauser, 47-50).

Then Gunzenhauser argues for three tenets of professionalism for educators: 1. As a professional, an educator is in a position to profess substantive beliefs about the meaning and value of education. In other words, a professional educator has a philosophy of education and engages others who may have different ideas about the meaning and value of education. A philosophy of education grounded on the care of the self is a philosophy of possibility. 2. As a professional, an educator is in a position to exercise ethical and professional judgment. An educator is in a position to continually develop ethical and professional judgment throughout his career and in his various positions of responsibility. Further, professional judgment spans the positions of educators throughout the educational sector. Active/ethical professionalism applies to educators, school leaders, school boards, teacher educators, graduate educators, and policymakers. 3. As a professional, an educator is in a position to acknowledge and resist opportunities to enact normalization on herself, students, and colleagues. One very important part of articulating an active/ethical professionalism is being clear on the role that resistance plays in order to achieve more defensible educational aims than those that are encouraged by high-stakes accountability policy. To act ethically, an educator needs to understand how and why her work must at some level be resistant (Gunzenhauser, 126-127).

2. The importance of ethics

When I stress the importance of ethics in education, it constitutes the repository of their social and cultural values, and the medium of their historical memory. In common usage multicultural education generally refers to education about different ethnic groups. As dialogue on cultural difference and education has spread to other nations, it has become more sharply focused on complex issues of identity, diversity, and citizenship. "the relationships between democracy, citizenship, and education cannot be treated in isolation from the question of multiculturalism." Several vectors of globalization have converged to raise the topic of multicultural education to the level of public, or at least professional, debate around the world today. The increasing cross-national mobility of people and the transnational communication of ideas that took place in the twenty-first century has fed into the contours of diversity around the world. It has also led to international dialogue. With increased human mobility and increasingly thick networks of communication, the common social fact of unequal educational experiences and outcomes is increasingly the subject of transnational dialogue. Educators around the world are faced with new challenges of balancing local, national, and global norms and moral as well as ethical values in the process of educating children. While fostering a sense of citizenship remains an important function of mass schooling, it is becoming less and less viable to do so at the expense of socializing children for their futures in a global society (Sutton, 100).

Schools should ensure multicultural perspectives are incorporated into all aspects of school life by: promoting diversity as a positive learning experience, incorporating multicultural perspectives across all learning domains, incorporating multicultural, anti-racism, and human rights perspectives in school policies and practices, enhancing teachers' and students' intercultural understanding and cross-cultural communication skills. Teaching multiculturalism in the classroom is important. At the basic level, multicultural education provides a fundamental education for all students, with the purpose of eliminating discrimination because of ethnic origin and background. By incorporating many cultures into the classroom, schools can celebrate diversity, learn about cultures around the world and raise awareness. There are four steps to bring multiculturalism into each classroom: 1. Provide a basic education for all students – it means to keep in mind that there are stereotypes for international students. By understanding that you will be teaching students from many different walks of life, you will have won half the battle. Therefore, do not favor or ignore international students specifically. You may feel like you should favor these students so you can teach them more, but it is important to treat all of your students, international or not, with the

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same respect and understanding. 2. Address language and cultural norms: dispel myths that are often associated with certain cultures; avoid using jargon while speaking; be willing to use multiple forms of communication to convey ideas; repeat and recap information; use visual aids for clarity; teachers encourages the usage of multiple modes of learning: including logical, mathematical, literate, kinesthetic, music and spatial methods; active listening may also help when there is a moderate language barrier; reading material on cultural norms may also help with transitions. Gestures in one part of the world may not mean the same thing in others. 3. Make it a learning experience - if you have just a few international students in your classroom, the best way to integrate their new perspective into your classroom is to integrate their cultures into the curriculum as well. One of the best ways for younger students includes incorporating fairy tales and folklore into the learning. Storytelling is a great way to have your students learn about new customs.

In connection with contemporary global issues in multicultural and globalized school environment I would like to stress ethical and human approach. Humanity and human dignity are the terms used in moral, ethical, and political discussions to signify that a being has an innate right to respect an ethical treatment. Young people must be able to measure current events against the yardstick of the principles of humanity, dignity and law and not just in terms of economic or political criteria; develop resistance to feelings of impotence and indifference and refuse to become hardened the face of complex and negative world events; develop tangible bonds of solidarity with the suffering or needy; develop the strength to reject acts which take account only of the end to be achieved and not of the consequences to themselves and others; to incorporate the minimum standards of behaviour to respect in the event of conflict in the values handed down by official educational establishments, families and social authorities and in the rules of the society.

3. Human dignity in the profession of teacher

When we speak about human dignity in the globalising teaching of ethics, it is necessary to state that in the process of ethics education, disparate (including potential) moral agents meet, in which various levels of ability to respect others can be observed (Bergem, 95). This is connected to the fact that some students at preschool age, but most at school age, come to a completely new school environment and dispose of varied levels of expressing appreciation and respect towards others. In the teaching profession, a very demanding and responsible job connected to a constant inflow of new students arises for, first of all, teachers (but, naturally, also for other pedagogical workers) to lead them in their reasoning and decision making, and to such behaviour and actions that are manifested in the form of respect towards all human beings, and mainly parents, teachers, other pedagogical workers, classmates and all other people they come in contact with. Teachers of ethics could be a significant stimulus (in the interaction with, especially, parents, but also other adults, primarily relatives, i.e. members of the nuclear and extended family) when forming students on their journey to achieving higher quality, or added value, of human dignity of a moral agent in the future (however, depending on the behaviour and actions of every individual). A crucial role of teachers, as well as the teaching profession as such, is to, together with parents and families, help students on their path from potential to full moral agents, which also means that they help children and youths in developing awareness of those times when respect and appreciation towards man depends, to a large extent, on his/her behaviour and actions (Strike & Soltis, 42). This also concerns emphasising the fact that respect and appreciation on the part of teachers (and also other adults) towards students at a higher school age (starting with puberty) depends, to a certain extent, on their behaviour and actions (Joseph & Efron, 213). In this way, the level of human dignity becomes partly dependant on their behaviour and actions.

With regard to the above facts in school and out of school environment, I assume that the principle and value of human dignity should be among the most significant in the mutual relationship of the teacher

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towards students and vice versa. Education at school should be directed at a full development of human personality and a strengthening of respect for human rights. It should help mutual understanding, tolerance and friendship (Fitzmaurice, 49). This aspect especially emphasises awareness of the obligation to accept this value and show respect, above all, on the part of teachers towards students. On the other hand, it embodies the obligation, or commitment, within the teaching profession, so that teachers lead and educate children and youths to mutual respect and appreciation towards the human dignity of other children as well as adults.

The globalising features in education are discipline and violence in and out of school which are becoming a problem of the present era (Morrell, 43). It has been a long time since good teachers rejected corporal punishment as a means which, in education, does not lead to anything good, but only humiliates human dignity and either nurtures self-conscious people or leads to further aggression and violence. In schools, we can most frequently come across verbal aggression, which, in many cases, may negatively influence not only the mentality of the teacher but also students. With regard to the problem of aggression and violence, I would also like to point out some aspects which are closely connected to shattering human dignity, or humiliation of individuals or some groups of students by means of behaviour or actions of teachers, or, possibly, their classmates or other individuals who are, in some way, involved in the school's functioning. It is often true that if the teacher does not respect the student's dignity, then he/she cannot expect his/her own dignity to be respected. Many of us remember teachers who formed our lives in a positive way but also such teachers, or principals, who degraded children's dignity, favoured boys over girls, or vice versa, or were only interested in children of influential parents (Billings, 66).

4. Conclusion

Every teacher should show an equal level of dignity to every person as an individual starting with their first common lesson. Teachers' respect towards the dignity of their students should also be manifested through how they fulfil their professional obligations; one of which is to clarify to the students, at the very beginning, the details of their study, the criteria of evaluation, the dates of their sessions, etc. Each lecture or seminar should start on time, and provide students with help or advice if necessary. Teachers at all levels of education should ensure the cognitive, intellectual and moral progress of their students and show them appropriate respect and appreciation. Keeping the set rules and requirements for fulfilling students' obligations and making sure that they do not change in the course of the term or school year merely through the teacher's wilful decisions is also a way of showing respect for the human dignity of students on the part of the teacher.

I state that a moral way of life helps the development of human life, it protects and supports it. At present, contemplations on these global ethical issues have been revived, thanks to, in part, discussions on ethics and morality regarding various professional aspects of human life. Many deal with moral issues occurring in individual professions and look for ways to solve them. With regard to these activities, there is an effort to integrate moral reasoning in people's professional lives in order to achieve happiness and contentment, or to minimise negative consequences. The new characteristics of the globalized world and its accelerated process of modernization have caused society to face situations considered unthinkable until then.

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The influence of different variables in evaluation within the building degree in the Polytechnic University of Madrid

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Abstract

In this paper we have analyzed different factors that affect the subject "Prevention and Safety I" evaluation, within the Building Degree from the Polytechnic University of Madrid and its influence in its students' learning, in order to establish guidelines for improvement in the evaluation. This paper reflects the influence in the evaluation of the base the students already have, the student's perception of the evaluation and the kind of evaluation made. With the results obtained, we have reviewed the teaching planning for the next year, in order to improve the learning objectives fulfilment.

Keywords: evaluation; objectives; teaching; learning; competencies. * Corresponding author. Tel.: +34 91 336 75 69
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1. Introduction

The adaptation of the university studies in Spain to the European Higher Education Area (hereinafter EHEA), has involved a change in the way of guiding the teaching, starting from broad and specific objectives, which allow to train professionals, from broad and specific skills which the student has to be able to develop and some learning results which the student must demonstrate. In the EHEA is foreseen, inter alia, the European Credit Transfer and Accumulation System application, whose purpose consists in establishing a credit system in order to promote the comparison among studies and the students and graduates' mobility. This system involves that the teaching objectives consist, not only in knowledge acquirements, as traditionally, but also in the development of a range of competences, that is, capacities and skills (Delgado & Oliver, 2006).

One of the most important issues of teaching is assessment (Hannan & Silver, 2005). Reviewing and qualifying are very important aspects in teaching and they affect in the process of helping and encouraging students to learn and understand their progress in their learning. For us, the teachers, they help us to find our weaknesses, in order to find the best way to teach. What would be ideal is that reviewing and qualifying interlock, benefiting learning and being related with the planned objectives and the obtained results (Ames & Ames, 1991).

The assessment type determines the number of approved, but not always the level of knowledge acquired. That is why it is important to study the influence of different methods of assessment, in order to determine which one reflects better the learning. In assessment also affects, as the assessment method, the human factor, what is to say, what the student thinks about the adequacy or inadequacy of the assessment system (Bain, 2004).

Taking into account the previous premises, the aim of this paper is to analyze the different factors which affect assessment in the technical subjects and its influence in the students' learning, through the

analysis of the assessment made in the subject "Prevention and Safety I" from the Building Degree from the Polytechnic University of Madrid, during the year 2013-2014, in order to establish guidelines to improve assessment. This subject is taught in the third year and the analysis has been made with students who have studied this subject in the continuous assessment mode.

2. Approach to work

2.1. Stages of the research

"Prevention and Safety I" is a compulsory subject of third year (sixth semester) of 6 ECTS credits and of type II. The continuous assessment done in the subjects during the year 2013-2014 has been chosen by the 99% of the students. This assessment has been divided into three large parts:

- Three individual practices, made during the semester, concerning particular parts of the contents. Each one calculates the 10% of the global mark. Each test involves a particular part of the contents different from the other tests'.
- A group practice, which calculates the 10% of the global mark.
- A global test, made at the end of the semester, which calculates the 60% of the global mark. In this test, which is global and concurrent to all students, regardless of their group, all the contents of the subject are included and it is necessary to obtain a minimum mark of 5 out of 10 in order to pass the subject.

To analyze the type of assessment and respond to the aim of this research, we are going to study assessment from different points of view. First, we are going to analyze directly the marks. Then, we are going to study assessment from the students' point of view, relating their perception of the subject to the results. Finally, we will analyze the influence of the different methods of assessment in the marks.

2.2. Data gathering strategy

The students' marks are in the database of the teachers who teach this subject, whereas the data offered by the students are part of the filling of a datasheet by the students of the groups 2 and 3 of the subject "Prevention and Safety I", during the year 2013-2014. This sheet was filled individually inside the classroom, three months after the start of the classes, but without having presented the group practice, in order to avoid that the obtained mark could influence the valuation of the subject. All the valuations were made in a scale from 1 to 5, in this way: 1-strongly disagree; 5-strongly agree. The sheet was divided into four large blocks, which allowed the data gathering in the following aspects: The call in which they passed the basic and fundamental subjects for the understanding and the learning of the subject, the student valuation of the fulfillment of the learning objectives planned in the subject, the method of assessment used and the effectiveness of the system of assessment concerning the learning and the encouraging.

3. Results

The global analysis of the gathered data from the students for this research is detailed below:

- The number of students to whom we have made the research is 80. 50 students have passed all the specific subjects that contribute necessary knowledge to know the structural process where the preven-

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tion and safety are analyzed (62.5%). 40 students have passed subjects scheduled in the teaching plan at the same time as "Prevention and Safety I" (50.0%).

- Only 4 students asked for being tested by the "Only final test". The percentage of students who have passed the subject is the 70.0% (56 students).
- The average valuation of the students about the relation between the hours and the ECTS credits is 3.8 and about the benefits of the type of assessment is 3.5.
- The average valuation of the students concerning the achievement of the learning objectives is 3.8, and about the benefits of assessment in the learning is 3.4.

The results obtained in the system of assessment done in the subject "Prevention and Safety I" in the year 2013-2014 are showed below (Fig.1).

As showed in the picture, the percentage of students who have failed the subject is the 30.0%, compared to the 70.0% who have passed it, what shows a high number of passed students in continuous assessment, because it is a very practical subject (Fig.1).

Fig. 2 shows the relation between the marks obtained by the students and the base of knowledge the students have when they start to study the subject. We have considered as basic subject: Principles of Construction Materials, Chemistry and Geology and as specific subjects: Construction Materials I and II, Introduction to Building Construction, Masonry and Cladding Construction, Timber and Concrete Structure Construction, Steel Structure Construction, Roof and Envelope Construction, Site Equipment and Auxiliary Systems. We have also checked if the students have passed two specific subjects more, which, in the education program are taught in the same semester as "Prevention and Safety I". They are Site Work Planning and Management I and Bill of Quantities and Real Estate Valuation and Assessment.

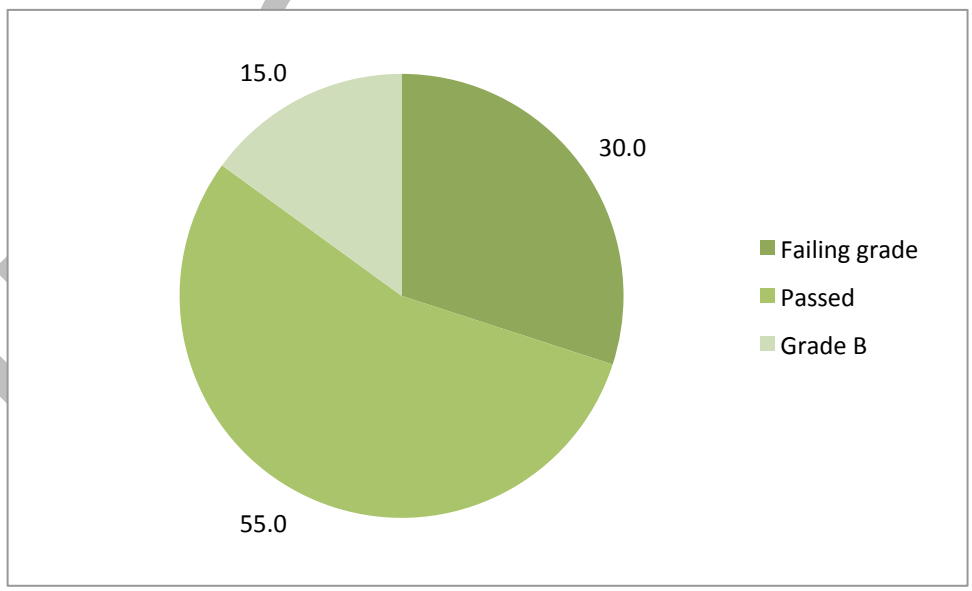


Fig. 1. Percentages depending on the marks.

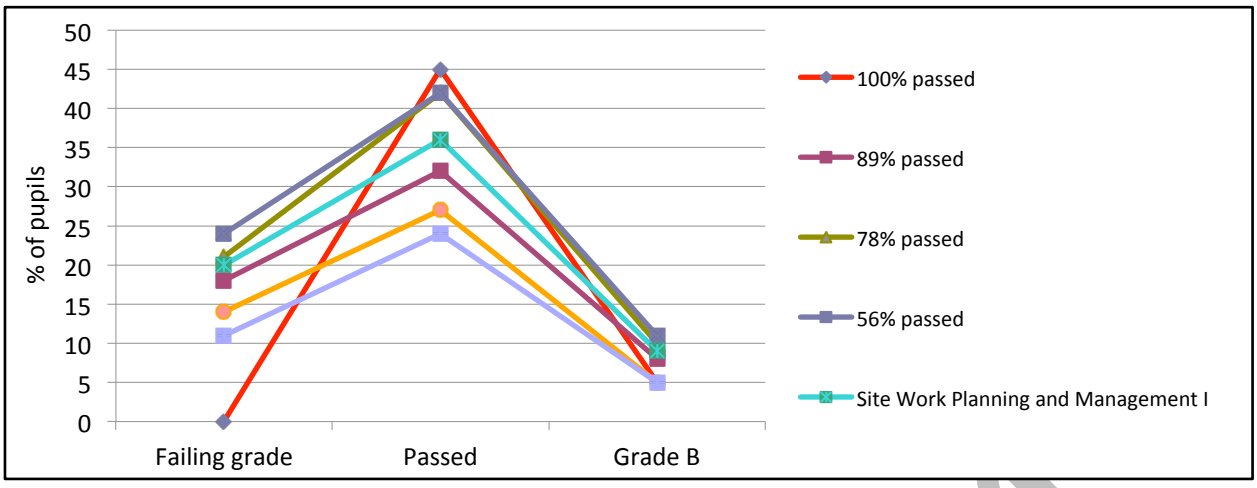


Fig. 2. Percentage of students who have passed the basic and specific subjects.

Next, we are going to compare the marks with the students' perceptions in different aspects. Fig. 3 relates the marks with the perception of the students between hours spent in the subject and ECTS credits. There, we can see that the students who obtained better marks are the ones who express better interrelationship between hours and credits. Fig. 4 relates the marks with the student's valuation about the type of assessment used. This figure shows that all students have a similar perception between the type of assessment and the marks.

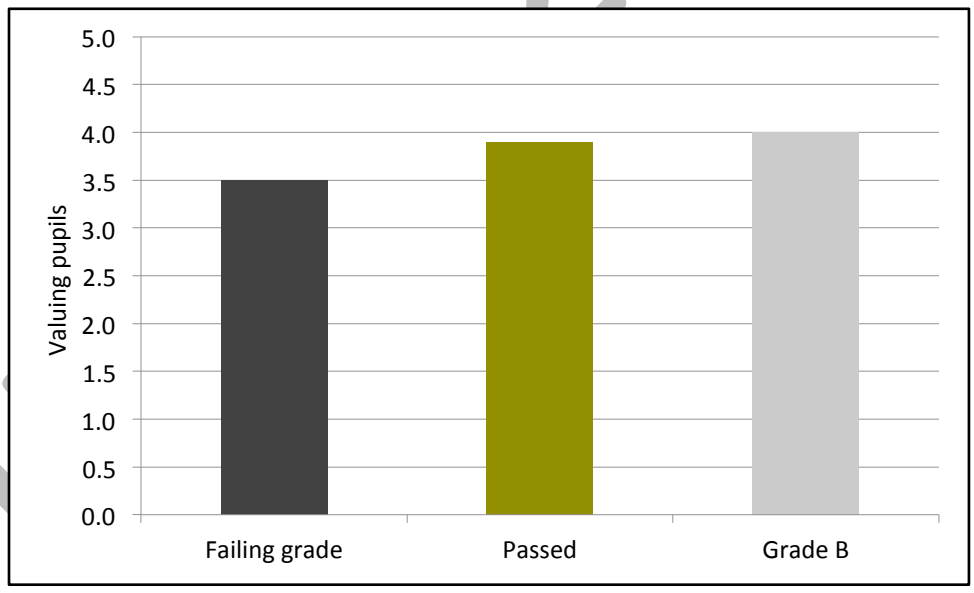


Fig. 3. Relation between the marks and the valuation about the relation hours-ECTS credits.

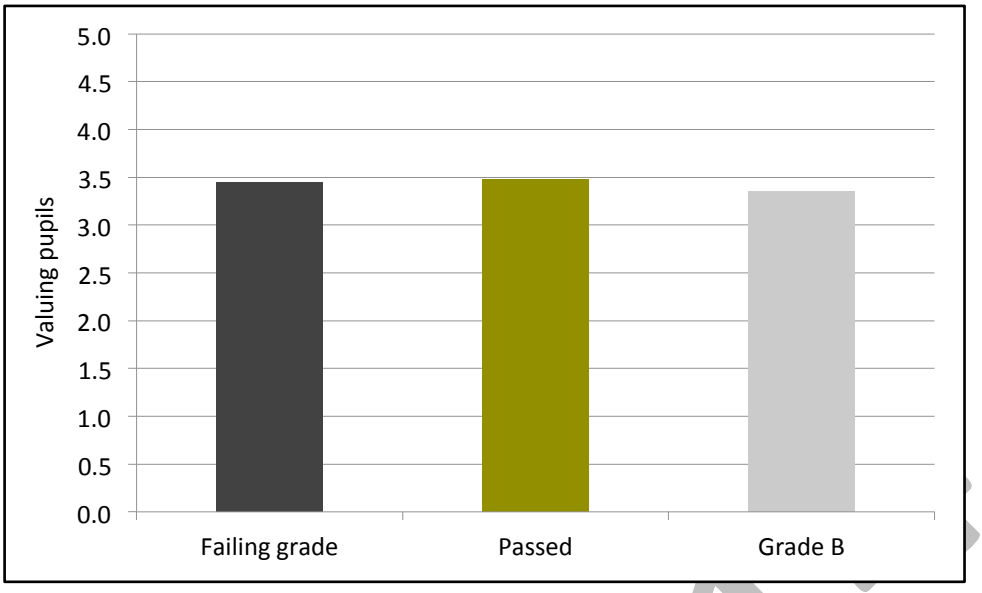


Fig. 4. Relation between the marks and the valuation of the type of assessment done.

Fig. 5 shows the relation between the marks and the perception about the fulfillment of the learning objectives. Oddly enough, the students who have failed value better this parameter. Finally, within the assessment analysis from the student's perspective, Fig. 6 shows the relation between the marks and the students' valuation about the usefulness of the type of assessment used for learning. Here, the students with better marks are, again, the ones who value better the method of assessment used.

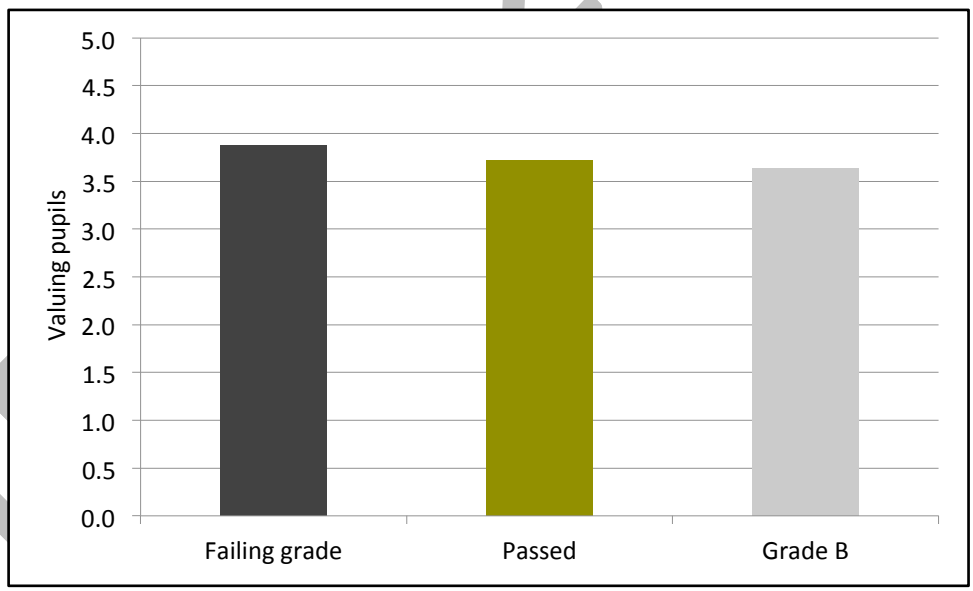


Fig. 5. Relation between the marks and the valuation of the learning objectives.

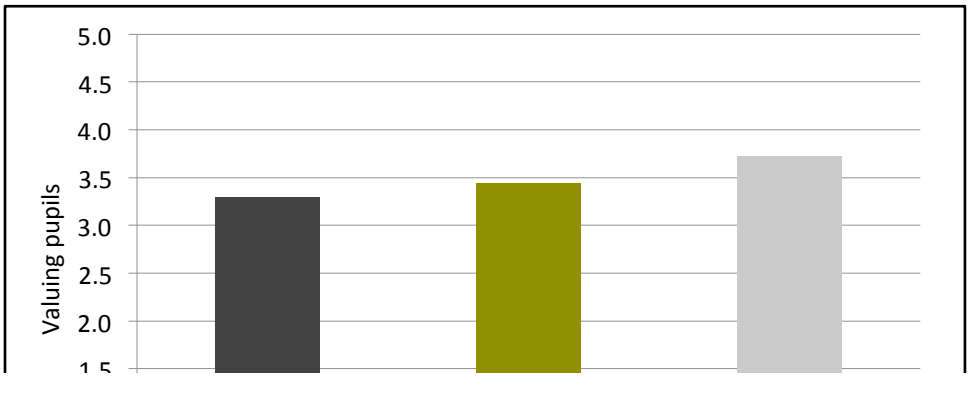


Fig. 6. Relation between the marks and the valuation of the benefits of assessment in learning.

4. Results analysis

The students' marks (Fig. 1) show that the percentage of students who pass the subject rises to the 70.0%, what involves a wide dedication to the subject.

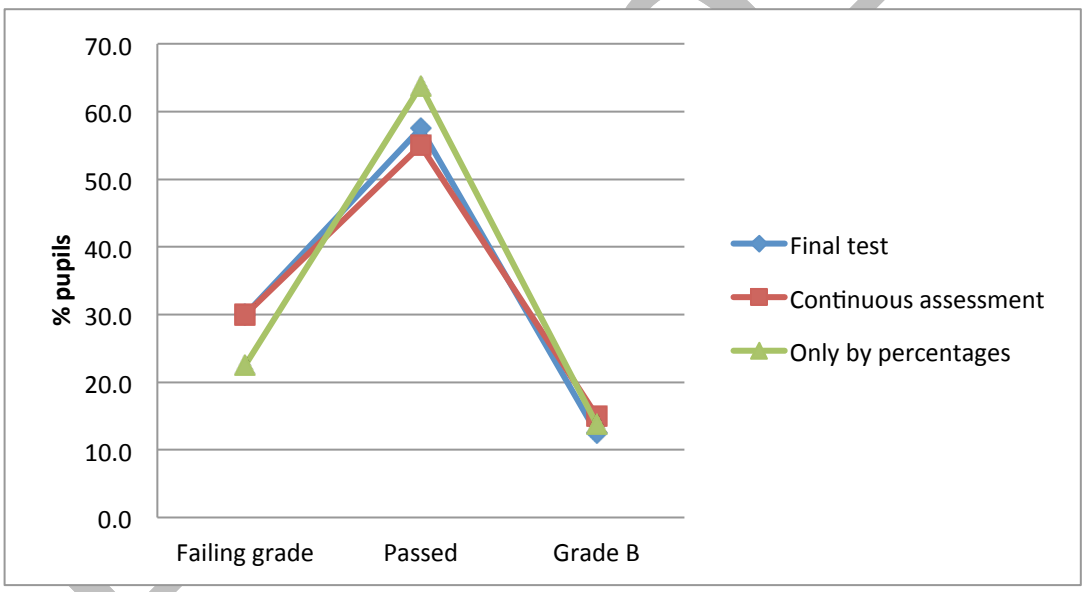


Fig. 7. Relation between the students' marks and the type of assessment.

Fig. 2 shows that the students who have passed the 100% of the basic and specific subjects have obtained better marks than the rest, especially when none of them has failed Prevention and Safety I. We can see that the percentage of failing grades in Prevention and Safety I increases as the student has failed more subjects. Also, the students who have passed the subjects Site Work Planning and Management I and Bill of Quantities and Real Estate Valuation and Assessment have a lower number of failing grades.

As can be seen in Fig. 3 and Fig. 6, the marks obtained by the students are proportional to their perception of the relation hours-ECTS credits and the benefit of assessment in the learning of the subject.

Analyzing Fig. 7 we can notice how, from the students' learning, the type of assessment affects the marks. However, when assessment is based only in the exams, the results are almost equal to the continuous assessment results. The only difference is that through continuous assessment the number of B grades is higher than through the assessment with exams only. The way to improve the results would be to remove the requirement to obtain a 5 at least in the gradable test in continuous assessment. Applying the same percentages indicated for the individual and group practices and the exam that we indicated in section 2. 1, and removing this requirement, we would have obtained a 7.5% less of failing grades.

5. Conclusions

As a response to the aim of the research, we are going to detail the conclusions and the possible strategies to improve.

- The student's perception of a subject is a determining factor in his motivation, obtaining better marks the students who have a positive view of the subject.
- The overcoming of basic and fundamental subjects from previous years affects, clearly, the marks.
- It is necessary that assessment benefits learning, encouraging the feedback, the motivation and the understanding skill by the students of his own learning process.
- The type of assessment used affects the marks and the way of confronting the subject learning. Continuous assessment is the better way to drive the student's work and the easiest way to acquire the required skills. However, it is necessary to remove the requirement of obtaining a minimum mark of 5 out of 10 in the grading test.

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The influence of learner characteristics on social presence

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Abstract

Social presence is one of the more important constructs for determining the level of interaction and effectiveness of learning in an online environment. The purpose of the present study is to determine what individual learner characteristics can influence student ratings of their online social presence. The results build on previous research reported but with a larger sample size drawn from practicing teachers enrolled in online postgraduate courses. The study also affirms that the revised Computer-mediated Communication Questionnaire (Tu, 2005) is an adequately reliable measure of the construct social presence.

Keywords: Social presence, Computer-mediated Communication, Learner Characteristics

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1. Introduction

The genesis of social presence lies in the conceptualization from social psychology of immediacy (Weiner & Mehrabian, 1968) and intimacy (Argyle & Dean, 1965) surrounding face-to-face communication. In face-to-face communication, immediacy refers to the psychological distance between two speakers, whereas intimacy is the closeness obtained, verbally and non-verbally, among individuals and maintained by immediacy behaviours (Rettie, 2003). When applied to computer-mediated communication, (i.e. CMC) Short, Williams, and Christie (1976) report that the social effects experienced are caused by the degree of social presence afforded users with Gunawardena (1995) further noting that immediacy behaviours enhance and maintain social presence.

To frame good pedagogical practices for online learning, Garrison, Anderson, and Archer (2000) developed the community of inquiry model to recognize the transactional relationship between instructors and learners through the interaction of cognitive presence (of the learner), teaching presence (i.e. the structure and process), and social presence (i.e. affective interpersonal communication). According to Garrison et al. (2000), these elements, which define the community of inquiry model, are fundamental to a successful higher education learning experience. A key component in the model is the concept of social presence, which refers to the affective domain as it relates to interpersonal communications.

In assessing social presence within a text-based, asynchronous environment, Rourke**,** Anderson**,** Garrison**,** and Archer (2001) identified three categories of communicative responses: affective indicators (i.e., values, beliefs, feelings, and emotions); cohesive indicators (i.e. group presence and commitment); and

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interactive indicators (i.e., attending in a socially meaningful way). Although Rourke et al. recognize that the coding and analyzing of CMC text-based transcripts using the aforementioned indicators provides a measure of the density of social presence, they also contend future exploratory studies including factor analysis would aid in further defining the construct.

The construct of social presence is the critical affective ingredient for online learning. Several researchers have demonstrated that social presence is a vital concept to be facilitated, developed, and sustained as it encourages and supports communication-based learning (Garrison et al., 2000; Kim, Kwon, & Cho; 2011; Lobry de Bruyn, 2004; Rourke et al., 2001; Tu & McIssac, 2002). However, learner characteristics including age and sex (Packham, Jones, Miller, & Thomas, 2004); one's readiness for e-learning (Smith, Murphy, & Mahoney, 2003); and computer self-efficacy (Hayashi, Chen, Ryan, & Wu, 2004) can also influence the persistence and motivation of online learning among students.

2. Purpose

The objective of the present study then is to determine what if any individual learner characteristics that include sex, age, teaching experience, number of online courses courses taken, years using the internet, years using email, and self-rated computer-mediated communication (CMC) proficiency can influence teacher ratings of their online social presence. A valid and reliable measure of social presence was administered (CMCQ: Tu, 2005) and demographic variables including age, sex, number of years teaching, number of online classes taken, and readiness for online learning (as measured by CMC proficiency) were determined. This research provides the opportunity to better assess what individual learner characteristics affect the degree of social presence experienced within an online learning environment.

3. Method

The participant sample is derived from students (i.e. practicing teachers) enrolled in postgraduate special education online courses offered at the University of Saskatchewan. The postgraduate program is comprised of 9 courses that are offered over a two-year period. Using convenience sampling, 275 students enrolled in the postgraduate program participated with a 90 percent response rate attained. Those enrolled in the program were varied demographically in age, proficiencies with computer mediated technologies, years of teaching experience, and experience with online learning. Participants in the study voluntarily completed the computer-mediated communication questionnaire (CMCQ; Tu, 2005). The sentence stems on the CMCQ were used to identify social presence in a text-based system with the CMC tools (email, discussion, and chat). The respondents were asked to complete each of the instrument's 24 items on the basis of a five-point Likert scale converted to a numerical weighting ranging in options from 0 (uncertain); 1 (strongly disagree); 2 (disagree); 3 (agree); and 4 (strongly agree). A reliability analysis for the instrument was conducted with a Cronbach alpha reliability coefficient value equal to or above .70 considered to reflect a high internal consistency. A visual inspection of the corrected item total correlations was then conducted with items below .10 deemed as outlier test items. Two items were deemed as outliers and were removed (i.e. items 4 & 19). The subsequent reliability analysis of the 22 remaining items reflected relatively high internal consistency with a Cronbach alpha reliability coefficient for the CMCQ instrument calculated at .732. A total raw score was then calculated with high scores indicating a strong degree of online social presence and low scores indicative of a lack of social presence.

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A self-rated CMC proficiency variable was obtained by aggregating three other five-point Likert scale variables, exclusive of the CMCQ, that pertained to the forms of CMC specific to each of email, discussion, and chat. A reliability analysis for the new variable was conducted with a Cronbach alpha reliability coefficient value equal to or above .70 considered to reflect a high internal consistency. A visual inspection of the corrected item total correlations for the three variables was conducted with items below .10 deemed as outlier test items. The Cronbach alpha reliability coefficient for the CMC proficiency scale was calculated at .824, indicative of a high internal consistency, with no items deemed as outliers. The mean values for the three five-point Likert scale variables pertaining to CMC forms of communication (email, discussion, and chat) were then combined and calculated to provide a new mean value representative of a CMC proficiency scale with low scores indicative of a high self rated CMC proficiency.

Correlation coefficients were used to determine the relationship between social presence, as measured by the total score on the CMCQ, and individual demographic, internet, email, and online learning readiness (i.e., CMC proficiency) variables. To determine which combination would be a better predictor of social presence scores, the variables were entered into a multiple linear regression analysis (enter method) to obtain a regression equation. The non-manipulated categorical variables were all dummy coded for inclusion in the multiple regression analysis (Pedhazur, 1997). Analysis of variance was used to determine if there were any significant differences in social presence scores as a function of the individual demographic and readiness variables.

4. Results

Frequency counts for the demographic variables age, sex, number of years teaching, number of online classes taken are displayed in Table 1. When examining the frequency counts, it was found that although sex was initially a variable considered having a potential impact on social presence it was excluded from further analysis because of the low number of males in the sample.

Table 1. Frequency Demographics, N=275

Demographic Variable	Frequency	Percent
Sex		
Male	20	8.3
Female	254	91.7
Age		
18-25	39	14.1
26-33	95	34.3
34-41	84	30.3
42 or older	59	21.3
Teaching Experience		
0-3 years	83	30.2
4-6 years	59	21.3
7-10 years	61`	22
More than 10	72	26

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Number of Online Courses		
1 course	113	40.8
2-3 courses	78	28.2
4 or more courses	86	31.0

Correlations for the dependent variable (i.e., total score on the CMCQ) and the independent variables (i.e., age, teaching experience, number of online classes taken, years using email, years using internet, and CMC proficiency) are displayed in Table 2. Inspection of Table 2 reveals significant correlations between the CMCQ and the number of online classes taken and the online learning readiness variable CMC proficiency, with age and number of years teaching also moderately correlated with one another.

Table 2. Correlations

	CMCQ Social Presence	Number of Online Courses	Age	Teaching Experience	Years Using Email	Years Using Internet	CMC Proficiency
CMCQ Social Presence	1	.149*	.043	.045	-.029	-.019	-.233*
Number of Online Courses	.149*	1	.118*	.085	.072	.101	-.261**
Age	.043	.118*	1	.623**	-.222**	-.185**	.119*
Teaching Experience	.045	.085	.623**	1	-.122*	-.083	.059
Years Using Email	-.018	.072	-.222**	-.122	1	.664*	-.306**
Years Using Internet	-.004	.101	-.185**	-.083	.664**	1	-.261**
CMC Proficiency	-.223**	-.261**	.119*	.059	-.306**	-.261**	1

* Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

For the multiple regression analysis the CMCQ is the predictor variable for social presence. Independent variables include age, teaching experience, number of online courses taken, years using the internet, years using email, and CMC proficiency. The enter selection method for the independent variables in the linear regression analysis was used. Examination of the strength of the equation reveals that the predictive power of the equation was moderate at 11 per cent where the proportion of variation in predicting online social presence is accounted for by number of online courses taken and CMC proficiency (Y=59.22 + 1.19[courses online] + [-3.76][CMC proficiency]). The multiple R was .33 and the proportion of variance accounted for was .11 (F [6, 258]=5.21, p<.00). The moderate predictive power of the equation was likely due to restricted variability in the sample, as "the reduced variability will cause the value of *r* to be less than its value in the unrestricted sample" (Glass & Hopkins, 1996, p. 123). For the present study, because only learners in their first year of online courses were sampled there was evidence of restricted variability in the sample.

One way ANOVA's were used to determine whether a significant difference occurred among students in online social presence based on age, teaching experience, number of e-learning courses taken, years using the internet, years using email, and readiness for online learning (i.e., CMC proficiency). The analysis of variance results indicate that a significant main effect for number of online learning courses F (2, 273) = 3.991 p<.05 exists with Levene's test of homogeneity of variances insignificant. In conducting the post hoc analysis, the Scheffé statistic was used because pairs of means with dissimilar group sizes are compared. The mean difference for online social presence, as measured by the total score of the CMCQ, was significantly lower for learners in their first online course as compared to those who had taken 2-3 or four or more online courses.

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4. Discussion

The present study sought to explore what if any individual learner characteristics of teachers enrolled in online special education courses predict the degree of social presence experienced. Findings reveal that the number of online courses taken followed by self-rated CMC proficiency are significantly correlated and are the salient predictors of social presence. Interestingly, the number of years of teaching experience and age of the teacher enrolled in the online courses are not significantly correlated with social presence as measured by the CMCQ. This would seem to indicate that online learning is accessible to learners of all ages. However, a limitation of the study is the use of convenience sampling and the homogeneity of the sample as it relates gender, although research on the construct social presence has found that gender differences do not appear to exist (Kim, Kwon & Cho, 2011; Tu, Yen & Blocher, 2011). Nevertheless, a more systematic sampling procedure should be considered in future research.

The functionality of CMC technology incorporated into text-based online learning environments and the usage of such tools among students can effect affective communication among users. If we desire our learners to be highly collaborative in their professional practice then it is important that they are provided the requisite training necessary to embrace computer-mediated communication so as to emulate these practices in their course work.

Further, instructors need to construct interaction patterns to overcome the inherent challenges of the medium. Informality and friendliness modelled by the instructor coupled with frequent interaction can facilitate this process (Tu, 2002; Tu & Yen, 2006). What this implies is that development and support for faculty in delivery of online courses is needed. Similarly, novice online students with limited CMC proficiency skills need to be made aware of how interaction is structured for online learning. Nevertheless, social presence can also be developed through instructional design strategies that include limiting enrolment (i.e. to a 30:1 ratio; Rovai, 2001) development of collaborative course assignments (Aragon, 2003; Mykota, 2013, So & Brush, 2008) and enhanced media integration (Kim, Kwon, & Chow, 2011).

5. Conclusion

Affective communication for online learning needs to recognize that instructors and course designers must facilitate and deliberately structure interaction patterns to overcome potential barriers to establish social presence. Moreover, if online learning is an accessible and flexible learning environment and if educators desire their learners to be highly collaborative in their professional practice then it is important that they are provided the requisite training necessary to embrace computer-mediated communication. This study contributes to knowledge and research on social presence through the applied measurement of the construct and confirms previously reported findings on CMC proficiency (Mykota & Duncan, 2007). Future research should continue to explore the construct, social presence, as measured by the CMCQ with varying samples and contexts so as to replicate previous research on the validity and reliability of the instrument. Additionally, qualitative phenomenological or grounded theory studies could be conducted to delve in-depth into the meaning of affective communication in a text-based environment and its effect on the learner's cognitive presence.

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The influence of using e-learning tools on the results of students at the tests

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Abstract

The paper describes the e-learning tools introduced to enlarge the range of background studying tools for students in the obligatory course Law basics at the University of Economics, Prague. Furthermore the paper analyses the influence of introducing e-learning tools on the results of students at the progress test of this course. The analysis compares the results of questions from the area of law where the tool was provided in a pilot version with the results of questions, where the e-learning tool was not provided. The results from the previous year, when the e-learning tool was not available at all are examined and compared too. We expect the positive influence of using e-learning tools on the results of students would be confirmed and if yes we will continue in further e-learning tools development.

Keywords:E-learning tools, Knowledge of students, Evaluation of results

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1. Introduction

The University of Economics, Prague (UEP) is the biggest public university of economics in the Czech Republic. Students of all branches of economics studies at the UEP are acquainted at least with basic principles of law in general and with the main principles of the commercial law in the course Law basics.

This course is assured by the Department of Business and European Law and is obligatory for all students of the UEP. The course is attended by approximately more than 2 000 students per academic year. The main aim of this course is to provide students with necessary basic knowledge of law especially in the field of the theory of law, theory of state, civil law and main principals of contract law. Special focus is put on business law at the national and also European level.

This knowledge is necessary for further consecutive courses in all study programs at UEP and should be useful for students after finishing their studies at their work and also in a daily life.

The knowledge of students is checked at final oral examination. To successfully pass the course students should be acquainted with basic terms of theory of law; they should identify the applicable legal provisions, know the basic types of contracts, determine the differences among types of business companies and identify the conditions for liability and the consequences of breaching obligations.

To ensure the high level of standard and the highest possible benefit of the course for students any possible improvements are constantly considered. One of the improvements was the introduction of the system of progress testing of students which is done by computerized tests in the mid-term and at the end of the course. In case of failing one of the tests students are enabled to resit the test once. When failing both of the tests or when failing the resitting test the student fails the whole course and has to repeat it following semester.

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The computerized method of progress testing of students helps the lecturers to continuously analyse the results of students at progress tests and at final exams at the same time. It also enables the lecturers to gain other useful data for further analysis of problematic issues, parts of the course, misleading questions or differences among particular lecturers.

One of the improvements the lecturers would like to introduce as well is to provide students an e-learning tool that would enable them to continuously check their knowledge after each lecture, to better understand each topic and to better prepare themselves for progress tests and final exam.

Provided e-learning materials should also help students to deal with the impacts of the process of re-codification of private law in the Czech Republic which has been effective since 1st January 2014.

The old Civil Code and the Commercial Code were derogated and replaced by the new Civil Code and the Companies Act. New legal regulation has brought many changes having direct impact on many areas of Czech private law especially on entrepreneurs because business law was the area with the most significant changes. The new Civil Code regulation has also unified the main principles of law of obligations which were unclearly spread both in the old Civil Code and the Commercial Code till the end of 2013.

It is necessary to deal besides other things with fundamental changes concerning Czech Limited Liability Company (s r. o.) and Public Limited Company (a. s.) new rules for company's statutory body members or dissolution of corporations as legal entities especially regarding the differences between the new and old legislations.

E-learning materials could therefore help students better understand the consequences of mentioned legal changes and their impacts.

The e-learning tool was elaborated and provided to students in pilot version in previous semester only in certain topics (areas of law) that are presented to students during the course.

The analyses of results of students at progress computerised tests in case of the set of questions concerning these areas and in case of questions from the areas that were not covered by the e-learning tool and their in-depth comparison are discussed further in the article. The elaboration of e-learning materials for all lectured topics will be decided based on the results of the research. The differences in particular types of questions which are included in the computerised test will be also analysed and discussed.

2. Literature Review / Research rationale

In the literature there exist many studies which examine the influence of provision the e-learning tools to the results of students.

Fatih Baris and Tosun described the influence of using e-tools in the education process at the high school and concluded the positive influence of this tool on students.

Heath described the benefits and also disadvantages of creating and developing of electronic portfolios which could be used for different purposes.

Horovčák et al. conclude that electronic version of testing presents modern and effective form of feedback from students to teacher and that electronic testing has its own unique place in the whole education process.

Stanescu et al. also prove the advantages of an e-learning tool that permits generation of questions from the certain base of question defined previously.

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Viciana et al. describe a computerized system that allows researchers creating, applying and tabulating surveys and paper instruments in an automatized way and consider them as a useful tool since it permits to input data with higher precision and no need for previous codifications.

Dindar et al. also describe the role of multimedia in education and in testing of students.

Deep research of using multiple choices testing at entrance exam for University of Economics in mathematics which is also computerized was conducted by Klůfa who perceives multiple choices testing as optimal and objective for entrance examinations at University of Economics, Prague.

3. The context of the study and the research questions

The main aim of the paper is to analyse the data available from computerized system of testing of students in the obligatory course Law basics before and after providing the e-learning tool for them in some areas of lectured topics and to verify if the provision of the tool has had some impact on the results of students at the progress tests. For this purpose the essay shall discusses following hypothesis at first.

H1: The provision of the e-learning tool has got a positive impact on the correctness of answers of students at the progress test.

When providing the e-learning materials for students only in some areas of lectured topics we presume that students could rely on provided materials and will concentrate primarily on these topics and their results in questions from other topics will therefore tend to get worse. To analyse this presumption following research hypothesis is discussed:

H2: The provision of the e-learning tool only in some areas of lectured topics has got a negative influence on results of students in case of questions from the areas of law where the tool was not provided.

To verify the influence of the provision of the e-learning tool it is also necessary to compare the results of students in case of questions from the area of law where the tool was provided in a pilot version with the results of students in case of questions, where the e-learning tool was not provided. In this context we pose following research hypothesis.

H3: The differences in correctness of answers of students in areas where the e-learning tool was provided are more positive than the differences in correctness of answers of students in areas where the e-learning tool was not provided.

To confirm and validate the findings of the analyses and exclude other influences we would also like to verify the results by comparing them with the control sample results from the previous year when the e-learning tool was not available. For this purpose the last two hypotheses are brought up.

H4a: We presume that the differences of average correctness of answers at regular test and at the resitting test from last year when the e-learning tool was not available are not significant.

H4b: The differences in correctness of answers of students in areas where the e-learning tool was provided are more positive than the differences in correctness of answers of students at the test from the previous year.

4. Changes in the correctness of answers after additional study materials were provided

After above mentioned considerable changes of Czech legislation which has been effective since 1st January 2014 the content of lectures of the course Law basics had to be revised and the content of the lec-

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tures deeply modified and adapted to new recodified legislation. Together with this the question base of the computerised progress testing had been examined and largely revised too.

After the changes were applied the results of students got significantly worse and many of them failed especially the second progress test, which is focused mainly on business law. The e-learning tool was therefore prepared afterwards and provided to students before the resitting test.

The research was carried out afterwards by analysing the data collected from the results of all students at the second (regular) progress test and from all students at the resitting second test, when the e-learning tool was available. In the pilot version the e-learning tool was available for topics covering 153 questions out of 447 questions in total. For each question of the test the correctness rate at the regular test and at the resitting test was examined. Afterwards the correctness of answers on each question from regular test was deducted from the correctness of answers on each question at resitting test.

Table 1 describes the analysis of results from part of the test where the e-learning tool was provided in pilot version. This part covered 153 questions which were distributed into three categories according to the type of the question (choice question with one correct answer, choice question with multiple correct answers and open question) and for each type of question the average correctness of answers before introducing the e-learning tool (at the regular test) and after (at the resitting test) and its differences were examined.

Table 1 Difference in average correctness of answers before and after the provision of the e-learning tool

Type of question	Number of questions where the tool was available	Average correctness of answers before tool was provided (%)	Average correctness of answers after tool was provided (%)	Difference in average correctness (percent points)
Choice with one correct answer	71	48.63	67.46	18.83
Choice with multiple correct answers	54	33.01	53.13	20.13
Open question	28	47.61	67.03	19.42
Total	153	43.10	62.33	19.23

Derived from Table 1 we can see that average correctness of answers differs for each type of question and especially at choice questions with multiple correct answers which are more difficult to answer the average correctness was around 33 % before the tool was provided. Despite this fact we can see that after the provision of the tool the average correctness of answers increased in average by around 20 percent points at each type of question. As a result of findings as described above we can confirm H1 and state that the provision of the e-learning tool to students helped to increase the average correctness of answers at the test from 43.10 % to 62.33 % and the average correctness grew by 19.23 % percent points.

5. Changes in the correctness of answers in case the additional study materials were not provided

We presume that the provision of the e-learning materials only in some areas of the course could have caused negative impact on the correctness of answers on questions from the other areas where the e-learning tool was not provided. We have therefore decided to deeply examine also the answers on this part of questions, (294 questions out of 447 questions in total) in Table 2.

Table 2 Difference in average correctness of answers in areas without the provision of the e-learning tool

Type of question	Number of questions where the tool was not available	Average correctness of answers at regular test (%)	Average correctness of answers at resitting test (%)	Difference in average correctness (percent points)
Choice with one correct answer	115	52.56	51.41	-1.15
Choice with multiple correct answers	163	30.70	39.96	9.25
Open question	16	41.50	60.13	18.62

Total	294	39.88	45.53	5.66

The Table 2 describes the comparison of results at regular the test and at the resitting test. In this case, where the e-learning tool was not provided the results of students did not get worse. The average correctness of answers in case of this set of questions increased from 39.88 % to 45.53 % and the average of correctness grew by 5.66 percent points. Partial results are slightly negative in case of choice question with one correct answer (difference is minus 1.15 percent points) on the other hand the results are quite positive at open question (increase by 18.62 percent points).

We can conclude that students underestimate a little their situation before the resitting test at the choice questions with one correct answer but in general we can conclude and reject the H2. The provision of the e-learning tool only in some areas of lectured topics did not have a negative influence on the results of students in case of questions from the areas where the tool was not provided.

6. Comparison of the correctness of answers on questions with and without study materials provided

To deeply analyse the influence of introducing the e-learning tool we would like to compare the results of students in case of questions from the lectured topics where the tool was provided in a pilot version with the results in case of questions, where the e-learning tool was not provided as it is shown in Table 3.

Table 3 Comparison of average correctness of answers on questions with and without the e-learning tool

Type of question	Difference in average correctness of answers on questions with the tool (percent points)	Difference in average correctness of answers on questions without the tool (percent points)
Choice with one correct answer	18.83	-1.15
Choice with multiple correct answers	20.13	9.25
Open question	19.42	18.62
Total	19.23	5.66

Results summarised in Table 3 confirm that the positive difference of average correctness of answers on questions where the e-learning tool was subsequently provided is higher than on questions where the tool was not available. Only in case of open questions the correctness comparing regular and resitting test increased regardless the provision of the e-learning tool. Students probably concentrate on this type of questions before the resitting tests more, because this type of question is the most difficult to answer.

Summarizing the results we can confirm our presumption at H3. The average correctness grew by 19.23 percent points in case of questions included in the e-learning tool and by 5.66 in case of questions not covered by the materials when comparing the regular and resitting test.

7. Verification of the changes in the correctness of answers comparing the results from the previous year

To verify the data gained by previous analyses we would like to exclude other possible factors that could influence the differences in average correctness at regular test and ressiting test. We are therefore going to compare the data with the control sample of results of students from the previous year (2013) when the e-learning tool was not available. We presume that the differences of average correctness of answers at regular test and at the resitting test from last year would not be significant. At the same time we presume that when comparing the difference of average correctness of answers on questions after the

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provision of the e-learning tool this year and the differences of average correctness of answers at regular test and at the resitting test from last year the positive influence of the e-learning tool will be confirmed.

Table 4 Comparison of difference in average correctness of answers with results from the previous year

Type of question	Number of relevant questions 2013	Average correctness of answers regular test 2013 (%)	Average correctness of answers resitting test 2013 (%)	Difference in average correctness of answers 2013 (percent points)	Difference in average correctness of questions with the tool 2014 (percent points)
Choice with one correct answer	35	67.00	66.13	-0.87	18.83
Choice with multiple correct answers	62	46.23	43.34	-2.90	20.13
Open question	2	72.97	71.43	-1.54	19.42
Total	99	54.11	51.96	-2.15	19.23

As indicated in the Table 4 differences in average correctness of regular and resitting test were slightly negative in previous year and the average correctness was almost the same at both tests and at each type of question. We can therefore confirm hypothesis H4a and conclude that there are no other influences that could affect the differences in average correctness at regular test and ressiting test.

We can also confirm the hypothesis H4b and state that the positive impact of provision of the e-learning tool is relevant also in this case.

At the same time we can see that the average correctness of answers was notably higher last year which confirms our presumption that the tests were further more demanding this year due to the significant changes in legislation but this question was not the subject of our research.

8. Limitations

The presented study has also some limitations. The e-learning tool was provided in the course of the semester before the resitting test. In the study the results of regular and resitting test are compared and the correctness rate between these tests could differ. Based on the comparison of correctness rate on the control sample from previous year this limitation was disproved.

The research was influenced by above mentioned fundamental legislative changes which caused that large part of question base had to be changed. When comparing the data from current year with the data from previous year only the questions which remain were included. Despite this fact we consider the scope of the research and the number of questions as sufficient.

The provision of supplementary study materials in the course of the semester before the resitting test we do not consider as entirely convenient and students passing the resitting test got an advantage than the students who successfully passed the regular test before. The e-learning tool was provided only in pilot version and only for part of the topics presented at the course on the other hand. The main aim of its provision was to help students to overcome the difficult situation of legislative changes. The results of pilot version of provided tool are further examined and the outcomes will be used in favour for future students. For the following semester the e-learning materials is planned to be provided for all topics and in a sufficient advance.

9. Conclusion

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We have discussed all research hypotheses questions posed in the paper. We can conclude that the e-learning tool was successfully introduced into the Law Basics course in the pilot version. The research confirmed that the provision of the e-learning tool for students has got positive influence on their results at progress test. At the same time the presumption that provision of the e-learning tool could have a negative impact on students who will rely only on this materials was disproved. The results of the research were confirmed by analysing the data also on control sample from previous year where it was proved, that the correctness rate did not change at all without providing the e-learning tool.

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The possibilities of ICT use for compensation of difficulties with reading in pupils with dyslexia

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Abstract

The paper presents the possibilities of using ICT for compensation of difficulties with reading in pupils with dyslexia and during re-education. These include mainly text editing, use of different fonts, special educational software, improvement of teaching process, use of multimedia etc. Furthermore the paper presents the results of a research project focusing on a comparison of reading speed and efficiency (the number of mistakes) when using the standard writing fonts and OpenDyslexic font (a font created for dyslectics). The data has been collected using a standardized reading test, the results have been statistically processed.

Keywords: ICT in education; writing font; dyslexia; pupils with special needs

1. Introduction

The article treats the possibilities of ICT use for the work with dyslectic pupils, focusing on text editing and adjustment of the visual aspects of the text to the needs of the pupils.

British Dyslexia Association (BDA) approved the following definition: „Dyslexia is a specific learning difficulty that mainly affects the development of literacy and language related skills. It is likely to be present at birth and to be life-long in its effects. It is characterised by difficulties with phonological processing, rapid naming, working memory, processing speed, and the automatic development of skills that may not match up to an individual's other cognitive abilities. It tends to be resistant to conventional teaching methods, but its effect can be mitigated by appropriately specific intervention, including the application of information technology and supportive counselling"(British Dyslexia Association, 2007). Dyslexia is the most frequent specific learning difficulty and it complicates all activities dependent on reading performance, consequently it has an essential impact on the child's success at school. The difficulty affects the basic variables of reading performance – speed, correctness, reading technique and comprehension. Moreover, it causes difficulties with orientation in the text (repetition of the beginning of words, skipping of lines etc.) and text reproduction. Incorrect reading or even mangling of words result in the so-called specific errors including static inversions (e.g. confusing letters of similar shapes such as b-d-p, a-o-e, m-n, l-k-h etc.), kinetic inversions (e.g. mixing of syllables), skipping or adding of extra syllables, words or sentences, inappropriate use of diacritics or guessing of word endings. However, the occurrence of specific errors is highly language specific both in terms of frequency and the presence of the various types (e.g. diacritics, specific pronunciation errors etc.). A specific error which inevitably occurs in all languages is the confusion of letters of similar shapes (see the presentation of the research project below).

Dyslectic children have general skills disproportionately better than reading skills. Furthermore, they are worse at reading in comparison with their peers. Pupils with dyslexia, a difficulty affecting the acquisi-

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tion of reading skills, achieve lower levels of reading efficiency although they are provided with normal educational guidance and have adequate intelligence.

One of the biological causes of dyslexia is a dysfunction of the magnocellular system. Dyslectic people have on average 30 % less magnocellular neurons compared with the control group. The system plays an essential role in reading, being responsible for the gathering of visual data. (Stein, 2003; Stein, Walsh, 1997). It is crucial for eye movements during reading, especially for the quick motional feedback preventing excessive fixation on the word being read. The malfunction of the magnocellular system manifests itself in an impairment of visual perception, leading to chaotic eye movements and consequent difficulties with the identification of letters etc. The effect of the chaotic eye movements is that letters seem to be moving making it impossible for the dyslectic reader to capture them and process their shape and order (e.g. if *c* and *l* come close together they look like *d*) (Zelinková, 2003).

Reading performance of pupils with SLD is affected by a number of factors, such as motivation and interest in reading, didactic procedures or socio-cultural environment, however, the graphic qualities of the text such as font size or line spacing are no less important (Zelinková, 2003). Some research projects (The effect of print size on reading speed in dyslexia., 2005) dealing with the influence of font size on reading speed in dyslectic pupils even assumed that appropriate graphic properties may enable dyslectic pupils to achieve a curve of development comparable with the curve of healthy individuals. Previous research confirmed that difficult visual conditions lower reading performance of dyslectic individuals.

There are a number of studies examining the influence of visual features on the improvement of reading performance of dyslectics. According to Stein (2003) the confusion is greater if font size is small, while bigger font size has a positive effect on reading (Stein, 2003, Stein, Walsh, 1997). A similar study (The Effect of Font Size on Reading Comprehension on Second and Fifth Grade Children: Bigger Is Not Always Better., 2013) dealing with the influence of font size on reading comprehension does not deny the findings, however, it also revealed that font size, line length and spacing etc. have a bearing on the reading performance of younger pupils, while having almost no effect in older pupils. This is connected with the fact that readers gradually develop a skill to decode smaller and smaller print. Nevertheless, it does not explain why dyslectic individuals require bigger font size to improve their reading. Considering the character of dyslexia discussed above, a plausible explanation seems to be that bigger font size creates bigger spaces between adjacent letters, which decreases their clustering and facilitates their identification (DeLamater, 2010).

More factors which have been examined in various studies apart from font size and line spacing include the use of serif/sans-serif typeface, letter spacing or the use of a special font. Research projects focusing on the appropriateness of serif/sense-serif typefaces for reading brought different findings. Some people found that a serif typeface helped them to focus on the current line, while others felt that it complicated the identification of letters. An explanation of the positive effects of sans-serif typeface is that bigger spaces between letters enable faster identification. Another finding in support of the use of sans serif typeface is that the majority of participants in the research prefer sans-serif typeface even if the reading was slower in comparison with serif typeface. (Pijpker, 2013). LDA (Learning Disabilities Association) states that the use of bigger font size, line spacing or a special font depends on the individual needs of every pupil (Accommodations, Techniques and Aids For Learning., 2014).

British Dyslexia Association recommends appropriate choice of font and background colour, the use of thick paper which is not transparent, the use of suitable font or font size as a prevention of visual stress and a means of facilitating the reading (Dyslexia style guide, 2014).

Hughes and Wilkins (2000) claim that children with reading difficulties are more susceptible to visual stress and graphic aspects of the text influence them heavily. Visual stress manifests itself in unpleasant visual symptoms during reading such as illusionary shapes, movement and colours of the text, broken or blurred print and general visual irritation. Furthermore, it may cause pain in the eyes and head, frequent loss of orientation in the text and worsened comprehension. Readers with dyslexia face more difficult word recognition and in comparison with other readers they are forced to focus more on the print, which makes them more sensitive to all visual aspects of the text that might cause visual stress, such as the contrast of black and white, line spacing, font or quality of the print. This finding led the authors to further examination of the influence of the visual properties of the text on reading in dyslectics. It is the font size and spacing that Hughes and Wilkins (2002) found to be the most important factors. The final part of the

study The Effect of Font Size on Reading Comprehension on Second and Fifth Grade Children: Bigger Is Not Always Better (2013) revealed that bigger letter spacing and word spacing affect reading even more than font size.

2. The possibilities of ICT use for the compensation of reading difficulties in dyslectic individuals

With respect to the development of Information and Communication Technologies and their integration in all spheres of social life including education, our company places considerable demands on teachers and their pupils in terms of the teaching methods and work with modern technology. It searches for the possibilities to use ICT as a tool enabling the implementation of new educational methods, improvement and modernization of education, finding new possibilities and making the teaching process more efficient (Vzdělání 21, 2014).

ICT is a suitable tool of individualization and satisfaction of the need to adapt the teaching process and methods to the needs of individuals, who are physically, mentally or socially disadvantaged in comparison with the rest of the population, i.e. the individuals with special needs.

The goal of the new progressive teaching method called *interactive teaching* is to offer to students a more amusing and less monotonous form of education, increasing their attention and motivation to learn. An equally important goal is the effort to involve the pupils themselves in the education process, enabling them to actively participate in it and shape it instead of being mere passive listeners (Interaktivní výuka, 2014).

In the course of the last five years, the Interactive Whiteboard (IWB) has become almost a common piece of classroom equipment, replacing the older overhead projectors, video, and TV or data projectors. The advantage of IWB is that it gives the teacher the possibility to create electronic multimedia materials combining photos, pictures, videos and hyperlinks to other sources. Such materials make teaching better arranged, more illustrative, systematic, and attractive and are more efficient in holding the weaker attention of pupils with SLD.

Technology permits teachers to provide materials using different media, webpages, e-mail etc. and to easily adjust them to the varying needs of pupils since it is easy to update and store them or insert references to further materials in any form.

There are a number of online gateways offering teachers further education, inspiration but also vast amounts of quality teaching materials available for free (in the Czech Republic these are created within subsidized projects whose results must be offered for free). IWB enables fast adjustments of the content and graphics of the material (change of font, font size, line spacing, background colour, font colour) according to the needs of individuals with SLD. For instance, it is possible to assign individual work to a group of pupils, asking them to take a test using the poll device enabling to answer questions which appear on the board, which gives us the possibility to provide immediate feedback and work with mistakes before they become fossilized, involving all the students at the same time. Another advantage of electronic materials is that they are not only easy to present but also easily made accessible to the whole class, which makes it possible to actively work with them or use them for practice at home. Moreover, they function as a clear outline of schoolwork for pupils with dyslexia or other learning difficulties.

A suitable complement of IWB is an interactive textbook. Interactive textbooks enable the use of interactive material (pictures, audio, video, animations etc.) in class. The individual subjects include audio and video recordings and references to webpages providing further information on the topic at hand. Furthermore, the subjects are connected by inter-subjects relations, which helps the children realize that it is necessary to combine some pieces of knowledge with others, supplement and connect them instead of separating them (Interaktivní výuka, 2014). For example, the design of reading books maximizes the amount of acquired knowledge and the saves the teacher time since it includes a tool for selection of difficult and less common words, audio versions of the texts, useful hyperlinks (e.g. a map of the place described in the text, encyclopaedic knowledge about the animal or plant mentioned in the text etc.), or

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questions and tasks to use with the text etc. Interactive textbooks enable the change of font size; however, unlike with e-book readers or tablets it is not possible to adjust line spacing, background, brightness or font.

Furthermore, modern technologies facilitate and seed up the communication between the individual participants in the teaching process (email, webpages, Facebook, e-learning etc.). E-learning is another step forward in the field of self-education (Zounek 2009). In e-learning, ICT are used to prepare courses offering online access to electronic materials and education independent of the school building, self-study, communication with other participants and management of the study). As far is primary education is concerned, it is used rather to provide further training for teachers.

Modern technologies play an important role in the education of pupils with special educational needs as well. Special software designed for children with special educational needs is a very useful didactic tool. Software for pupils with dyslexia or other SLD often focuses on the individual senses – aural and visual perception, orientation in space, it supports attention and development of memory but also helps with re-education in case of problems with specific skills such as arithmetic, writing, acquisition of grammatical rules reading etc. (Zikl, 2011).

An advantage of ICT use in teaching individuals with special educational needs is the already mentioned individualization enabling the teacher to involve all pupils at the same time despite their differing needs. The children can work independently on materials prepared in advance or in an electronic environment. Another asset as the possibility of compensation in the case of common activities since the software and various devices permit the pupils to eliminate the negative effects of their difficulties (e.g. write essays on a PC, read a book using tablet, which enables graphic adjustments of the text, listen to instructions instead of reading them etc.).

Both the effort to find a supportive tool improving reading capacity and the development and greater accessibility of ICT result in a more frequent use of e-book readers and tablets. These devices enable the reader to change font size, background, brightness, line spacing or typeface, which makes them friendly to dyslectic readers.

The use of special software or audio visual technologies in teaching is attractive and often also amusing. The richness of the accessible technologies permits interactive engagement with the teaching matter using different senses, which facilitates understanding and makes everything easier to remember. Modern technologies and software are useful complements of traditional didactic tools, their function is to motivate the learners, teach them to correct their own mistakes and be more independent.

3. The influence of font on the quality of reading in dyslectics

The aim of our research was to determine the impact of the choice of font on the reading of pupils with specific learning difficulties, i.e. reading speed and error rate in terms of both quality and quantity.

We compared the reading performance of pupils with SLD achieved when using the common sans-serif font Arial and the font Open Dyslectic. The font was created specifically for dyslectics with the goal of eliminate the most frequent difficulties such as confusion of letters of similar shape or letters which are mirror images of one another etc. The author tried to achieve this by introducing minute changes of letter shapes, their inclination or line weight (OpenDyslexic, 2014). The case of *b* and *d* may serve as an example of this. The two letters are identical in shape but one is a mirror image of the other. In the font Open Dyslectic, they have slightly different shapes, line weight of the curve and inclination (see figure 1). The font is not used in the Czech Republic yet, however, there is a Czech version covering the special Czech characters available for free. Foreign studies (Could a simple font help dyslexics read?, 2014) state that the use of Open Dyslectic does not increase reading speed but reduces the occurrence of specific reading errors. Besides the unique shape of individual letters, individuals with dyslexia view positively the bigger letter spacing and word spacing. The article OpenDyslexic font gains ground with help of Instapaper (2012)

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explains that better readability of the font moderates the effects of visual stress, which is another positive point.



Fig. 1. A sample of Open Dyslexic font (OpenDyslexic, 2014)

3.1. Research objectives and methods

Our objective was to verify whether the use of the specific font affects reading quality in dyslectics in the Czech Republic and whether the font is suitable to be used for re-education and compensation of their problems.

We compared the sans-serif font Open Dyslectic with the commonly used sans-serif font Arial. The text which we chose to collect data is a part of a standardized reading test used to diagnose dyslexia in the Czech Republic (Matějček, 1992). Since the pupils were asked to read the same text repeatedly (in different fonts) we selected an article called "Latyš", which is a piece of writing in an imaginary language structurally equivalent to Czech (the incidence of consonants/vowels, word length etc.). All the tables with texts in the individual fonts were adjusted according to the norms of the standardized test (the article Latyš) – same text, same number of words per line, font size, line spacing etc. The administration of the individual tests followed the standard procedures of the Reading test (recording of mistakes, instructions etc.). Each pupil read the same text twice in two different fonts, the second reading taking place two weeks after the first. The point of introducing the interval of two weeks was to prevent children from remembering the text as well as from using their intelligence to compensate for their reading difficulties, which is the purpose of texts in an unknown language. In order to maximize objectivity, the pupils were divided into random groups and they read the texts in different orders.

Research sample comprised 150 pupils of fourth and fifth grades from 58 primary schools (75 dyslectic pupils and 75 intact ones, 1-2 pairs from each school). Each pupil with dyslexia was paired with an intact pupil from the same school, class and of the same sex and age. The description of the research sample is given in table 1.

We formulated the following hypotheses:
H1: Dyslectic pupils will read more words per minute with Open Dyslectic than with Arial.
H2: Dyslectic pupils will make fewer mistakes with Open Dyslectic than with Arial.
The test was also administered in the control sample (intact pupils) so that it was possible to compare whether the different fonts have an effect on reading speed and error rate.

Table 1. Description of the research sample

	Dyslectic pupils	Intact pupils
Number of participants (boys/girls)*	75 (49/26)	75 (49/26)
Average age	10,24	10,13

*the ratio of boys/girls corresponds with the higher occurrence of dyslexia in boys

3.2. Research results

The results showed the expectable difference in reading speed and error rate between dyslectics and intact pupils. Reading speed of pupils with dyslexia is one third lower than reading speed of intact pupils, the difference being more or less constant irrespective of the font used (31,3 % with Open Dyslexic, 32,2

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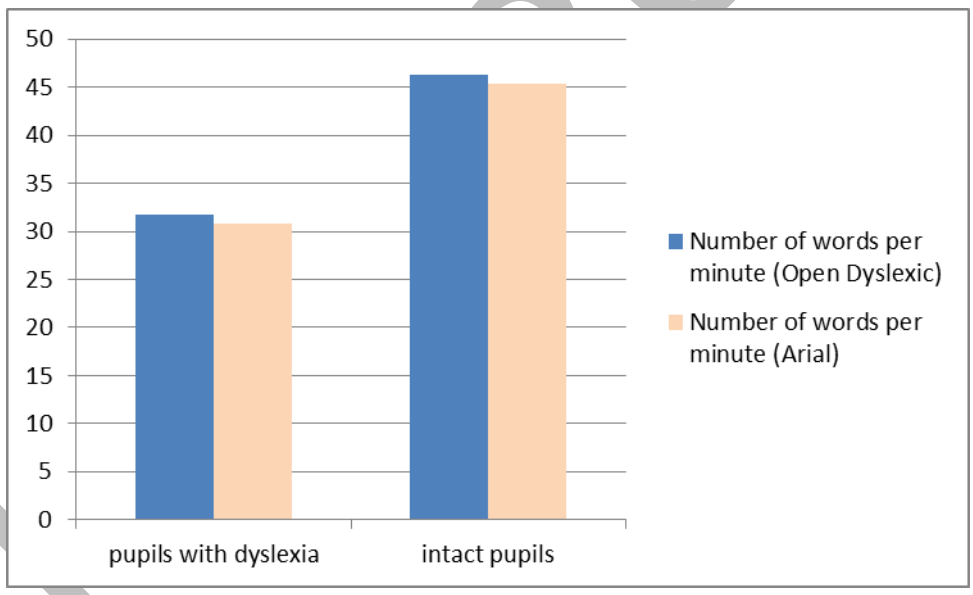
% Arial; Table 2). The difference in error rates is also considerable (84,4 % more mistakes with Open Dyslexic, 75 % more mistakes with Arial; Table 3). Nevertheless, this difference is very marked and it is not statistically significant.

Our main objective was the analysis of the results concerning pupils with dyslexia. As table 2 and graph 1 show, reading speed was approximately constant irrespective of the font, to be precise, when reading the font Open Dyslectic pupils were slightly faster (by a mere one word per minute). Neither the error rate was significantly influenced by the choice of font, which is evident from table 3 and graph 2. When reading Open Dyslectic, pupils made slightly fewer mistakes, however, the difference is minimal and not statistically significant.

Neither hypothesis was confirmed by the research, which suggests that the choice of font has no marked impact on reading speed and error rate.

Table 2. Number of words per minute

	average	standard deviation	median	T-value	Z-value
Dyslectic pupils (Open Dyslexic)	31,8	11	31	0,6238	0,701389
Dyslectic pupils (Arial)	30,8	9,06	30		
Intact pupils (Open Dyslexic)	46,3	12,94	43	0,4157	0,4218
Intact pupils (Arial)	45,4	12,54	43		
The differences in the results in this table are not statistically significant.					



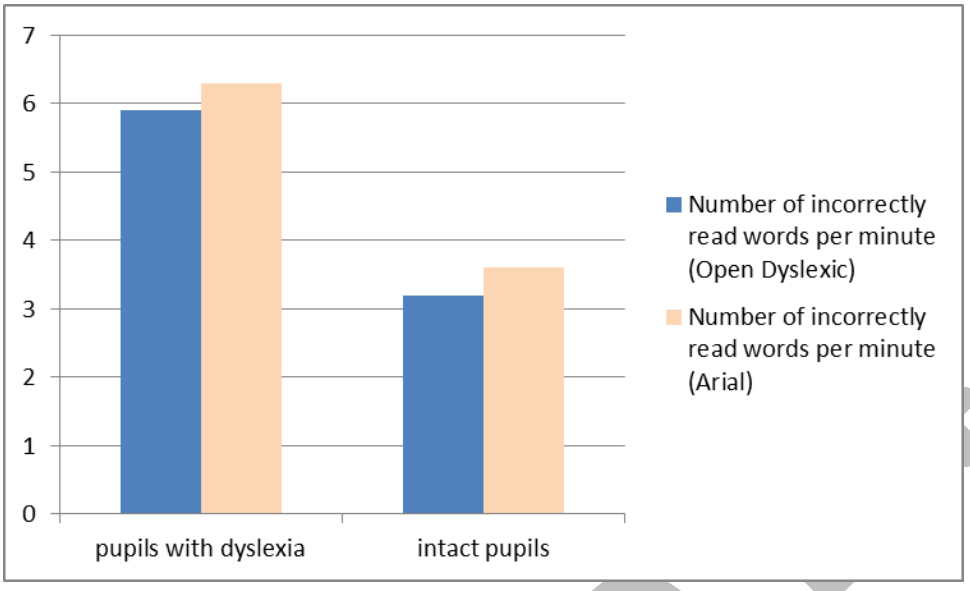
Graph 1. Number of words per minute.

Table 3. Number of incorrectly read words per minute

	average	standard deviation	median	T-value	Z-value
Dyslectic pupils (Open Dyslexic)	5,9	3,48	6	-0,6389	0,727558
Dyslectic pupils (Arial)	6,3	4,29	6		
Intact pupils (Open Dyslexic)	3,2	2,61	3	-0,7626	-0,5718

Intact pupils (Arial)	3,6	3,9	3

The differences in the results in this table are not statistically significant.



Graph 2. Number of incorrectly read words per minute.

Nevertheless, it is impossible to generalize and state that a different font has no importance since a positive effect might have been present only with some pupils, which is not evident from the overall results. Some of the participants claimed that the text on Open Dyslectic was easier to read, while others had a subjective feeling of worse readability. Some of the pupils may have a better subjective feeling about reading, they may be less tired and more motivated (and able to read longer) without their error rate and reading speed being affected.

Error rates were slightly lower with Open Dyslectic, mainly in pupils which made very frequent mistakes. For example, there were 12 pupils who made 10 or more mistakes with Open Dyslectic but there were 16 such pupils with Arial. These results suggest that the effect of Open Dyslectic might be present mainly in pupils with more serious reading difficulties. However, statistical testing of this requires more data collection and a more detailed analysis.

Furthermore the results might have been affected by different amount of experience with the individual fonts. While children often use Arial, Open Dyslectic was entirely new to them and it is possible that after familiarization with it the results might have been better.

As re-education of pupils with dyslexia should be individualized it is possible to offer a choice and try which font (as well as line spacing font size etc.) is more suitable for each pupil, since there are likely to be significant differences between the individual pupils.

4. Conclusion

To conclude, we may state that the use of the font Open Dyslectic, which was designed specifically for pupils with dyslexia did not lead to any marked improvement of reading speed or error rates in comparison with the commonly used font. Although the comparison shows slightly better results with Open Dyslectic, especially in pupils with serious problems, the font was not proved to be statistically better. On the other hand, a number of pupils claimed that Open Dyslectic was more readable for them, so it is possible that certain individuals might find the font more suitable than common fonts. The use of ICT enables us to

make quick and easy adjustments of the texts, permitting the pupils to try different fonts and graphic arrangements and chose the most efficient option.

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The potential of video game in Malay language learning for foreign students in a public higher education institution

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Abstract

The current study is aimed at investigating the potential of video game in teaching Malay language for foreign students in a Public Higher Education Institution (PHEI).The main objective is to consolidate the opinions of experts on types of video games, predicted year of appearance, and suitability of types of video games. Fuzzy delphi (FDM) is mainly used to consolidate a consensus of selected 30 experts from various disciplines and backgrounds. The administered instrument consists of 35 sub items across three themes.The findings show that the experts have reached consensus on items 1.1 to 3.5, with *defuzzification* value of 0.640 to 0.727. It is found that narrative genre, and platformer games are suitable for foreign learners to learn Malay language. The results also suggest that computer-based video games will not be the trend in Malay language learning from 2024 to 2028 (*defuzzification* value of 0.727). Instead, *augmented reality games* and *Mobile learning* will be dominant trends in future. The findings also show that expert consensus was reached on the effectiveness of video games in developing vocabulary of Malay language (*defuzzification value of* 0.693). In short, the experts "strongly agreed" that video game is potentially effective in teaching Malay language for foreign learners in the selected PHEI.

Keywords:Video games, Malay Language learning, Fuzzy Delphi

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1. Introduction

In this 21st century the role of Malay language has changed its context from an official language, national language and language of knowledge to a language learned as a foreign language. The Malay language is used in all Malaysian Public Higher Education Institutions (PHEI), Private Higher Education Institutions (PrHEI) and in institutions overseas in China, Russia, the United Kingdom, Uzbekistan, among others. Awang Sariyan (2006) also stated that bahasa Melayu, while not as widely needed as the English language. Its has own place among major languages of the world especially among foreign language learners. This is because teaching and learning of bahasa Melayu (BM) in PHEI has been introduced to foreign and

international students as a compulsory subject (Fai'zah Abd. Manan, Mohamad Amin Embi, & Zamri Mahamod, 2010).

Based on the experience of the International Islamic University Malaysia (IIUM), the BM course was made compulsory to foreign students at IIUM. According to Siti Baidura Kasiran and Nurul Jamilah Rosly (2011) most foreign students taking basic degree courses at the university learn BM as a third language. Students not only have to learn BM, they must pass the subject as acondition for graduation. The BM for Foreign Students course was made compulsory for all foreign students at IIUM by a Senate decision in April 1991.

The course offered is split into two parts, namely *Kursus Bahasa Melayu I untuk Pelajar Asing* (Malay Language Course I for Foreign Students) (LM 1010) and *Kursus Bahasa Melayu II untuk Pelajar Asing* (Malay Language Course II for Foreign Students) (LM 1011). The contact hours for this course are 50 minutes per session and classes are held twice a week (Siti Baidura Kasiran & Nurul Jamilah Rosly, 2011).However, in 2011 the BM course for foreign students was reviewed based on the decision by the senate 373rd meeting on 30th September 2011.

Video games has been used for the learning process and is referred to as *game-based learning* (Squire, 2003) or *digital game-based learning* (Prensky, 2001). This is supported by Tang et al.(2009) who also stated that the term used is computer game in education and it is also referred to as '*digital game-based learning*' (Prensky, 2001) and another term used is'*games-based eLearning*' by Connolly dan Stansfield (2007) in Tang et al. (2009). In fact, video game can be regarded as a teaching aid with potential for application in various disciplines in education (Moreno, 2008; Squire, 2003; Prensky, 2001).

2. Literature review

Studies on use of video games in language learning outside Malaysia mostly focused on effectiveness of computer games, digital games and video games by researchers (Muhammet Demirbilek, Ebru Yilmaz, & Suzan Tamer, 2010; Shelton & Scoresby, 2011; Ricardo Rosas et al., 2003; Ranalli, 2008; Walsh, 2010; Yildiz Turgut & Pelin Irgin, 2009). Other studies have focused on development and design of video games and application of existing video games for language learning, example *The Sims* (Ranalli, 2008), SHAIEx, a digital game byAdaptive Hypermedia system (Laleh Aghlara & Nasrin Hadidi Tamjid, 2011) as well as application of virtual 3D in language learning (Berns, Pardo, & Camacho, 2013; Ibanez et al., 2011; Piirainen & Tainio, 2009).

In Malaysia, research on video games in language learning had been conducted for Arabic language by Muhammad Sabri Sahrirdan Nor Aziah Alias (2011). Muhammad Sabri Sahrir, Nor Aziah Alias, Zawawi Ismail and Nurul Huda Osman (2012) used a design and developmental research (DDR) approach to develop a prototype for online vocabulary games in learning Arabic. A case study for transfer of vocabulary through computer games was carried out by Nadzrah Abu Bakar and Elaheh Nosratirad (2013) in English as a Scond language (ESL) subject using the existing video game SIM 3 as the platform for vocabulary learning. In addition, Fuziah Rosman et al. (2013) has done a meta analysis on the potential of video game in BM vocabulary learning for international students in Malaysia.

3. Statement of the problem

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Studies on learning of BM as a foreign language mostly cover language learning strategies (Fa'izah Abd. Manan, Zamri Mahamod & Mohamed Amin Embi, 2009; Fai'zah Abd. Manan, Mohamad Amin Embi, &Zamri Mahamod, 2010; Yong, Siti Saniah Abu Bakar, Chan, & Vijayaletchumi, 2010; Siti Saniah Abu Bakar & Sharala Subramaniam, 2012) whereas analysis of student errors was done by Siti Baidura Kasiran dan Nurul Jamilah Rosly (2011) as well as Yong danVijayaletchumi (2012). Study on video game in the context of language learning was done by Walsh (2010); Yildiz Turgut and Pelin Irgin (2009); Muhammet Demirbilek, Ebru Yilmaz and Suzan Tamer (2010); Ranalli (2008); Piirainen and Tainio (2009); as well as Laleh Aghlara and Nasrin Hadidi Tamjid (2011). These studies mainly touched on two main topics: the type of video and the effectiveness of video game in language learning. Among the types of video games discussed are Massively Multiplayer Online Role Playing Games (MMORPGs), online video game, 3D Multi-User Virtual World, and SHAIEX (*Adaptive Hypermedia System*). However, the effectiveness of video game in language learning is mostly seen in studies on learning of English as a Second Language (ESL) or English as a Foreign Language (EFL).

Further, studies were done on approaches to BM learning for foreign students such as the study by Siti Radziah Azit (2005) regarding implementation of multimedia in BM language learning and the study by Anuradha (2008) on designing a BM language learning portal for foreign students at University of Malaya. However, there does not seem to be any studies on the use of video game for learning BM for foreign students in PHEI as areare research reports on foreign students in PHEIs.The study by Fuziah Rosman, Norlidah Alias, Saedah Siraj, Husaina Banu Kenayathullah, Abd Razak Zakaria, and Ghazali Darusalam (2013) only used a meta analysis approach on the potential of video game in BM vocabulary learning by international students in Malaysia.

4. Objectives

In general, this study is aimed at investigating the potential of video game in implementing learning of BM as a foreign language in a Public Higher Education Institute (PHEI). The research objectives are given in the following:

4.1 To obtain expert consensus on the predictions of the type/genre of video game in implementing learning of BM by foreign students in a PHEI.

4.2 To obtain expert consensus on prediction of emergence of video game based on technology used in implementing teaching and learning of Bahasa Melayu among foreign students at a PHEI.

4.3 To obtain opinion of experts regarding the suitability of each type of video game for the aspect of basic skills in Bahasa Melayu in implementing learning of bahasa Melayu by foreign students in a PHEI.

5 Theoretical framework

In this study, the theoretical framework used is the model of curriculum by Hunkins and the social constructivist theory. Discussion will begin with the Hunkins curriculum model followed by social constructivist theory. Hunkins (1980) in Ornstein and Hunkins (2004)outlined seven phases in decision making on curriculum namely: a) conceptualizing the curriculum and verifying it; b) diagnosis; c) selecing content; d) selecting experiences; e) implementation; f) evaluation, and g)sustainment. The Hunkins curriculum model is used to design the futuristic curriculum in determining the suitability of selecting

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video game elements and implementation of curriculum in BM language learning for foreign students in PHEI.

Social constructivism is a theory derived from Piaget's cognitive development theory and the *Zone of Proximal Development*, ZPD introduced by Vygotsky (Mok, 2013). ZPD is the performance and ability of students to solve problems exceeding their capability as well as achieving development at a higher potential. In the context of this study, social constructivism theory is used in the aspect of video game as the medium of instruction or *scaffolding* in implementing learning of Malay language among foreign students in PHEI. This theory shows that the process of learning Malay language through video games can enhance the performance of a student whether aided by a teacher or more proficient peer to succeed and be motivated according to capability level.

5. Methodology

This study uses the *Fuzzy Delphi* technique introduced by Murray, Pipino, and Gigch (1985) and revised by Kaufman and Gupta (1988). FDM is a combination of *fuzzy set numbering* or *fuzzy set theory* applied in thetraditional Delphi technique. This technique is not new in future studies and a fast and effective technique for obtaining consensus from experts without too many iterations or cycles (Norlidah Alias, Mohd Nazri Abdul Rahman,& Saedah Siraj, 2013).

Two main considerations are found in FDM, namely the*Triangular Fuzzy Number and Defuzzification Process*. Triangular Fuzzy Number has three values (m_1, m_2, m_3) namely the minimum value, most reasonable value and the maximum value. Defuzzication is used to determine the ranking for each variable or item or each subvariable or sub item. Three equations can be applied to determine the ranking:

6.1 $A_{max} = 1/3 * (a_1 + a_m + a_2)$

6.2 $A_{max} = 1/4 * (a_1 + 2a_m + a_2)$

6.3 $A_{max} = 1/6 * (a_1 + 4a_m + a_2)$

Next, a list of 30 experts was selected as the expert panel in this study. The data collection is implemented through the Fuzzy Delphi approach. Firstly, interviews were carried out, and the Delphi technique was used to develop a questionaire. Next, the questionnaire responses were analyzed using *fuzzy number* technique. A 5-point scale was used (Norlidah Alias, Mohd Nazri Abdul Rahman & Saedah Siraj, 2013). The purpose was to obtain consensus among the experts to predict the type of video game required for instruction in the basic skills for BM for foreign students. The answers from the experts is placed on a scale from 1 to 5 with the fuzzy value (Table 1).

Table 1: Five point scale

Scale (Linguistic variable)	
Highly Disagree	(0.00, 0.10, 0.20)
Disagree	(0.10, 0.20, 0.40)
Moderately Agree	(0.20, 0.40, 0.60)
Agree	(0.40, 0.60, 0.80)
Highly Agree	(0.60, 0.80, 1.00)

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6. Results

Data analysis was carried out using the *Fuzzy Delphi* technique to ascertain the level of consensus between experts. The findings for all items have been analysed by determining the distance between 2 *Fuzzy numbers* for calculating the threshold value, **d** (Chu & Hwang, 2008) as follows:

$$d(\bar{m},\bar{n}) = \sqrt{\frac{1}{3}\left[(m_1 - n_1)^2 + (m_2 - n_2)^2 + (m_3 - n_3)^2\right]}.$$

In this study, the prerequisite (1) was fulfilled because the *threshold* value for most sub items is ≤ 0.2, but for part of the sub items only. Nevertheless, the second condition (2) also was fulfilled because the expert consensus had exceeded 75%. The result of summing up the *threshold* values ≤ 0.2, showing that this study found a *threshold* value exceeding 75% and recording 77.8% for all items encompassing 41 sub items.

Subsequently, analysis shows the prediction of the types of video games in implementing learning of BM for foreign students in PHEI. In item 1, there were five sub itemsas explained in Table 2.

Table 2: The ranking for different genres of video games used in implementing BM learning among foreign students

Item	Predicted type / genre of video game	*Fuzzy evaluation*	*Defuzzification*	Ranking
1.1	Video games of all types/genres need to be applied in learning of BM among foreign students.	(13.2, 19.2, 25.2)	0.640	4
1.2	Video games on racing are very suitable for learning activities in BM learning among foreign students.	(11, 17, 23)	0.567	5
1.3	Online video games must be used in learning BM among foreign students whether in class or outside class.	(14.2, 20.2, 26.2)	0.673	3
1.4	Video games of the narrative genre are suitable for learning of BM by foreign students.	(14.9, 20.8, 26.8)	0.694	1
1.5	The learning situation for BM learning among foreign students will be more interactive by implementing *video simulation games*.	(14.8, 20.8, 26.8)	0.693	2

Based on Table 2, the majority of experts agreed with item 1.4 with a *defuzzification* value of 0.694 in the first rank. This shows that video games in the narrative genre are very suitable for learning BM as a foreign language.

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The following analysis shows that the predicted time of emergence of video game based on technology used in implementing BM learning among foreign students in PHEI. For item 2, there are five sub items and five phases in question, namely from 2014 - 2018, 2019 - 2023, 2024 - 2028, 2029 - 2033 and 2034 – 2038, as given in Table 3.

Table 3: Predicted emergence of technology-based video game in learning of BM among foreign students.

Item	Prediction	subitem	Predicted time frame	Fuzzy evaluation	*Defuzzification*	Ranking
2.1	Bahasa Melayu video game for foreign students will be available on any gadget and public interactive board.	2.1.1	2014 – 2018	(10.8,16.8,22.8)	(0.560)	2
		2.1.2	2019 – 2023	(13.2,19.2,25.2)	(0.640)	1
		2.1.3	2024 – 2028	(9.4,15.4,21.4)	(0.513)	3
		2.1.4	2029- 2033	(6.5,10.4,16.4)	(0.370)	4
		2.1.5	2034-2038	(5.2, 9.8, 14.6)	(0.329)	5
2.2	Potential of *Mobile learning* with the capability of video game technology using touch screen through smart phone or tablet in implementing learning of BM by foreign students.	2.2.1	2014 – 2018	(13.8,19.6,25.8)	(0.658)	1
		2.2.2	2019 – 2023	(13.2,19.2,25.2)	(0.640)	2
		2.2.3	2024 – 2028	(9.1,15,21.2)	(0.503)	4
		2.2.4	2029- 2033	(9.8,15.4,21.4)	(0.518)	3
		2.2.5	2034-2038	(5.6,10,14.4)	(0.333)	5
2.3	Augmented Reality Gameswill feature virtual technology *Depth-Sensing Cameras* in smartphones and tablet more effective for learning of bahasaMelayu.	2.3.1	2014 – 2018	(7.9,12.8, 18)	0.430	5
		2.3.2	2019 – 2023	(13.4,19.4,25.4)	0.647	2
		2.3.3	2024 – 2028	(13.8,19.8,25.8)	0.660	1
		2.3.4	2029 - 2033	(8.5,13.4,19.4)	0.459	4
		2.3.5	2034 - 2038	(9.2,14.3,19.6)	0.479	3
2.4	Computer based video game will not become the trend in Bahasa melayu learning among foreign students.	2.4.1	2014 – 2018	(7.7,12.6,17.8)	0.423	5
		2.4.2	2019 – 2023	(9.8,14.8,20.6)	0.502	4
		2.4.3	2024 – 2028	(15.8,21.8,27.8)	0.727	1
		2.4.4	2029 - 2033	(11.5,17.4,23.4)	0.581	2
		2.4.5	2034 - 2038	(10.4,16.1,21.8)	0.537	3
2.5	Transfer of nano technology knowledge can be the trend in shaping the use of video game in learning BM among foreign students.	2.5.1	2014 – 2018	(9.5,15.2,21)	0.508	2
		2.5.2	2019 – 2023	(13.2,15.2,25.2)	0.640	1
		2.5.3	2024 – 2028	(8.4,14.4,20.4)	0.480	3
		2.5.4	2029 - 2033	(8.1,13.2,19.2)	0.450	5
		2.5.5	2034 - 2038	(9,1.13.9,18.8)	0.463	4

The ranking according to expert consensus for all sub items is given from 2.1.1 until 2.5.5 is shown in Table 3.Based on Table 3, the majority of experts agree withsubitem 2.1.2 and its *defuzzification* value of 0.640 in the first rank. This shows that video game in BM for foreign students can be found in any gadjet and public interactive board predicted from 2019 - 2023.

The majority of experts also agreed with subitem 2.2.1 with a *defuzzification* value of 0.658. This shows that the potential of *Mobile learning* will see the capability of video game technology on touch screen of smartphone or tablet in implementing the learning of BM among foreign studentsis expected from 2014 - 2018.

Meanwhile, for item 2.3, The majority of experts also agreed with subitem 2.3.3 with a *defuzzification* value of 0.660 in the first rank.This shows that Augmented Reality Games*featuring* virtual technology such

as Depth-Sensing Camerasin smartphones and tablets will be more effective in BM learning predicted from 2024 - 2028.

Similarly with item 2.4, the majority of experts agreed withsubitem 2.4.3 with a *defuzzification*value of 0.727 in the first rank. This implies that video game based on computers will not be the trend in BM learning among foreign students is expected between 2024 - 2028.

Lastly, for item 2.5 the majority of experts agreed with subitem 2.5.2 with a *defuzzification* value of 0.640 in the first rank. This shows thattransfer of nano technology knowledge will be the trend in video game in learning of BM among foreign students as predicted to occur over the years 2019-2023.

The following is the analysis for prediction of suitability of video game type in the aspect of basic skills in implementing BM as a foreign language among foreign students in PHEI.For item 3, there were five sub items as explained in Table 4.

Table 4: Ranking for sub items 3.1 to 3.5on suitability of video game types in learning BM among foreign students

Item	Prediction of the suitability of each type of video game from the aspect of basic skills in Malay language	Fuzzy evaluation	*Defuzzification*	Ranking
3.1	Strategy video games are suitable for use in the aspect of grammar and sentence-building in BM for foreign students.	(14.4,20.4,26.4)	0.680	2
3.2	A*dventure* video games and *puzzle games* are very attractive for use in learning BM for foreign students in the aspect of understanding text in the form of animation and multimedia or *hypermedia*.	(13.4,19.4,25.4)	0.647	5
3.3	Problem solving games are more interesting for application in learning BM for foreign students in the aspect of BM acquisition.	(13.9,19.8,25.8)	0.661	3
3.4	Role playing games and simulation gamesare very suitable for mastering speaking skills or presenting ideas in learning BM among foreign students.	(13.8,19.8,25.8)	0.660	4
3.5	Platformer games are more effective for enhancing the aspect of vocabulary skills in BM by foreign students.	(14.8,20.8,26.8)	0.693	1

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Based on Table 4, the majority of experts agree withsubitem3.5 with a *defuzzification value of* 0.693 in the first rank. This shows that the video game platform *platformer game* is more effective in enhancing the aspect of Malay language vocabulary mastery among foreign students. The rankings as agreed to by the expert panel are given in Table 4.

8.Conclusions

Studies on a futuristic curriculum through video game are appropriate to be carried out in order to effect change in the curriculum in the next 5 to 10 years. The result of expert consensus proves that part of the elements of video game playing have potential in implementing learning of BM among foreign students in PHEI as shown by the consensus of experts at the level of 0.60 to 0.80. This means that the expert consensus was at the level of "agree" to "highly agree".

The impact of decision based on expert consensus shows that a new framework for designing curriculum based on potential of video game as a medium of instruction or *scaffolding* in BM language learning for foreign students in PHEI.This study suggests a new education policy be implemented by the relevant stakeholders especially the Higher Education Department and Ministry of Education Malaysia in general to highlight the potential of video games as a teaching aid too in all PHEIs in Malaysia. The language centers and faculties in all PHEIs should see the development of this technology as being capable of making language learning more attractive and interactive for application as a medium for BM language learning among foreign students.

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The reduction of speaking anxiety in EFL learners through drama techniques

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Abstract

The study on drama and anxiety reduction was conducted with 24, 12th grade students at a high school in Kozan, Turkey. The triangulation of the data was established with pre and post-tests, semi-structured pre and post-interviews, and student diaries. The teacher's reflections strengthened the qualitative aspect of the study. After six weeks of language and drama training, the drama techniques significantly lowered the speaking anxiety of EFL learners.

Keywords: Speaking anxiety; reduction of speaking anxiety; drama and speaking anxiety; anxiety and EFL; drama and EFL

1. Introduction

The word *drama* is originally derived from the Greek word *dran* which means "to do, to act." Action is an essential part of learning a language, as it develops body language, increases motivation, and keeps students involved in the learning process (Miccoli, 2003; Gorjian, Moosavinia, & Jabripour, 2010). Drama also creates a friendly, stress-free atmosphere where optimal learning occurs (Miccoli, 2003; Conejeros & Fernandez, 2008; Gorjian et al., 2010). Even when adults, let alone children, feel pressure on themselves, it becomes a burden to act, move or speak naturally, especially in public, which means anxiety.

While trying to find out if drama helps students' oral skills development, researchers have also found that drama lowers anxiety levels of EFL learners (Miccoli, 2003; Conejeros & Fernandez, 2008; Gorjian et al., 2010). Drama itself has become a teaching technique which encourages students to learn a new language in a creative and effective way. This means that drama techniques create an atmosphere where students learn in context, use their imagination, and spontaneously react. Speaking a language without any preparation is of great importance for fluency in EFL. Fluency requires "performance." To achieve fluency, a learner has to perform the language. However, speaking a foreign language in the classroom is inherently artificial. It is very difficult to involve students in artificial speaking activities. Students need lifelike situations to perform the elements of the language. They also need to feel as if they are not acting. When they are aware that they are imitating a foreigner, they become anxious.

Teenagers are afraid of making mistakes in front of their friends and their teachers. They feel embarrassed, anxious and humiliated. These feelings may cause reticence. When they are anxious, they can't speak. When they can't speak, they become more anxious. The purpose of this study is to examine the effects of drama techniques on speaking anxiety in EFL learners. The research question for this study is:

How does the use of drama techniques affect the speaking anxiety of EFL learners?

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2. Review of literature

2.1. Speaking anxiety in EFL classes

Foreign language anxiety is a major element which affects performances and acquisition of FL learners. FLA occurs more in output language abilities such as writing and speaking than in input abilities (Chiu et al., 2010). In the study of Chiu et al.(2010), a high percentage of students reported that it was easy for them to become anxious when they spoke in English (p.109). Accordingly, students who tested high on anxiety in the study of Horwitz et al., remarked that they are afraid to speak in the FL (1986). Though the results of the study of MacIntyre and Gardner (1991) presented that speaking is the most anxiety-provoking activity in second language acquisition, half of their students reflected the use of speaking skills as confidence-building experience (p.303). Thus, it can be implied from this study that, when there is no anxiety provoking situation, speaking a FL can increase students' self-confidence. The level of self-confidence is one of the most important factors provoking anxiety because, when students experience high self-confidence, they are not afraid of making mistakes or having other students laugh at them. Besides, it was found in the study of Park and Lee (2005) that low self-confidence or high anxiety levels affect students' oral performances negatively. Zheng (2008) stated that when students are supposed to complete an oral task, their anxiety level can increase. Giving oral presentations and performing in front of other students was reported to be one of the most anxiety provoking situations, as well (Ohata, 2005; Woodrow, 2006). Ohata (2005) and Ay (2010) also mentioned the effect of "unpreparedness" on students' speaking anxiety. In this situation, a student reported that s/he feels weird, and prefers to keep his/her silence during whole class, and wishes not to be asked any questions (Ohata, 2005).

People are often anxious about their ability in a foreign language, especially in listening/speaking situations, which leads to a type of anxiety called "communication apprehension" (Macintyre & Gardner, 1991). This type of anxiety plays such a crucial role in FL speaking anxiety that even talkative people become silent in a FL class when they have communication apprehension (Horwitz et al., 1986; Aydın, 2008; Ay, 2010).

In summary, there are many reasons for why EFL learners experience speaking anxiety, such as:

- fear of public speaking,
- communicating orally
- immature vocabulary
- fear of making pronunciation mistakes
- limited grammatical knowledge
- unpreparedness
- fear of being laughed at
- taking an oral test
- native speaker effect
- error correction style of the teacher
- levels of English proficiency
- worrying about being understood or not
- shyness, and
- low self-confidence. (Wörde, 2003; Ohata, 2005; Woodrow, 2006; Awan et al., 2010.; Dalkılıç, 2013; Park & Lee, 2005).

When FL learners continually experience FL speaking anxiety, they react physically with heart pulpitation, sweating, and trembling. They also react psychologically with negative thoughts concerning language learning and speaking; having low level of self-confidence in language class; and by not looking

at the eyes of the teacher. They may also remain silent during the lesson. At this point, what teachers are supposed to do is to create an atmosphere of low or no anxiety. Only by doing this can the student overcome the apprehension of speaking an FL.

2.2. Use of drama for speaking anxiety

Even though the history of drama dates back thousands of years, the use of drama in language classrooms has played a small, but consistent role in language teaching for only about four decades. Nevertheless, the advantage of this technique hasn't been completely appreciated in second/foreign language learning (Dodson, 2000). Hamilton and Mcleod (1993) claim that the use of drama techniques fits naturally into the nature of language and language learning (p.2). According to Du Mont (2007), in drama, there is emotion and movement, both of which have the power for liberating linguistic abilities. Holden (as cited in Davies, 1990, p. 87) describes drama when he says, "In other words, drama is concerned with the world of 'let's pretend'; it asks the learner to project himself imaginatively into another situation, outside the classroom, or into the skin and persona of another person."

According to Schewe "if drama had a place in the curriculum then its purpose must straightforwardly be the improvement of pupil's speech." (as cited in Hölzl, 2009, p. 37). Among all the positive effects of drama in ELT, improvement of speaking has a very special place. Still, as the use of drama techniques for speaking skills is relatively recent, and there is limited research on the issue, the effects of drama activities on oral skills development of FL learners hasn't clearly been put forth (Zerey, 2008; Galante, 2012).

The previous research showed that the largest portion of anxiety in a FL classroom belongs to "speaking" an FL (Stroud & Wee, 2006; Woodrow, 2006; Wood Shand, 2008; Zerey, 2008; Gai & Yang, 2010; Galante, 2012). With the intention of finding a remedy for this disturbing situation, researchers, like Miccoli (2003), Wood Shand (2008), Zerey (2008), Gorjian et al. (2010), Galante (2012), have tried drama techniques in FL classrooms. Based on this research, it can be implied that drama changes attitudes and beliefs of students about learning a foreign language as well as speaking it in public or in FL classroom atmosphere. We can hopefully say that drama techniques psychologically and physically affect students' language abilities. Students' understanding of drama texts, their verbal knowledge, and communication skills improve. Drama keeps students active in the learning situations. Students' self-confidence and motivation increase. However, their anxiety level, which plays a major role in communicative skills in FL classes, decreases.

3. Method

3.1. Participants

This study was conducted at Kozan Anatolian Medical Vocational High School in the first term of academic year 2013-2014. The participants of the study were 24 students who were chosen through purposive sampling. They were 12th graders at the age of 18. Students at this level were preferred because they were studying at the department for emergency medical technicians. As there was only one class of students in this department, there wouldn't be unfairness to any other classes. Moreover, despite their negative feelings about English, most of the students were interested in studying language through drama and they complained about the time given to English speaking exercises during regular English classes. For these reasons, these participants were chosen, and all the students willingly agreed to participate in the study. The participants were number coded such as St1, St2, to ensure their confidentiality.

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3.2. Materials & design

To investigate how drama affects the speaking anxiety of EFL learners, the data was collected through pre- and post-questionnaires, semi-structured pre- and post-interviews, and student diaries. Foreign Language Classroom Anxiety Scale (FLCAS), designed by Horwitz, Horwitz, and Cope (1986), was used as pre- and post-questionnaire. During 6-weeks-drama course, the students kept diaries which gave better insights into the effects of drama techniques. The teacher video-recorded the drama sessions and took notes on her reflections. Right after the course period, students took post-questionnaires and answered the semi-structured, post-interview questions.

In this case study, qualitative data was collected through student diaries and semi-structured pre- and post-interviews, and teacher reflections. The one-group, pretest-posttest design was conducted for the quantitative data.

3.3. Procedure

Before beginning the data collection, the instructor talked to the students and confirmed all the students are willingly attending the study. First, the Turkish version of FLCAS was administered to the students as pre-test. There were 33 items in this five-points likert scale test. Second, 10 students out of 24 were chosen by lot for the interview. The interview was conducted one-to-one in an empty classroom. The interviewee was informed that his/her voice will be recorded for the benefit of the teacher. After the administration of the questionnaire and conducting the interviews, it was time to record a diary, and answer pre-drama questions. One day before the drama activities began, the pre-drama questions and drama-questions were pre-prepared and given to the students. All the questions written on the handout were read by the teacher and explained by giving examples to make sure that all the students clearly understood everything. The following day, the drama exercises began. Within the drama exercises, there were famous films, fairy tales and a final performance show. Using films is mostly preferred because, in films, there are human emotions which the students feel while acting the roles. Drama scripts were used which were previously prepared. The scripts were prepared according to learners' interests, age, and language level. Music was an important point in the study. The soundtracks of the films were effectively used in the drama activities to motivate students better. A soundtrack was played in the background of a drama activity or it was the activity itself. Props were also very important for the exercises. Students had a chance to create their own props which was very motivating for them, or they were able to choose from the variety of props which were brought to the classroom by the teacher.

Language games, role play, mime, improvisation (Dundar, 2012), and drama scripts (Karakaya & Kahraman, 2013) are the drama techniques used in this study.

Table 1 is prepared to briefly present which data collection tools were used for the research question, together with how it was applied.

Table 1. Data Collection Procedure

Research Question	Data Collection Tools	Data Collection Procedure
How does the use of drama techniques affect the speaking anxiety of EFL learners?	FLCAS	Turkish FLCAS Before-after drama sessions
	Semi-Structured Pre and post-interviews	Turkish 10 randomly-chosen interviewees (40%) Before-after drama sessions

Student Diaries	Turkish 24 students 6 weeks
Teacher's Reflections	Video records Notes

The Foreign Language Classroom Anxiety Scale (FLCAS) FLCAS was analyzed using the Statistical Package for Social Sciences (SPSS). To test the reliability of both pre-test and post-test questionnaires, Cronbach's Alpha statistic was used and calculated as 0.948 for pre-test and 0.914 for post-test. Because the statistics are very close to 1, reliability was found to be very high. Foreign language speaking anxiety level of the students was determined with the total scores of each student's answers to the FLCAS. The responses to each item in the questionnaire were analyzed calculating the individual item means. For each item, frequencies and percentages were also calculated to see the general distribution of the responses among the participants.

The qualitative data were collected through pre- and post-interviews, students' diaries, and teacher reflections which were analyzed using the content analysis technique. In the content analysis, the steps used by Zerey (2008, p. 73-74) were followed throughout the analysis process:

- Transcribing
- Coding/labeling
- Clustering
- Looking for interrelationships between categories
- Write-up

4. Findings & analysis

4.1. Foreign language classroom anxiety scale(FLCAS)

For the FLCAS, a paired samples t-Test was administered to the data in order to determine the difference between the pre and post-test results. In the following tables, the mean of pre-test scores showing the level of anxiety of the students was 3.07 over 5 and this represents "neither agree nor disagree" point on the Likert Scale. The mean of post-test scores was 2.40 over 5 and this nearly represents the "disagree" point on the Likert Scale. In the questionnaire, negative propositions was questioned. Because of that, it can be implied that the students' foreign language classroom anxiety decreased after the drama application.

Paired Samples t -Test shows that there is a statistically significant, positive difference between the means of pre-test and post-test scores, because t statistic is 3.592 and corresponding P value is 0.002 which is less than predetermined significance level 0.05.

Table 2. Paired Samples Statistics of FLCAS

	Mean	N	Std. Deviation	Std. Error Mean

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Pair 1	Pre-Test	3.0694	24	.80378	.16407
	Post-Test	2.4028	24	.62064	.12669

*N= number, *Std Deviation=Standard Deviation, *Std Error Mean=Standard Error Mean

Table 3. Paired Samples t-Test

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
Pair 1 Pre-Test-Post-Test	.66667	.90919	.18559	.28275	1.05058	3.592	23	.002

*Df = Degrees of Freedom, * t = t-Test, *Sig. = Significance Level

The findings of the quantitative data show that drama positively affected students' anxiety, fear, nervousness, and embarrassment towards speaking in the FL. Most of the students benefited from drama exercises in ways such as speaking in FL when unprepared; feeling confident while speaking English; overcoming the feel of being worse at speaking English than other students; and the fear of being laughed at while speaking an FL.

4.2. Interviews

As for the interviews and the student diaries, the findings are not much different from the findings of FLCAS. During the pre- interviews, the students continually articulated that they are afraid of making mistakes while speaking. They mostly mentioned pronunciation mistakes.

St3. *If I don't know (the answer), I feel embarrassed. If I pronounce funny or silly, I feel embarrassed.*

When they were asked about their reaction to this disturbing situation, students reported that they stop speaking, feel ashamed, or get angry.

Similar to the findings of FLCAS, it is found in the post test that after the drama application most of the students started to feel better in English classroom, and consequently, found it easier to speak English.

St1. *There are many differences. For example, when we are in the classroom, it is just an ordinary lesson. But while doing drama activities, we both have fun and learn at the same time. It helps us to overcome our excitement.*

St2. *Speaking in a regular English lesson and speaking in a drama course is so different from each other. You learn speech patterns in drama. I mean you learn what to say with using these patterns. But it is more difficult (to speak) in a regular class. I mean, I think learning grammar rules is more difficult.*

However some students handled the issue in a different way:

St9. *As we are doing something "critical," as we believe that we shouldn't make a mistake, we give more importance to drama. But in a regular English class, when we make a mistake, you can correct it. We don't need to get anxious. However we get anxious in drama as it is a "critical" issue.*

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4.3. Student diaries

In the student diaries, the responses of the students to the question asking if they feel comfortable, excited, anxious, frightened or happy, showed that most of the students were anxious, frightened, or excited while speaking English in the first drama session. However, when the last week arrived, no students felt this way. Some students also stated that their self-confidence had increased. In the first week, while half of students observed that their friends liked to speak English, after 6 weeks, all of the students agreed that their friends enjoyed speaking English. Moreover, after the six-week-drama application, students compared their thoughts and feelings towards English speaking situations with the ones they had before the drama application. The responses demonstrated that there is a great difference after six weeks. More than half of the students stated that they used to have problems with pronunciation. Almost half of the students stated that they used to abstain from speaking English lessons while some students expressed that they used to be afraid of making mistakes while speaking English. Similarly, some of the students said that they used to get excited while speaking, However, some complained about that they used to have poor vocabulary. Yet, these negative situations turned into positive thoughts and feelings with the help of drama application. Many of the students stated that they are not afraid of making mistakes while speaking English. Most of the students expressed that their pronunciation has improved. More than half of the students stated that they feel comfortable in English lessons, while some students said that they spoke better after the six-week-drama application.

4.4. Teacher's reflection

As a result of my observations, I start to believe that drama is a must in foreign language teaching. After 6-week-drama application, I conclude that drama helped my students to discover themselves; see their strengths and weaknesses; face their fear or nervousness; and overcome these relatively negative feelings. The students who were always abstaining from speaking English and acting, started to raise their hands when I asked for a volunteer. These students also wanted frequently to be called on. Although there was not an observable improvement in their pronunciation, after the application, students weren't afraid of making mistakes while pronouncing a word.

On the other hand, warm up activities also had a significant effect on lowering speaking anxiety levels. During warm up activities, both the students and I enjoyed the language training experience. We acted, danced and sang out loud. Everybody laughed at each other which appeared to help students overcome the fear of being laughed at.

After the drama application, it was clear that their friendship became stronger. There was no grouping among the students any more. All of them wanted to share a scene with a volunteer who they really don't know very well. This also helped students to overcome their fear of making a mistake in front of their friends.

Drama had many positive effects on students. Among the most important ones, we can count the lowering of speaking anxiety levels; improving self-confidence; increasing motivation; decreasing the level of their fear of being laughed at; and being called on in English class.

5. Discussion

In order to explore the effects of drama on the speaking anxiety of students, the findings of FLCAS, interviews, students' diaries ant the teacher's reflections were analyzed. As a result of the comparison between the pre-test and post-test (FLCAS) anxiety scores of the students, it is found that there is a significant difference between the anxiety levels of the students before and after the 6-week-drama

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application. Examining the items specifically related to speaking in FL (Items 1,9,14,16,24,27,33) provided data to support the argument of the present thesis. The findings revealed that drama application lowered students' speaking anxiety in FL.

Moreover, the post-interview results showed that students constantly mentioned their previous concerns about pronunciation which is reported to decrease after the drama application. Similarly, in the students' diaries, the most frequently (n=15) mentioned issue was the improvement of pronunciation after the drama. It is clear in the findings of the present study that pronunciation is considered to be among the dominant elements of FL speaking. As it is accepted as an obligation to pronounce well or perfect in FL, students get anxious when they don't have a good command of it.

Another outcome of the drama application was that students felt comfortable. The word "comfortable" might define several situations here such as, not excited, not anxious, not embarrassed, no fear of making mistakes, no grammar rules, and feeling comfortable among friends. Regardless of these meanings, most of the students said that they feel more comfortable in drama classes than in regular classes. However, there were 2 students who reported that speaking in drama classes was more difficult than in regular classes. One of these students said that the reason for the difficulty was that they had to give attention to more than one thing at the same time, such as the lines, intonation, pronunciation, and of course acting. The other student explained the reason for the anxiety, underlining that drama is a "critical" issue. Since she finds drama more important than a regular lesson, she believes that when she makes a mistake in a regular class, the teacher can correct it, yet this is not possible in drama when she is on the stage. It would not be appropriate to assume that the reaction of the two students was evidence for the negative effect of drama. Rather, they need to be accepted as good outcomes. It was difficult for the first student to speak, as he put effort into the drama by speaking and expressing feelings at the same time, which shows his eagerness to do his best. On the other hand, since the drama activity was given excessive importance by the second student, she believed that she shouldn't make any mistakes. Both students also expressed that they enjoyed the drama activities, which shows that negative feelings towards English don't stem from anything related to the teacher, the other students, or the drama exercises. The reason for their speaking anxiety is directly related to the importance they give to what they are doing in drama.

Additionally, in line with the findings of Zerey (2008), after the drama application, students stated that they gained more self-confidence in speaking English. Pre and post-test included item 31: "I'm afraid that the other students will laugh at me when I speak the foreign language." It shows that the number of the students who are not afraid of being laughed at increases (n=17) in the post-test. According to the teacher's reflections, this might not have been caused by the decrease in laughter directed at the student, *b*ut by an increase in the students' level of self-confidence.

In addition to these favorable outcomes of the study, there is another issue to mention here. The findings of the FLCAS reveal that there is a statistically significant difference between the speaking anxiety levels of the students before and after the drama application. However, there are 7 items in the findings which differ from the other 28 items in the scale. Basically, what was found in the FLCAS was that the students got benefits from drama. These 28 supporting items showed significant support for the idea that drama has positive effects on students' speaking and general anxiety in language classrooms. Though, the findings of these 7 differing items (Item 2,5,8,11,14,18,28) don't show consistency with the majority of the items supporting the present thesis. According to the findings of the Item 5, most of the students (n=18) don't want to have more English lessons after the drama application, while in the student diaries, students frequently stated that they are happier and more comfortable in a language class. Similarly, all of the 10 interviewees reported that they like English classes after the drama application.

This was an unanticipated result which caused the researcher to re-examine the data in an attempt to understand why this situation occurred. The reasons for this apparent contradiction may be related to the students' ability to understand question content and the misunderstanding of the purpose of the questions during the administration of FLCAS. This seems reasonable because the student clearly responded in a positive way to the use of drama in other data collection areas of the study.

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6. Educational implications

The present study shows that drama has positive effects on the speaking anxiety of EFL learners which corresponds to the findings in the FLSA literature. To understand how and to what extent drama helps to lower the levels of speaking anxiety of EFL learners, it is necessary to explain the factors which contribute to anxiety in EFL classrooms.

In order to make use of the findings of the present study, anxiety in foreign language classes should be discussed with the students. They are not alone in the feeling of anxiety in language training classes. As most of the students suffer from the fear of making a mistake, they might also be told that everybody, even the native speakers, can make a mistake while speaking. The same thing happens in Turkish language training. Students should give the same level of respect as they prefer to receive from friends during language training exercises.

In addition, language teachers should be given special education concerning how to create an anxiety free atmosphere in classes. When a student becomes reticent in a language classroom, it means that the teacher has lost a student. The unwillingness of a student to participate in a language classroom is not a sign of discipline, but a sign of higher levels of anxiety, or no anxiety which might suggest complete disinterest. As Brown (1994) suggests, anxiety is a matter of degree. How it is perceived depends on if it is a mild or severe anxiety. Severe anxiety is debilitating while mild anxiety can be facilitating in FL classes. For this reason, anxiety, to a certain degree, could be considered as a beneficial effect on language learning.

Moreover, language teachers should also be informed about the positive effects of drama on speaking and anxiety of FL learners. The literature of FLCA also supports the effectiveness of drama for reducing speaking anxiety. Foreign language teachers could use drama as a powerful medium to teach FL; to motivate students to speak in FL; or to encourage student involvement in literature. On the basis of the observations performed in this study, teachers can work miracles in FL classrooms through the use of drama techniques.

7. Conclusion

This study shows that drama helped to reduce speaking anxiety in FL classes. Thus, the purpose of this study was to seek the answer to the question:

How does the use of drama techniques affect the speaking anxiety of EFL learners?

The study was conducted with a group of 12th graders in Kozan Anatolian Medical Vocational High School. The language levels of these 24 participants were A2. To answer the research questions, the quantitative data was collected through pre and post-tests by the use of FLCAS (Horwitz et al., 1986). The data was analyzed via SPSS program. Semi-structured pre and post-interviews, students' diaries, and the teacher's reflections were included to collect qualitative data which were analyzed through content analysis.

In the present study, it is found that drama application significantly contributed to the emotional quality of the FL classroom. Students felt better, got rid of their prejudices about English classes, and became eager to come to FL classes. In addition, drama lowered the speaking anxiety of the participants. The students started to speak without the fear of making mistakes. They willingly started to take part in English speaking situations.

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Helping students to speak in FL classes is a major responsibility of an FL teacher. In order to fulfil this duty, it is necessary to inform students that it is common to get anxious while speaking an FL, and they are not alone. Moreover the students need to know that the teacher is waiting there to help and courage them; not to correct their mistakes or insult them. When students start to feel secure in the FL classroom, they naturally start to speak.

In conclusion, all foreign language teachers need to motivate their students; encourage them to speak; and to allow them to make mistakes without punishment. In general, it is impossible to learn a foreign language without making mistakes. Given this situation, teachers should make adjustments in the language class to prevent negative feelings toward English language learning. According to this study, the use of drama in foreign language teaching promotes positive feelings toward the learning experience while it increases the likelihood that students will continue to involve themselves in language training.

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The study of students' opinions on the knowledge management system to support online instruction for self-directed learning

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Abstract

This research paper focuses on students' opinions towards knowledge management system for online instruction whose role is to enhance self-direct learning. The target group of this research work was the 43 graduate students who had been studied Master of Education in Educational Technology and Communications and undertaken professional training in the second semester in Academic Year 2011. Research tools conveyed to obtain data were 3 designed questionnaires: 1) an opinionating questionnaire inquiring the web site components for professional training, 2) a questionnaire collecting opinions towards the web site as a whole, and 3) a questionnaire to obtain satisfaction level of users. Statistical methods used in this research were and standard deviation, which presented in tabulated forms and descriptions.

Research findings reveal that students' opinions towards the web site components for knowledge management system governed by online instruction is at the value of =3.97, SD=0.55. Students recommend there be an assigned individual user log, which used to track and update personal record and linked to YouTube at all times or a program that enable a user to present his/her own academic presentation. It is also found out that students are greatly satisfied with professional records employed in the web site at the value of =3.95 and SD=0.50. The focused group suggests the Google Map be used as a potential locator to pinpoint places for professional training. This could be very productive to explore surrounded environments, the neighborhoods, and modes of transportation when a supervisor pays a visit to the place for his/her supervision/assessment. More importantly, this will serve as key information for other students should he/she plan to conduct professional training at the site, for he/she will have a trusted resource as to what kind of positions and job descriptions at the training place will be like. Students' satisfaction towards online instruction is of a high value at =3.83 and SD=0.65. There are 2 particular comments obtained from the audience:

1. Social media should be extensively used and site integration into the web site to achieve a better knowledge management system whether it is a purpose directed to peer to peer, student and supervisor, or student and mentor. This could prove to be an effective channel of communication yielding a number of solutions for unforeseen circumstance during an internship.

2. There should be a careful selection of application available in social media; it should efficiently contribute to development of knowledge management under a single accessible network where stakeholders can equally make use of.

Keywords: opinions, Knowledge Management System, Self-Directed Learning

Introduction

According to the development of knowledge management system for teaching through internet based learning for self-directed learning in higher education, it has served as a supporting mechanism used as a guideline for development of teaching delivery to facilitate knowledge management networks for lecturers and students. Such development enhances knowledge management system and makes possible by an implementation of required evaluation process, which includes using of technological innovation and a promotion of cooperative knowledge management among universities (Tipparat Sittiwong, Anirut Satiman and Surapon Boonlue et al). The results lead to the development of students who are keen on lifelong learning and a better guidance of curriculum development among universities in pursuit of well-qualified graduates. The results also reveal that students are well familiar with website and knowledge management system for teaching through internet based learning, since the system has already been in the E-learning base form which is easily accessible. Clearer, students understand lectures, lessons, experi-

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ences, or attitudes than writing in conventional internship report, for the aforementioned system provides features like editing, adding images, and chatting. For these reasons, the Department of Educational Technology and Communication agrees that knowledge management system for teaching in self-directed learning could be benefit for senior students in the annual professional training. After the crucial innovation of information technology and necessities of knowledge management system, the monitoring process of knowledge management system should be performed annually to apply its results in program development. The benefits of the monitoring process are to:

1. Identify potential problems and prioritize them in order to achieve required solutions.
2. Plan and develop the program in line with objectives and policies.
3. Implement the plan and effective solutions or adjustments.
4. Understand overall progress of the program, which serves as indispensable information for decision making of related problems.

Follow up and monitoring process, if practiced continually, could help to recognize forthcoming obstacles and resource requirements. The program is able to achieve goals and offer some suitable improvements and assessment results. As a result, the program would contribute to exact and up-to-date information, which considered a tool for effective management (http://wipharat0073.blogspot.com/2009/11/blogpost _05.hml, retrieved on November 5th, 2012). Such process is deemed a guideline for up-to-date information management and that the students max out experiences from professional training. These experiences could become knowledgebase and learning resources for junior students and be used to develop curricula in the Department of Educational Technology and Communication to produce highly competent graduates for labor markets.

To collect required data, questionnaires will be used to gather students' opinions towards the system whereas obtained information will be applied to a more up-to-date and efficient system, which significantly meets users' requirements.

Research objectives

To query the opinions on knowledge management system using from the students for teaching support on internet based learning in self-directed learning in higher education.

Benefits

The benefits from the study are to obtain information in order to improve the knowledge management system using from the students, to develop the teaching through internet based learning in self-directed learning of the Department of Educational Technology and Communication in the response of social requirements, and to reach the target of Quality Assurance of Faculty and TQF Standard of the university.

Methods

The population of this study was the 43 graduate students from Department of Educational Technology and Communication in the Naresuan University in the 2nd semester of the 2011 academic year

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Variables

The variables were students' opinions on the teaching through internet based learning in self-directed learning.

Tool

The tools were the professional training website structure questionnaire, the opinions on professional training questionnaire, and information technology system questionnaire.

Statistical tools

The descriptive statistical tools used in the study were mean and standard deviation.

Data collection

- The questionnaire collected from 43 students (100 % feedback) in professional training program of the Department of Educational Technology and Communication, the 2nd /2011 academic year.
- Students 'opinions analysis and conclusion following the research method.

Results

Table 1. The opinion analysis results on the professional training website structure questionnaire, 2nd /2011 of the knowledge management system development for teaching through internet based learning.

Assessment title	Mean	SD	Level
1. Public relation page – news, announcements, teaching and examination information, etc.	3.98	.77	Good
2. User account access system to log in to study provided lessons in the web page.	4.28	.66	Good
3. The online internship report in each semester and description of page usage.	4.09	.72	Good
4. The knowledge on professional training page.	3.91	.68	Good
5. The knowledge management activities on professional training page.	4.14	.67	Good
6. Types of knowledge documentation – e.g. image, html, pdf, PPT, etc.	3.81	.64	Good
7. The knowledge management activities on professional training – i.e. duties, training details, work presentation.	4.19	.70	Good
8. Communication channel.	4.02	.74	Good
9. The self-directed learning help desk and manual	3.81	.63	Good
10. Discussion page.	3.86	.71	Good
11. The related context on support learning resources page.	3.79	.77	Good

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12. The assessment result page.	3.86	.74	Good
13. The data collection of the professional training page.	4.07	.80	Good
14. The statistics on the system accessing.	3.81	.73	Good
Average	3.97	.55	Good

The table 1 displays the opinions on the professional training website structure questionnaire, 2nd /2011 for the knowledge management system development for teaching through internet based learning. The average of total result is in good level (= 3.97, SD = 0.55). Each item analysis results are all in good level following these details: User account access system to log in to study provided lessons in the web page (= 4.28, SD = 0.66), the knowledge management activity on professional training – i.e. duties, training details, work presentation (= 4.19, SD = 0.70), the knowledge management activity on professional training page (= 4.14, SD = 0.67), the online internship report in each semester and description of page usage (= 4.09, SD = 0.72), the data collection of the professional training page (= 4.07, SD = 0.80), communication channel (= 4.02, SD = 0.74), Public relation page – news, announcements, teaching and examination information, etc. (= 3.98, SD = 0.77), the knowledge on professional training page (= 3.91, SD = 0.68), the assessment result page (= 3.86, SD = 0.74), the discussion page (= 3.86, SD = 0.71), The statistical usage on the system accessing (= 3.81, SD = 0.73), the types of knowledge documentation – e.g. image, html, pdf, PPT, etc. (= 3.81, SD = 0.64), the self-directed learning help desk and manual (= 3.81, SD = 0.63),and the related context on support learning resources page (= 3.79, SD = 0.77).

The students recommend on the professional training website structure for the knowledge management system development for teaching through internet based learning that the system should be able to update the multimedia daily journal by its users and enable them to connect to YouTube or other presentation software.

Table 2. The result of opinion analysis on professional training questionnaire in 2nd/ 2011 academic year for journaling the training experiences.

Assessment title	**Mean**	**SD**	**Level**
The knowledge management system access	3.84	.52	Good
1. Web page using manual.	3.88	.59	Good
2. Simplicity and convenience.	3.91	.68	Good
3. Teaching and Learning instruction.	3.95	.58	Good
4. The clarity of teaching documents.	3.65	.78	Good
Web page designs	3.84	.62	Good
5. The decency of page designs for target users.	3.91	.75	Good
6. Attractiveness of page designs.	3.72	.75	Good
7. Website navigation links.	3.74	.79	Good
8. External links to supported documents.	3.81	.79	Good
9. Buttons and Icons.	3.79	.77	Good
10. Context exhibition technique.	3.77	.88	Good
11. Graphical designs	4.07	.80	Good
12. Rapidity of lesson access and document download	3.93	.80	Good
Learning lesson design	4.05	.51	Good
13. The clarity of lesson objectives.	4.28	.73	Good
14. Instruction, description, and example in the lessons.	4.21	.64	Good
15. The clarity of learning activity process.	4.12	.66	Good
16. Suitability for self-learning of the context.	4.07	.63	Good
17. The clarity of the title.	3.98	.74	Good

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18. The suitability of the quantity, frequency, and length of time.	4.02	.80	Good
19. The appropriation for self-learning of the pre-post evaluation.	3.88	.76	Good
20. The clarity of the process of learning activity determination.	3.98	.67	Good
21. The context appropriation for self-learner.	4.05	.69	Good
22. The clarity of each activity.	4.12	.66	Good
23. The suitability of the quantity, frequency, and length of time.	3.95	.69	Good
24. The appropriation for self-learning of the pre-post evaluation.	4.00	.62	Good
25. Benefits of learning activities for self-learners.	4.14	.74	Good
26. Participation between the students and lecturers on the learning activities	3.86	.67	Good
The communication and interaction between students and examiners.	3.95	.57	Good
27. Announcement of the learning activities or schedules.	3.84	.72	Good
28. Interaction between learners and lecturers (E-mail, Chat room, forum)	3.91	.81	Good
29. Interaction between learners and lecturers (E-mail, Chat room, forum)	3.93	.74	Good
30. Knowledge management on internet-based learning overview.	4.02	.60	Good
31. Facebook as a tool of communication and problems discussion.	4.05	.78	Good
Average	**3.95**	**.50**	Good

The table 2 exhibits the opinion on professional training assessment in the 2nd semester of the 2011 academic year. The average of total result is in good level (= 3.95, SD = 0.50). Each item analysis results are all in good level following these details: the knowledge management system access (= 3.84, SD = 0.52), web page designs (= 3.84, SD = 0.62), Learning lesson design (= 4.05, SD = 0.51), and the communication and interaction between students and examiners (= 3.95, SD = 0.57).

Except from the questionnaire, students recommend that application of Google Map to locate the places and environments of the company could be convenient for examiners and other students to access to details of the professional training.

Table 3. The result of opinion analysis on information technology system

Assessment title	Mean	SD	Level
1. The up to date of information	3.60	.69	Good
2. The clarity and reliability of the information	3.88	.66	Good
3. The comprehension of Information system	3.72	.77	Good
4. The benefits of the information in operation	4.00	.98	Good
5. User's demand response of the information	3.81	.73	Good
6. Categorization of the information	3.86	.80	Good
7. The systematic and ordering information presentation	3.81	.85	Good
8. The rapidity of the searching engine.	3.72	.88	Good
9. Accessibility of information	3.95	.90	Good
10. Simplicity of the information	4.07	.88	Good
11. Satisfaction on system overview	3.86	.86	Good
12. Convenience of information using	3.95	.75	Good
13. Rapidity of using.	3.74	.87	Good
14. Accuracy of the system	3.91	.81	Good
15. The comprehension of system	3.79	.80	Good
16. Consulting and solution providing	3.70	.74	Good
Average	3.83	.65	Good

The table 3 presents the opinion on information technology system. The average of total result is in good level (= 3.83, SD = 0.65). Each item analysis results are all in good level following these details: Simplicity of the information (= 4.07, SD = 0.88), the benefits of the information in operation (= 4.00, SD = 0.98), accessibility of information (= 3.95, SD = 0.90), convenience of information using (= 3.95, SD = 0.75), Accuracy of the system (= 3.91, SD = 0.81), the clarity and reliability of the information (= 3.88, SD = 0.66), satisfaction on system overview (= 3.86, SD = 0.86), categorization of the information (= 3.86, SD = 0.80), the systematic and ordering information presentation (= 3.81, SD = 0.85), user's demand response of the information (= 3.81, SD = 0.73), the comprehension of system (= 3.79, SD = 0.80), rapidity

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of using (= 3.74, SD = 0.87), the rapidity of the searching engine (= 3.72, SD = 0.88), the comprehension of Information system (= 3.72, SD = 0.77), consulting and solution providing (= 3.70, SD = 0.74), and the up to date of information (= 3.60, SD = 0.69)

Other recommendations

The knowledge management system should be applied by the social media for interaction between lecturers, students, and mentors in order to effectively improve the communication process. The problems occurred in the mid of training program will be resolved instantly by the cooperative management of students, lectures, and mentors.

The use of internet-based tool as social media online should be applied in order to narrow up the inequalities of training program knowledge access to use in the teaching entirely. The descriptive statistical tools used in the study were mean and standard deviation.

Discussion

As above research results, there are issues to discuss as follow.

1. While the overview opinions of students on the professional training website structure questionnaire, 2nd /2011 of the knowledge management system development for teaching through internet based learning exhibit in good level (= 3.97, SD = 0.55), there are points to be discussed from the opinions. Online internship report should be more convenient to use as a study result of Naowarat Jankomol (2011) on the staff promotion decision support system for administrators in Bangkok, which assisted the administrators to assess the employee performances conveniently. The study found that the system should be included with working performance index, staff performance records, and the performance evaluation. The staff performance records are similar to the internship report in the professional training which is able to report the brief details to whom concerned.

2. The overview opinions on professional training system in the 2nd/ 2011 school year for journaling the training experiences reveal a good level (= 3.95, SD = 0.50). The analysis in each title also appears all in good level as follows: the knowledge management system access (= 3.84, SD = 0.52), Web page designs (= 3.84, SD = 0.62), Learning lesson design (= 4.05, SD = 0.51), the communication and interaction between students and examiners (= 3.95, SD = 0.57). These are the basic elements of knowledge management system design for the endless development of professional training website. The further recommendations from students are Google Map as its properties are able to locate the organizations or companies and to explore environment nearby. This could facilitate the examiners and could be necessary information for the junior students who desire to be trained there. Boontham Kaewpeng (2002)'s study explored the pilot project of the 9 years compulsory education by Chiang Rai primary education office and found that the facility preparation for instant teaching resources and textbooks were insufficient for students. Hence, the professional training website should meet the user requirements as much as possible.

3. The opinions on information technology system are in good level (= 3.83, SD = 0.65) in consideration that the system could reciprocate their requirements well. Additional requirements are the practicable features and tools in order to use the professional training knowledge management for further progress.

Suggestion

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1. Under the knowledge management system, the social media application for the knowledge interaction between students to students, students to examiners, and students to mentors should be considered in order to improve the communication process effectively, be able to resolve problems instantly, and initiate the cooperation between students and students, students and examiners, and students and mentors.

2. The online tools of social media technologies should be applied in order to develop the knowledge management networks and narrow the inequalities of professional training knowledge access for effective teaching.

3. The application of knowledge management system should have publication to related people. They should realize the method and process of the system for the purpose of participating and discussion preparation

Suggestion for further study

1. The pursuance of the knowledge management system development for teaching through internet based learning should be attached to improve and update the system and its elements.

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The use of e-portfolio-based assessment to develop students' self-regulated learning in English language teaching

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Abstract

Traditional assessment ways like multiple choice tests have been used to evaluate students' performance in English language teaching (ELT) at schools, but these assessment methods are not effective and efficient because they do not show the real performance of students. On the other hand, student-centeredness is the main focus of many teaching and learning methods and techniques used in ELT. It emphasizes learning by doing. As the main focus is on learning by doing, assessing this process requires different assessment methods that take factors, such as students' understanding and personal difference into consideration, while evaluating learners' performance. Therefore, educators need to develop new student-centred assessment methods to evaluate learners in ELT. One of these ways is the use of e-portfolios. E-portfolios can be used as an assessment in courses effectively to improve different learning styles of learners. One of them is self-regulated learning, which focuses on students' taking responsibility for their learning from the beginning to the end. This process includes setting goals and organizing learning environments according to their determined goals, but finding research on the use of e-portfolios as an assessment tool in self-regulated learning in ELT is rare. Therefore, this paper aims to find out whether e-portfolio-based assessment can be used to improve students' self-regulated learning through reviewing the literature. The result of the literature review indicates that e-portfolio-based assessment can develop students' self-regulated learning in ELT.

Keywords: E-portfolio; E-portfolio based assessment; Self-regulated learning

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1. Introduction

For many years, traditional assessment styles like multiple choice tests have been used to evaluate students' performance at school, but these assessment methods are not effective and efficient because they do not show the real performance of students and are mainly based on the behaviourist approach, which defines education as "habit formation." Therefore, traditional ways of assessment are not enough to measure the skills of learners in different courses. On the other hand, the constructivist approach, which focuses on students, supports student-centred activities in classroom and defines education as "learning by doing," and is the basis of modern education methods and techniques, such as the problem-solving method or the project-based method. As the main focus is on learning by doing, assessing this process requires different assessment methods that factor in students' understanding, personal differences, and individual performance when evaluating learners' performance. Unlike traditional assessment ways, the new assessment ways should be student-centred. Consequently, some new ways, such as e-portfolios are developed to assess learners. E-portfolios can be defined as electronically collected works and reflections of students, which are used to show their growth and development during the learning process (Gülbahar and Tinmaz, 2006, 311). The works and reflections of students are stored in electronic formats, such as graphics or CDs (Gülbahar & Tinmaz, 2006). Educators, instructors, and teachers know how to use e-

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portfolios in their courses, but they cannot use them effectively to improve the different learning styles of students. One of them is self-regulated learning that focuses on students taking responsibility of their education from the beginning to the end. This process involves setting goals and maintaining a learning environment according to their determined goals (Zimmerman, 1990). However, the use of e-portfolios as an assessment tool in self-regulated learning has not been researched much in the English language-teaching field. Therefore, the aim of this paper is to find out whether e-portfolio-based assessment can be used to improve students' self-regulated learning by reviewing the literature about e-portfolios, e-portfolio-based assessment, and self-regulated learning in English language teaching. The present paper aims to answer the following question: Can e-portfolio-based assessment be used to develop students' self-regulated learning in English language teaching? If so, how does e-portfolio-based assessment develop students' self-regulated learning in English language teaching?

2. E-portfolio

In order to evaluate the relationship between e-portfolio-based assessment and self-regulated learning, this section explains what an e-portfolio is, along with its benefits and characteristics. This section starts with the definition of an e-portfolio. Then the section focuses on benefits of an e-portfolio and ends up with its characteristics.

2.1. Definition of e-portfolio

Rhodes (2011) mentions, "…ePortfolios might be the biggest thing in technology innovation on campus. Electronic portfolios have a greater potential to alter higher education at its very core than any other technology application we've known thus far" (p. 7). This emphasizes the importance of the use of e-portfolios in education because it can make students work digitally and in an organized, searchable, and transportable way, as Rhodes mentions. The definitions of e-portfolio focus on the features of being digital, organized, searchable, and transportable. In one definition, Lorenzo and Ittelson (2005) define an e-portfolio as "a digitized collection of artefacts including demonstrations, resources, and accomplishments that represent an individual, group, or institution" (p. 2). They also add that e-portfolios are "personalized, Web-based collections of work, responses to work, and reflections that are used to demonstrate key skills and accomplishment for a variety of contexts and time periods" (p. 2). In another definition, an e-portfolio is defined as "the product, created by the learner, a collection of digital artefacts articulating experiences, achievements and learning" and as "a purposeful aggregation of digital items – ideas, evidence, reflections, feedback, etc., which presents a selected audience with evidence of a person's learning and/or ability" (Gray, 2008, pp. 6-7). Consequently, the definitions indicate that e-portfolios include the artefacts of students that help others understand and observe the learning processes of students.

2.2. Benefits of e-Portfolio

According to Goldsmith (2007), institutions and students can benefit from e-portfolios since they allow them to understand "how well they are educating their students" and they are able to assess "their educational experiences and achievements, and how these are linked to their personal goals" (p. 31). They connect students' coursework to the outcomes of institutions, so students can "understand these connections as well as the connections between their own lives and their academic work" (Goldsmith, 2007, p. 37). This stems from a need to evaluate the improvement of students' "understanding of the self and the curriculum" (Gray, 2008, p. 9).

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According to Goldsmith, e-portfolios can enhance the learning process and assess learners authentically because of its requirements. They include taking the responsibility of their learning by making students organize their material for a specific purpose, self-evaluating their work, and reflecting their findings about their learning process, experiences, and skills. Students, therefore, can be in charge of their own learning and be motivated to study (Akçıl & Arap, 2009). Also, e-portfolios can assist to facilitate and document learners' experiences authentically (Reese & Levy, 2009). Consequently, they require students to be engaged in the process, so they can contribute to the enhancement of learning process and authentic assessment. Since students are responsible for their own e-portfolio process, they can individualize and personalize their learning (Schmitz, Whitson, Heest, & Maddaus, 2010; Gray, 2008).

In addition, e-portfolios can save students' and teachers' time and energy. Through the use of e-portfolios, students can store information easily, give easy access for viewing and review purposes, and minimize the any risks of loss (Goldsmith, 2007). E-portfolios can promote student autonomy. According to Gonzalez (2009), the European Language Portfolio encourages the use of e-portfolio assessment in language education because e-portfolios can increase students' awareness of the "language learning process and its implications" (p. 373). This process can help students become autonomous. First, they can find out and "become aware of all the important invisible factors, procedures, and attitudes involved in language learning" (Gonzalez, 2009, p. 382). Second, students can become the owners of their language learning and recognize that learning has to also occur outside the classroom.

E-portfolios promote feedback, reflection, and self-reflection. They possess digital collections of student artefacts related to their goals, achievements, experiences, ideas, and so on, and require students to reflect on their learning processes. Therefore, they can contribute to the assessment of students' own products and individual achievement and to the effectiveness of courses, programs, departments, or institutions (Reese & Levy, 2009; Goldsmith, 2007). They enhance the reflection of students since students understand their learning and have the "evidence of their capacity for critical thinking, analytic reasoning, and integrative learning" (Rhodes, 2011, p. 5). In one study, Lin (2008) indicates that reflection helped students revisit their learning experiences and make a change in the way they viewed their learning. According to Lin, students can develop a sense of purpose and focus through the use of e-portfolios because upon reflection, students make a comparison between their artefacts and the standards in order to understand and check first whether their artefacts meet the standards or not, and then how and why they meet the standards if so. Also, it can assess students formatively in terms of the evaluation of student learning, and summatively in terms of the evaluation of student progress and achievement as Rhodes mentions (2011). According to Rhodes, it can help learners to become active in the presentation and representation of their learning, so this can motivate them to do their best. Also, Goldsmith (2007) mentions that e-portfolios can provide students with individual feedback about their learning, experiences, achievements, and can provide feedback about the effectiveness of their work. Therefore, e-portfolios can improve students' learning through feedback and reflection, which supports permanent learning (Akçıl & Arap, 2009) and makes them more willing to overcome problems (Gray, 2008).

In short, e-portfolios can be used effectively and efficiently in teaching, learning, and assessment as they are learner-centred. They make students responsible for their learning by enabling them to organize and control the content of their e-portfolios, which helps them to personalize their e-portfolios. This responsibility requires students to reflect and assess their own learning.

2.3. Characteristics of e-portfolio

In reviewing studies related to the use of e-portfolios, ten common characteristics were noticed. The first characteristic of e-portfolios is *being authentic.* It is *authentic* because students take responsibility for their learning, so they are supposed to organize their e-portfolios, reflect on their own learning processes and findings, and improve their learning depending on their reflections (Goldsmith, 2007; Reese & Levy, 2009). Second, it is *controllable* since students can organize their e-portfolios, reflect and assess their learning processes, and make necessary changes to their e-portfolios according to their reflections (Goldsmith, 2007). Third, it is *communicative* and *interactive* because students need to communicate and interact with their peers and teachers to improve their learning (Bolliger & Shepherd, 2010; Lin, 2008). Fourth, it is *dynamic* since the structure of e-portfolios is continuously developing as a result of the organization of content, collection and selection of artefacts, the self-assessment and self-reflection of the learning process, and improvement made according to self-assessment and self-reflections. Fifth, it is *personalized* because students form their e-portfolios on their own (Goldsmith, 2007; Schmitz et al., 2010; Gray; 2008).

Sixth, it is *integrative* since e-portfolios create connections between students' lives and academic work (Goldsmith, 2007, p. 37). Seventh, it is *multi-purposed* in that it can be used for the assessment of students' learning performances and of institutions' education programs (Goldsmith, 2007), and for gaining employment in the future (Goldsmith, 2007; Lin, 2008; Reese & Levy, 2009; Kocoglu, 2008). Eighth, it is *multi-sourced* as it provides students with feedback on their learning, teachers with the assessment of students' performances, and institutions with the opportunity to assess their programs, courses, or departments (Goldsmith, 2007). Ninth, it is *motivational* because it gives students ownership of their own learning and leads to the improvement of their skills (Akçıl & Arap, 2009; Bolliger & Shepherd, 2010; Rhodes, 2011). Finally, it is *reflective* because e-portfolios requires reflection of one's own learning, so students can self-reflect and assess their learning processes via e-portfolios (Goldsmith, 2007; Reese & Levy, 2009; Lin, 2008).

3. E-portfolio based assessment

Yastıbaş (2013) has carried out a theory on the use of e-portfolios in speaking classes as an assessment tool. The results of the study show that e-portfolio assessment improved students' self-assessment skills because they could monitor their learning process, understand their strengths and weaknesses, and try to overcome their weaknesses. It also helped them to take responsibility for their learning and be aware of the progress of their learning (Yastıbaş, 2013). This makes the students more self-confident, motivated, and engaged in learning (Yastıbaş, 2013). In addition, the study suggests that e-portfolio assessment increased active participation because students had control over the organization, selection, and design of the content of their e-portfolios. In another study, Tonbul (2009) dealt with developing an e-portfolio model for a university. The study indicates that using e-portfolios in assessment and learning, students were able to reflect on their own learning and discover their strengths and weaknesses. According to Tonbul, it also increased collaboration and interaction between teacher and students, so it facilitated learning. It made students more responsible for their own learning, assisted them in monitoring their own learning by checking what they learnt, increased their self-assessment skills, and motivated them. In addition, Abbaszad Tehrani (2010) has used net-folio to improve writing skills. Net folio is another name used instead of e-portfolio. The results of that study show that net-folio motivated students and helped them to be responsible for their own learning because they took control of the content of their net-folios. It also improved the self-assessment and peer feedback skills of the students so that they could learn from each other, understand their strengths and weaknesses, monitor and follow progress in their own learning (Abbaszad Tehrani, 2010). In another study, Erice (2008) researched the impact of e-portfolios as assessment and learning tools in writing classes.. According to Erice, e-portfolios enable students to be owners of their own learning processes, and helped them to reflect on their learning by improving their self-assessment skills, motivated them, and also allowed them to follow the progress of their own learning.

These studies describe the contributions of e-portfolio based assessment, and these contributions are aligned with the ones mentioned in "Assessing with ePortfolios" (n.d.) and Chang (2008). The first study, "Assessing with ePortfolios" (n.d.) explains the contributions of e-portfolio assessment. It supports and encourages independent, self-directed, and individualized learning. It allows students to plan and compile the content. It enables students to reflect on their learning, performance, and achievement. It creates connections between students' learning and assessment criteria. Students can be responsible for their own learning and assessment and regulate their learning through e-portfolios in and out of the class. It provides a personalized learning space. It is a kind of sustainable assessment as it helps students identify their learning, make judgments about it, and be ready for future learning. It is continuous and evidence-based assessment. It allows learners to connect tacit knowledge with constructed knowledge. It keeps track of students' learning process. It enables students to own and direct their own learning as they select and reflect on their learning. In the second study, Chang (2008) categorized the contributions of e-portfolio assessment. According to Chang, students organize and develop their e-portfolios. It is the demonstration and reflection of students' learning process and achievements. It develops students' self-learning, self-evaluation, self-assessment, and self-reflection. It promotes teacher-learner interaction and reader evaluation. Students can participate in e-portfolio assessment actively. They can take part in the decision-making process actively (Chang, 2008, p.1757). It enhances the interaction between peers, peer assessment, and learning outcomes in the long run. Students are in charge of their own learning by planning their learning actively in e-portfolio assessment process. It supports students' creativity. It is motivates students to learn and help them evaluate themselves with confidence. It enhances students' technological skills.

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4. Self-regulated learning

According to Zimmerman (2000), self-regulation is defined as "self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals" (p. 14). In the academic arena, it requires the planning and managing of time, attention and focus on education, rehearsal, code, and the organization of information, making working environment productive, and utilizing social resources effectively (Schunk & Zimmerman, 1997). Also, Pintrich (1995) mentioned that academically it possesses self-directed processes that require learners to monitor, control and evaluate their effects, cognition, behavior, and certain aspects of the environment. In addition, according to Bandura (1986), personal, behavioral and environmental processes are interactive and required in self-regulation. Besides, some psychological components including motivation, strategies, self-awareness of performance outcomes, and sensitivity to environmental and social settings are required in self-regulation (Zimmerman & Risemberg, 1997). Depending on the definitions, self-regulated learning motivates students to set their own goals and decide which plans and strategies should be used to attain those goals, which increases their self-awareness of their performance and makes them monitor their learning process and control the social and physical setting (Wang, 2004).

According to Bandura (1986) and Zimmerman (2000), being self-regulated has three important processes or phases. For Bandura, self-observation, self-judgment, and self-reaction are important in self-regulating one's own learning process. Self-observation is the observing of one's own behavior in an attentional way, self-judgment is comparing one's own performances with that of a standard, and self-reaction is responding to self-judgment in an evaluative way (Bandura, 1986). Similarly, Zimmerman (2000) claimed that there are three phases in self-regulation that are cyclical and consist of three components: forethought, performance, and self-reflection phases. There are processes and beliefs such as motivation, self-efficacy, goal setting, and planning that trigger efforts to learn in the forethought phase, performance phase includes processes like attentional control, keeping records, and monitoring in which students concentrate on the task to optimize their performance, and self-reflection phase involves processes like self-evaluation in which learners compare their performance with a goal and evaluate their results (Zimmerman, 2000). To understand these phases better, Zimmerman (1998, 2002) considers some questions. In the forethought phase, learners can ask when and where they will write, how they will start, and what will help them to write. In the performance phase, they can try to find answer to the questions whether they accomplished the aim of the assignment, whether it is taking more time than the planned time, whether they can be encouraged to keep going, and what will help them. In the self-reflection face, the questions "whether the students did a good job, how they kept on task, what helped them, whether they gave enough time to complete the assignment, whether they chose the right study strategies, whether they set rewards and consequences for themselves, and whether the students followed their plans" are asked.

Depending on the cyclical method of Zimmerman for self-regulated learning, Hirata (2010) mentioned four components of self-regulated learning: cognitive/metacognitive, affective, behavioral, and environmental regulations. According to Hirata, cognitive and metacognitive regulation includes perceptions of previous experience, goal setting, and strategic planning in the forethought phase, implementing strategies, monitoring and controlling progress in the performance phase, performance evaluation, and strategic adoption in self-reflection phase. Affective regulation is related to motivational beliefs, perceptions about possible outcomes in forethought phase, and affective responses in the self-reflection phase, and needs to monitor and control motivation and emotion in the performance phase (Hirata, 2010). Behavioral regulation involves preparing for behavioral engagement in the forethought phase, undertaking and controlling planned commitments, noticing behavioral changes in the performance phase, behavioral adaption, and defensive reactions in the self-reflection phase as Hirata (2010) mentions. According to Hirata, environmental regulation includes the processes of observations about available resources and learning contexts in the forethought phase, managing resources, identifying problems, seeking help in the performance phase, environmental restructuring, and disengagement in the self-reflection phase.

In relation to the phases and components of self-regulated learning, Zimmerman and Martinez-Pons (1986) found out that there are 14 different self-regulated learning strategies used. They are self-evaluation, organizing and transforming, goal setting and planning, seeking information, keeping records and monitoring, environmental structuring, self-consequences, rehearsing and memorizing, seeking peer assistance, seeking teacher assistance, seeking adult assistance, reviewing tests, reviewing notes, and reviewing texts. While heavily relying on the strategy list created by Zimmerman and Martinez-Pons, two other scholars, Pape and Wang (2003) developed another 11-item list of self-regulated learning strategies. They are self-evaluation, organizing and transforming, goal setting and planning, seeking information,

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keeping records and monitoring, environmental structuring, self-consequences, attentional control, rehearsing and memorizing, seeking social assistance, and reviewing records (Pang & Wang, 2003). All of these strategies are based on being self-initiated.

The definitions, phases, components, and strategies of self-regulated learning describe the characteristics of a self-regulated learner. According to Zimmerman (1990), learners are proactive and reactive during their learning process. They look for information proactively when they need and are ready to take the necessary steps to master their skills (Zimmerman, 1990). Also, they establish goals by using appropriate strategies, their self-efficacy beliefs towards their capabilities are high, and these two affect their goal setting and the level of commitment to attain their goals (Zimmerman, 1990). This means that self-regulated learners are active in their learning process in terms of motivation, metacognition, and behavior (Zimmerman, 1990). According to Zimmerman, they are self-efficacious and possess positive attitudes toward learning, so they can act by selecting and structuring action. In addition, Schunk and Zimmerman (1997) mentioned that self-regulated learners are active participants because they can control their learning experiences in many different ways efficiently. They can do so by organizing and rehearsing information to be learned, holding positive beliefs about their capabilities, and putting a high value on learning (Schunk & Zimmerman, 1997). Consequently, the characteristics show that self-regulated learners initiate their own learning, use strategies to achieve their self-set goals, monitor their learning by checking what worked and what did not work. Therefore, they can have the ability to control and influence their own learning processes positively.

4.1. Studies related to self-regulated learning in English language teaching

Studies on self-regulated learning in English language teaching are based on the relationship between self-regulation and self-efficacy, motivation, academic achievement, and learning strategies. Also, some studies focus on the effect of self-regulation learning on writing, reading, listening, speaking, and vocabulary learning.

In Wang's dissertation (2004), the researcher focused on the relationship between self-regulated learning strategies and self-efficacy beliefs of four Chinese students learning English as a second language. The results of the dissertation show that self-regulated learning strategies of the students such as seeking social assistance and information, reviewing records, and environmental structuring affected the students' self-efficacy beliefs positively while they used the strategies more in reading than in writing. In addition, the focus of another project is on raising self-efficacy through self-regulated learning strategies in a secondary EFL classroom (Koehler, 2007). This study found that self-regulated learning strategies led to higher levels of self-efficacy, which resulted in more engagement of students in reading activities.

Hirata (2010) concentrated on the relationship between motivation and self-regulated learning in second language acquisition related to Kanji learning. Hirata found that self-regulated learning has a positive effect on self-regulated learning. Different aspects of motivation including intrinsic orientation and value, self-efficacy, and self-concept are predictors of different types of self-regulated learning. To illustrate, intrinsic orientation and value are indicators of cognitive and metacognitive self-regulated learning, while self-efficacy is related to behavioral regulation and self-concept is connected to environmental self-regulation (Hirata, 2010). Also, Al-Otaibi (2013) has studied the relationship between Saudi EFL learners' vision of future-self and their self-regulated learning behavior. According to Al-Otaibi, Dörnyei developed a second language motivational self-system in which ideal-self and ought self are defined. Dörnyei's system focuses on the discrepancy between a learner's actual self and his/her ideal self (Al-Otaibi, 2013). The results of the study indicate that ideal self increases motivation and self-regulated learning. This makes them be motivationally, meta-cognitively, and behaviourally ready to be active in their learning (Al-Otaibi, 2013). Also, it makes them self-efficacious and they have positive attitudes toward learning (Al-Otaibi, 2013).

Mahmoodi, Kalantari, and Ghaslani (2014) have searched the relationship between self-regulated learning, motivation, and language achievement among Iranian EFL learners. They have found out that self-regulated learning strategies affect the motivation of the students positively, while there is no connection between self-regulated learning and second language achievement. Also, the research indicates that the students use cognitive and metacognitive strategies more than behavioral strategies. Besides this, Garri-

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do-Vargas (2012) studied the relationship between self-regulated learning and academic achievement among English language learners. This dissertation indicates that self-regulated learning influenced motivation and self-efficacy in a positive way; therefore, self-regulated learning contributed to the learners' academic achievement in reading and writing. Also, Andrade (2012) states that self-regulated learning can improve learning proficiency, make learners satisfied, and help them increase their capacity for autonomy.

Bloom (2013) has focused on the place of goal setting and self-monitoring in self-regulated learning. He mentions that self-regulated learning strategies enables students to make higher academic achievements, make greater effort to solve problems, overcome obstacles, and motivate them to learn. Goal setting and self-monitoring are two of these strategies and help them to be aware of their learning, judge their learning ability, and adjust themselves according to their own evaluation (Bloom, 2013). Self-regulated learning increases self-confidence, self-efficacy, and motivation, so it results in active participation and increased collaboration (Bloom, 2013).

Çelik, Arkın, and Sabriler (2012) researched EFL' learners' use of Information Communication Technologies (ICT) for self-regulated learning. They have found out that ICT provides learners with opportunities to regulate their learning outside of the class by reaching their language learning goals and motivating themselves via ICT, making language learning an enjoyable process. Also, Cheng and Chau (2013) have investigated the relationship between self-regulated learning ability and e-portfolio achievement. The study shows that cognitive skills, metacognitive control strategies, and collaboration have a positive effect on students' e-portfolio achievements.

Lin and Gan (2014) studied Taiwanese college students' use of English listening strategies and self-regulated learning. The study finds out that self-regulated learning made students plan and evaluate their own listening education, give them a desire to acquire the knowledge, motivated them to succeed, and take action to become proficient (Lin & Gan, 2014). This process helped them to be more active in their learning, discover their strengths and weaknesses and use effective methods to succeed; therefore, self-regulation made them good listeners (Lin & Gan, 2014). Aregu (2013) studied the relationship between self-regulated learning and speaking efficacy and performance among Ethiopian students. As Aregu (2013) states, self-regulation made the Ethiopian learners more motivated and responsible for their learning. Therefore, self-regulated learning improved their speaking efficacy and performance.

In Filate's study (2012), the impact of self-regulated language learning among the reading achievements of grade 9 students was assessed. The results of the study show that cognitive self-regulation strategies were indicators of the students' reading performance and contributed to their reading performance. In Zarei and Hatami's research (2012), the relationship between self-regulated learning components and L2 vocabulary knowledge and reading comprehension of Iranian EFL learners was studied. The self-regulated learning components that were examined in this study were planning, self-check, effort, and self-efficacy. The study indicates that these components do not have an effect on vocabulary knowledge, while only self-check and effort have a direct and positive effect on reading comprehension. Pratontep and Chinwonno (2008) have focused on self-regulated learning among Thai university students in an EFL extensive reading program. The study reveals that self-regulated learning training about the strategies particularly related to metacognitive and performance improved the students' reading comprehension. Al Asmari and Ismail (2012) have searched self-regulated learning strategies as predictors of reading comprehension among students of English as a foreign language. Their study indicates that self-regulated learning strategies such as rehearsal, self-talk, and elaboration are indicators of reading comprehension. Mizumoto (2013) has dealt with enhancing self-efficacy in vocabulary learning through a self-regulated learning approach. According to Mizumoto, self-regulated learning increased self-efficacy in vocabulary learning. Hence, it helped the participants improve their vocabulary knowledge. Hamedani (2013) studied the relationship between self-efficacy and self-regulation in vocabulary acquisition of Iranian EFL learners. Hamedani mentions that there is a strong relationship between self-efficacy and self-regulation, which results in an increase in vocabulary acquisition.

The study of Soureshjani (n.d.) has focused on the relationship between self-regulation and motivation and Iranian EFL learners' writing achievement. The results of the study point out that there is a strong connection between motivation and self-regulated learning, so it has a positive impact on the learners' writing performance. Zhang (n.d.) focused on self-regulated learning in an online ESL writing class. According to Zhang, self-regulated learning has a positive influence on motivation; therefore, the students could benefit from an online writing course.

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4.2. Studies related to self-regulated learning and e-portfolio

There are few studies whose focus is on the enhancement of self-regulated learning through e-portfolios in different areas rather than English language teaching. In one of these studies, Alexiou and Paraskeva (2010) have worked on enhancing self-regulated learning skills through the implementation of e-portfolios in a computer science university. The results of the study show that e-portfolios make students more engaged and enthusiastic about their learning, and also there was a high correlation between cognitive, motivational, and affective factors. They suggest that the use of e-portfolios supports and promotes students' learning, so the structuring of e-portfolios can enhance self-regulated learning skills. In addition, there are some e-portfolio systems such as the Electronic Portfolio Encouraging Active Reflective Learning Software (ePEARL) (Abrami, Wade, Pillay, Aslan, Bures, & Bentley, 2008) and MySelf E-portfolio (Alexiou & Paraskeva, 2013) that are developed and used in some studies. Abrami et al. and Alexiou and Paraskeva mention that their e-portfolio systems are structured according to the phases of self-regulated learning developed by Zimmerman. Abrami et al. have found out that the efficiency and effectiveness of e-portfolios depends on the enhancement of self-regulated learning skills, since teachers and students were not familiar with self-regulated learning, and it was difficult for teachers to teach self-regulated learning strategies. Alexiou and Paraskeva (2013) emphasize that a self-regulated oriented e-portfolio could increase motivation and self-efficacy and could be used for professional and academic development. Also, the study shows that students could acquire some skills of self-regulated learning, and so e-portfolios could be used to improve self-regulated learning. In another study, Jenson (2011) focused on how to promote self-regulation and critical reflection through students' writing e-portfolios. The results of the study have indicated that e-portfolios could develop self-regulation and critical reflections of students in writing. Similarly, Mackenzie (2014) has studied medical students' experiences using an e-portfolio for self-regulated learning. Mackenzie has stressed that e-portfolio helped the students acquire some elements of forethought and reflection phases, but they did not acquire elements of performance phase, so e-portfolios could enhance students' self-regulated learning skills, but to make it more effective and efficient, self-regulated learning instruction should be given more importance. Lou and Blaustein (2014) complied a literature review study on the relationship between e-portfolios with motivation, self-regulation, and academic achievement. Their review of the literature indicates that the use of e-portfolios is associated with motivation and reflection, can increase learners' strategies, motivation, academic achievement, and technology aptitude, is student-centred, offers user-control, and needs full commitment and planning. In addition, a review study on self-regulated learning in technologically enhanced learning environments was carried out in Europe. The review implies that technological tools can be used to promote and enhance self-regulated learning (Carneiro, Lefrere, & Steffens, 2007).

5. Conclusion

The literature review indicates that e-portfolio-based assessment can be used to develop students' self-regulated learning in English language teaching because the focus is primarily on students. This focus has some certain characteristics that promote and support the conclusion mentioned. First, e-portfolio-based assessment requires students to be active participants in the learning process because they are in charge of every step of e-portfolio-based assessment, such as selecting and organizing the content of e-portfolios, setting goals, and evaluating their learning process. Similarly, self-regulated learning aims to make students active in their learning process by helping them to take responsibility for their own learning. Being responsible for one's own education enables them to control their own learning processes, which is another common thing between e-portfolio-based assessment and self-regulated learning. Third, e-portfolio-based assessment provides students with artefacts that they can use to monitor their own learning process. Monitoring one's own learning can enable one to assess and reflect on one's own work, which can help to understand one's strengths and weaknesses, what worked and what did not work, and improve learning according to those findings. Like e-portfolio-based assessment, self-regulated learning requires self-reflection that can allow students to find out their strengths and weakness, and whether the strategies they choose worked or not, and to improve their learning. In addition, both self-regulated lear-

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ning and e-portfolio-based assessment can motivate students since they are individualized learning types and can enable students to monitor the development in their learning. In e-portfolio-based assessment and self-regulated learning, motivation to study can assist students in forming positive attitudes toward learning, as they can understand what they can achieve. This feeling can make students more self-efficacious and self-confident. Hence, both self-regulated learning and e-portfolio-based assessment can prepare students behaviourally, metacognitively, and motivationally for their learning processes. Consequently, the aim of this form of assessment is to enable students to individualize and personalize their learning by supporting and encouraging active participation, taking responsibility of one's own learning, observation and reflection of learning by students. This indicates that both of them can be connected to each other, and e-portfolio-based assessment can promote self-regulated learning.

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The use of multimedia in increasing perceived knowledge and awareness of cyber-bullying among adolescents: A pilot study

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Abstract

As cyber-bullying has become more serious lately, steps should be taken to ensure that this threat is curtailed. Some schools currently use small group discussions, large school assemblies, or lecture workshops to address this problem and these methods are often ineffective. Other than these conventional methods, initiative that could be taken includes developing a multimedia application that would be able to assist adolescents in increasing their knowledge and awareness on cyber-bullying. This paper reports the findings of a pilot study on the use of a multimedia application, CyBA in increasing the knowledge and perceived adolescents towards cyber-bullying among adolescents. A quasi-experimental research design with pre-test and post-test was used to investigate the effectiveness of CyBA. The result indicates that knowledge and perceived awareness among the adolescents were increased after they were exposed to the multimedia application.

Keywords: multimedia; cyber-bullying; adolescents

1. Introduction

The issue of bullying has long been a topic of discussion amongst educationists, academicians and researchers. Smith & Thompson (1991) defined bullying as a set of conduct that is done intentionally and causes physical and psychological harm to the receiver. Bullying is an aggressive behaviour that is repeatedly carried out towards others individually or as a group (Olweus, 1993). Bullying is not limited merely to physical conduct like beating, kicking, pinching or pushing someone; it also exists in other forms as in speech, by calling someone names, cruel jokes, threatening or slandering (Olweus, 1993). Bully victims may experience depression, low self-esteem, health problems, poor grades, and suicidal thoughts (Olweus, 2010).

As the technology evolves, bullying has also evolves to include electronically based forms of aggression. Now, there is a new channel though which someone is bullied, and that is through the Internet and other telecommunication devices like cell phones. This form of bullying is known as cyber bullying. Kowalski & Limber (2007) defined cyber-bullying as *"bullying through e-mail, instant messaging, in a chat room, on a website, or through a text message sent to a cell phone."*

As the exposure to media has increased over the past decade, adolescents' utilization of computers, mobile phones, stereos and televisions to gain access to various mediums has also increased (Lenhart & Madden, 2007). As a result of the amount of time adolescents spend using these devices, their total media exposure is high (Lenhart & Madden, 2007). Unfortunately, not all individuals are able to take advantage of what the Internet has to offer. For some children and adolescents, the cyber-world can be a place where they are exposed to violence, aggression, mistreatment, and harassment, which is now commonly known as cyber-bullying (Hinduja & Patchin, 2008).

Like traditional bullying, cyber bullying victims are also exposed to the negative consequences of this phenomenon. These include the possibility of someone facing psychological function deficiency and other problems such as being anti-social, anxiety disorder and depressive symptoms (Cappadocia, 2008; Tynes & Giang, 2009; Wolak, et al., 2007). Most victims of cyber-bullying are frequently distracted, feel low esteem, anxiety and have a tendency to commit suicide (Patchin & Hinduja, 2006). A study on cyber-bullying amongst teenagers and found that 33% of the respondents admitted that they were victims of cyber-

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bullying, while 22% of teenagers felt sadness and wished to commit suicide as a result of cyber-bullying (Patchin & Hinduja, 2006).

Given that cyber-bullying has become more serious lately, steps should be taken to ensure that this threat is curtailed. Some schools currently use small group discussions, large school assemblies, or lecture workshops to address the problem of cyber-bullying with students and these methods are often ineffective (Beale & Hall, 2007; Diamanduros et al., 2008; Keith & Martin, 2005). Other than the conventional methods and the involvement of parents, schools and society in curtailing this problem, other initiatives that could be taken include developing a multimedia application that would be able to assist adolescents in increasing their knowledge and awareness on cyber-bullying.

1.1. Multimedia learning

The advances in multimedia technology open up even more opportunities in innovating ways to learn, to acquire information and to increase knowledge. According to Harun and Tasir (2003), multimedia opens up frontiers to educators in the application of a variety of teaching techniques, while students are given opportunities to have control over a learning session. This shows that multimedia is able to create a more interesting learning environment compared to conventional methods which are governed by text books.

In multimedia learning, visual and auditory information is used as a method of presenting a lesson. Learners will then use this information to form knowledge. Mayer (2001) opined that people learn better from words and pictures than from words alone. The meaning of 'word' here encompasses written and spoken texts, while 'picture' includes static graphic images, animation and video.

According to Harun and Tasir (2000) a teaching approach based on multimedia is capable of having positive effects on students in the teaching and learning processes as this process moves information from static text books to a new learning pattern that is more interesting, dynamic and interactive with the aid of additional media such as audio, video, animation and graphic. In addition to that, multimedia application in the field of education will give rise to a new concept of learning, a combination of education and entertainment, which is edutainment and it will replace the traditional text book with the electronic text book which has a friendlier approach (Harun & Tasir, 2000).

The characteristics and advantages of multimedia have encouraged the researcher to develop Cyber-Bullying Application (CyBA), to increase perceived knowledge and awareness amongst adolescents towards cyber-bullying. Development of an interactive multimedia application that comes with attractive graphics, audio and animation have great potential in attracting the interest of adolescents in gaining a deeper understanding of this issue. In addition to that, advanced internet technology and the existence of gadgets like tablets and smart phones make it easier for teenagers from all walks of life to access this application.

2. Multimedia application development and description

The Cyber-bullying Application (CyBA) will be used to instil knowledge and awareness about cyber-bullying amongst teenagers. For the purposes of this research, the groups that serve as target learners of the research are lower secondary and upper secondary school students. The age of the learners ranges from 13 to 17 years old. CyBA is divided into 4 main modules, which are:

- What is cyber-bullying – gives information about the definition of cyber-bullying and the method through which cyber-bullying is conducted as well as the examples of cyber-bullying acts.
- The dangers of cyber-bullying – provides information about the dangers of cyber-bullying to victims and the reasons these acts should be avoided.
- Overcoming cyber-bullying – provides awareness to teenagers on steps to handle cyber-bullying, tips for communicating in the cyber world in order to avoid incidences of cyber-bullying, ways to curb the growth of cyber-bullying among teenagers.

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- Activity – This module consists of reinforcement activities in the form of quizzes with the purpose of providing reinforcement for the knowledge and awareness of teenagers on the topic of cyber-bullying that is presented in the three modules above.

When using this application, the user is free to select any module to explore. The user also has control over the presentation of the animation whereby control buttons are prepared so that the users are able to play, pause, rewind, forward and replay the animation. Fig. 1 and Fig. 2 show some screen-shots of CyBA.

a b



Fig. 1. (a) screen-shot of the main page; (b) screen-shot of the intro page.

a b

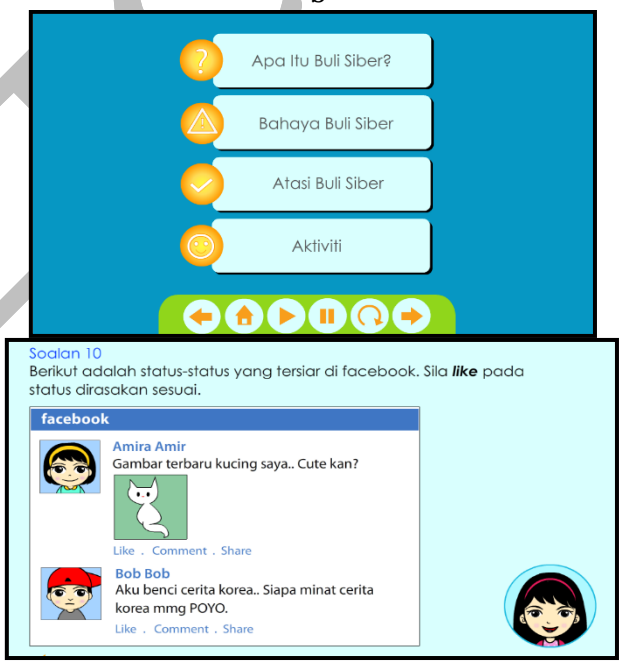


Fig. 2. (a) screen-shot of the main menu ; (b) screen-shot of the activity page.

3. Method

In preparation for the actual study, a pilot study was carried out to test logistics and gather information prior to larger study. A pilot study will be able to detect any deficiencies in research design or procedure and therefore improve the quality and efficiency of a research. The pilot study had been conducted using the same procedures as in the actual study.

A quasi-experimental research design with pre-test and post-test was used to investigate the effectiveness of the multimedia application during the pilot study. A quasi-experimental study is a type of evaluation which aims to determine whether a program or intervention has the intended effect on a study's participants (Trochim, 2006). Quasi-experimental design was chosen as the randomization of subjects is impractical. Although true experiments are considered stronger than quasi-experiment alone, it is believed that the quasi experimental research is useful in situations where randomization is unfeasible (Cook & Campbell, 1986).

32 students (14 males and 18 females) participated in the pilot study. They are from two different schools in Perlis state, Malaysia. The age of the participants ranges from 13 to 17 years old. During the first week of the pilot study, the participants were asked to answer the pre-test before the treatment. The pre-test utilized the Cyber-bullying Knowledge and Awareness Instrument (CBKAi) which was developed by the researcher. On the following week, the participants were given treatment using CyBA. Right after the treatment, the participants were then asked to answer the post-test. Pre-test and Post-test tests are identical and have the same set of questions but the items were be arranged in different order.

3.1. Research instrument

In this study, the researcher developed the instrument to measure the level of adolescents' perceived knowledge and awareness on cyber-bullying. This instrument is known as the *Cyber-bullying Knowledge and Awareness Instrument* (CBKAi). It was used as the pre-test and post-test of this study. CBKAi consists of 28 items. 10 items will be utilized to access the level of knowledge that the students posses in understanding the characteristics, method and the nature of cyber-bullying. Another 18 items is used to measure the level of awareness that the students have regarding the consequences of cyber-bullying, coping strategy of cyber-bullying and steps to prevent the growth of cyber-bullying among teenagers.

CBKAi was validated by a senior lecturer from a public university who is also an expert in cyber-bullying. As suggested by (Anastasi & Urbina, 1997) the content validity is performed to determine whether it comprises a representative sample of the behaviour domain to be measured. Foxcroft, Paterson, Le Roux, & Herbst (2004) stated that the content validity could be improved by using experts to review the test specifications and the selection of items. The experts will be able to review the items and give comment whether the items comprise a representative sample of the domain.

CBKAi was tested for its reliability with 30 respondents. The analysis was done using SPSS 20. The Cronbach's alpha internal consistency reliability coefficient for the instrument is 0.919 for items that are related to perceived knowledge and 0.810 for items that are related to perceived awareness. The statistics show that this instrument is a reliable instrument to be utilized in this study.

4. Result

The data collected in pilot study was analyzed using descriptive statistic. Table 1 and Table 2 show descriptive statistic for the perceive knowledge and awareness score from the pilot study. The perceive knowledge and awareness score is higher in Post-test compared to Pre-test. The result clearly indicates

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that perceived knowledge and perceived awareness among the adolescents were increased after the participants were given treatment using CyBA.

Table 1. Perceived Knowledge Score in Pre-Test and Post-Test.

	Pre-Test	Post-Test
Sample size	32	32
Mean	55.56	66.62
Standard Deviation	2.29	2.57

Table 2. Perceived Awareness Score in Pre-Test and Post-Test.

	Pre-Test	Post-Test
Sample size	32	32
Mean	46.93	56.53
Standard Deviation	5.63	4.48

5. Conclusion

Although limited by small sample size, this pilot study suggests that the perceive knowledge and awareness of cyber-bullying among adolescents were increase after they were exposed to CyBA. The result of this study clearly shows that a multimedia application has a positive impact in increasing perceived knowledge and awareness of cyber-bullying among adolescents. The pilot study will guide the researcher in conducting the actual study with larger sample size.

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UM postgraduates experiences with spectrum

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Abstract

This study looks at students experience while using SPECTRUM (as a virtual space in terms of Blended learning) in their learning process. The research is a phenomenological design study and uses a semi-structured interview to collect data. A total of 9 postgraduate students from the Faculty of Education in the University of Malaya were interviewed. Results based on the two main themes, which are the challenges and the benefits of BL show that students are aware of the benefit SPECTRUM has on their learning process. However, they do still face challenges regarding the BL platform

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Keyword: Blended Learning, Spectrum, Experience

1. Introduction

Blended learning is now becoming an important tool in the educational system. Higher Education Institutions all over Malaysia has acknowledged the benefits of e-learning to cater for a wide variety of students as well as to help renew the teaching and learning process. In a study done by Mohamed Amin Embi (2011), he found that 42.3% of 26 Higher Education Institutions in the study offered online courses to supplement the face-to-face mode. University of Malaya has also invested in creating its own e-learning tool. Every course is now available online automatically as SPECTRUM takes information on courses, instructors and students form the University's database (Raja Maznah & Abdul Halim, 2011). After more than five years of implementing SPECTRUM in the university, this research sought to understand postgraduates' students experience in using SPECTRUM as a BL tool. Two themes as pointed out by Smyth, Houghton, Cooney and Casey (2012) are the challenges and benefits of BL as a learning tool. Therefore, this article gives the finding towards the challenges and benefits of using SPECTRUM form postgraduate students' point of view in the Faculty of Education.

2. A brief history of spectrum
3.

The use of E-learning dates back to year 2003. However it was still in its early stages and not many lecturers used them in every classroom. In 2005 to 2006, University of Malaya used two e-learning system concurrently which were called Moodle and Learning Care. Later in 2007, an official report was made to choose one e-learning platform and further develop it. The University decided to stick with Moodle for its better benefits and user-friendly purposes. Thus SPECTRUM was developed. Dr. Abdul Halim Sulaiman,

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Deputy Director of University of Malaya Academic Development Center, officially coined SPECTRUM in 2009. The name SPECTRUM is an abbreviation where 'SP' stands for Student-Powered, 'EC' for E-Collaboration, 'TR' for Transforming and 'UM' for University of Malaya. Every lecturer and students now uses this e-learning tool in UM. Dr Abdul Halim Sulaiman, in an interview, says *"SPECTRUM is developed in hopes to change the way students learn and the way lecturers teach".* SPECTRUM is a simple e-learning application that allows students to communicate with each classmates and lecturer online. The e-learning tool is connected to students and lecturer's e-mail account, which further notify users of any new content. Lecturers in University of Malaya are encouraged to use SPECTRUM in their teaching for at least one of their undergraduate courses (Raja Maznah & Abdul Halim, 2011).

4. Theoretical framework

Many theories on education and technology crop up as the years pass by. With the integration of technology into education there is a need to understand how technology should be utilized to bring out the best in utilizing BL in education. Education today should focus on specific information or skills such as "learning to learn" skills that helps students to cope with technological change (Roblyer & Doering, 2013). The Technology Integration Planning (TIP) model is a model used when teachers need to select the best strategies to integrate technology in their classroom. There are three phases in its implementation and a total of 7 steps. This model gives teachers a general approach to identifying and addressing challenges involved in integrating tech into teaching.

The three phases are analysis of learning and teaching needs, planning for integration and post-instructional analysis and revisions

Along with the TIP model there are also a few conditions that need to be met when integrating technology into classroom. This is to ensure the technology based strategies work best to support the teaching and learning process. According to Roblyer and Doering (2013), when the National Education Technology Standards (NETS) was established, necessary conditions were describe so teachers could exploit the potential power of technology. These conditions were summarized in ISTE's NETS for teachers (2008) book, as well as online at http://www.iste.org (Roblyer & Doering, 2013). The essential conditions for effective technology integration are standards and curriculum support, required policies, access to hardware, software, and other resources, skilled personnel, technical assistance, appropriate teaching and assessment approaches and engaged community. The conditions mention focus more on the requirements that educators need to fulfill. However, we use this understanding of what necessary conditions needed to successfully have a BL in classroom based on student's experience. These conditions will be used to identify the challenges students face in a BL classroom. When a condition is not met, there will be problems. However, when it is met there will be benefits.

5. Blended learning

There is still no ultimatum for the definition of BL. However there are ways to look at BL that may help to uncover its characteristic and usefulness for different purposes. In a general definition, BL is understood as the use of both face-to-face and online method of teaching and learning (Martyn, 2003; Gray 2006; Staker and Horn, 2012). This definition gives way to several models of BL in a classroom setting. As the term gets more attention from educators, many models of BL are developed. These models are created in an attempt to harness the usefulness of BL in the classroom. Staker and Horn (2012) reported on 4 models of BL emerging in the education sector today. The models are rotation model; flex model, self-blend model and Enriched-virtual model. The rotation model is further divided into four subcategories that are station-rotation model, lab-rotation model, flipped-classroom model and individual-rotation model.

The rotation model is a program where students rotate on a fixed timetable or at a teacher's decision between learning modalities. At least one of the stations uses online learning. The other method or station might include activities such as small-group or full-class instruction, group projects, individual tutoring and pencil-and paper assignments (Staker & Horn, 2012). Station rotation and lab-rotation modal have the

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same concept in which students rotate between places or groups. The difference is station rotation happens in the class while lab-rotation modal happens on campus in several classes or computer labs. Individual rotation looks at students have a personal schedule in which they will use to rotate between different stations. This model differs from the other three because student does not necessarily go to every available station or modality.

Flex model in a BL model where primary delivery of content and instruction are done through the Internet. Face-to-face support by teachers is provided on a flexible and adaptive as-needed basis. Some activities that is used in this model are small-group instruction, group projects, and individual tutoring (Staker & Horn, 2012). Self-blend model is where students take one or more online courses to enhance the learning process of certain subject. The last model is the enriched-virtual model. This model concept started out as a full time online learning which was later adept to be a BL learning model. Students get to decide between attending a face-to-face class and learning online. It may seem similar to Flipped classroom and enhance-virtual model. However, student does not attend the on line campus every weekday and it is a whole-school experience.

Farahiza Zaihan Azizan (2010) proposed several other frameworks for effectively implementing BL in higher education institution such as Khan's Octagonal Framework and Carman's BL Process. Khan's Octagonal Framework has eight dimensions where each of them represents a category of issues to be addressed. The dimensions are Institutional pedagogical, technological, interface design, management, resource support and ethical. Carman's BL Process (Carman, 2005) applied 5 different learning theories to propose a framework that focus on 5 key ingredients of BL process, which are live events, self paced learning, collaboration, assessment, performance support materials.

In the higher education in University of Malaya, BL model used is a simplified version of the flipped-classroom model as proposed by Staker and Horn (2012). Students are required to attend classes on a weekly basis as well as monitor their activity online using SPECTRUM.

6. Past researches on bl

Technology has taken center stage in education and many researchers have shown an interest in BL. Delivery modes in classroom now differ from face-to-face, blended, and fully online. However, Bleffert-Schmidt (2011) and Risner, (2011) reported no significant difference between the three different delivery modes. Even so, classroom pedagogy was more student-centered (Ruck, 2012), and has attained a general appreciation in the educational community.

Several research focusing on students as the sample shows that BL does in fact benefit students. From student's point of view, blended learning is a positive affect toward the value of intercultural awareness (Risner, 2011). Edginton and Holbrook (2010) reported that student' had concerned when using BL platform for the first time. They were unsure about their ability to communicate with the instructor about the online components. However, at the end of the course, their perception shifted to focus on their time management skills (Edginton & Holbrook, 2010). In another research, Shroff and Vogel (2010) observed that students engage in textual dialogue in the online discussions and participated more compared to the face-to-face discussions. According to Vaughan (2007), lecturers suggested that blended courses create enhanced opportunities for teacher-student interaction, increased student engagement in learning, added flexibility in the teaching and learning environment, and opportunities for continuous improvement.

Though BL platform has been in used for a few years now, there are some challenges towards online learning tool. According Mohamed Amin Embi (2011). One of the two major challenges lecturers faced are concerning the integration of e-learning into their lesson while balancing between teaching and research. The other major challenge would be time constraints educator face (Mohamed Amin Embi, 2011). In his study, Mohamed Amin Embi (2011) also highlighted challenges student faced are lack of access and feedback from lecturers.

7. Research question

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The study looked at postgraduate students' experiences in using SPECTRUM in a BL class. The research questions of the research are as below;

- What are the challenges students faced when using SPECTRUM?
- What are the benefits students' experiences when using SPECTRUM?

8. Research methodology

The purpose of this research requires a focus on the qualitative aspects of the experience. Therefore a phenomenological method is chosen to answer the research question. This method allows data to be analyzed and reported in a descriptive and interpretative manner. Data collection was carried out by interview sessions with postgraduate students. To get an in depth account on students experience in using SPECTRUM, a semi-structured interview method was used. A guide was developed prior to the semi-structured interview to aid researcher in getting answer from respondent. The interview guide addressed several questions such as; students general view of SPECTRUM, Experience of using SPECTRUM, Purpose of using SPECTRUM, Program content and, Program delivery.

All students are postgraduate students from the faculty of Education with different courses. Students were chosen by purposive sampling method based on availability and convenience. Students were allowed to use any language they are comfortable with. The study was designed to investigate students' experience in using SPECTRUM in their studies as well as their feelings towards the online system.

Consequently, researcher plays an important role in the study as an active interpreter. Postgraduate students from the faculty of education were first contacted to find a suitable time for an interview. 9 students were available for interview. Two interviews were conducted in a group while the rest was one-to-one. Then data was collected through a semi-structured interview. Initial question were asked followed by additional question derived from students answers. Students' responses were then transcribed into text for

further analysis. Initial readings of the data were done to find similar concepts or ideas. A second reading was carried to connect the concept or ideas of similar traits.

9. Findings

The findings presented here are of two themes where each contains sub-themes. Several benefits found in the data are accessibility to information, time saving, and helpfulness to the learning process. Some of the challenges students met while using SPECTRUM are learning to use SPECTRUM, Technical difficulty and formality in interactions. The first part will talk about the benefits students experience when using SPECTRUM in a BL class. The next part will look at the challenges students face when using SPECTRUM.

8.1 Benefits of using spectrum

Students have positive perception to the usefulness of SPECTRUM in their learning process. They claim that SPECTRUM allows them to have access to the subject content easily. They see SPECTRUM as a place to get and share information with one another.

"I think SPECTRUM is a useful platform for us because for postgraduate students sometimes when the lecturer upload notes or "friends sharing" you know, we can read before the class starts and can share something like that…"

"…and when people do their presentation they can upload their slides as well."

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Another benefits that students feel helped them were the ability to download notes before and after classes. This aids them in their note-taking process and also allows them to prepare for lesson.

"Yeah, sometimes when the lecturer is giving notes in the class, power point, we don't have enough time to write or we miss the class, we still can download from the SPECTRUM."

Another benefit students experience with SPECTRUM is the flexibility of time. This is one benefit that is known to the educational world and is often reported on. Students in this study find that they are free to choose when to engage in the subject content uploaded in SPECTRUM. Students claim that it saves their time from having to look for reading materials on their own.

"We just read, we don't have to find other articles. They are provided in SPECTRUM. It's easier for us. Because some of our friends are working and they don't have time to search for other articles."

"Maybe because we have a lack of time. Maybe fulltime students will have more time to read up."

SPECTRUM was also considered a helpful tool for the students learning process. Students were not told of the benefits SPECTRUM has on their education but by using it they realize that BL does help them be independent learners. Students expresses that SPECTRUM help them to keep track of the course content and lessons.

"…You can go back to the notes if you accidentally loose the hardcopy given by lecturers… with SPECTRUM we can go back and print them again or read it online."

"We can still keep track of what happens… sometimes we forget what we had learned last week, so we go back to SPECTRUM to check."

"So if you have the time…the whole syllabus is there, so roughly you know what the lecturer is going to teach… it is very good, because, let say you missed out something, you don't understand, you can go back."

Overall findings shows that students did in fact realized the benefits of SPECTRUM by experiencing it firsthand. There was no need to specifically tell them the objective of such e-learning platform. The few benefits here are all related to students learning process. Thus SPECTRUM has indeed change the way student learn but giving them the independence of taking charge of their studies.

8.2 Challenges in using spectrum

Even with the benefits mention above nothing is without its challenges. One of the challenges that students experience when using SPECTRUM is learning to use SPECTRUM. The criteria of a successful integration of technology in classroom are standards and curriculum support where certain skills need to be set in order to support both subject and content with technology. However, students only receive little guidance towards using SPECTRUM. Thus they are left to explore SPECTRUM on their own. Older students claim that it is rather difficult for them to get used to SPECTRUM. Often they would acquire help from friends and family member. On the other hand, younger students who are IT savvy still claims that it takes time to get used to SPECTRUM without proper guidance.

"..It takes time."
"Of course I have difficulties, I have to ask my kids to help me…"
"I only have a problem with uploading assignments. Ah, maybe I don't know how. Maybe I'm not skillful in using SPECTRUM yet."

Lack of technical assistance does not only occur towards educators. In fact, technical difficulty is still a pervasive challenge that students face. Though UM has various means to counter these problem, students are still unsure of the support that is available to them. In this case, data shows that students sometimes face a problem with their username and password. Students also expresses that they initially did not know whom to turn to when problems like this occur.

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"…Except in the beginning of the semester, I don't know why it took so long to log in. I couldn't log into spectrum. In fact, after that thing happened, I also didn't bother. I don't know if mine can't open or what."

Another criteria that is necessary when using technology in classroom is presence of an engaged community. The benefit of BL is its flexibility to be access by students wherever and whenever they want. However, data shows that a challenge student face is regarding the interactions that happen in SPECTRUM. SPECTRUM is not like a social network. Most students nowadays interact in different social network such as Facebook, Twitter or Instagram. Social network gives them the freedom to express themselves. Thus, when they use SPECTRUM for discussions, students feel a total opposite to the online interactions they are

used to. Students feel that SPECTRUM has a more formal and serious atmosphere when it comes to communications.

"…it's more professional and educational…."
"and most of us don't put personal things, we put it in our Facebook."
"We do the conversation in Facebook."
"Just formal language with the lecturer."

There is little engagement between communities. Interactions are perceived as forced and formal. Furthermore, students are more reserved when it comes to using SPECTRUM to interact. They perceived it being as a formal setting where each member are supposed to exhibit a certain level of knowledge that is expected from a master students. Students feel a little pressured when it is made compulsory to post comments in the forum on SPECTRUM.

"…We're afraid if we're late to do the task in SPECTRUM or missed an announcement…"
"Did we give the right link that's useful…"
"…There's nothing to interact on in there except if there's a new forum. Another thing is if we want to chat with friends there's no chat box"

Students also express that they feel SPECTRUM should be more user friendly in regards to the changes made. Their experiences using SPECTRUM is affected by the layout display of the e-learning platform.

"There must be some instruction or guidelines on how to use… if you really want to change that, make a workshop or something… Let the students know that it has changed…give fliers or give information on the changed version."

"In my opinion, sometimes SPECTRUM is not user-friendly. One reason is when we want to start a new forum topic and another is I'm not familiar with SPECTRUM."

10. Discussion

The findings contribute to the understanding of postgraduate students experience in using SPECTRUM in a BL classroom. Their experience highlighted the benefits and challenges of pursuing BL in classroom in higher education. The data reveals that SPECTRUM supports students to gain accessibility to information, in saving time, and to help in their learning process. The flexibility SPECTRUM offers to students on where and when to engage with the content supports past research (Staker & Horn, 2012, Smyth et al., 2012). BL allows students to easily monitor their lesson and receive course content. Furthermore it save time in having to find reading materials. SPECTRUM is seen as a place to share information. The benefits of BL in the Faculty of Education are probably because of the educator's activeness in using SPECTRUM in their class. This support past research on BL where educators still plays an important role in determining the successfulness of a BL model (Peruso, 2012).

Some of the challenges students experience while using SPECTRUM were the fact that they had to get used to using SPECTRUM. Though SPECTRUM is easy to use, students perceive it as a not so user-friendly e-learning platform. They need guidance instead of having to explore the platform on their own. Technical

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difficulty is also one challenges students face as they have trouble logging into SPECTRUM. Another challenge student's face is the unattractiveness of SPECTRUM elements. According to Mohamed

Amin Embi (2011), students expresses that e-learning platform has lack of interesting content and uninteresting content as compared to other online applications such as Facebook. This is also shown in the data collected for this research where student expresses the dullness SPECTRUM as compare to social networks they are used to. Furthermore, students are more used to the conduct of a social network and feel the interaction in SPECTRUM as a problem.

BL has to have a clearer objective when implemented into classroom as well as a develop community for student to feel it as more user-friendly. There are other ways for interaction to happen and those that do happen in SPECTRUM are either too formal or forced engagement from lecturers. Thus the corresponding activity such as discussions is seen as another activity for the course requirement. It masked the fact that SPECTRUM can be used for educational or beneficial interactions between students and teachers. The study does have its limitation and may not be able to represents other students from different faculty. Therefore further research should be done to identify the similarities and differences of students experience in using SPECTRUM throughout the campus.

11.Conclusion

This study aimed to understand postgraduate students from the faculty of education's experience with using SPECTRUM in a BL classroom. It confirmed past research about the usefulness of BL in classroom and gave a first look at how students use SPECTRUM and in what context. Though the research is still in its early development, it is clear that further study into this matter might help educators understand students' perspective towards BL. There is a need to see what students face everyday in order to help educators to carry of an effective BL class on campus.

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Using of simulation in technical subjects education process

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Abstract

Teaching of technical subjects is a very complicate and complex process. It is demand on logical thinking and imagination. One of the choice to make learning process simplify is using of illustrative examples of the real process. The paper deals with the didactically potential of using simulation software of logistics center. It is used for improving teaching of the modeling of transport processes. Simulation software due to their own variability, construction layout and configuration of applied technology creates the elite place for the evaluation of all parts. Active use of the simulation tool in the teaching of modeling of transport and transport processes is of great importance for understanding of the synergies activities in marshalling yard, intermodal terminal and warehouse. Simulation enables direct visualization and such facilitate the understanding of the activities and feedbacks between them.

Keywords: simulation model, technical subject, transport technology

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1. Introduction

The education process of professional transport subjects is a very complex system. It takes place under conditions of interaction and the conditionality objective (logical and gnoseological) and subjective (psychological) factors. From the perspective of cybernetic science the teaching can be understood as a kind of governance as purposeful activity aimed to develop the psychical processes and system of control properties. Consequently the factors governing the system (teachers) are rightly set out requirements planning the teaching process. These factors are valid, including a mastery of the subject curriculum and its didactic transformation into the student's operational language. Only after it can be expected that the pedagogical activities of teacher will be purposeful, conceptually clarified, operational, creative and ultimately effective.

Planning of pedagogical activities is in many ways different compared to the programming of other human activities. This difference is given by the factors that enter into the teaching process. Relatively stable educational objectives and content of the teacher's work will be conducted in variable and always well understood and incompletely recognizable conditions (new pupils, the variety of psychological readiness, new environment, new teacher´s experiences, his/her mental condition, etc..). Hereby planning of the teachers activities based on incomplete information and therefore it becomes the role of preparing teachers for the teaching very demanding, requiring significant pedagogical mastery.

Dynamics and variability of the conditions of the teaching process makes difficult the teacher's decisions about the optimal methods, forms and means of teaching. For the reasons outlined above the teachers planning bears activities risk that the proposed procedures do not always yield the expected results. Each teaching unit is set by teachers before the solution unplanned situations requiring swift response and improvisation. Those factors are affecting the attitudes of teachers to planning activities.

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2. The research as a teaching method

The purpose of the research is collect of knowledge. This knowledge needs to be searched and discovered. In the fields of engineering - comparing to natural sciences and philosophy - there are found mainly the specific results of the research. These lead to specific solutions, technological process or final products; in contrast with philosophy or the natural sciences, where the research or study is ideally a matter of impartial objective of mind.

The scientific research is the development of means of transport didactics of vocational subjects. Its characteristic features are:

- • Objectivity
- • Verifiability
- • Methodically
- • Reproducibility

Conformably to their aims of transport research can be subdivided to:

- • Basic (this typically takes transport as theoretical science)
- • Applied (uses exact methods and their potential applications of transport)

A solution to difficult problems requires the originality - new approach of mind, a willingness to explore new horizons, maintaining of objectivity, endurance even by failures.

2.1. The problem interpretation

The essence of creative interpretation is the activity, independence and creativity of students. It is a most effective method of learning specialized subjects of transport. The student is an active participant wondering just of acquire the scientific or technical problem (origin, evolution, default hypothesis, critical points, the doubts and weaknesses) with continuous verification of the accuracy of thought. The student identifies the problem.

The problem interpretation gives rise to the original visions, development of critical thinking, creative and adaptive activity of thought. It is a school of thought in front of teacher and student dialogue about the problem.

The scenario of problematic interpretation is based on a listener dragged into the action and his/her active part in a "dramatization" teaching unit. The method requires excellent professional and teaching skills of teacher and also students to be available.

2.2. The autonomous research

The method of individual student´s research activities ensures the active participation in the instructional activities. The basis of the method is to solve the defined problem or task, at which the application or reproduction of actual knowledge is not enough to resolve them. The independent research in the teaching of transport subjects also includes the adaptation of knowledge in other conditions (nonspecific transfer).

In this method the teacher plays a role of professional consultant. His/her main task is to prepare some specifications of tasks and problems to be solved. The tasks are compiled to use creative knowledge and skills, openness of variation solutions and participation of students in solving so called difficult tasks. While solving the teacher is in role of corrector, in the case the corrector of incorrect solutions on key issues (check-points).

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2.3. The experimental research

Trainee researcher has often distorted and simplified view of the research work. He has no experience with severe problems. A systematic research work is the most important aspect. The initial phase comprise of the orientation on the subject (information gathering). The next phase is represented by the preliminary results - a set of experimental conclusions. Later, it will be extended, strengthened or rejected. A phase of substantial results is characterized by increasing knowledge improved with the concrete results and conclusions. The last phase - "packaging" - means an arrangement of accumulated empirical and experimental data. It also means the theoretical justification of the results and the practical processing work (text, graphs, tables and figures).

Methods of individual student research activities guarantee the active participation of the student on taught activity. The essence of the method is to solve a defined problem or task. Application or reproduction is not enough to solve the current knowledge. As a separate research shall be deemed also adaptation of knowledge in other conditions (unspecified transfer).

The teacher has a major role in preparing the assignment of tasks and problems to solve. Tasks are drawn up to the creative use of knowledge and skills, and openness of variation solutions and involving pupils in solving so called difficult tasks. The teacher is a corrector of solutions, especially in case of wrong solutions of key issues (control points).

The process of scientific discovery is based on systematically arranged progress. Researcher, working individually or in the research group, establishes the vision of the outcome of own already acquired knowledge. The result arises through a certain methodology.

For applying research teaching methods, a teacher has to base on precisely defined grounds, that students already must have previously acquired (Prerequisites).

3. Modelling of railway transport

Major logistical task of transport is relocation as important service activities. The movement of goods and people is a complex of service activities that deals with the implementation of specific transport systems.

In addition to rail transport routes the technical implementation of relocation usually requires expensive and considerably mobile sources, such as railway locomotives and wagons. In order to minimize these sources, they are usually not moved by elements after one, but collectively in groups, in so called transport complete.

Due to the speed limits of particular transport modes is not the largest relocation timeframe. More important point of delays in transport goods are the transport terminals.

3.1. Transport terminals

Transportation terminals are also known as logistics centres. They are places of the transport system which perform the sorting transport elements from one set to another.

Some of the most famous types of transport terminals in railway transport are:

- The marshalling yards, where the wagons are sorted between transport set (freight trains) for individual destinations
- The Passenger terminals, where the passenger transfers from one means of transport to another and which often have multimodal character. There shall meet several modes of transport (rail, bus, air, etc.).

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- Container terminals, which have multimodal dimension similar as the passenger terminal (typically they meets rail, road and waterborne), but their function is sorting (transshipment) of containers.
- Warehouses, which function is to balance unevenly dimensioned material flows in terms of time, space and product range.

Transport terminals are among the most complex and comprehensive service systems. They include expensive and complex technical equipment and complicated technological processes.

They have been designed and managed so as to ensure the necessary performance and quality of service processes at minimum cost to the utility source. This can be achieved by various means. Some of them are modification of infrastructure, use of alternative types of resources, improving the work schedule of resources, improvement of technological processes, modification of decision-making strategies or complete reengineering of transport terminals.

Due to the high complexity of transport systems the application of exact mathematical methods is very limited.

Classical expert studies without using objective tools of management do not give sufficiently objective arguments and this may cause concerns for the decision or even aversion to implement any rationalization measures.

In relation to transport terminals various problems are solved and also with varying degrees of complexity. We can divide these problems into two basic categories - spatial planning (design) and planning processes of technological activities, including the management of employees' work.

3.2. Simulation model of transport terminal

Computer simulation is a method that is used for analysis, evaluation and optimization of systems that exist or could exist. The basic process includes building a computer simulation model, abstraction, experimentation, interpretation and use of the results.

The most effective tool for solving problems of transport terminals satisfying these requirements is simulation model of the transport terminal. The principle of simulation techniques is the replacement of the existing or the designed transport hub by dynamic computer model of the hub, which reproduces well the processes and animates the real system. This method allows the experimenter to verify the computer to simulate the series of different operational scenarios of terminals. Consequently, in practice, he can recommend the implementation of such measures, which verify the simulation model and has led to the terminal operation at the required qualitative and quantitative level.

Creation of models in rail transport is actually dealing with two at first glance significantly distant disciplines. The first and also keys´ discipline is area of information technology, namely technology creation and use of simulation models of complex service systems. The second discipline is the area of transport technologies, in particular technologies in marshalling yards, intermodal terminals and warehouse.

Although such connection may be a little unusual, in this case it is deliberate. If the task is to establish the quality transport engineers in rail transport, they shall have acquired not only technological disciplines transport but also the various simulation techniques.

There is displayed the demonstration processing the technological process of ending train in Fig. 1.

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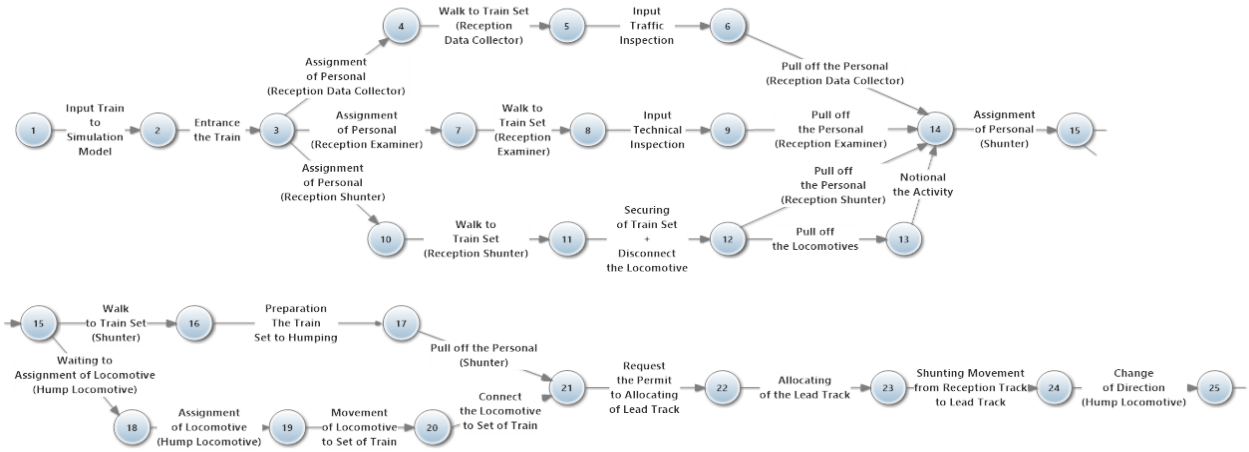


Fig. 1. Part of technology activities in process diagram (ending train)

4. Modeling of transport operation processes in the logistic center by using the tool Byron

4.1. The links between modules

There are created interlinks between all the modeled modules. Output current requirements of any module can be directed to the input current requirements in another module, possibly outside the simulation model (completes went the simulation). A student has available all these variants in all modules in process of setting each part.

This option explains to students all the possibilities of behavior of the train sets. It simplifies the students understanding the links between the modeled modules, their interaction and complexity of their management.

Modules can simulate the processes separately, but also all three modules together. The outputs of one module can be input for other modules. Admission requirements to individual modules from outside can enter several alternatives, but also through individual inputs outsourcer.

Links between individual modules are shown in Fig. 2.



Fig. 2. Links between individual modules

4.2. Marshalling yard

Marshalling yard is an important hub in the process of rail transport. Marshalling yard simulation model allows students to choose from several standard configurations each track groups, approximation in

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marshalling yard activities, and especially dimensioning of each source. The model also allows to simulate several variants of technological processes. These options give the student a comprehensive view of all the factors of individual capacities and processes of marshalling yard.

Allows the students to choose:

- standard configuration of rail groups (serial or parallel),
- number of tracks in each group (reception tracks, sorting tracks, departure tracks, secondary sorting tracks).

The main part of specifying configuration parameters yard is completed with a choice:

- configuration from a predefined set of rail groups
- method of sorting wagons.

Input flows of parameters are presented by the cars which are transported by in trains. Every wagon, including pallets stored therein, shall be defined destination. Outlet flow are presented by the outgoing train sets which are formed by the need to (enough number of wagons - the collection of standard) or on a timetable (scheduled requirement.

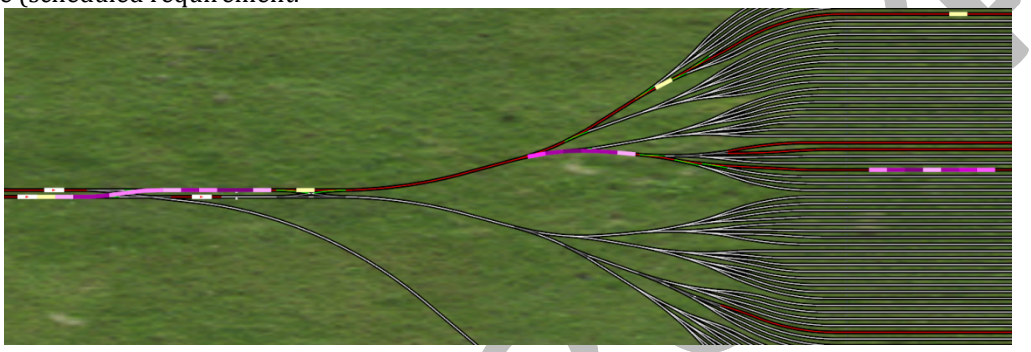


Fig. 3. Sorting process in simulation model.

4.3. Intermodal terminal

The intermodal terminal provides a basic preview of the infrastructure and processes in terminal. The model allows students to choose between two basic types of internal infrastructure, with defined handling tools:

- The 1st category terminal – the portal bridge crane and crane car with spreader
- The 2nd category terminal – only crane car.

Each configuration of intermodal terminal contains one transshipment module with the following parameters:

- number of tracks at a transfer module,
- the number of lanes on the road and stop in a truck with transshipment module
- capacity of storage area (containers, trailers),
- input (road, rail),
- output (road, rail).

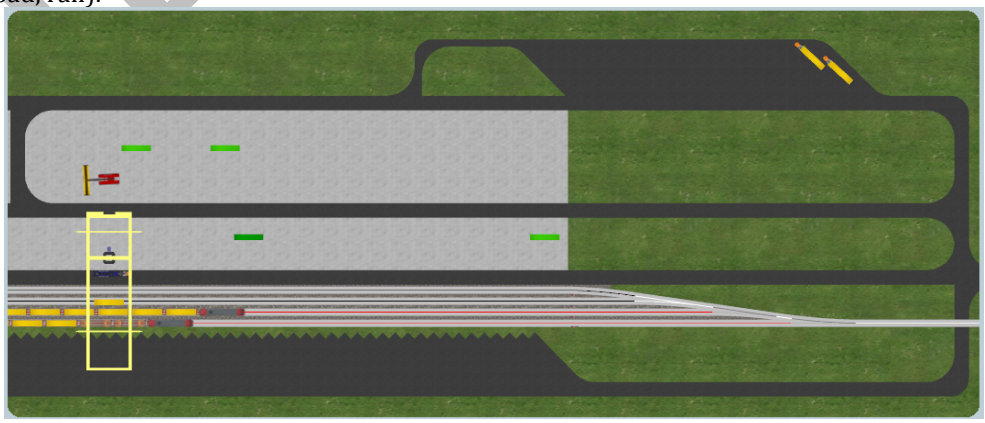


Fig. 4. The intermodal terminal in the simulation model.

Input flow of parameters represent containers and semi-trailers which are transported to the wagon sets, then a truck with a container or truck with trailer. Output flow represents the requirements for delivery of containers and semi-trailers. Requirement occurs randomly or according to a fixed time (planned requirement for delivery).

4.4. Warehouse

Storage is the inseparable part of every logistics system. Warehouse is the object or area specifically designed and intended for the storage of goods which is equipped with storage technology and equipment intended for the reception, storage, handling, repair and distribution of goods.

The student thus pays attention to the importance and the all-important functions of the warehouse that must be performed. The primary function of the warehouse is quantitative, temporal and spatial adjusting of disparities in balancing different sized material flows. Other warehouse roles include:

- The insurance function - arise from foreseeable and unforeseeable risks in the supply and distribution
- The assembling function - creating a range of supply according to specific customer requirements
- Speculation function - stockpiling on the evolution of market prices, the supply, the distribution
- Technology function - focus on qualitative changes of stored goods unrelated to the production process

The modeled warehouse allows to create links between railway and road transport.

The student has a choice of two basic types of infrastructure, with defined handling tools:

- Type 1 - Warehouse for forklift truck or forklift supported,
- Type 2 - Stock to the vehicles with thrust and twist fork or stacker. The layout of storage space is defined on the basis of selected type of handling equipment with a specified minimum building module.

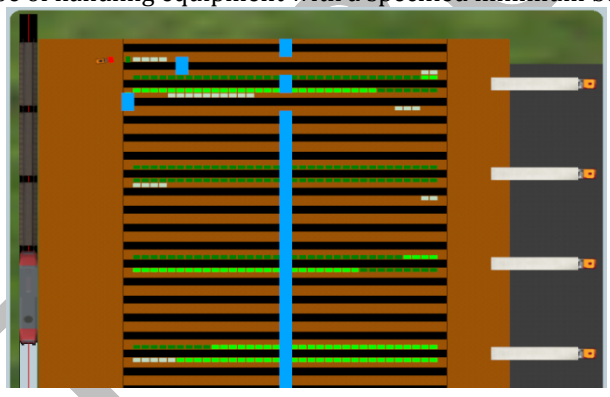


Fig. 5 The part of warehouse in technology process.

Input flow of parameters is presented by the palettes that can be brought in through sets of railway wagons or by goods road transport vehicle loaded with pallets on the loading area of the relevant vehicle, or stored in a container.

4.5. Result

Evaluation of simulation belongs to the final steps for the simulation run was carried. A student evaluates all the set elements in the simulation and interprets individual obtained results. He/she evaluates adequately all the set parameters of simulation with all restrictions.

Successful simulation results can be interpreted in the form of tables or graphical representations of using the various elements over time.

a. b.

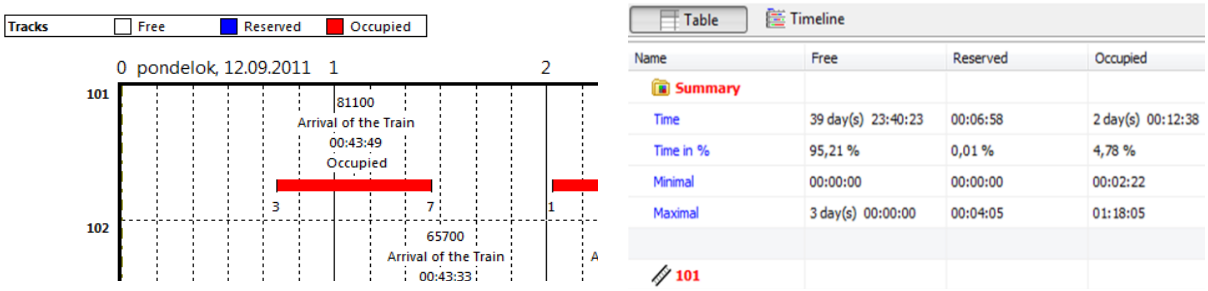


Fig. 6. Results of simulation run

5. Conclusion

Teaching of technical subjects is a very complicate and complex process. It demands a logical thinking and imagination. Using of illustrative examples of the real process is one of the ways how to make learning process simplify.

Planning and infrastructure optimization, scheduling and sources of management practices in transport hubs cannot be done without a thorough and objective assessment of the consequences of the decisions.

However, the transport hub represents a complex dynamic system. There are complex links among its elements service processes have a complex interdependencies. A lot of them have stochastic status. Because of this complexity hubs and traffic in them is currently the most effective technique of examining the consequences of decisions experimentation for sufficiently faithful simulation model and operation of infrastructure hub. Obviously, such a complex simulation model hub is also very large and complex. Building model and its practical use is possible when two conditions are met. The first condition is sufficient performance of the computer used for experimentation. The second condition is the use of such architecture simulation model, which allows to build a model to understand in its complexity, sufficiently intelligible, maintainable and flexible. These architectures are currently the subject of intensive research.

The computer simulation as the primary method is used for finding answers to a customer's questions and problems. Simulation of systems enables testing of alternative solutions, proposals and decision-making strategies with essentially lower costs in comparison with experiments on the real system, which are often even not feasible due to financial, ethical and other reasons.

Simulation software Byron due to its own variability, construction layout and configuration of applied technology creates the elite place for the evaluation of all parts. Active use of the simulation tool in the teaching of modeling of transport and transport processes is very important for understanding of the synergies activities in all modules. Simulation enables direct visualization and such facilitates the understanding of the activities and feedbacks between them.

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Validation of the educational game for seniors: "Live Well, Live Healthy!"

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Abstract

A literature review was conducted as part of a development project to flesh out a number of issues: How can game component design be adapted to accommodate seniors' physical or intellectual limitations? How should a game interface and its components be displayed on the screen to facilitate game navigation? What restrictions should be considered when selecting computer game equipment to be used by seniors? What are the guidelines for efficient game audio, video and text readability? This communication first presents the pedagogical and technological adaptations of the online educational game: "Live Well, Live Healthy!" This adaptation of the Bingo game has allowed us to introduce learning content with the objective of improving the quality of life for seniors. Second, the methodology used for the validation of the ergonomics of this educational game with seniors and third, the results of validation and the recommendations from the seniors to improve the ergonomic conditions.

Keywords: Educational Game; Seniors, Ergonomic conditions, Validation

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1. Introduction

Online games aimed at seniors need to address the particular needs and physical limitations of this target group. Several researchers have attempted to use commercial digital games in their investigations with seniors, while others have adapted games or have done research to establish requirements for digital games for seniors. However, research is still limited about the ergonomic requirements of online games created for seniors.

These are being studied as part of a project funded by an Insight Grant from Canada's Social Sciences and Humanities Research Council. The goal is to examine, through the use of online games designed for seniors, the key factors for effective implementation of digital games for this audience. More specifically, our study has the following objectives: 1) develop and publicize online educational games for maintaining or adopting healthy lifestyles for retired seniors 55 years and older; 2) test these games with the target audience to check their ergonomic quality (design, user-friendliness and educational readability) and 3) test these games with the target audience in order to assess the effect they have on the adoption of healthy lifestyles. In this paper, we describe the pedagogical and technological adaptations we made to an online Bingo game to introduce learning content, taking into account the ergonomic criteria that we identified in the literature for seniors 55 and older, the methodology and the testing results of 27 seniors as well as their recommendations to improve the game, "Live Well, Live Healthy!"

2. Seniors and games

The aging population represents a serious challenge for healthcare systems and social insurance in the 21st century. The number of people aged 60 and over is growing faster than other age groups and is expected to reach two billion in 2050 (Aalbers, Baars & Olde Rickert, 2011). In 2010, almost five million Canadians were over the age of 64 years. In 2036, they will number more than 10 million (HRSDC, 2011).

These aging seniors are facing the decline of their physical and cognitive abilities, loss of long-term companions and social support, changes in their familial or professional environment, different lifestyles, and the increased likelihood of developing chronic and disabling diseases. But what are they doing to improve their quality of life? Can games help them effectively meet the challenges of aging?

An increasing number of studies have demonstrated that video games can have a positive impact on seniors: digital games can provide physical training for seniors and can overcome their isolation (Rosenberg, Deep, Vahia, Reichst, Plamer & Kerr, 2010; De Schutter, 2011; Diaz-Orueta, Facal, Herman Nap & Ranga, 2012; Astell, 2013). These studies also show that the effects of these games depend on the needs and individual characteristics of seniors and that systems need to be developed that are capable of adapting to the demands of this population. An inappropriate design can act as a barrier to seniors' use of games, thus reducing the games' physical, cognitive and social benefits and consequently seniors' health and quality of life (Whitlock, McLaughlin & Allaire, 2011). It is therefore important to ensure that games offered to seniors have appropriate ergonomics.

In the case of online educational games, the ergonomist develops solutions that inform and guide the user while minimizing the cognitive and technological information load as much as possible (Barnard, Bradley, Hodgson & Lloyd, 2013). A technology will be adopted if the person is attracted to using it, and its user-friendliness must be appropriate for the user: the technology must not be too difficult to use.

In order to establish the ergonomic indicators of online games for seniors, we rely on three quality criteria: 1) the design: the components of the game must adapt to the characteristics of the users, 2) user-friendliness: the game interface and computer equipment must be easy to use, and 3) readability: the way in which the text, illustrations and videos are visually presented must facilitate reading and understanding by users.

We now examine how we addressed these criteria during the educational adaptation and computerization of the Bingo game for seniors.

3. The adaptation of the Bingo Game

According to a survey of 932 Canadian seniors (Kaufman, Sauvé, Renaud & Duplaa, 2014), the game Bingo turns out to be the most mentioned game by respondents. In the remainder of this paper, we look at how the structure and content of this popular game have been adapted to create an educational online game for seniors.

3.1. The game design

An increasing number of studies advocate that it is necessary to create a design specifically tailored to players from the 'baby boomer' generation. Various aspects of the Bingo game have been adapted in terms of design to create an educational game for seniors (Callari, Ciairano & Re, 2012; De Schutter, 2011; Diaz-Orueta, Facal, Herman Nap & Ranga, 2012; Hwang, Hong, Hao & Jong, 2011; Lopez-Martinez, Santiago-Ramajo, Caracuel, Valls-Serrano, Hornos & Rodriguez-Fortiz, 2011; Marin, Lawrence, Navarro & Sax, 2011 ; Ogomori, Nagamachi, Ishihara, Ishihara & Kohchi, 2011; Pham & Theng, 2012; Sauvé, 2010a; Shang-Ti,

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Huang & Chiang, 2012; Theng, Chua & Pham, 2012; Whitlock, McLaughlin & Allaire, 2011; Wu, Miao, Tao, & Helander, 2012).

Challenge. The game must maintain a constant challenge for the players. In our "Live Well, Live Healthy!" game, we have put in place mechanisms (Fig. 1B) that allow players to choose from three levels of difficulty at the start of the game. These levels are based on the seniors' knowledge about the learning content (easy, medium and difficult) of the game (Fig. 1A): easy corresponds to 75 % of the content which refers to the prior knowledge of the seniors; medium is 50 % and difficult is 25 %. We also integrated into the game mechanics Bonus balls that are drawn at random during the game, thus reducing the gap between the players that are too strong and those that are weaker (easy = 3, medium = 2 and difficult = 1).



Fig. 1. Main page interface of the game

Competition. The game must create competition among seniors to maintain their interest. In our "Live Well, Live Healthy!" educational game, we first determined it would take three participants or more to create competition between seniors. We gave the opportunity to vary the duration of the game by allowing players to choose how the game ends and thus decide the playing time: a complete row of vertical boxes requires less time than a full card or the contour of the card (Fig. 2A). Similarly, players choose the degree of difficulty (easy, medium and difficult) before starting the game. We opted to display the scoring system in the game interface at any time for each player (Fig. 2B). Then we inserted points that reward or penalize the player according to whether they answer the question correctly or not, which in turn allows the player to place a token in one of the boxes on the card. The penalty is 50% less than the gain in order to maintain the interest of players, in particular, for those who have little knowledge about the content to be learned. Finally, we changed the rules that determine the winners and losers in the context of an online game without a game master: the first player to click on the Bingo button (Fig. 2C) after correctly placing their tokens on the Bingo card wins 50 points. Players who have a "Bingo" at the same time but were not fast enough to click on the "Bingo" button first, only receive 25 additional points. Should a player click on the Bingo button and not have their tokens placed correctly, the game continues and the player loses 25 points.

Learning Content. To ensure effective learning, the game must incorporate learning content while maintaining a balance between learning time and play time to maintain the player's interest. In our "Live Well, Live Healthy!" game, we have built a mechanism to display a question every time the number of a ball drawn at random is on a card of one or more players. If the player answers the question correctly, a token appears in the box and the player earns points (20 points for an easy question, 30 points for a medium question and 50 points for a difficult question). If the player does not correctly answer the question, the token will not appear in the box and the player loses half of the points allocated to the question. We prepared 40 questions instead of 75 (the number of balls) to ensure that these questions come at least twice during a game whose aim is to complete a full card.

Feedback. The game must provide feedback to support the learning of the defined content Immediate feedback, related to each learning task, allows the player to identify successful activities and those they have failed. In our "Live Well, Live Healthy!" game, we have integrated visual feedback in the question card window; it uses a



Fig. 2. Point system

smiley or sad face to communicate the results of game (Fig. 3A) and textual and audible feedback to explain the correct answer (Fig3. B-C). A tutorial is also included to guide the seniors as the game progresses. Players can open or close the tutorial at any time with a single click. At the end of a game, each player's total points is listed, where achievement is highlighted with the sound of applause and players are ranked according to their ability to correctly answer questions and carry out learning activities. The game must allow players to see what they have learned by providing an overview of the results of the game's learning activities. When the game is over, each senior can see their learning process in a personalized environment.

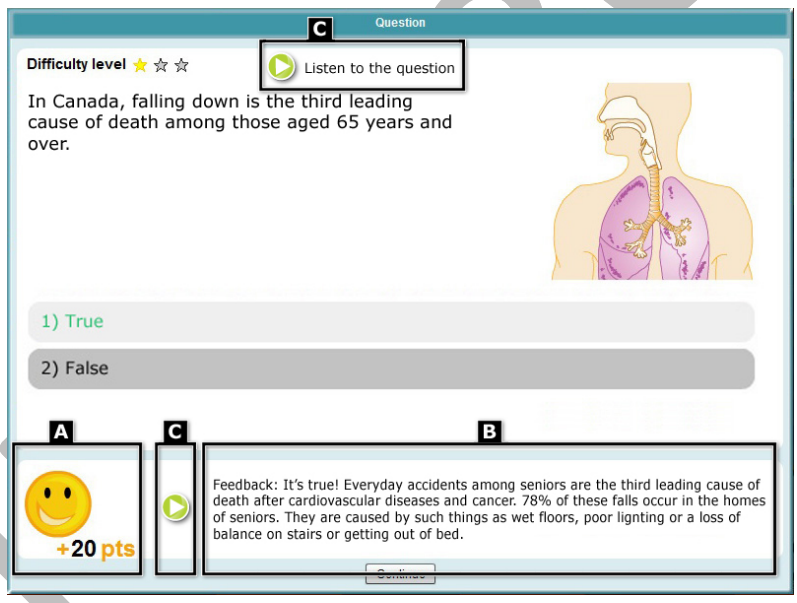


Fig. 3. Question Cards

3.2. The game's user-friendliness

Studies have found that seniors' problems with technology use are most frequently associated with user-friendliness and could be solved by an appropriate design of the screen display and game navigation (Pearrow, 2007; Hwang, Hong Hao & Jong, 2011; Marin, Lawrence, Navarro & Sax, 2011; Sauvé, 2010b; Whitlock, McLaughlin & Allaire, 2011).

The display screen of the game and the learning activities. The board, tokens, navigation buttons, instructions, score and rules must be displayed and accessible to ensure that the game runs smoothly. In our "Live Well, Live Healthy!" game, we restricted the display size of the game board to the smallest resolution used by our target audience: 1024X768. For screens with larger dimensions, we inserted a back-

ground of the same color as the background of the board and programmed the display so that the board is positioned in the center of the screen. This window is always visible regardless of other superimposed windows that appear. A second window may appear superimposed onto the game board. It contains questions, answers, feedback, the tutorial or the rules of the game. The size of this window is variable but always smaller than the board.

Navigation in the game. The game should provide easy navigation and must meet certain conditions. In our "Live Well, Live Healthy!" game, we divided the game interface into three zones: a) the Bingo card, rules, and tutorial; b) information on the game's progress: the type of game, randomly drawn ball, and the Bingo button for ending the game; and c) information related to the actions of players: players' names and their scores as well as the control of the microphone and chat. At all times, the board, tokens, navigation buttons, instructions, score and rules must be displayed and accessible to ensure that the game runs smoothly. All player actions are done using single clicks. We opted for buttons with words rather than symbols for ease of use by seniors who were not born in the digital age. Finally, we limited the number of superimposed windows to a maximum of two. When a second window appears in the center of the screen, the game board will be grayed out and become inactive.

3.3. Educational readability for multimedia

By readability, we mean the way in which a text, an illustration or a video is visually presented (formatting) in order to make reading and understanding easier for users. A readable interface is an indispensable component of any digital product (Ergolab, 2003), particularly one intended for seniors. Educational games must meet certain formatting criteria for text, videos and illustrations (Kellner, 2008; Millerand & Martial, 2001; Nogier, 2005; Marin et al, 2011; Melonio, Tarantino & Mascio; 2012; Thoa, 2004).

Text. The layout of the text on the screen must facilitate reading and viewing. In our "Live Well, Live Healthy!" game, the text is left-justified and the only font used is Arial (12 pts for regular text and 14 pts for headings). This font is the most commonly used on the web, as it provides users with the best readability. Upper case is only used for headings on the site to facilitate navigation. The vocabulary used in our rules, instructions, questions and feedback were adapted to our target audience. Experts and our target group validated our adaptation via game trials.

Illustrations. The use of illustrations must be relevant to the content of the game. In our "Live Well, Live Healthy!" game, we included mechanisms to facilitate the viewing of images. Players may enlarge illustrations to full screen with a simple click of the mouse. We also tested the length of display time for illustrations using various types of connections: low, medium and high speed. Computer display time in all cases was immediate. Finally, we assessed the usefulness of each image illustrating game questions by the inter-rater method.

Sound. Use of spoken texts can motivate seniors. In our "Live Well, Live Healthy!" game, we integrated a virtual voice so players may listen to the questions, rules and instructions, instead of reading them, therefore facilitating game play for seniors who suffer from visual impairments. Sound control is always available and associated with a button to activate or mute the sound, thus giving players full control over sound features.

4. Methodology

In order to validate the "Live Well, Live Healthy!" game, we used the *Learner Verification and Revision* (L.V.R.) method. This method focuses on the user, is characterized by flexibility and is well adapted to the context in which the product will be used (Nguyen et al, 2008). It allowed us to identify and correct errors and problems (Thulal, 2003; Maddrell, 2008) and to effectively validate a prototype in the course of development with a sample of the target users for whom it was created. This method, also known as a user trial, has also been used in educational games development research (Sauvé, 2010c). The process involves validating the prototype through a sample of the target audience in order to measure its effectiveness.

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For validation of the game's ergonomics, we chose a sample of 27 seniors aged 55 and over and who are retired.

In addition to the demographic data, knowledge of the Internet and online gaming, and the type of computer equipment - 8 statements on the ergonomics of the online educational game were evaluated using a short online Likert scale questionnaire. Efficiency of design - 16 statements - covers competition, challenge, learning content and feedback. User-friendliness - 17 statements - refers to the instructions and rules linked to navigation within the communication tools and the ease of carrying out the action as well as the display size and the layout of the web game. Educational readability - 8 statements - focuses on the vocabulary used and the visual treatment of the text, photos and videos. Each ergonomic aspect also included one open-ended question. An observation grid filled out by an auxiliary researcher completes the qualitative data.

Participants in the validation process were informed of the research and signed a consent form. All measurement scales were found to possess satisfactory psychometric characteristics. Overall, the analysis shows that the scales used were adequate because for the vast majority they explain beyond 50% of the variance of the measured variables and their accurateness indices are beyond 0.60, which is sufficient for an exploratory study.

5. Main results

Respondents. There were 27 seniors who participated in the experiment of which 56% were women and 44% were men. Those aged 55-59, or 33%, formed the largest group of respondents, followed by those aged 60-64, or 26%, then those aged 65-69, or 22% and finally those aged 70-74, or 19%. All participants are independent and live at home or in an apartment. They evaluate their computer skills as intermediate (59.3%), beginner (29.6%) and expert (11.1%). The vast majority (92.6%) have played Bingo. More than two-thirds of them use tablets (iPad or Android) and less than half (40.7%) use a smartphone. Finally, less than half (44.4%) play games on the internet.

Design. Respondents identified that playing against other people (4.5 / 5), having the choice of duration (4.0 / 5) and how the game ends (3.9 / 5), obtaining points or not as they answer correctly or not (4.3 / 5) helps maintain competition (4.28 / 5) among the players. Integrating Bonus balls (4.27 / 5) and the choice of the level of difficulty of the questions (4.0 / 5) maintains a sense of challenge (4.13 / 5) throughout the game. As for the learning content (4.05 / 5), respondents indicate that the game takes into account their prior knowledge (4.35 / 5) to help them earn points and that the questions were not too difficult (4.0 / 5), most have opted for the Easy level, and that the repetition of the questions (3.92 / 5) in the game more or less helped them to earn points. Regarding the feedback mechanisms (4.32 / 5), they consider that the feedback for their incorrect answers to questions helped them to correct themselves (4.35 / 5), the smiley or sad faces quickly informed them about their performance regarding the question (4.38 / 5), the tutorial informed them on actions to be performed during the game (4.26 / 5) and that having access to a summary of their right or wrong answers helped them to measure what they have learned and allowed them to review any incorrect answers to the questions (4.29 / 5).

User-friendliness. In terms of the display (4.37 / 5), respondents indicate that animations add interest to the game (4.2 / 5), that the game board (4.4 / 5) and the questions (4.4 / 5) are displayed within the screen, the Rules (4.3 / 5) and Tutorial (4.3 / 5) buttons are visible on the game interface and easily accessible, the positioning of the tutorial in the center of the game allows them to read the instructions properly (4.3 / 5), the score of the players is well located (4.6 / 5) to track the progress of the players, the Bingo button is well located in the game (4.7 / 5) and finally, that the button for the microphone is more or less visible (3.9 / 5). Regarding navigation (4.1 / 5), the game requires little computer knowledge from the seniors (4.1 / 5), the tutorial (4.1 / 5) and rules (4.0 / 5) helps them to understand how the game works and the rules (4.0 / 5) are available at all times with a single click. With respect to the controller used to play the game (4.1 / 5), the keyboard (4.1 / 5) and mouse (4.4 / 5) are easy to use during the game while the touch screen (3.9 / 5) is a little less easy.

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***Educational readability*.** The text (3.97 / 5), the size (4.1 / 5) and the color (4.1 / 5) of the characters of the words found on the card and the tutorial allows for easy reading; however, the font size of the questions (3.7 / 5) seem less easy to read. The respondents felt that the language is appropriate (4.1 / 5). Regarding the sound (4.0 / 5), the respondents noted that it is audible whether for the rules or the questions and that the sound control button is easy to use. Finally, the images are large enough to be well seen on the screen and the time for them being displayed is instantaneous on all computers (4.3 / 5).

Table 1. Results of validation

Categories	Conditions	Results
Design	Challenge	4.13
	Competition	4.28
	Game content	4.05
	Feedback	4.32
Readability	Text	3.97
	Illustrations	4.27
	Sound	4.00
User-friendliness	Display	4.37
	Navigation	4.09
	Controller	4.14

6. Recommendations for revising the game

Various recommendations were drawn from the observations and qualitative data of the questionnaire to improve the game.

Challenge. Respondents suggest adding a second Bingo card to increase their chances to win, to set a response time to reduce the wait between the drawing of two balls when the player does not have the number on his card, to display a message when a player has correctly answered all questions from a difficulty level to encourage the player to move to a higher level, to readjust the message that says that players must click on the Bonus number on their card corresponding to the Bonus ball in order to avoid making the other players wait and thus crippling the game until the player executes the action.

Competition. Respondents have a diverging view on the time allotted for answering the questions: according to the rhythm of the players or a timed response. Some players take a long time to respond, which may slow the pace of the game and reduce the motivation of the waiting players. Several players suggested reducing the minimum number of players to two instead of three, which would allow them to play as a couple or with one of their grandchildren.

Learning content. Respondents have conflicting opinions concerning the repetition of questions during the game; for some it is viewed as a good way to winning more points and for others, it reduces competition.

Feedback. Respondents recommend displaying a message inviting them to view their results (good and bad responses) when the game is over; this consultation would help them perform better during future games.

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Display. Players suggest increasing the size of the Rules and Tutorial buttons to make them more visible to some respondents. They suggest adding a message to the tutorial explaining their location and operation. They suggest moving the display of the Bonus ball from the center to the right of the interface to allow players to view the entire Bingo card as well as being able to click in the O column. They find that it would be important to know the name of the player who created the gaming session, especially when there are multiple games being played at the same time because they do not know which game to join.

Navigation. Respondents propose including in the first message of the tutorial explaining the choice of the level of difficulty and how the game ends that you need to click the Continue button to activate the game. This action is not intuitive for some players. They recommend eliminating the message, "This number is not on your card" when the player does not have the number on the card, and consider it an unnecessary message. They suggest adding a message to the tutorial explaining how the Bonus ball works. Players understand they cannot answer a question or gain points if the number on the ball is a Bonus ball they have previously won on their card. Finally, they suggest adding an explanation for the Microphone button as soon as the game starts.

Text. Respondents recommend increasing the font size of the words in the questions by at least 2 pts or include a button allowing them to magnify the question screen.

Illustrations. Respondents suggest increasing the color contrast of the buttons (Join, Start Game) in order for them to be easily seen and read on the screen.

Sound. Players suggest slightly accelerating the speed of the virtual voice to improve listening.

The recommendations of the respondents were taken into account and have been included in the pedagogical and IT revisions of the game.

Conclusion

As part of this developmental research, the "Live Well, Live Healthy!" game for seniors is being prepared with the help of the generic shell of the educational game of Bingo, which has been developed by taking into account the ergonomic conditions that we identified from the literature; for references and more detail, see http://cvje2concepteur.savie.ca. This game was validated with 27 seniors using the LVR method. While recognizing the limitations of the testing: the seniors were recruited through the suggestions of names from the students and members of the team (family and friends) and through word of mouth of these people among their friends, the positive results of validation will allow us to review the games and to experiment on them in the autumn of 2014 with seniors (n=150) in both French and English.

When ergonomic conditions are included during the design stage, online educational games become easier to use and thus costs to correct problems can be avoided. In other words, good ergonomics will increase the degree to which a specific group of users are able to play a game and effectively accomplish tasks; therefore, ensuring that good results are obtained to the satisfaction of users in a specific usage context. Display selection, fonts, screen element organization, navigational elements, visual, audio and text formatting on the game interface, as well as rules and tutorials all play an important role in ensuring that the educational game is adapted to the specific needs of seniors, and ensure that the game environment is user-friendly, useful, simple and motivating.

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E-Learning Policy and SMART Education in South Korea

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Abstract

"The informatization of education" means a total change in content, method, target etc. of education in the society of informatization. The goal of education informatization is to build a so-called new Eutopia which is characterized by open education and lifelong learning, namely which makes it possible for anyone to receive his/her wanted education anytime and anywhere on the basis of information & communication technology.

In 1996, the Republic of Korea established a five-year comprehensive education informatization plan, which is in its fourth stage as of 2014. The plan of education informatization consists of four stages: 1st stage (1996-2000), 2nd stage (2001-2005), 3rd stage (2006-2010), and 4th stage (2010-2014). Established separately from the stage-specific plan in 2011, the smart education strategy is aimed to expand and develop a project of "ICT-based creative talent cultivation" in the four-stage education informatization plan and to change a social paradigm in order of informatization → ubiquitous → smart. The essence of the smart education strategy lies in creating a 3D educational environment based on the development and distribution of digital textbooks. To this end, a cloud-based education information service system is being built as an infrastructure for education information service. Therefore, this presentation will look into South Korea's advanced e-learning and smart education policies that are pursued on the basis of the development of IT.

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Keywords: E-Learning Policy, Smart Education, South Korea, informatization, ubiquitous, smart, digital textbooks, ICT

7. Introduction

"The informatization of education" means a total change in the content, method, target etc. of education in the society of informatization. The goal of education informatization is to build a so-called new Edutopia which is characterized by open education and lifelong learning, namely which makes it possible for anyone to receive his/her wanted education anytime and anywhere on the basis of information & communication technology (ICT). In South Korea, education informatization began with "the computer education plan" established in July 1970. The computer education was extended from commercial high schools into technical and general education high schools and even into elementary schools in accordance with the fifth education curriculum in 1987 and underwent an epoch-making transition through "the reinforcement plan for school computer education" in December 1987. The plan was to present basic directions on education informatization not only by consolidating computer education, but also by distributing education computers, expanding computer application and computerizing school office work. Thereafter, five computer networks were built for government institutions (administration, education & research, finance, defense and public security), education computers were distributed to schools according to "the school computer education support plan," and computer education was spurred according to a comprehensive plan for developing and distributing the Computer-aided Instruction (CAI). At the same time, pan-governmental informatization began to be propelled, as the Basic Act on informatization Promotion was enacted to cope with worldwide computer distribution. Accordingly, every government agency had to work out a basic plan on informatization promotion and implement it every year. From 1996 on, a five-year comprehensive

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education informatization plan was set up every five years and is in its fourth stage as of 2014. This presentation will look into the education informatization plan and SMART education which is implemented as part of e-learning policy in the Republic of Korea. In establishing their policies, other countries will get much help from South Korea which is advanced in e-learning policy and education based on advanced IT.

8. Education Informatization Policy in South Korea

In terms of syntax, Korean students find the greatest difficulty in using the correct word orders of Hungarian. Word orders are defined grammatically in Korean, while they can vary, depending on the wishes of speakers in Hungarian. For instance, a sentence of the third form is always composed in order of subject (S) + object (O) + predicate (P) in Korean. However, things are different in Hungarian: if no specific vocabulary is emphasized, a sentence is composed in order of S + P + O, but for example if O is emphasized, it is composed in order of S + O + P. In Hungarian, a sentence generally employs an order of S + P + O + other components, but if a specific vocabulary is emphasized, it is placed before a verb. Like this, Hungarian word orders are very variable. Therefore, it causes difficulties to Korean students accustomed to fixed word orders. In South Korea, an education informatization policy has been implemented in four stages every five years since 1996. The policy is in the forth stage as of 2014. The following is a stage-specific education informatization plan:

The material infrastructure for education informatization was built with the distribution of education computers, teaching advanced materials, school and campus computer networks etc. in the plan's first stage from 1996 through 2000. An education information service like Edunet was opened and education programs were developed and distributed. The groundwork for education informatization was laid with a systematic pursuit of teachers' informatization to help them use education information services. Not only was office work computerized at government agencies, but the computerization of teachers' tasks was made possible with the development and distribution of a comprehensive information management system for elementary and middle schools. The system laid the groundwork for the current education and administration system "NICE." From 2001 through 2005, the second-stage education informatization project greatly contributed toward enhancing the levels of the material groundwork built in the first stage and eventually the quality levels of public education using ICT. ICT was elevated to a key means and goal of nationwide human resource development, as the Ministry of Education was reorganized into the Ministry of Education and Human Resources and was raised to the ministry of Deputy Prime Minister. Besides, education informatization was extended into higher education, lifelong education, infant education, special education, genius education etc. In the third stage, from 2006 through 2010, e-learning was changed into u-learning, as the internet environment was transformed from cable to wireless. In scope and content, the project was expanded in a direction that takes the initiative in education innovation. Especially as the results of the second stage education informatization was made known all over the world, developing countries scrambled to import South Korea's education informatization models, thus promoting the export of international consulting and e-learning. In the forth stage, from 2010 through 2014, a policy was pursued to build a learner-focused digital society and leap into the seventh biggest science and technology power, as the informatization was unified in education and science and technology sectors with the integration of the Ministry of Education and the Ministry of Science and Technology. This period is characterized by the education informatization that is aimed at sharing, openness, participation and cooperation and focuses on the cultivation of creative talents.

Established separately from the stage-specific plan in 2011, the SMART education strategy is aimed to expand and develop a project of "ICT-based creative talent cultivation" in the four-stage education informatization plan and to change a social paradigm in order of informatization → ubiquitous → SMART. The essence of SMART education strategy lies in creating a 3D education on environment based on the development and distribution of digital textbooks. To this end, a cloud-based education information service system is being built as an infrastructure for education information service. The education informatization project is characterized by requiring the balanced development between ICT and material (hardware and software), human and information resources and the establishment of the infrastructure, such as relevant laws and organizations.

9. Revitalization of SMART Education in South Korea

It is well known that social each filed is drastically changing with the innovation of ICT. Individuals or organizations are required to change for survival and development in the transition into the knowledge & information based society represented by globalization, networking, digitalization and smartization. Now is the time when human resource development is emphasized to cope with such change. In such trend, e-learning and SMART learning are new concepts that are recently spoken of in the filed of education. It also demonstrates social interest that the new concepts are often referred to. These days, the Ministry of Education is pursuing new directions

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and policies related to e-learning-SMART learning. This encourages schools to expand a new form of education like web-based online education (cyber education). Such e-learning-SMART learning education, which emerges as "a new type of education in the ubiquitous age," is joined by offline universities as well as cyber universities. Universities are more and more interested in e-learning and SMART learning, as the government's relevant policies come to the surface one after another. Since 2000, the government has pushed ahead with ICT-based education, e-learning, u-learning, SMART education etc. by its education informatization project. These days, the government puts stress on the roles and capabilities of teachers especially to promote the interactions with students.

ICT education is to build an infrastructure for ICT-based education by installing PCs in classrooms and combining them with super high-speed communication networks and to establish operation directions for education. E-learning is to make individual learning possible anytime and anywhere by developing contents and building a cyber home learning system, a central teaching & learning center, an EBS system for the college scholastic ability test, a cyber education system for broadcasting high schools, etc. Ubiquitous-learning is to make it possible to get access to internet and search necessary data by building wireless communication networks, developing digital textbooks and distributing tablet PCs and IPTVs. SMART education is to perform five key tasks, i.e. introduction of online class, introduction of online evaluation, application of digital textbooks, reinforcement of teachers' capabilities and construction of cloud-based education environment.

10. Concept of SMART Education in South Korea

SMART education is a 21st century education paradigm to develop every student into a global leader by innovating the content, method, evaluation, environment, system etc. of education using ICT and ICT-based network resources. “SMART” is a combination of five concepts: Self-directed, Motivated, Adaptive, Resource Enriched and Technology Embedded. "Self-directed" is aimed to change a student and a teacher into a producer of knowledge and a mentor and to make a student study independently by diagnosing and evaluating achievement online. "Motivated" is aimed to emphasize teaching and learning methods to reorganize knowledge based on experience, solve problems creatively and make an individual evaluation based on process. This concept is focused on experience and problem solution. "Adaptive" is aimed to strengthen the flexibility of education system, realize a customized learning to connect personal preferences with future occupations, and evolve a school into a place to provide students with individual learning according to their levels and aptitudes. "Resource Enriched" is aimed to use the contents public institutions and individuals have developed on the basis of cloud education service and expand the joint use and cooperative learning using collective intellect, social learning etc. This concept is focused on open market and social networking. "Technology Embedded" is aimed to realize an education environment where students can learn anywhere and anytime through IT and are assured of maximum learning options using various teaching methods. This concept is focused on opening.

11. Conclusion

Though its stages are different from each other in objective, direction and content, the education informatization policy is ultimately aimed at improving the quality levels of public education. South Korea has now reached a world's top-level education informatization environment by establishing a comprehensive plan to seek a balanced development of three major resources and build a corresponding infrastructure and inputting resources continuously. Such education informatization policy will increase in importance with the development of ICT in the future as well. After all, it will be a solid driving force to foster creative talents and build an environment where they exercise their capabilities to the utmost.

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On the problem of categorizing students based on their cognitive styles and teaching strategies

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Abstract

The research determines different types of students according to their dominant cognitive learning styles. We are focused on the students of Russian language at high school, acquiring statistical representation of various typological groups we cluster the students into to verify whether the development of metacognitive skills does improve the efficiency of learning foreign languages.

The research includes a survey based on the works by Howard Gardner and others. We categorize students according to their dominant cognitive learning styles and corresponding teaching strategies. Two hundred respondents were included in the survey. The paper also provides a historical background of the subject.

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Keywords:Howard Gardner; Multiple Intelligences; teaching strategies; cognitive learning styles

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12. Introduction

Compulsory teaching of a second foreign language no later than from the 8th grade of school was introduced in the academic year 2013/2014. This step is a reflection of the EU policy of multilingualism and multiculturalism. In connection with this, an increase has been recorded in the number of schools that offer Russian as well as an increase in the number of students who choose this language apart from English language. In the center of our interest lies the classification of types of students who chose Russian as the second foreign language. If we take into account the fact that one of the basic approaches of modern pedagogy is paedocentrism, we can see possibilities of improving the efficiency of teaching the first foreign language as well as the second foreign language in the classification of students according to the type of learning (type of intellect) and subsequent individualization of teaching with regard to each of the types. In conducting our research, we depart from H. Gardner's theory.

2. Preceding Methodology

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In the 1970s in the USA, psychiatrists John Grinder and Richard Bandler dealt with the issue of neuro-linguistic programming. The scholars examined the behavior of very successful people and attempted to define basic elements in their communication and behavior that positively affect their success. This is the basis of the theory of multiple intelligences, a method which gives rise to numerous debates among scholars but which has found application in the curricula of many American educational institutions. This theory is based on the philosophy of language teaching according to which the intellect of man is composed of many different equivalent intellects, which we must first uncover, and only then it is possible to develop them in the process of teaching. This theory was developed by the American scholar Howard Gardner as a counterpoint to the classic IQ test, based on the idea of a compact innate and unchangeable human intellect. In Gardner's view, IQ tests only measure the linguistic and logical skills of a person, but teaching practice shows that people gain knowledge in different ways. The scholar further contends that language is not connected only with the linguistic abilities of an individual, but with all parts of human intellect. Besides, this theory also had its predecessors. As early as in 1904, the French scholar and psychologist Alfred Binet dealt, in a sense, with a variety of intelligence when he and Theodor Simon created, on the basis of their long-term examination of children in their natural environment, a so-called Binet–Simon scale, which was a scale of various skills, broken down by age of children, which was, according to the authors, typical for the mastery of these skills. This finding was the core of Binet's claim that it is not possible to generalize intelligence, that it is diverse; he also examined the approach of mentally disabled children to the mastery of these skills (Lojová & Vlčková, 2011; Gardner, 1993; Binet, 1907).

A pioneer in the field of examination of children in terms of their preferred intelligence was, without a doubt, Maria Montessori. In her profession as director of the school Casa dei Bambini (C*hildren's House*), she was fully aware of the peculiarities and differences of individual children, and therefore also promoted individual work with each child or their division into smaller groups according to the predominant style of learning.

In the 1970s, phenomenological psychology appeared, examining subjective human experience, on the basis of which the Swedish scholar and psychologist FerenceMarton, together with his British colleague Noel Entwistl, later introduced a qualitative research method, phenomenography (Lojová & Vlčková, 2011; Mareš, 1998).

In 1984, American theorist David Kolb focused on the natural preference of learning styles and, based on his so-called experiential learning psychology, defined four types of students: 1. diverging (sensitive students, able to look at a problem from different angles, they like observing), 2. assimilating (students requiring a clear logical explanation), 3. converging (students preferring practical experience over theory, they like solving problems), and 4. accommodating (students who like experimenting, during which they involve their excellent intuition and instincts) (Osland & Kolb & Rubin, 2006).

3. Theory of Multiple Intelligences

The theory of multiple intelligences was comprehensively described for the first time in Gardner's 1983 publication *"Frames of Mind: The Theory of Multiple Intelligences"*. Gardner sees intelligence as the ability to solve problems and to participate in the results that are important for a particular cultu-

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re or community. In his book, the author formulates a number of criteria that define intelligence as a prerequisite of the ability to solve problems or difficulties fitted into cultural context and create one's judgment. The author defines the following eight types of intellect:

- Verbal or linguistic intelligence (*so-called "wordsmart" or "booksmart"*)
- Logical-mathematical intelligence (*so-called "numbersmart" or "reasoningsmart"*)
- Visual-spatial intelligence (*so-called "picturesmart" or "art smart"*)
- Bodily-kinesthetic intelligence (*so-called "body smart" or "movementsmart"*)
- Musical or aural intelligence (*so-called "music smart" or "soundsmart"*)
- Interpersonal intelligence (*so-called "peoplesmart" or "groupsmart"*)
- Intra-personal intelligence (*so-called "selfsmart" or "introspectionsmart"*)
- Natural or naturalist intelligence (*so-called "naturesmart" or "environmentsmart"*)

The first two types of intelligence (verbal and logical-mathematical) are most apparent mainly in the process of education in schools, the other three (visual-spatial, bodily-kinesthetic and musical) are associated with artistic movements, and the remaining three types (interpersonal, intra-personal and natural) were described by Gardner as "personal intelligence" (Gardner, 1993). However, all types are interconnected, complementary, and rarely work alone. The basis of the theory of multiple intelligence is the fact that every individual has a unique set of intelligences that interconnect and cooperate in solving problems, which is the essence of the uniqueness of each individual (Lojová & Vlčková, 2011).

Academic psychologists viewed Gardner's theory of multiple intelligence with skepticism. By contrast, it was accepted by teachers very positively. Teachers and theorists of education did not hesitate to apply this theory in practice. One of the reasons of the positive acceptance of the theory in the school environment is the fact that it provides a conceptual framework for the organization of the educational process, for the building of a new approach to the arrangement of the lessons and the classrooms themselves, and it is focused on the specific needs of different types of students (Kornhaber &Fierros &Veenema, 2004).

Mindy Kornhaber, together with her colleagues from Harvard University, in the framework of the group's project "Project Zero", which has been carrying out its research since 1967, tested 41 educational institutions in the USA that use the theory of multiple intelligences in practice by using globally standardized entrance tests for U.S. universities – SAT (Scholastic Assessment Test). The research showed that the progress of students of these schools in three years of study was really substantial; one of the findings also was a decrease in the number of missed classes and an increase in the participation in leisure activities organized by the educational establishments (Gardner, 1993; Kornhaber &Fierros &Veenema, 2004).

4. Research and results

To conduct our psycho-didactic research, the method selected was a questionnaire drawn up on the basis of the literature studied and focused on five types of students according to their predominant intelligence. All items of the questionnaire were created in accordance with the characteristics of the individual, most commonly occurring, learning styles, with the manner of receiving information by students, their typical needs, behaviors, and prevailing intelligence.

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In addition to H. Gardner's theory, in compiling the questionnaire, another theory taken into account was that of the prominent Czech scholar M. Sovák, who, in his publication "*Learning need not be torture*" (*Učení nemusí být mučení*), defined four basic types of students according to their most frequent needs in the learning process. These are: 1. aural-speech, 2. visual, 3. tactile and motional, and 4. verbally-conceptual (Sovák, 1990).

Furthermore, S.F.Reif's theory, working with seven types of intelligence, sometimes called learning styles, was taken into account. The author bases her classification of students on the type of intelligence the individual uses the most. The types of intelligence are: 1. verbal, 2. logical-mathematical, 3. spatial, 4. musical, 5. bodily-kinesthetical, 6. interpersonal and 7. intra-personal (Reifová, 2007).

On the basis of the above theories, all respondents were, after the evaluation of the questionnaires, divided into five categories, which are further explored and analyzed in this paper. The types of students are: 1. aural-speech, 2. visual, 3. bodily-kinesthetic, 4. logical-mathematical, 5. verbal. The reason of the choice of these five categories was the mutual similarity and permeability of individual theories and types of classification of students according to the senses which the individual uses most frequently as well as according to the intelligence which is developed to the greatest extent in them. (See Gardner's and Rief's bodily-kinesthetic type and Sovák's tactile and motional one, logical-mathematical type by both Gardner and Rief and the verbally conceptual type by Sovák, musical and aural-speech one; and last but not least Sovák's visual type of a student, which corresponds with Rief's spatial intelligence and visually-spatial intelligence by Gardner, when a student has a high perception of drawings and sketches).

It can be easily proved using the above classification that every student has different ways of learning, different interests and motivation, and therefore different teaching activities are suitable for them. The teacher's task is thus to actively engage students in learning activities and stimulate the development of different types of intelligence and the various senses of the students.

A total of 200 students of the Russian language of different age groups from schools in the Hradec Králové region, the Pardubice region, and the Vysočina region were tested. The selection of educational institutions was significantly restricted by teaching of Russian, which unfortunately is not yet in place in all types of schools. Research was conducted in five secondary schools, and, for comparison a small sample of students of the University of Hradec Králové participated in the test too (these were students of the follow-up Master's program Teaching of Russian in lower and upper secondary school). The comparison of learning style preferences was crucial as they are changing with age because, from the perspective of ontogeny, time is an important factor influencing the development of human intelligence.
The respondents were subsequently divided into groups according to age in order to obtain an overview of their development over time (respondents aged 15 – 16 years; 17 years; 18 years; 20 – 22 years; 23 – 24 years).

In the questionnaire presented, the respondents gave their opinions on a total of 35 statements; always 7 statements were focused on each learning style of the student, his/her predominant senses and intelligence. The respondents were asked to assign a point value to each statement according to the following scale (0 = I don't agree with this statement at all, 1 = this statement describes me parti-

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ally, 2 = I completely agree with this statement). Statements representing each type were not presented in blocks but were randomly mixed. In the evaluation of the questionnaires, the total number of points for each of the five types of intelligence was added up, which was subsequently verified by the sum of the number of zeros, one's and two's. The highest number of points obtained represented the biggest agreement of students with statements representing a specific type of intelligence, and therefore the greatest preference by students of this type. Summary results were recorded in charts according to the different age groups of respondents. A total of six charts were created in this research, the last of which, the sixth, is the final overview of the complex scoring of all of the surveyed respondents.

In the paper, we will only present the results and conclusions of the research conducted.

4.1. The group of students aged 15 to 16 years

The group of students aged 15 to 16 years contains a total of 58 respondents, whose score is shown in Fig. 1. In this group of respondents, two types of students are predominant: aural-speech (22.7%) and bodily-kinesthetic (22.5%). The visual (19.3%) and verbal (18.9%) types are very balanced and the logical-mathematical type has significantly fewer points (16.6%), which is generally repeated in all the surveyed groups, which also confirms the hypothesis of M. Sovák that the group of students of the logical-mathematical type is generally the least represented one.

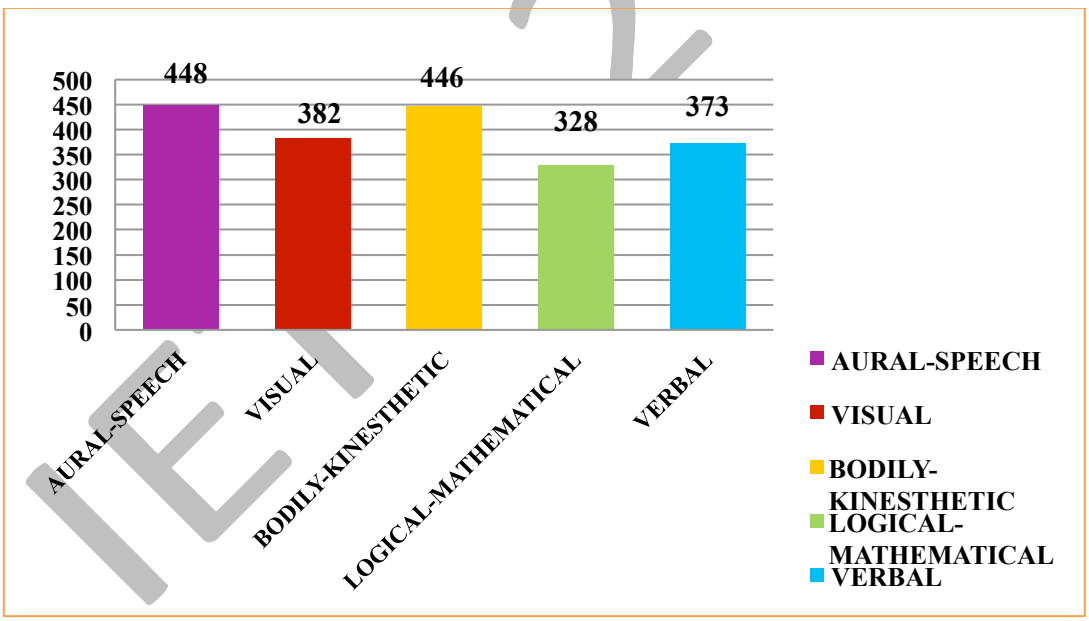


Fig. 1. Points scored – students aged 15 to 16 years.

4.2. The group of students at the age of 17 years

The group of students at the age of 17 years old had a total of 59 respondents (see Fig. 2.). Also in this sample, the aural-speech type of students is most represented (23.4%), followed by the bodily-kinesthetic type (22.7%). The third largest group of respondents in this sample are representatives of the verbal type of learning (19.7%), followed by representatives of the visual type (19.2%) and the logical-mathematical one (15%).

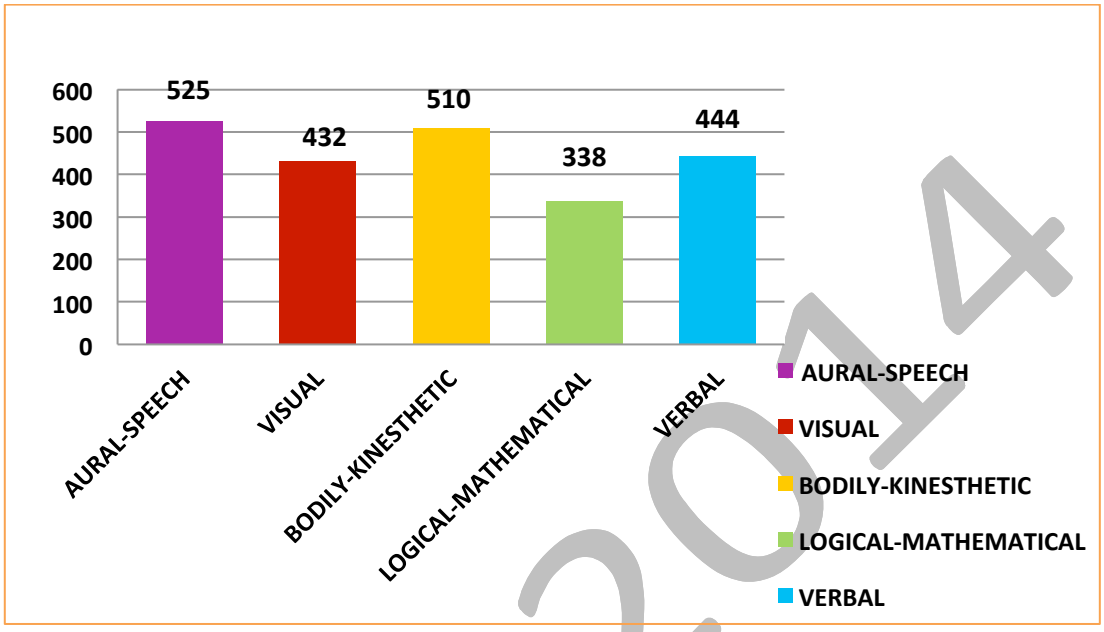


Fig. 2. Points scored – students aged 17 years.

4.3.The group of students at the age of 18 years

Fig. 3.shows the distribution of students in a 12-member group of 18-year-olds. The dominant type is the aural-speech one (24.7%), followed by the bodily-kinesthetic type (21.5%) and the visual type (20.5%). 19.1% of students belong to the verbal type, and the least frequent is the logical-mathematical type (14.2%). These results basically copy the previous ones without a significant change in the positions of the individual types.

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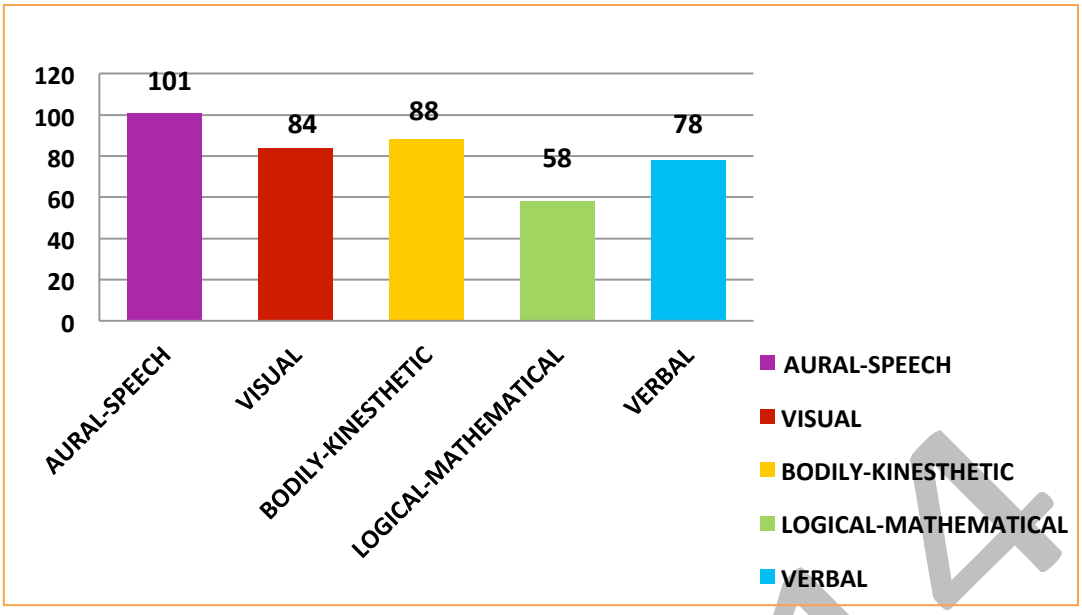


Fig. 3. Points scored – students aged 18 years.

4.4. The group of students aged 20 to 22 years

Fig. 4.shows answers of a total of 20 students aged 20 to 22 years. The sample of respondents is composed of individuals older than in the previous three groups. The fact that every year plays an important role in adolescence and forming of personality is also demonstrated by the results obtained – although the most represented type is the aural-speech one (22.9%) and the second largest group consists of representatives of the visual type (21.8%), which did not happen in any of the previous groups. The results obtained can be interpreted that at this age, students need, in addition to the teacher's verbal description also visual material. In foreign language teaching, it is therefore most suitable to include elements of audiovisual methods.

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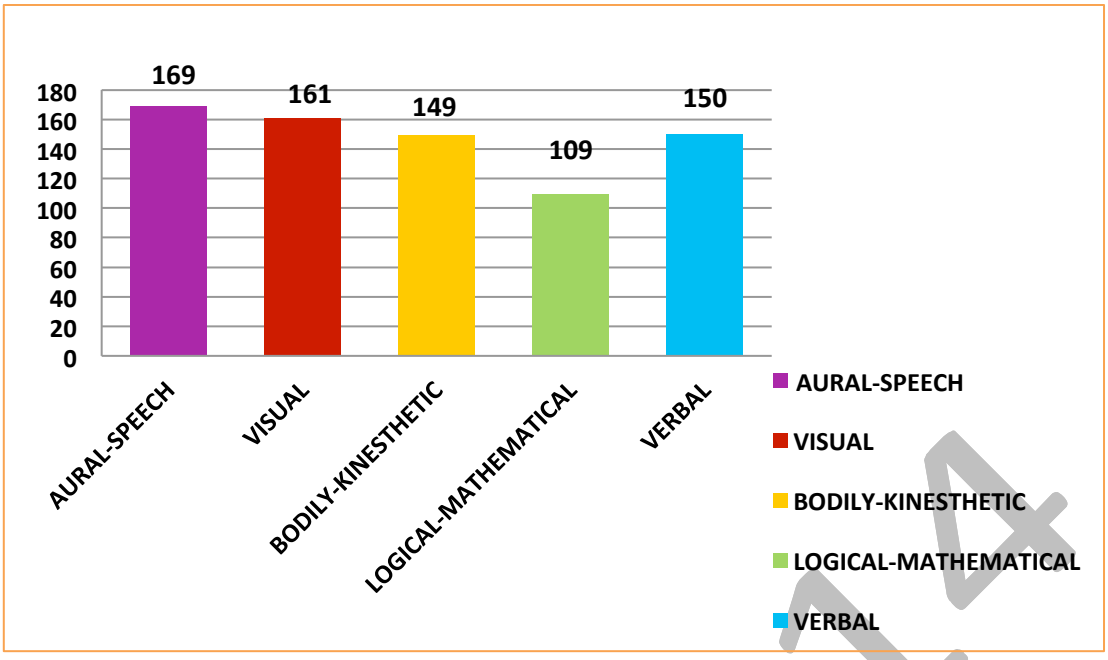


Fig. 4. Points scored – students aged 20 to 22 years.

4.5.The group of university students aged 23 to 24 years

The fifth chart presents the research results in a group of 13 respondents – university students aged 23 to 24 years (see Fig. 5.). The most numerous group in this sample are representatives of the verbal type of students (22.6%), followed by the bodily-kinesthetic type (22.4%) and the aural-speech type (20%). On the basis of the results one can conclude that the representatives of this age group are no longer dependent on the verbal description of the teacher and, on the contrary, prefer their own discussion with suggestions for solutions to problems or their own projects and their public presentation, which fully corresponds to the reality. The number of representatives of the visual type (17.4%) and the logical-mathematical type (17.6%) reflects the assumption that for older students there is usually no need for support in the form of visual images, diagrams or photos.

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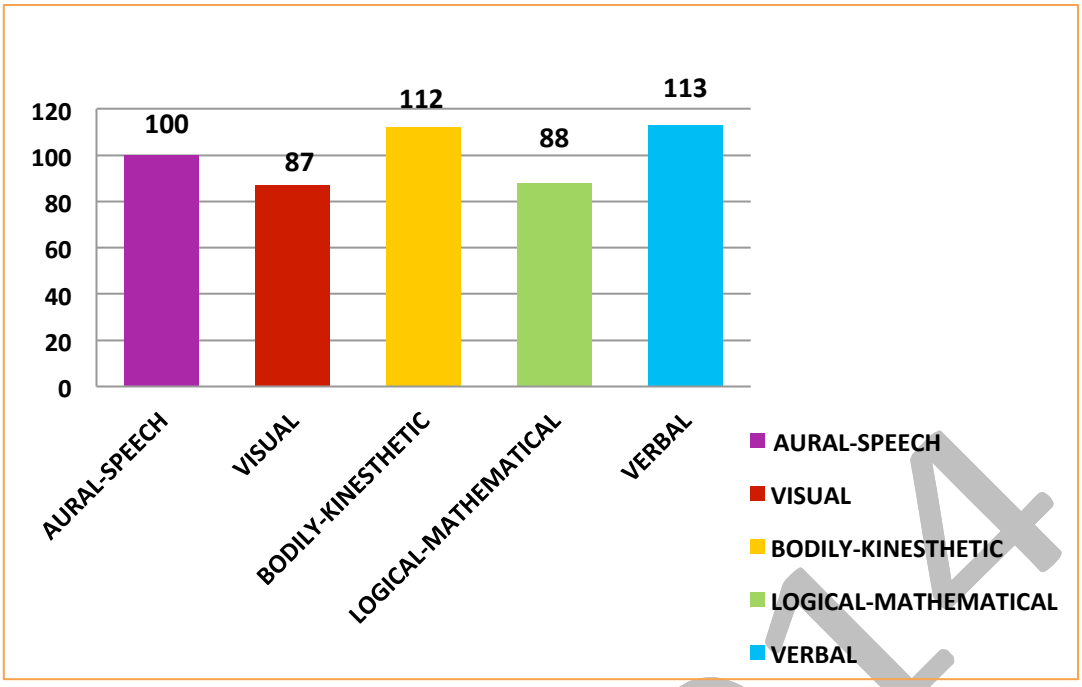


Fig. 5. Points scored – university students aged 23 to 24 years.

4.6. Summary

Last two charts present summary results of the research (see Fig. 6. and Fig. 7.). When sorting preferences of individual intelligence types in ascending order, the least frequent type of students is the logical-mathematical type (15.8%), which is confirmed by the partial results of our research as well as M. Sovák's claims.

The second least numerous group consists of representatives of the visual type (19.2%). At the beginning of the research, a hypothesis was formulated that due to the intense influence of mass media on shaping the personality of a child, the visual type of intellect will be predominant in the group of students. The results of the research did not confirm this assumption, on the contrary, it turned out that this type of students is among the least represented ones in the sample.

In third place is the verbal type of students (19.9%). All of the respondents were students of generally-oriented fields of studies or humanities disciplines; it can be noted that the result confirms the theory of H. Gardner, who claims that verbal types are mostly students of humanities, who like discussing problems.

The bodily-kinesthetic type of students (21.9%) is represented mainly by active students, who need motion and constant switching of activities in the course of one teaching unit. At the beginning of the research, we expected that the bodily-kinesthetic type of intellect would be represented in the research sample by only a small number of respondents, which would correspond to the decline in physical activity of children in contemporary society. Quite surprisingly, however, this type was in second

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place in the summary overview as to the number of points obtained, and it was significantly represented in all age categories.

The absolutely most widespread type of student in general seems to be the aural-speech type (23.2%). These individuals prefer aural memory; in teaching, work with recordings and other audio materials should prevail, and the teacher must be prepared for the fact that their speech will be a model for the students, who will imitate them. For this reason, it should not be deformed by accents or defects.

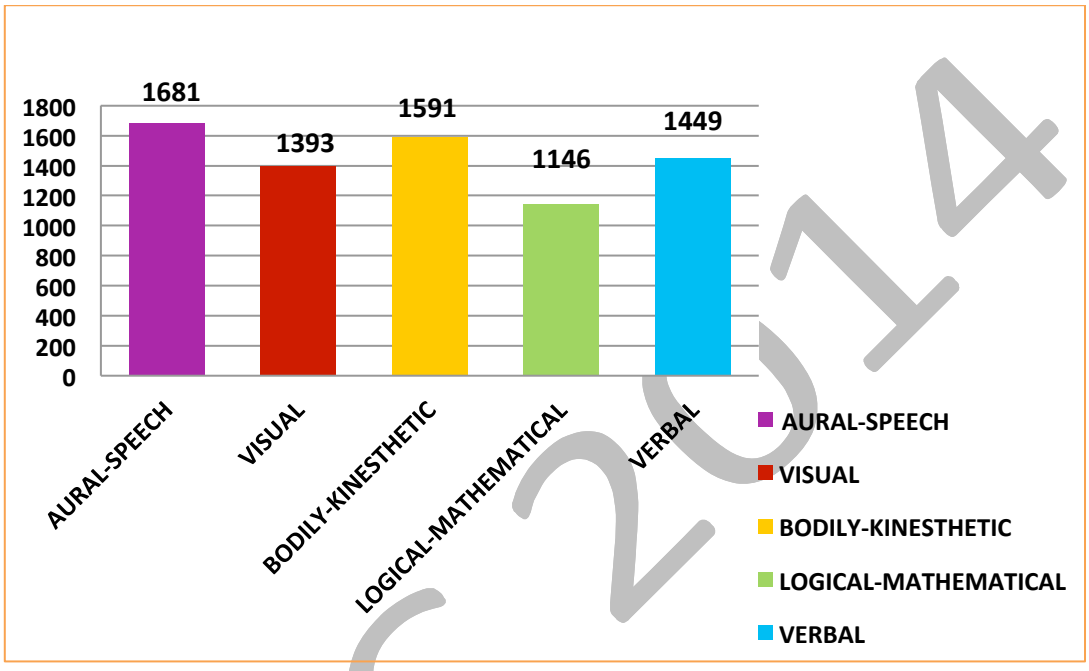


Fig. 6.Total points for different types of students.

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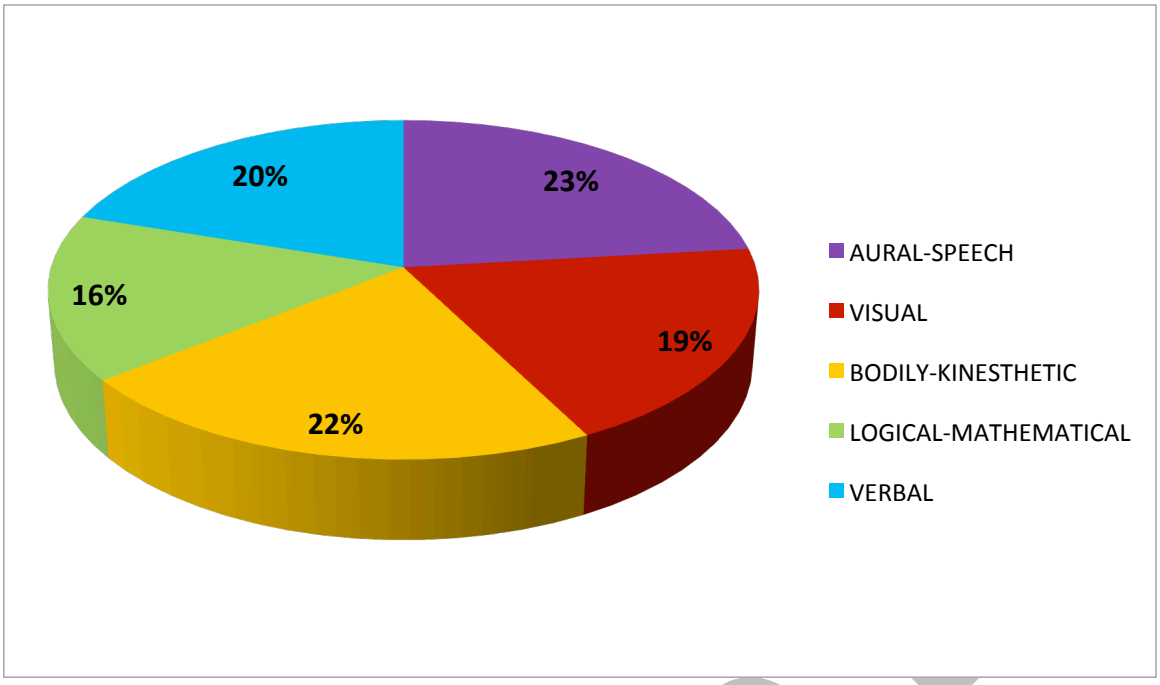


Fig. 7.Preferred intelligence type percentage of respondents.

5. Conclusion

This paper attempts to show that even though the children play videogames, watch TV and browse the internet in their free time nowadays, they still need to hear a new piece of information and to change activities during the lesson. In view of the fact that visual type of student is surprisingly not dominant as the questionnaire proved.

The charts also demonstrate that preferences of individual intelligence types change with age of students.

In conclusion, we express our agreement with the claim of J. Mareš that every child is a specific personality with individual learning styles that develop, and over time they permeate and change. It is then up to the teacher to respect students and try to understand their specificities at least to a certain extent. (Mareš, 1998).

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THE USE OF 3D VIRTUAL LEARNING ENVIRONMENTS IN TRAINING PRE-SERVICE TEACHERS

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The continuous development in technologies like wireless connection, voice and video recording, and the capability to use various media types that are independent of time and place has made the virtual worlds more applicable and accessible. The recent developments in computer and Internet technologies and in three-dimensional modeling necessitate the new approaches and methods in the education field and bring new opportunities to the higher education. The investment in the infrastructure of the Internet in Turkey has made the outreach to such technologies faster and easier than ever before. The use of different learning materials and applications other than classroom and course books requires the reconsideration of education concept, methods, applications, teachers' roles, interaction types and the education environment itself. One answer to these concerns could be using the three dimensional virtual learning environments in the higher education. Many higher education institutions are employing one of the most widely used virtual worlds the Second Life Platform and are conducting classes on their virtual campuses, and organize meetings, seminars and conferences. In this study, Istanbul University Virtual Campus in Second Life Platform has been designed and used for classes with pre-service teachers from English Language Teaching department and Computer and Instructional Technologies Teaching department. The experience of pre-service teachers on this platform has been recorded and they have been interviewed afterwards.

Keywords: 3D Virtual Learning Environments, Teacher Training, Distance Education

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An Empirical Study in Turkey upon Teacher Performance and Student Satisfaction in Education Life

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Abstract

The purpose of this research was to carry out an empirical study upon determining teacher performance and student satisfaction in educational life. Education and teaching have an important place all around the world. Two different questionnaires including 25 questions were performed to teachers for their personal evaluation and measuring student satisfaction through their own viewpoints. The same questionnaire was designed for student satisfaction, and performance of teachers was evaluated in terms of students. The obtained data was statistically evaluated using SPSS program. Professional commitment as the first factor among the addressed questions had a structure including the aspects as commitment of a teacher to his/her profession, job enthusiasm, developing and innovating yourself, performing the assigned duties on time and correctly. In empathy and sacrifice as the second sub-title included teachers' trying to understand the requests and complaints of students better, and making efforts for leading them to the right way. In the questionnaire of determining the student satisfaction, empathy and sacrifice, and professional commitment were discussed.
Key Words: *Teacher Performance, Student Satisfaction, Leadership in Education*
JEL Code: M10, I20

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1- INTRODUCTION

In recent information age, education is a system affecting from the implementation carried out in science and results of these implementation from all respects. In the adaptation of individuals to each other in this changing world and raising of them in accordance with the social goals, educational establishment has been accepted to have a significant role. Education is a process starting from the moment we were born and maintaining as life-long. Over the years, developing education through creative thinking and presenting to people without any profit motives expanding positively is a fact up to individuals' themselves. During this process, people see the people around themselves as a role model affecting primarily from their families, and then from the people around and their teachers. Teachers are no doubt the ones having the most important duty after families. Education means each teacher's being able to raise a socially beneficial product, and owning the product of his/her own. The more teachers carry on their duties affectionately, the more success will be inevitable for students and teachers. When looked from a broad perspective, the children are a product. Raising, developing, contributing upon themselves, noticing imperfections and criticizing or not are included with-

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in the field of a teacher. A teacher should be a leader offering an insight into students constantly. Whereas students are expected to be luckier, more satisfied and confident rather than the previous years through the rapidly changing technology, they have been noticed to have increased anxiety and worries. At this point, teachers should create an atmosphere that will keep students away from these worries. This is teaching. In order to increase the performance of a student positively, parents and teachers should encourage students for participating in extracurricular activities. Constant studying of students exhausts their brains and bodies; and no efficiency can be obtained. Therefore, physical activities such as sports will be beneficial for students' spending energy and mental fatigue. For that reason, knowing that to what extent individuals gain these behaviors become important. And this makes assessment and evaluation studies important in schools. Performance-based status determination is a type of evaluation depending upon students' presenting their knowledge and skills revealing a performance or product. Moreover, performance evaluation as an alternative to tests created using multiple-choice and short-answer items presents open-described duties providing opportunities for students to use their special knowledge and skills for factual circumstances (Kumandaş et al., 2013).

Education of pedagogues always reflects the processes in a society in terms of content and method. During the recent few years, Russian society has experienced radical changes, and made great changes in its educational system and the education of pedagogues assigned in kindergarten schools and the other schools. Content and methods of studying with children affects the curriculum and analysis of education and retraining for pedagogues. In past, the pedagogues presented the common fact to the students through reproducing. The curriculum included detailed instructions related to all sides of the study they would carry out with students pedagogues had to study with. Training and retraining of the pedagogues followed common ideological dogmas integrated in all institutions of the society. The ideology infiltrated into all educational systems. The main purpose of a kindergarten was to raise Soviet citizens having a real communist attitude against effort and obeying the rules determined by their own groups (Ryzhova,2012, 21). The basic feature of the modern period (2000-2012) is great changes' providing all processes started during the Post Perestroyka Period to be systematized and developed. Furthermore, the effect of state upon the content and organization of education has also increased. New State and Federal Regulations were published for the curriculums of pre-school educational institutions. Beside aiming to make pre-school Russian education to be more people oriented, the quality of education has also been expected to be more similar to the European standards. In regulations; development of children psychology and children personality, being away from school-type education, the partnership between kindergarten schools and kindergarten schools, and families, and initiative of children have been regarded. Pre-school education has recently been depended upon an integrative approach including different types of children activities (Ryzhova, 2012).

This empirical study was carried out in Halit Ziya Uşaklıgil Elementary School. Performances of teachers, their relationships with students, and student satisfaction were analyzed in this study. The questionnaire scale used for teachers was categorized into two titles as factor. The first of these was professional commitment, and the other was empathy and sacrifice. It was prepared using the concepts such as professional knowledge of teachers, their efforts to renovate themselves, rewarding the success of students, establishing easy communications with students, and innovating knowledge. The empathy and sacrifice under the second title included teachers' understanding the requests and complaints of students better, making efforts to lead the students correctly, and organizing the content of lessons more attract-grabbing. In the evaluation performed to determine student satisfaction, the questions related to whether they were satisfied from the performance of teacher or not. This part was categorized into three titles. Those were openness in communication, professional commitment, and

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finally, empathy and sacrifice.

In this study, a questionnaire including totally 25 questions were addressed to teachers, and 12 to students; and the questionnaires were collected performing face-to-face method. The questionnaire was performed to 100 teachers, and 120 students. After the evaluation of the questionnaires, the obtained data were controlled in SPSS 17.0 program in terms of their reliability and validity. It was analyzed through correlation, regression, and factor analyses; and those were presented in tables and figures.

2- LITERATURE

2.1 Definition of Education

Education is a concept developing individual within the period from birth to death; and is hard to be defined because it includes political, social, cultural, and individual dimensions at the same time. Education is the whole of the processes when people develop abilities, attitudes, and other types of behaviors prized in the society they live in. Education is a social process as well as a psychological fact including the parents. Because, children primarily take the people around them as a role model.

Education is also learning. And learning is establishing cumulative correlation of knowledge. Learning is always based upon available knowledge and cognitive structures. As mentioned by Ausubel (1978); "If I had wanted to gather whole educational psychology under only one principle, I would have said so: The unique important factor affecting education is the current knowledge of the student. Determine this, and educate in accordance with this. Learning is cooperative." Education means organizing by yourself: as being very different from old behavioral viewpoints, efficient learning has strong metacognitive (creative thinking) features such as planning, management and taking time to consider. Education and training are target-oriented; teacher defines the targets of learning. Through the necessary educational instruments, learning targets can be defined by teacher or learning materials (Güleryüz, 2011, 118). Education is the common understanding of technologic and pedagogic viewpoints; and aims to convey learning to people in a productive way as a whole including information and communication (Göksoyet al., 2014, 292-305). Education is a process maintaining during the life. Within this process, individuals sink themselves into the effort of self-realization recognizing their psychomotor skills beside their interest and personality. Attitudes and behaviors of teachers towards students also play an important role upon supporting and enhancing the students' self-realization efforts. Teachers' having a positive viewpoint towards students and students' having characteristics such as citizenship virtue, responsibility and mutual sacrifice, liveliness and kindness are also a part of education (Aydın et al.,2013, 3).

2.2 Leadership

Leadership in education reveals itself through authority, duty, execution and effect. Formal authorization can only provide status leadership to the administrator. And informal authorization is granted by a group; and this, in fact, is a kind of leadership granted for the administrator. The grades of effect are understood well from the responses returned by the group members. In an educational organization, expectations of members can be regarded as a response to leadership in management. The behaviors of administrators expected by members are essential in structure of the institution. The leader mostly works with these two dimensions. Recent educational leaders should be well-informed and versatile above all. Only such leaders can determine goal-oriented policies, and deal with the instruments that will actualize these. A leader is an administrator distinguishing between what education and enterprise are and what these should be, and using human and material sources positively. Development in education is a leadership problem; therefore, the problem is raising and employing the admin-

istrators that have or possibility to have a leadership qualification. Effective leadership performance and eagerness to work with anyone in your organization provides more careful. In addition, training their students set a goal in life and can make them emotionally stronger. Especially transformational leaders achieve these results in one or more ways. They may meet the emotional needs of each student and/or they may intellectually stimulate students (Bass, 1991). Maintenance of leadership in education depends upon the maintenance of this raising process and placing elements into the system that will encourage such leader administrators to be in the system. It has recently been mentioned that these administrators have been present in practice whether the effect of management class in education is accepted or not. Therefore, the problem is to develop the ones on-the-job rather than raising the new ones (Bursalıoğlu, 2010, 210). Although the theories related to leadership were established many years ago, the importance of acquiring and practicing the leadership skills has increased in the 21st century (Landis et al., 2014,1). School leadership is a field including social justice and ways to educate students. Social justice is a situation of balance provided through considering the issues such as living standards and level of income in different parts of a society (Woods et al., 2013, 2). Furthermore, especially the educational institutions can establish a more productive and efficient organizational structure using modern leadership approaches such as transformational leadership (Egri and Herman, 2000).

Through leadership in education, the primary aim of this research study was to discuss student success and expressive motivational approaches as a whole analyzing the critical and complex relationship between the fundamental leadership qualifications. The environment and external factors (for example; poverty, violence, social support) affect the success of teachers and students in an urban school area (Bethani,2011, 1). Efficient leadership and management have been accepted in all institutions as the time passes by. The teachers are for reaching to profound targets determined for them by schools and colleges. In the global economy, educated workforce has been essential for protecting and developing the power of competition. In a rapidly changing environment; society, schools, colleges and universities are for preparing people to employment. Teachers, their leaders and administrators are productive people necessary for "delivering" the high educational standards (Bush 2008, 8).

Leadership in education is modeling, informing and motivating. As mentioned by Artur Sanio "We cannot be successful suddenly; this actualizes step by step." Namely, in order to be productive for students, teachers should have adequate knowledge and equipment; and this is possible through teachers' innovating themselves and improving their knowledge whenever possible (Aksu, 2011, 11). As an efficient leader, a teacher has responsibility for developing vision, sharing his/her vision, and organizing learning experiences appropriate to individual differences. While teachers actualize their leadership roles, they play these roles both at school and classroom. Teacher leadership is the ability for playing and developing roles at a cognitive level in school activities and organizing the in-class activities efficiently sharing their knowledge with students and innovating themselves constantly (Apaydın et al., 2011, 107-129; Eagly et al., 2003).

The qualification of leadership disappears when teachers have uninterested behaviors towards their students and in culture isolation, and when they blame their students for failure frequently depending upon the factors. When a compelling educational model is applied without empathy and sacrifice, not only students but also all employees affect from this (Fleming et al., 2007,7). Leadership of school manager is one of the most important variables for increasing the learning performance of students and creating a qualified learning environment. The concept of leadership should not only be analyzed within the scope of school manager's leadership, but also analyzed through an understanding providing opportunities for whole school members to take the lead. Moreover, at schools where leadership capacity is high, Kılınç mentioned that a broad-based and efficient participation, high-level trust, values creat-

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ed by the school members and implementations increasing the success of students have become intense (Kılınç et al., 2014). Leadership concept at schools is quite important for strengthening the cultural structures of schools and appropriate ethical behaviors of teachers. Besides, "school manager" as a leader successful in his/her field defines the vision and mission of school (Uğurlu et al., 2012).

2.3.Teacher Performance

Performance evaluation is one of the most important functions of studies carried out upon determining the efficiency and success level of pedagogues. In the study, the literature related to performance evaluation was reviewed; a model was determined to discuss student satisfaction and performance evaluation system of teachers, and performances of pedagogues were evaluated in accordance with this model (Uysal, 2011, 13).Evaluation of teachers was especially emphasized. The most familiar one among the various evaluation criteria was success depending upon seniority. As in any profession, old generation seniority and new generation adequacy have been argued. Selection of seniority is arisen from the difficulty in evaluation of the teachers. The benefits of seniority as an evaluation criteria are its including the feeling of social justice, preventing personal effects, being an indicator of organizational commitment, its being easily-measurable, preventing destructive competition, its retrieving from pressure and decreasing the difficulty of evaluation (Bursalıoğlu, 2010, 46-47). Evaluation of teacher performance by the students defines the efficiency of a teacher. Whereas some administrators consider teacher performance measurement as a feedback instrument, most of them feel this as a threat against teacher while taking personal decisions (Odabaşı, 2004, 26). In a classroom, teacher performance and leadership affect student success positively, and has an important place in establishing a positive relationship with the student. Secondary education teachers prefer rescuer, developer and enterpriser roles. Secondary education teachers can be mentioned to display highly complicated behaviors among these roles (Apaydın et al., 2011).School's fulfilling its functions, in other words its mission, depends upon teachers' displaying the performance expected from them as the ones playing the key role among the educational employees. Teachers' presenting the highest level of performance is possible through the presence of implementations such as providing feedback related to their performance in schools they carry on their duties, determining the educational needs and potentials, providing support and orienting those (Çorbacı et al., 2013, 3).

Performance of a teacher is essential for providing efficiency and productivity during the education and training process. Since teacher performance can be mentioned to affect participation of students into lesson, and student satisfaction directly. Performance evaluation of teacher has a "compass" role upon students to provide educational targets to be actualized at the highest level. This study had a field research quality because of its trying to determine thoughts of teachers related to students (Aksit, 2006). In teacher performance, the personal qualifications expected from a teacher are (Çelikten et al., 2005,10):

Teachers are good observers; and they are in an effort to innovate themselves constantly; behave patiently, stand up to circumstances, and control their feelings. They are devoted to their students. They are respectful for different beliefs, views and groups, and peacemaker. They are open for improving and criticizing themselves. Teachers are a model for students through their thought and behaviors; they are good-humor, tolerant and affectionate. Moreover, they have leadership features. They are encouraging and supporting. They make efforts to find solutions to problems instead of complaining. They know the basic concepts of educational sciences, and facilitate learning. They are open-minded, modern, and flexible when appropriate. The professional qualifications determining the teacher performance are; general culture, pedagogical content knowledge, supervising and planning the teaching process, productive use of the course period productively for students, organizing a participative teaching

environment, observing and following the improvement of students (Erden, 2011, 153-154).

2.4. Student Performance

While evaluating the concept of performance, students should firstly determine their own purposes. A life experienced hopefully and efficiently is a successful life. In order to be successful, it is not necessary to study hard, but to study efficiently. In order to be successful, the purpose should be defined clearly, and preparing annual, monthly and weekly programs for this purpose is a fundamental condition. The researches carried out upon people proved to be successful through using various criteria have emphasized these students to have such characteristics (Güleryüz, 2011). Curriculum is the leading one among the techniques used for student performance. This curriculum includes all activities related to actualizing all purposes of the National Education (Adanalı, 2008, 38-39). For example, authentic evaluation is a kind of evaluation in which students actualize their responsibilities in real life. Concept map is writing or drawing the cognitive schemes of individuals related to any subject on a paper considering as objectified through a paper or observation. Peer evaluation is students' assessing the assignments of their friends such as homework, projects, reports, etc. The other factor determining the performance of students is dramatization; namely, practicing the game components out of school can provide an important opportunity for overcoming the significant problems of schools. Adaptation of these motivating implementations into education will have a positive effect upon the interest of students towards lesson. Academic success and performance of the students will no doubt increase through the increase in their interest and motivation (Yıldırım, 2014,11). According to Cianni and Wnuck, the leading factors that will be provided by the team career model revealing the high-performance teams during career improvement process of students to the organization are as such (Akın, 2005, 12-13). High productivity and the success that will be provided through the motivation of being a team member are strengthened in time. Team spirit provided through team career model increases productivity in project team studies.

In concept of commitment, team members adapt to be a member of a project team providing career development opportunities for themselves. In order to help for the physical, mental and psycho-social development of students as a whole, pupil personnel services takes over important tasks besides management. A teacher should be near students as a guide, so student satisfaction can improve positively. Different from teaching and administration services, pupil personnel services are for preparing the environment that will provide development of students exceeding their own limits (Satan 2013,7).Teachers and parents should discuss the homework of students, remind them of their homework in their free time, and create a quiet and relaxing study environment in order to provide them to be successful in their educational life. Institutions, families, and teachers should always be ready for helping to children (Mulford et al., 2004,156). When the literature related to student performance was analyzed, several studies proved that tests and questionnaire methods had significant effects upon student performance and reminding the information learnt before (Yıldırım, 2014,54).

3. METHODOLOGY AND APPLICATION

In this section, methods and implementations used during the scope of the research, creation of scales, sample selection and data collection, validity and reliability analyses of the scale, correlation, regression and factor analyses were included. In this thesis study, performance of teachers carrying on their duties in Halit Ziya Uşaklıgil Elementary School, and satisfaction of students studying at the same school were measured. The questionnaires were

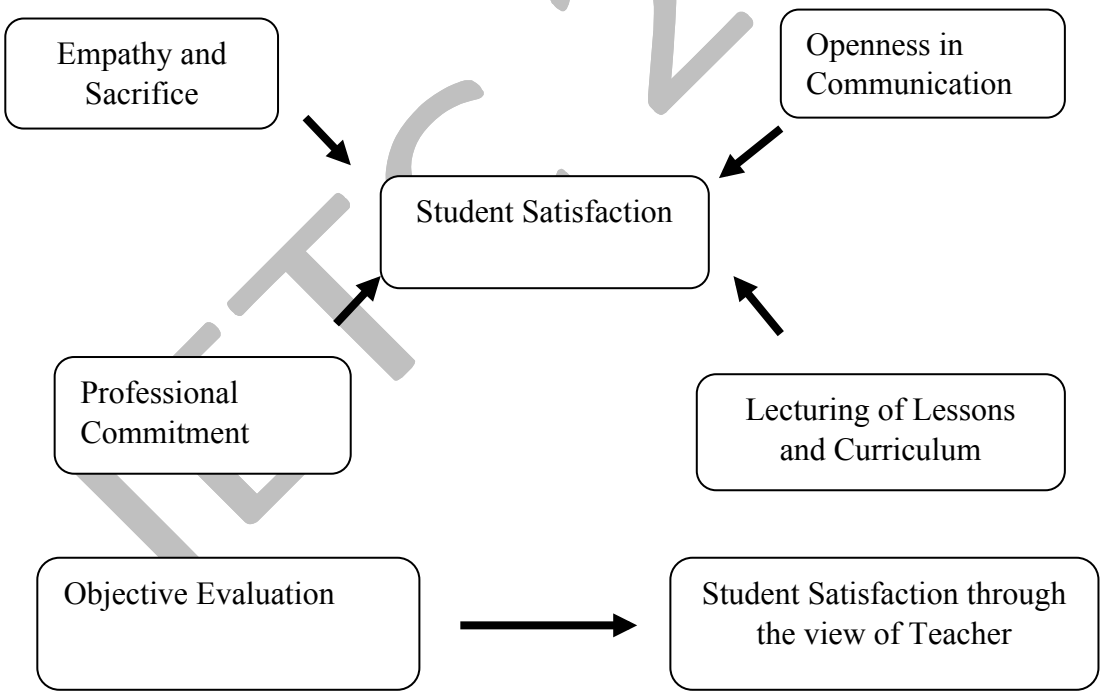
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performed as one-to-one to teachers and as face-to-face to students in the classroom. The questionnaire forms were prepared according to 7-point Likert scale for answering the questionnaires performed to teachers and students in the research. The choices related to assessment of the answers in the questionnaire was as 1) I totally disagree, 2) I mostly disagree, 3) I partly disagree, 4) I am indecisive, 5) I partly agree, 6) I mostly agree, 7) I totally agree. The data obtained from the questionnaire were analyzed using SPSS 17.0 program. After determining the subjective evaluation of teachers, their performance over the students and satisfaction of students, factor and reliability, correlation and regression analyses were performed.

Within the scope of the research, total number of questions addressed to teachers was 25, and total number of questions addressed to students was 12. The questionnaires were performed to totally 220 people including 100 teachers and 120 students.

The research hypotheses were as below:
H1A- Professional commitment of teachers affects student satisfaction directly and positively according to their own subjective evaluations.
H1B-Empathy abilities and sacrifice of teachers affect student satisfaction directly and positively according to their own subjective evaluations.

Figure 1: Dependent and independent variables in the research model



Although the scales used in the research model were used in previous scientific studies, reliability analyses of the scale were important within the scope of the research. Reliability is arisen from the internal consistency of measurement regarding the relationship between the questions within a variable. Reliability analyses and validity analyses of the questions used in the questionnaire were mentioned in the table below in details. The construct validity of the

research model was tested through factor analysis; whether the scale was mono or multi-factor was researched, and the statistical analyses were provided to be fulfilled optimally.

Table 1.Factor Analysis

Sub-titles	***Item Numbers***
Teacher Success	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,13
Student Success (From the Viewpoint of Teacher)	14, 15, 16, 17, 18, 19, 20, 21, 22, 23 24, 25

Questions	Cronbach Alpha	Factor Load	KMO
I have an effort to increase, develop and renovate my professional knowledge.	,921	,697	
My professional commitment and job enthusiasm are more than they should be.	,923	,623	
I perform the assigned duty on time and correctly.	,919	,719	
I am a model for students through my clothes, words, and behaviors.	,918	,765	
I avoid from using unclear, meaningless, slang language.	,919	,750	
I reward my students after noticing their success.	,917	,791	
I aim my students to acquire behaviors of looking into subjects from different viewpoints, consulting, discussing, and asking questions.	,916	,827	
I provide performing studies related to observation, experiment, and new inventions.	,926	,552	,907
I can associate the subject I lecture with the previous ones.	,918	,767	
I care for the requests and thoughts of my students in my communication as a teacher, and I try to understand them.	,915	,848	
I create opportunities that provide my students to associate what they learn with their lives.	,918	,762	
As a farseeing teacher, I explain my teachers that everything will be better in future.	,924	,636	
I take time my students for teaching and leading them.	,917	,801	
I can easily see my teachers whenever I need.	,891	,657	
My teachers make efforts for the solution of the problem I mentioned.	,887	,728	
I trust in teachers of our school.	,855	,718	
The lessons are lectured in accordance with our level of knowledge.	,886	,720	
I consider that what I learn at school will be beneficial in my daily life and/or my subsequent educational life.	,889	,650	

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The lessons are amusing,	,888	,686	,823
The opportunity for learning and achieving is provided for us.	,884	,777	
I can easily ask anything I do not understand to my teacher.	,884	,803	
I can easily discuss my views and suggestions in classroom and school garden.	,885	,713	
Teachers behave unbiased in evaluation of exam results (oral exam, written exam).	,892	,621	
Prepared exam questions and evaluations measure the real success of students.	,892	,595	
The content of the lessons was organized in a way grabbing my attention.	,890	,645	

In factor analyses, it was observed that the questionnaire scale used for teachers was categorized into tow sub-titles within inside. Those were professional commitment, and empathy and sacrifice. Professional commitment as the first factor among the addressed questions had a structure including the aspects as commitment of a teacher to his/her profession, job enthusiasm, developing and innovating yourself, performing the assigned duties on time and correctly. In empathy and sacrifice as the second sub-title included teachers' trying to understand the requests and complaints of students better, and making efforts for leading them to the right way. In questionnaire of determining the student satisfaction, empathy and sacrifice, and professional commitment were discussed.

In questionnaire of determining the student satisfaction, three main factors were clearly determined. Those were professional commitment, empathy and sacrifice, and openness in communication. Those determined factors were evaluated through both the viewpoints of teachers and students, and then analyzed. The findings revealed as the result of the analysis were evaluated in conclusion section.

Firstly, correlation analysis was performed. The correlation coefficient indicates the direction and size of the relationship between the variables. This coefficient has a value varying between (-1) and (+1). Positive values represent direct linear relationship. And negative values represent a reverse linear relationship. This coefficient's having the value of (0) represents that there is no linear relationship between the variables included into the research. In the research, the correlation analysis related to all variables was created through SPSS program before regression analysis providing opportunity to find a cause & result relationship between the variables. The correlation analysis of this study was presented in the table below.

When the factors having effect upon the student satisfaction were analyzed, it was noticed that the factors including the questions related to lecturing of the lessons and curriculum had a direct effect upon student satisfaction. The main reason for this was that the teachers who lecture pleasant and satisfying lessons leave a positive effect upon the students. The factor of openness in communication as an independent variable including the high correlation proved that the teachers that were open for dialogues with students are affected more by the students, and students participated more in lessons of the teachers they love. Openness in communication means students' reaching to their teachers whenever they want, and their asking questions without hesitation. Under normal circumstances, these two factors were expected to be in a positive strong relationship with student performance.

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Table 2. Correlation analysis

	1	2	3	4	5	6	7	8
1 Professional Commitment	1	,690** ,000	,537** ,000	,593** ,000	,386** ,000	-,133 ,188	-,129 ,200	-,150 ,136
2 Empathy and sacrifice	,690** ,000	1	,680** ,000	,658** ,000	,501** ,000	-,121 ,231	-,044 ,664	-,050 ,623
3 Openness in communication	,537** ,000	,680** ,000	1	,574** ,000	,479** ,000	-,104 ,305	-,073 ,469	-,062 ,541
4 Lecturing the lessons and curriculum	,593** ,000	,658** ,000	,574** ,000	1	,607** ,000	-,226* ,024	-,166 ,098	-,148 ,142
5 Objective Evaluation	,386** ,000	,501** ,000	,479** ,000	,607** ,000	1	-,139 ,168	-,181 ,072	-,098 ,330
6 Openness in Communication	-,133 ,188	-,121 ,231	-,104 ,305	-,226* ,024	-,139 ,168	1	,475** ,000	,300** ,001
7 Lecturing the lessons and curriculum	-,129 ,200	-,044 ,664	-,073 ,469	-,166 ,098	-,181 ,072	,475** ,000	1	,391** ,000
8 Objective Evaluation	-,150 ,136	-,050 ,623	-,062 ,541	-,148 ,142	-,098 ,330	,300** ,001	,391** ,000	1

Regression analysis used in general for the analysis of quantitative variables is categorized into two as basic and multi-directional. Multiple regression analysis analyzing the relationship between one dependent variable and more than one independent variable is a natural extension of simple regression analyses (Kleinbaum et al. 1998, Uzgören, 2007; Quoter). In our research, regression providing to find the cause & result relationship between the variables was analyzed using SPSS program. The results obtained from the regression analysis were interpreted in tables. R^2value of the table (coefficient of determination) expressed to what extent independent variables could be defined by the dependent variable, and F value expressed whether the model was statistically significant or not.

Regression analysis results related to the questionnaire data of teachers and students participated into the research were presented and interpreted in tables.

Table 3.*Professional Commitment*

	β	**T**	**P**
Professional Commitment	-,182	-1,254	,213
	Dependent Variable: Student satisfaction through the view of teacher R^2= ,042 F=,831 P: ,213		

As could be seen from the table, professional commitment of teachers did not affect the satisfaction of students according to their own subjective evaluations. The level of significance was quite over the limit value of .005; and F value and Beta (β) coefficient proved that there was no significant relationship between these two variables.

Table 4.*Empathyand Sacrifice*

	B	**T**	**P**
Empathy and Sacrifice	,179	1,051	,296
	Dependent Variable: student satisfaction R^2= ,042 F=,831 P: ,296		

As could be seen from the table, empathy and sacrifice fact of teachers did not affect the satisfaction of students according to their own subjective evaluations. F value and Beta (β) coefficient proved that there was no significant relationship between these two variables.

Table 5.*Openness in Communication*

	B	**T**	**P**
Openness in Communication	,014	,099	,921
	Dependent Variable: student satisfaction R^2= ,042 F=,831 P: ,921		

As could be seen from the table, teachers' openness in communication did not affect the satisfaction of students according to their own subjective evaluations. Considering F value and Beta (β) coefficient, it was proved that there was no significant relationship between these two variables. In other words, student satisfaction revealed in teachers' own subjective evaluations was insignificant rather than the students' own subjective evaluations.

Table 6.*Lecturing the Lessons and Curriculum*

	β	**T**	**P**
Lecturing the Lessons and Curriculum	-,143	-,926	,357
	Dependent Variable: Student satisfaction R^2= ,042 F=,831 P: ,357		

As could be seen from the table above, teachers' lecturing the lessons and curriculum did not affect the satisfaction of students according to their own subjective evaluations. The level of significance was quite over the limit value of .005; and F value and Beta (β) coefficient proved that there was no significant relationship between these two variables.

Table 7.*Objective Evaluation*

	B	**T**	**P**
	-,038	-,290	,773

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Objective Evaluation	Dependent Variable: student satisfaction R^2= ,042 F=,831 P: ,773

As could be seen from the table above, objective evaluations of teachers did not affect the satisfaction of students. F value and Beta (β) coefficient proved that there was no significant relationship between these two variables.

Table 8.*Empathy and Sacrifice, Student Satisfaction*

	B	**T**	**P**
Empathyand Sacrifice	,590	5,782	0,00
	Dependent Variable: student satisfaction R^2= 471, F= 43,183 P: 0,00		

When Beta (β) value and significance level of the independent variable called as empathy ability and sacrifice of teacher was analyzed in terms ofthe student satisfaction, it was proved that this ability of teachers increased the student satisfaction by 47.1%. Depending upon this, it could also be said that in case these abilities of teachers have been used in whole educational system, a great performance increase will be experienced.

Table: 9. *Empathy and Sacrifice, AverageStudent Satisfaction*

	B	**T**	**P**
Empathyand Sacrifice	,595	6,237	0,00
	Dependent Variable: average student satisfaction R^2= ,537 F=56,345 P: 0,00		

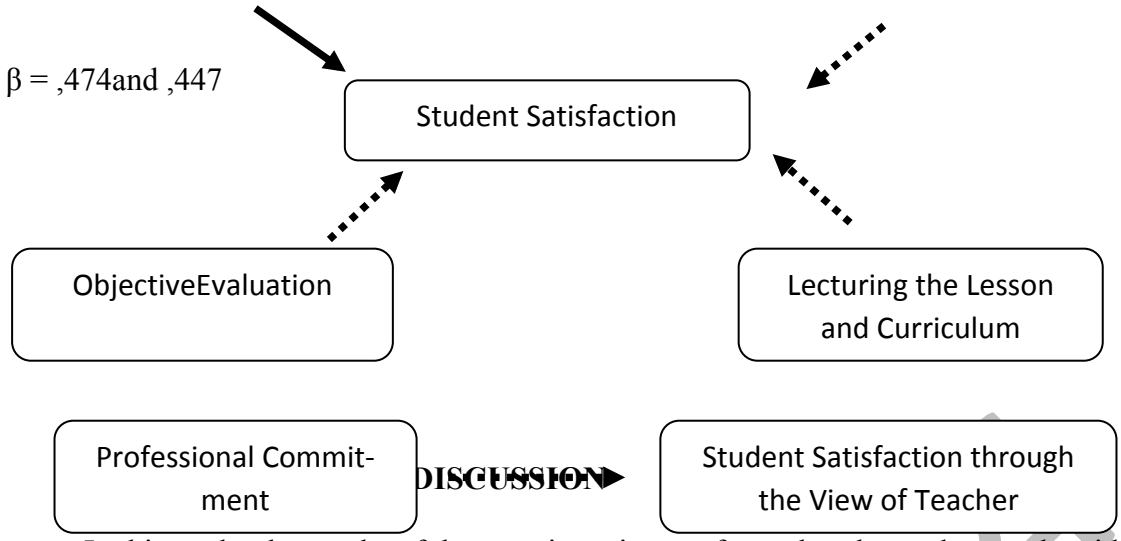
When Beta (β) value and significance level of the dependent variable called as empathy ability and sacrifice of teacher was analyzed in terms ofthe student satisfaction, the 53.7% direct and positive relationship proved only one thing:teachers who are aware of this ability, and use this ability always affect student performance and satisfaction positively and directly.

According to the results of this additional analysis, it can be possible to mention that especially empathy and sacrifice variables increased the student satisfaction when evaluated through the subjective viewpoints of teachers. Moreover, when the same situation was analyzed from the viewpoints of students, it had no significance upon these two variables.

Figure 2. Dependent and Independent Variables in Regression Research Model



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In this study, the results of the questionnaires performed to the study sample within the scope of the research were evaluated. Subjective evaluations of teachers related to themselves, teacher performance and student satisfactions in terms of students were measured. Depending upon this, students had contrast ideas on areas teachers considered as successful. In other words, teachers and students who filled in the questionnaires considered the same thing from two different viewpoints, and did not understand each other. Research's causing such result indicated that the mutual relationship between teachers and students should be evaluated more carefully and elaborately. Whereas teachers' qualification of empathy as understanding the problems of students and sacrifice as a business philosophy were noticed as a very important virtue by teachers, these were evaluated as meaningless by the students. According to the questionnaire results, teachers considered that both empathy and sacrifice, openness in communication and objective evaluation were all efficient upon students; however, the students did not share the same ideas with their teachers. This was an indicator of the lack of communication between students and teachers.

As result of the questionnaire performed to teachers upon evaluating themselves and measuring student satisfaction, the questionnaire scale used for teachers was categorized into two titles. Those were professional commitment and empathy and sacrifice. When professional knowledge was considered through the own viewpoints of teachers within the presence of concepts such as self-adaptation efforts and rewarding the successful students, a significant difference can be mentioned to be obtained. The empathy and sacrifice under the second title included teachers' understanding the requests and complaints of students better, making efforts to lead the students correctly, and organizing the content of lessons more attract-grabbing. When results of these were analyzed, it was understood that the teachers had a complete confidence in themselves, they experienced no problem in communication with their students, and were satisfied with their current communication. Furthermore, because teachers considered themselves as fully-equipped, expectations of teachers can be regarded to be deemed as difficult by students.

In the evaluation upon satisfaction of students, questions related to whether they were satisfied with their teachers' performances or not were asked. The questions were categorized into three main titles. Those were openness in communication, professional commitment, and empathy and sacrifice. In questionnaires, because the students were not obliged to write their names, the students can be considered to express their ideas easily without hesitation and fear. The obtained result proved that students were not satisfied from teacher performance and student satisfaction in contrast to teachers. As result of the research carried out by MNE (Ministry of National Education) Department of Educational Research and Development in 1999

upon "modern teacher profile in the 21st century," whereas teachers considered themselves as adequate, the students considered their teachers as inadequate in students and teachers group interacting mutually for teaching activities in classroom environment. Having similar results in two studies as the one was carried out 14 years ago and the other carried out recently in 2013 upon "teacher performance and student satisfaction in educational life" proved that the education and training system in Turkey has not been systematized yet without an exact progression.

When the research was analyzed in terms of two variables, it could be mentioned that there was a serious communication problem between teacher and students. Neither teachers understood the students nor did the students understand teachers. Whereas the teachers of the modern age improve their knowledge, approach students in a friendly manner rather than a teacher, and try to communicate more. This study carried out in Halit Ziya Uşaklıgil Elementary School proved an essential fact. Teacher and student relationships on the basis of education quality that have been discussed for years should be revised radically, modern pedagogical educational techniques should be integrated into the system, and an educational system that will strengthen the dialogue between teachers and students should be established. Applied training should be regarded more apart from the pedagogical theories. In the case a modern, elaborate educational model has been applied considering all these, a more positive result can be obtained for both teachers and students. Determining before the problem emerges and developing a precaution will be better rather than experiencing a problem and overcoming it. But it should not be forgotten that, education and communications primarily starts in family.

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