

**Futur *e*-Learning 2012**

**4th International Future-Learning  
Conference on Innovations in Learning for  
The Future 2012: e-Learning**

**Istanbul , TURKEY, November 14-16, 2012**

**Proceedings**

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Çiğdem SELÇUKCAN EROL (ed.)

**futur *e* learning**

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**Future Learning 2012**

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## PREFACE OF THE EDITORS

The Fourth International Conference on Innovations in Learning for the Future: e-Learning (FL2012), organized by Istanbul University (Department of Informatics), Turkish Informatics Foundation (Distance Learning Platform – UzEP) and Turkish Informatics Society (Istanbul Branch) was held at Istanbul University Congress and Culture Center (Beyazıt-Istanbul. TURKEY), November 14-16, 2012.

First of all, let us express our gratitude to the Rector of Istanbul University Prof. Dr. Yunus SÖYLET for his patronage and support to organize such a large international event. In the same spirit we also express our thanks to Vice Rector Prof. Dr. Z. Çiğdem KAYACAN, Rector Advisor's Prof. Dr. H. Rıza GÜVEN and Assoc. Prof. Dr. Ergün YOLCU for providing tools, instruments and necessary means for the completion of this conference in a most successful way.

FL2012 provides a unique forum for the interchange of ideas, advances, and applications among academicians, practitioners and companies in the Information Technology, Teaching and Learning (both traditional and web based) and Digital Information Resources fields. Under the influence of Information Technology, learning has acquired new dimensions, discussed quite regularly on many levels. With the excellent papers written by researchers, practitioners and academics from several countries, the conference will encourage a debate on strategies for the development of the most effective methods, techniques, and technologies that will serve humankind in the lifelong learning process.

The total number of submissions was about 96 papers from 31 countries. The FL2012 Program Committee has developed an exciting program that includes 32 sessions (contributed and invited) on the following themes: Institutional strategies, policies, standards, accreditation and legislation for e-Learning, New Technologies for e-Learning, Content Design for e-Learning, Sociological and psychological dimensions of e-Learning, Learning with Online Games, Testing and Evaluation of e-Learning Systems, e-Learning Strategies for Moderation and Assessment, Virtual Class Applications, Security problems and solutions in e-Learning, e-Government and e-Learning, Distance Learning in Higher Education Institutions, Mobile Learning, Social Media and e-Learning. These Proceedings consist only of papers that have not previously been published. They have undergone a detailed peer review process and were selected based on rigorous standards. At the conference, these papers were presented by the authors or co-authors and discussed in highly interactive sessions.

We would like to thank all members of the Program Committee for their effort in putting together such a comprehensive program. Sincere thanks go to all the authors, attendees, chairpersons, advisory and honorary committees, and conference secretariat for making this conference a good success. Last but not the least, the organizing committee members deserve a special applause and mention for their effort and time for organizing this conference.

We acknowledge the sponsorship of Microsoft, e-Nocta, BilgeAdam, Bilgi Kurdu, EMN Hitachi, Idea Elearning, Sandalyeburada.com, Tez Dağıtım, BT Haber and Telepati for their support for this conference.

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# KEYNOTES

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## The USGM Experience: Virtual Immersive Labs and The New Frontier For Learning

Prof. Alessandra BRIGANTI  
www.marconiuniversity.org Rector of Marconi University



**Abstract:** Marconi University ([www.marconiuniversity.org](http://www.marconiuniversity.org)) is the first Italian Open University officially recognized by the Italian Ministry of Education, University and Research. In compliance with the three-cycle system established by the framework of qualifications for the European Higher Education Area, it offers a wide range of programs and courses including first and second level degrees, masters, certificates and PhDs. Taking into account the societal and economic changes of recent years, Marconi University is constantly engaged in offering flexible format and innovative technological solutions, allowing graduates to easily settle in a professional career or to empower their abilities. Marconi's innovative learning methodology which merges e-learning, m-learning and t-learning solutions with traditional activities, has successfully responded to the different target of students' needs, allowing to reach a current number of 14.707 students enrolled.

In 2006 Marconi University founded GUIDE - Global Universities in Distance Education, a network currently joined by around over 120 universities located worldwide ([www.guideassociation.org](http://www.guideassociation.org)), aiming at improving the globalization and internationalization of knowledge. The main objective of the Association is to promote the spread of an equal, supportive and sustainable knowledge making use of Information and Communication Technologies in the respect of cultural specificity and values of each member.

The internationalization aim of Marconi University, together with the efforts and work dedicated to the production of online excellence contents and didactic and technological solutions, have led to the development of different educational projects like virtual labs, interactive and multimedia paths, role-play, simulations and 3D learning path.

The aim of this paper is to present and discuss the experiences achieved on online course design, paying particular attention to interactiveness and multidisciplinary. The virtual learning environment we developed, thanks to the use of advanced technologies, allow students to experience in a full and total way his/her learning and knowledge, from a subjective perspective, where multisensory interaction is provided. The social context of learning is created from the content itself. If we can create social spaces online than in so far as disciplines connected with the social sciences are concerned, that content can be created as an interactive learning environments with unique, though simulated, social contexts for learning. The aim of this study was to investigate students' perceptions of simulations and role plays and how these tools, if well managed, offer a variety of powerful information sharing and collaboration features. Understanding students' perceptions and usage behavior of these systems is a very important goal, because the success of them depends on several social and psychological factors. In addition, the benefits of 3D graphics for education in distance teaching activities have been explored.

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## **The Changing Landscape of E-learning**

Prof. Sushil SHARMA

Prof. Sharma is an Associate Dean and Professor of Information Systems the Miller College of Business at Ball State University, USA.



***Abstract:** The landscape of e-learning is changing from mere web based learning to more personal learning environments using Web 2.0 , Google Docs, Facebook, wikispaces, Youtube and many other social media technologies. This is bringing a fundamental shift in both learning and working environments and has resulted in growth of e-learning centers, virtual classrooms, and open-source materials. E-books and e-book readers are becoming popular among students and instructors. In a similar vein, online chalkboards and social networking sites have become legitimate channels for learning, sharing, and communication between teachers and students. Screenr, Google apps, Youtube and DIM (virtual classroom) all being used as free tools to deliver learning. The presentation discusses the various new technologies and methodologies that could enhance e-learning environment immensely.*

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## **Distance Learning in Europe**

**Prof. Danguole RUTKAUSKIENE**

Prof. Rutkauskiene, Ph D, is a Director of Kaunas Regional Distance Education Study Centre at Kaunas University of Technology.



*"We must engage in a fundamental transformation of our education and training systems. And we need to fully exploit the potential that open and flexible education offers."*

*Androulla Vassiliou*

*European Commissioner for Education, Culture, Multilingualism and Youth*

**Abstract:** *The report is about innovative initiatives which support the European e-learning development it also includes the role of Open and Flexible Learning in Higher Education European Systems for 2020 and policies for Lifelong Learning in HE.*

*Particular attention is focused to the Open Educational Resources (OER) initiatives in Europe. Due to technological progress, knowledge is increasingly available to all citizens and it is free. Open Education Movement and other public and private initiatives in Europe are promoting the use of ICT, there are less barriers to education and more flexible and creative ways of learning. Open Education can be an instrument to foster the EU's leadership on the international agenda in matters related to ICT and education.*

*It is noticed that a new portal has launched free to bring transparency to the growing quickly study options: <http://www.DistanceLearningPortal.eu>. This project was funded by the European Union and developed by study portals and EADTU, it will support the orienting learners worldwide to study abroad from home.*

*In the second part of report the experience of Lithuania in the development of e-learning is presented. The successful implementation of national projects creates conditions for Lithuania to become one of the successful developers of e-Learning.*

*There is also mentioned the program "Lithuanian Virtual University (LVU)" for the year 2007-2012, the main aim of it is to create the conditions and support for the Lithuanian Universities and Colleges to develop and implement their activities virtually, acting on the networking model basis, using the accumulated experience and already developed infrastructure of information technologies. One of the main tasks of this program is to encourage virtual e-learning processes.*

*Another program this report presents is "Lithuanian Information Infrastructure for Science and Studies - LITMIS (2013-2019)", one of the main tasks of it is development of E-Learning Infrastructure (LieDM) in Lithuania.*

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# PAPERS

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## A Mobile Information Management Framework Proposal for Development of Personal Learning Environments

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**Abstract:** *In this study, a personal information management (PIM) framework has been suggested in which the individual can record and evaluate formal, non-formal and informal learning experiences in lifelong learning process together with his/her other experiences. With personal learning environment (PLE), as a part of this framework, individuals can manage lifelong learning processes, balance their life-wide learning activities and determine the future learning goals more effectively. The purpose of this paper is (a) reviewing research to support this claim, (b) conceptualizing the connection between lifelong learning, life wide learning, personal information management, personal learning environment, and (c) providing a circular pedagogical framework for using personal information management systems to create personal learning environments which support student for lifelong learning and life-wide learning. Implications for future researches in this area are provided as well.*

**Keywords:** Lifelong learning; life-wide learning; personal learning environments; informal learning; capture, archival and retrieval of learning experiences

### Introduction

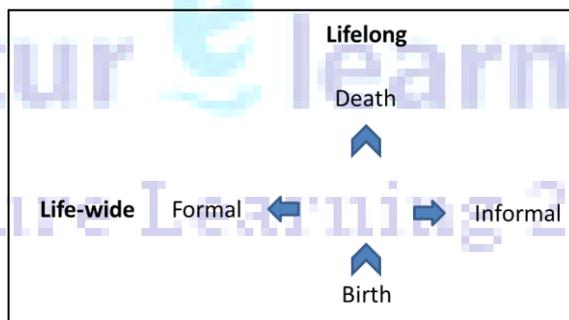
Due to the fast changing nature of the information society, learning requirements of the individuals continue during their lifetime and formal education is not enough to meet all these requirements. Individuals mostly start learning process on their own to meet lifelong learning requirements in accordance with the current necessities (self-initiated), they continue this process at interest driven and learner-centered environments. For that purpose, they create personal and/or shared common learning spaces and they experience planned/not planned learning practices (Häkkinen and Hämäläinen, 2011). In this study, a personal information management framework, in which the learner can save his/her personal learning experiences and simultaneously or later he/she can evaluate his/her integrated learning experiences with his/her other experiences a person has, will be offered. By using this approach users can manage their personal and professional development more efficiently. For that purpose, in the second part of this study, lifelong learning and its characteristics have been analyzed, structure and importance of PLE in

lifelong learning has been discussed, current studies in PIM have been overviewed and approaches towards recording lifelong learning experiences have been mentioned. In the third part of the study, a mobile PIM based PLE framework for lifelong learning is suggested. In the fourth part, in order to observe the applicability of the framework an implementation is made. In the fifth part, the outcomes of this implementation have been discussed and suggestions for the future studies are made.

## **Related Literature**

### **Lifelong Learning and Life-Wide Learning**

Learning is a process which starts from birth continues till death (time horizon) and it happens consciously or unconsciously everywhere during daytime (space horizon). This learning, which involves entire life, called as lifelong learning. Learning can occur at an educational institution in a planned way or on its own with the help of communication provided by a person's social surroundings. The space, which contains all the learning types from formal education to informal education, named as life-wide learning (Figure 1).



**Figure 1:** Time-space dimensions of learning (Clark, 2005).

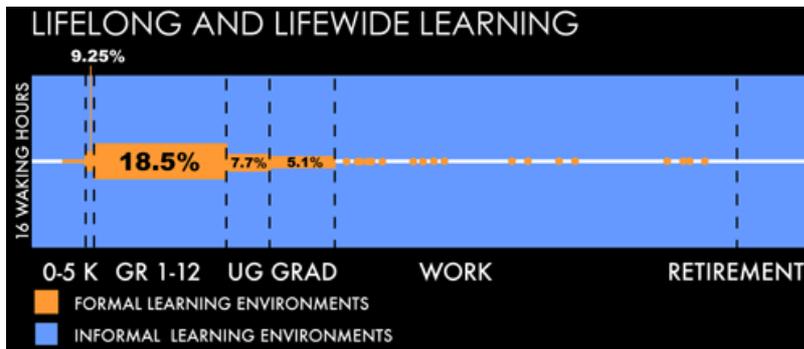
The distinction between formal and non-formal learning environments is about

**where** learning takes place. Formal learning occurs within institutions established primarily to deliver education and training, often leads to recognized outcomes and qualifications. Non-formal learning has intended education and training outcomes; however, the setting is out of the dedicated learning institutions, most often in places where learning is not the primary business. Informal learning is distinguishable by an absence of primary **intent**. It can occur almost anywhere, but as a by-product of other activities. It is often unplanned and without explicit emphasis on learning, yet may still lead to the acquisition of valuable skills, knowledge and attitudes (Clark, 2005) (Table 1).

**Table 1:** Life-wide learning (Clark, 2005).

<b>Formal</b>	<b>Non-formal</b>	<b>Informal</b>
Adult and community education institutions	Labor market programs	Clubs
Universities	Professional associations	Libraries
Vocational education and training providers	On-the-job training	Museums
High schools	Work experience programs	Art galleries
Primary schools	Volunteer organizations	Playgrounds
Pre-schools	Childcare centers	Families
University of third age	Learning circles	Eldercare homes

When we check how much time lifelong learning consumes at which part of the individuals' life; formal and informal learning starts at kindergarten stage (contains %9,25 of time), increases at primary and middle school education (increases up to %18,5 of time), starts decreasing at bachelor's and master's degree (contains %7,7 and %5,1 of time in turn) and when school life ends except vocational trainings and refresher trainings it doesn't appear in a person's life. Rest of the time is used at informal learning environments (Life Center, 2005) (Figure 2).



**Figure 2:** Estimated time spent in school and informal learning environment (Life Center, 2005)

Bureau of Education of Hong Kong Special Administrative Region has been developed a lifelong learning template for students. In this template, time, place and people dimensions of the students are divided and detailed into two fundamental parts as in-school and out of school. According to this model, lifelong learning focuses on place, time and instructions of the learning. When whole learning process is scanned, all the time when a person is awake is a learning moment, all the people he/she knows are potential instructors, all the places he/she has been are potential learning environments (Hong Kong, 2012).

Life-Deep Learning is defined by LIFE Center of University of Washington, USA, as another concept. According to this center, life deep learning, which leads people what to believe, how to behave, how to judge himself/herself and others, embraces all the religious, spiritual, ethical and social values (Banks et al, 2007). Formation of all these values are closely related to other experiences a person has and roles a person takes. An individual's objective perception of self with an integrated approach happens by a detailed examination of his/her past and inner world. This kind of examination can be achieved with the help of evaluation of different unstructured private information such as memories, journals, diaries, comments, personal notes etc. In this study, gains of life deep learning are defined as a part of informal learning and they are

not taken as horizon of third dimension.

In order to technologically support formal and non-formal learning CMS, LMS, LCMS or systems named as virtual learning environments are used extensively at educational institutions. At VLES, when a semester ends, students' environment is reset and new environments are created for new courses. Similar to that, when a student changes his/her educational institution horizontally or vertically the proof of his/her experiences belong to that learning environments are left behind. In other words, student cannot manage learning environment on his/her own during lifetime (Mott and Wiley, 2009). On the other hand, institutions usually do not aim to support informal learning. To fulfill needs of VLEs PLE concept is developed.

### **Personal Learning Environments**

Personal learning environment concept is used in 2004 for the first time (Jisc/Cetis, 2004); gained importance after web 2.0 technologies and social media networks have become widespread. Ron Lubensky (2006) defined a PLE as "A personal learning environment is a facility for an individual to access, aggregate, configure and manipulate digital artifacts of their ongoing learning experience". According to Atwell, PLE is a technological environment constructed by an individual and used in everyday life for learning (Attwell, 2007).

In contrast to Virtual Learning Environments, PLEs are made-up of a collection of loosely coupled tools, including Web 2.0 technologies, used for working, learning, reflection and collaboration with others. PLEs can be seen as the spaces in which people interact and communicate and whose ultimate results are learning and the development of collective know-how. A PLE can use social software for informal learning which is learner driven, problem-based and motivated by interest – not as a process triggered by a single learning provider, but as a continuing activity (Attwell et al., 2009).

According to Milligan et al. (2006) "In a Personal Learning Environment (PLE), the learner would utilise a single set of tools, customized to their needs and

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preferences inside a single learning environment. The tools would allow the learner to:

**Learn with other people:** managing their relationships with tutors, and peers, as well as form links between contacts who are not part of their formal learning network.

**Control their learning resources:** enabling them to structure, share and annotate the resources they have been given along with those they have found or created themselves, or been given by their peers.

**Manage the activities they participate in:** providing them with the opportunity to set up and join activities such as study groups, bringing together a specific group of people, together with the appropriate resources.

**Integrate their learning:** allowing them the opportunity to combine learning from different institutions, re-using previously generated evidence of competency or making links between formal and informal learning.”

Personal learning environments offer learners tools different than traditional learning with the help of web 2.0 and social network technologies and enables them to practice different learning activities. A common list of learning activities made and tools used at personal learning environments have been collected from various authors and summarized in Table 2 (White, 2010; Leslie, 2012; Milligan et al., 2006; Wilson et al., 2006; Ivanova, 2009; Torres et al., 2010; Zhao and Yang, 2009; Pérez-Sanagustín et al., 2008; Castañeda and Soto, 2010; Mutlu, 2012a).

**Table 2:** Activities and tools in personal learning environments

<b>Activity</b>	<b>Explanation</b>	<b>Tools that can be used</b>
Accessing to Internet	Personal learning process mainly realize on the Internet and cloud	Internet Explorer, Mozilla Firefox, Google Chrome, ...
Planning learning process	Setting the personal learning objectives, preparation of work calendar, tasks and to-do lists	Google Calendar, Google Goals, Tasks, To-do List plug-ins, ...
Recording daily notes and ideas	Capturing and recording of the all notes and ideas to the internet and cloud with a mobile device.	Evernote, Springpad, ...
Finding the information	Determination of sources of needed information	Google Search, Google Blog Search, ...
Reaching to information sources	Reaching the academic and encyclopedic information, and course content	Wikipedia, Google Scholar, Google Books, Google News, MIT OpenCourseware, Open University Open Learn, iTunesU, YouTube Edu, Flickr, SlideShare, Scribd,
Notify for new information	Automatically notifying from information updates	Google Reader, Google Alerts, ...
Creating the documents	Creating new documents in learning process	Google Docs, Google Drive, Microsoft SkyDrive, Gliffy, Prezi, ...
Storing the documents	Storing of documents to the cloud	Google Drive, Microsoft SkyDrive, Dropbox, ...
Collaborating	Creating content with others	WikiSpaces, pbWorks, ...
Creating a network	Participating to social networks in order to learning from others and working together and discussing	Twitter, Facebook, LinkedIn, Google+, ...
Communicate	Synchronous or asynchronous conversation on a topic with others	Gmail, Google Talk, Microsoft Live Messenger, Skype, ...
Sharing of information sources	Storing of sources of valuable information and sharing them with others	Delicious, Diigo, ...
Sharing and publishing of information	Sharing of new content created in learning process	Blogger, Facebook, Google+, Twitter, YouTube, Flickr, Picasa, SlideShare, Scribd, ...

Adaptability of PLE by user according to his/her own needs and own learning style makes PLE an important tool for lifelong learning and informal learning (Attwell, 2007).

## **Personal Information Management**

First designs of PIM are made in 1945: In 1945, Vannevar Bush, director of the U.S. Office of Scientific R&D during World War II, envisioned using technology to support PIM through the creation of what he called a Memex “... device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility” (Teevan and Bederson, 2006).

A more comprehensive definition of PIM is provided by Jones (2008) and it states: Personal Information Management (PIM) refers to both the practice and the study of the activities a person performs in order to acquire or create, store, organize, maintain, retrieve, use and distribute the information needed to meet life’s many goals (everyday and long-term, work-related and not) and to fulfill life’s many roles and responsibilities (as parent, spouse, friend, employee, member of community, etc.). PIM places special emphasis on the organization and maintenance of personal information collections in which information items, such as paper documents, electronic documents, email messages, web references, handwritten notes, etc., are stored for later use and repeated re-use (Jones, 2008).

According to Badia; “While not a completely new idea, PIMs are the point of encounter in the evolution of several trends: tools (appointment managers, to-do lists, calendars); hardware (new digital gadgets: PDA, smart phones); ideas (“record everything”/“digital memories”, “compute anywhere”); and, most importantly, needs: in a data-intensive, information-rich world, we sometimes fail to find what we’re looking for, even though we know it’s in there, somewhere” (Badia, 2008)

Researches towards personal information management are divided according to two outlooks:

**Personal implementation of information management:** According to this aspect, personal information management activities defined by Jones as activities of which are acquire or create, store, organize, maintain, retrieve, use and distribute the information

**Management of personal information:** In this aspect, management of personal information types with suitable tools is examined. “We refer to personal information as all types of information that are notable and of archival values to individuals. Personal information includes names, phone numbers, email addresses, street addresses, URLs, to-do lists, references, directory paths, flashing thoughts or ideas, appointments/meetings, passwords, phone messages, procedures, server addresses, installation keys for software, and so on” (Campbell & Maglio, 2003).

When we consider the personal learning environments, we see that functions of “personal information management” can be fulfilled for certain levels with common PLE tools. For example, Diigo offers important functions for organization and management of internet based information; Google Drive or Microsoft SkyDrive enables cloud drive for information management. Similarly, search engines provide convenience for reaching information, blogs and wikis disseminate the information. When we examine PLE tools in scope of “management of personal information”, PIM tools such as calendar, note-taking aids, task lists which are developed autonomously are distinguished.

If we do not put effort to combine them, PLE and PIM are placed in different worlds. Because of that, people try to compensate their PIM based necessities with PLE based tools. Although, some daily life PIM necessities are compensated with a group of tools different from PLE.

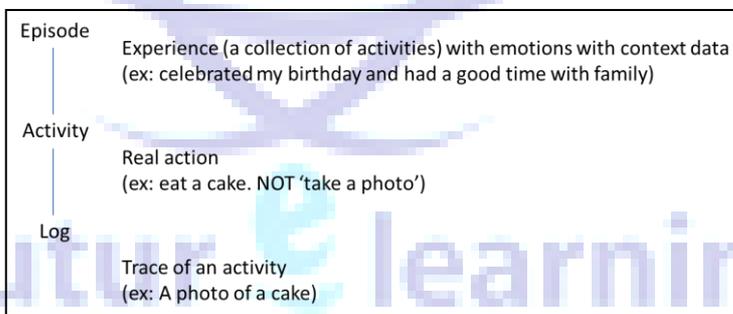
### **Recording Life Experiences**

Nowadays, high tech methods towards saving whole life experience of person are being examined. Steve Mann’s wearable computer experiments (Mann, 2012) and Gordon Bell’s MyLifeBits Project (Bell, 2012) are leading these methods. With all these applications, it is aimed to record everything heard, seen, told and read by a person during 24 hours, 365 days digitally and reach these records whenever they are needed. The researches in lifelogging field have been transformed into a research area named as CARPE (Continuously/Capture, Archival and Retrieval of Personal Experiences) within

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scope of ACM. At first these applications were required to wear and carry heavy cameras, sensors, monitors but nowadays they have become more ergonomic. For example, Project Glass developed by Google seems to provide opportunities for popularizing this technology in future (Miller, 2012).

In the model, which is suggested by Teraoka for personal experience management, experience is defined as collection of events and/or activities from which an individual or group may gather knowledge, opinions, and skills according to Wikipedia (Wikipedia, 2012a). Lifelog researches confuse activities with logs, data, information, lifelogs, actions, behaviors, and experiences. Because of that, researchers are working on developing formal definitions for recording personal experiences. According to his model, there is a hierarchy between log, action and episodes (Teraoka, 2012), (Figure 3).



**Figure 3:** Levels of trace of experience (Teraoka, 2012).

An activity shows a real action. Of course, it is difficult to deduce a user's real action only from log level data. For example, a digital photograph is stored with some attributes including a taken date, size, and format. However, although the real action may be 'eating a cake', the recorded action is 'taking a photograph' with regard to log. Most lifelog research mainly considers log level data. Therefore, we have to distinguish between real actions and recorded actions because they are not always correspond with

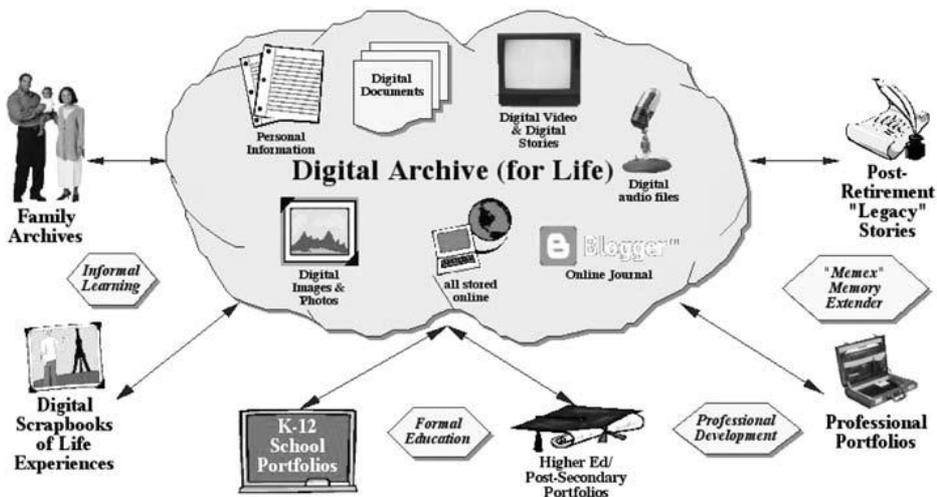
each other. An episode consists of a collection of activities (i.e., equal to experience), emotions, and context information (Teraoka, 2012).

Depending on Wikipedia, Teraoka defined episodic memory as “the memory of events that contains times, places, associated emotions, and other context information” from Wikipedia (Wikipedia, 2012b). According to this, “Most digital traces are scattered logs about experiences. Usually a user has to recall his/her memory by reconstructing those scattered traces of logs” (Teraoka, 2012).

Some authors discuss lifelong learning and recording of the life activities together. Barreau (2006) discussed Personal Information Management and context in learning environments. Ballantyne (2012) developed a framework for implementation of e-portfolio with lifelong access. Vavoula and Sharples (2009) discussed general requirements for the design of Lifelong Organizers based on findings from a diary-based study of everyday learning practice and also based on the design and evaluation of KLOS, a prototype Lifelong Organizer that supports learning projects, episodes and activities through the linking of learning content with semantic and episodic context.

Barret and Garret (2009) proposed “lifetime personal web space,” this online archive of a life’s collection of reflections, memories, digital artifacts and memorabilia, both personal and professional, has the potential to change the current paradigm of electronic portfolios, mostly institution-bound, and focus instead on the individual or the family as the center for creating a digital archive, which can be used in a variety of contexts across the lifespan, from schools to universities to the workplace (Figure 4).

In order to record life experiences, an approach called as “Life Experiences Management Framework” has been suggested by Mutlu and an information architecture suitable to this framework is developed and to test the applicability of the framework a software is developed too (Mutlu, 2012b).



**Figure 4:** A scenario for a lifelong, life wide approach to lifetime personal web space, electronic portfolios, online videos and digital stories (Barret and Garret, 2009).

## **A Mobile Information Management System Based PLE Framework Proposal**

To manage and implement lifelong learning and life wide learning, a mobile PIM based PLE system is suggested. The facts and reasons given below are considered while this framework is being formed.

### **Rationale**

**Organization of Lifelong Learning and life wide learning:** Individuals should have skills for self-organized learning and self-regulated learning in order to organize their lifelong learning and life-wide learning processes.

According to Kalz et al., (2008); “Self-organized learning covers ways of learning, which allow learners -in comparison to traditional educational scenarios-a major dimension of self-determination and self-regulation: self-regulated learning is a self-initiated action that involves goal setting and regulating one’s efforts to reach the

goal. Nowadays this way of learning is increasingly supported by interactive learning environments, semantically enhanced content and social software (e.g. Wikis, Weblogs, ePortfolios, Social Bookmarks, Social networks like YouTube, FaceBook, Flickr).

Self-organized learning is pre-requisite for competence based development. This is defined as an activity in which individuals have primary responsibility for the planning, the performance and evaluation of learning activities in order to attain specific learning goals. Although the importance of self-regulated learning has been discussed intensively in the educational field, it has not been an important topic for technology-enhanced learning until today”.

Various SRL theories share three basic assumptions that self-regulated learners are able to: (a) personally improve their ability to learn through selective use of metacognitive and motivational strategies; (b) proactively select, organize, and even create advantageous learning environments; and (c) play a significant role in choosing the form and amount of instruction they need (Sha et al., 2012).

Self-regulated learning can be regarded as a skill, where students must know how to set goals, what is needed to achieve those goals, and how to actually attain these goals. Therefore, in order for students to self-regulate and direct their own behaviors, they must also be motivated or driven to attain goals (Kitsantas & Dabbagh, 2010). The motivational components of self-regulated learning help students persist in the face of difficult tasks and resist other sometimes more tempting options (Dabbagh and Kitsantas, 2012).

In lifelong learning, keeping motivation of students high is an important problem. It can be achieved by setting goals by student, maintaining self-awareness and putting effort to reach those goals also self-discipline. Self-awareness can be maintained by being aware of previous and current formal, non-formal and informal learning experiences and the things gained with their outcomes. When we consider long life parts, individual organization and management of lifelong learning are important in order to maintain this awareness continuously.

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**Management of Learning Experiences:** Learning activities are meaningful in formal education as long as they can be defined beforehand. Informal learning processes in which mostly learning activities take place on their own, learning activity may not be defined and planned beforehand. With this reason instead of “learning activity”, “learning experience” as a more general concept will be used in framework.

According to the famous quote of Einstein “learning is an experience, everything else just information”. While reading a book, watching a movie, listening a song, chatting with someone, wandering around, taking a photo or video, noting a/an memory-idea, sharing time-space-ideas-objects with someone, deciding, planning and calculating, a personal experience occurs and each of these experiences are accompanied by learning.

According to Giovanella et al (2011) there are three different learning experience processes: a) investigate: the environment to collect information & learn; b) elaborate: the information to design/produce; c) communicate: the "products" by means of "actions" that, in the case of very complex organisms, can make use of highly structured and conventional languages.

There is a need for method to plan, direct, live, record, evaluate the learning experiences and recognize the experiences lived before.

**To Record Learning Experiences:** To record any experience belongs to our life means the thing triggered that experience or our knowledge and abilities belong to that are recorded as well. Here, despite objective information belongs to an asset, recording subjective information such as comments, memories, emotions, ideas etc. gains importance as well. This subjective information relates the asset or event to us, shapes our experience, and enables us to define necessary conjunctions which help us to retrieve and evaluate this recorded moment later (Mutlu 2012b). As stressed by Teraoka, in order to record experiences in episodic memory not only activities, emotions and connections related to these activities must be recorded as well (Teraoka 2012b).

**Individuality of Learning Experiences:** When we discuss life-wide learning

process, even though learning experiences can be lived alone or with other people, comments, memories, plans recorded by individuals about these experiences are mainly private and individuals may not want to share them with others without a detailed elimination. Because of the fact that, records belong to individuals' learning experiences also belong to their other life experiences as well and they cannot be isolated from each other.

The tool will be used for recording both learning experiences and other life experiences, must be an element of personal information management. On the other hand, this tool will be related to planning, living and evaluation of learning experiences; it has to be a part of personal learning environment.

PLE and PIM must be engaged but this must not prevent privacy. Because of that, PIM must be able to record events belong to PLE but tools in PLE level will not be able to reach records in PIM on their own.

**Contextual Learning Experience:** Personal learning environment should make possible to record all the learning experiences in life-wide belong and retrieve the content-context itself or its comments. Contextual learning experience is defined below:

“Lifelong learning takes place anywhere and anytime and across multiple learning contexts. In this learning, learning experiences of a user can be instantly acquired anytime, anywhere and in a context. Therefore, a learning experience of a user relates to not only learning resource characteristics but also user's context including the user location, the user device, the current time, and the environment around the user, etc.). We call it as a contextual learning experience.” (Bouzeghoub and Do, 2010).

In this study, we suggest to form the context of the learning experience not only with limited information such as user's location, user's device, current time and the environment around the user but also unlimited information which can be formed freely by user.

**Mobile PLE:** The potential immensity of instructors, learning places and the learning moments in lifelong learning and life-wide learning, forces learner to be ready

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to learn from everyone, everywhere and every time. This requires personal learning environment to be carried to everywhere. When we search for technologies that can be anywhere anytime, mobile Technologies takes the first place. As a result mobile learning environment must be the personal learning environment which can be used lifelong.

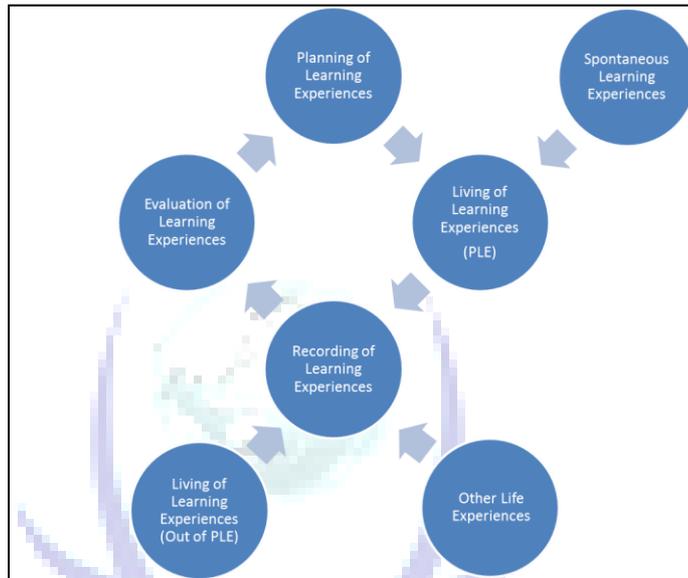
When we go out of formal education, mobility is needed for lifelong education. We usually carry a mobile device, when we go to a concert or a museum. So it is possible to record the event, place, persons and the moment. Today, mobile devices contain a lot of sensors to record life experiences. Camera for taking photos and shooting videos, for voice recording microphone, for determining the location GPS is some of them. Moreover, to determine direction, speed, angular momentum and light level there are other sensors too. Plus, applications for sensing who is around, recognizing faces and sound and also for augmented reality can be downloaded.

Role of mobile technologies in lifelong learning have been researched for a long time. (Sharples 2000). Because of the usage of PLE tools in mobile environments, the number of studies in mobile PLE is increasing. (Attwell et al., 2009; Chen et al., 2008; 2011; Perifanou, 2011; Services, 2011; Thüs, 2011)

### **The Proposal Framework**

The framework we suggest (Life Wide Learning Experiences Management Framework) contains a cycle of plan, live, record, personal and professional evaluation of life long and life wide learning experiences (Figure 5).

**Planning of Learning Experiences:** It is possible to plan formal and non-formal education experiences beforehand (learning aims and effectiveness can be designed before); it may not be possible to plan all the informal learning experiences. Unplanned self-learning experiences can be experienced. The important things are realizing, storing and using these experiences at self-evaluation stage while the experience occurs or after that.



**Figure 5:** Life-Wide Learning Experiences Management Framework.

**Living of Learning Experiences:** Learning experience happens at a defined place (formal, non-formal, informal environment), defined time and defined period. Experience is a personal concept and it can occur with a private/common event/event series every situation, a content that can be the source or outcome of the experience accompanies the experience. There are different types of learning experience:

*In class learning experience:* Formal and non-formal learning environment mostly contain in class and out of classroom activities. In class activities are formed by activities determined by the instructor, PLE should support the learner to get the most effective experience. With this aim, content of the course can be carried at PLE in mobile devices, photos of slides or black/whiteboard can be taken during the course and notes can be taken via PLE.

*Out of classroom formal and non-formal learning experiences:* In formal education, while studying the course taught in classroom or doing homework PLE is

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used. If learner takes distant education classes, there is no obstacle to do all the activities via PLE. In self-regulated and self-directed learning processes, at most situations learner defines his/her learning aims and activities on his/her own and does them via PLE.

*Informal learning experiences:* Each of the books read while resting, on vacation, on journey, music pieces listened, movies watched, museums visited, concerts attended, people met, places visited can cause learning experiences. Individuals may not realize they are having a learning experience at that time. Experienced learners can catch and record these experiences with systematical review later. Informal learning experiences may have happened out of PLE or before PLE is established. At this point, manual recording of out of PLE learning experience can happen later just like other out of learning life experiences.

**Recording of Learning Experiences:** Planned experiences can be recorded beforehand unlike unplanned ones. Recording the learning experience, is recording activities, content, people, places, assets, specifications, emotions, comments and behaviors related to that experience. Because of this qualification of recording function, people can record their past unplanned learning experiences when they remember them and prepare a learning experience inventory. Most people do not notice the existence of the informal learning experiences in their life. Learning experience inventory help them to be aware of these experiences and while they are gaining experience, this will help them to recognize these experiences faster. A learning experience can be associated with other learning experiences and form an upper experience group. In this experience group, deficiencies can be defined, updates can be made and this can be used to prove that the learner has been educated at this field.

**Evaluation of Learning Experiences:** Recording realized learning experiences provides an objective way to evaluate learner's planned learning experience performance. The person sets learning goals for a specific period (annual, weekly, monthly, periodical etc.), plans his/her learning activities to reach that goals and at the end of that specific period he/she accounts his/her performance and updates his/her

plans. Learning experiences cannot be isolated from other experiences, plans, aims and problems in a person's life. The person should evaluate each learning experience by considering his/her whole life. He/she can redirect his/her future by knowing the areas he/she is sufficient enough or getting no opportunities. Individual also should be record other than the experiences of learning on the recording system in order to effectively evaluate the learning experiences.

### **Information Architecture**

With the aim of designing information architecture for recording learning experiences, "Life Experiences Management Framework" will be used as a base (Mutlu, 2012). In this framework, it is assumed that individuals can record their life and as well as learning experiences as **asset lists** and **activity lists**. In initial version of the framework; other people we know, objects around us, the features we assume that we have, notes we take, our memories, journals, the place we know or visit, our emotions, our issues and all the tools we use in our learning environment form our **asset lists**. The events we live or affect us, the things we would like achieve, our responsibilities and duties, our expectations from life and the goals we set, the things we would like to at a certain time, activities we do with other people and the our defined attitudes form **activity lists**. On the other hand, preparing lists belong to PLE tools each of which is a Web 2.0 service or using more than one tool as an item of that list.

In that initial framework suggested, asset and activity lists can be formed by 20-30 various data fields collected in four groups as definitive fields, location fields, time fields and content fields (Table 3).

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**Table 3: Data Fields**

<b>Definitive Fields</b>	<b>Content Fields</b>	<b>Time Fields</b>	<b>Location Fields</b>
Title	Textual Content	Due Date	Location
Subtitle	ImagePath	Start Date	MapPath
Description	AudioPath	Finish Date	...
Priority	VideoPath	Reminder	
Type	DocumentPath	Done	
Category	Web Site URL	Change Date	
...	...	Creation Date	
		...	

Templates for required lists can be prepared by using these main fields. For example in “Place List” template “Title”, “Content”, “ImagePath”, “VideoPath”, “AudioPath”, “Category”, “Change Date”, “Creation Date”, “Location” and “MapPath” fields will be enough. Users can form the lists they need by using these prepared templates. For example by using “Place List” template so many lists such as “The cities I have been living”, “The places I have been working”, “Schools I have attend”, “Favorite places” can be formed; they can add items to these lists.

With an software application prepared suitable to this architecture, users can record their movements (location information) continuous and discontinuous by using GPS. Moreover, when we record voices, take photos/videos and do internet based activities in scope of a framework prepared suitable to the suggested framework, they can record informal learning experiences automatically. Later they can analyze time, location and content by studying these records.

## **Implementation of Framework**

### **To Design a Prototype**

To apply the framework, under Windows 8 Release Preview operating system the software named AllMyListsMetro, which is prepared in Metro Style Application Development Environment, used as a base and the software is adopted for this framework. Windows 8 operating system can be used both at desktops and tablets

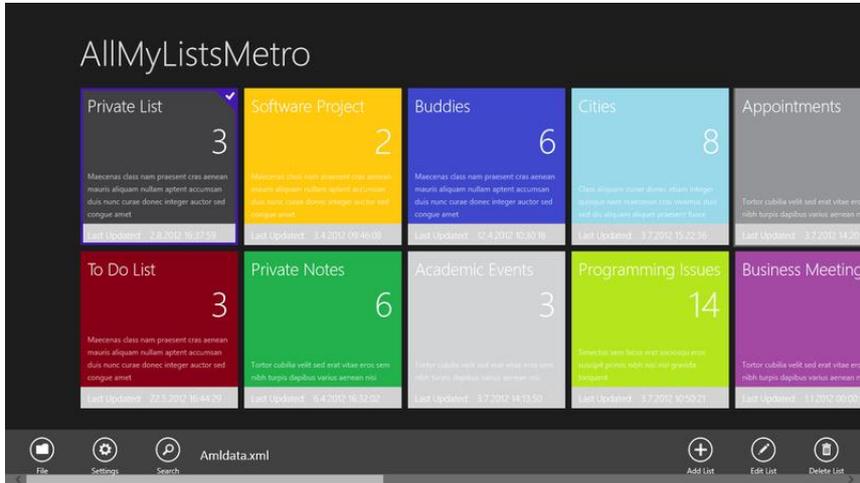
because of this reason it has been chosen.

In this version of AllMyListsMetro users can choose one of 16 different templates to form a list and suitable items can be added to these lists. In prototype templates such as “Standart List”, “Link List”, “To Do List”, “Task List”, “Note List”, “People List”, “Event List”, “Place List”, “Issue List”, “Appointment List”, “Meeting List”, “Asset List”, “Behavior List”, “Feeling List”, “Goal List” and “Feature List” are prepared. Users can form indefinite number of lists by using these templates. Various information types such as text, picture, voice, video, location, person and document can be recorded to these lists.

In the original “Life Experiences Management Framework” none of the information belong to the websites visited by the user is recorded. In recent study, “Link List” is added to the framework’s architecture and AllMyListsMetro software is updated to enable users to create PLE (Mutlu, 2012c). Because of the fact that all the tools, which can be used in PLE activities, are websites, to form a PLE, users should form “Link Lists” for tool/tool groups and enter their favorite websites these lists.

### **Main Functions of the Prototype**

According to the developed prototype, users form a PLE document, which hosts all their lists. When it is needed, these documents can be saved under different names and a new PLE document can be formed. Required lists can be formed by using templates in a PLE document; these lists can be deleted or organized later. When we start working on a list, items suitable to field structure can be added, deleted or organized. In the application, items can be e-mailed to other users, items can be searched at whole PLE document according to values in their fields, people in your computer’s contact list can be transferred into a new “People List”, lists and items can be printed, location information can be getting via computer’s GPS. Moreover, files from computer’s library can be added to image, audio and video fields like this; voice, image and video can be captured via computer’s microphone and camera.



**Figure 6:** Lists screen

### **Executing the Framework**

Before users start managing their learning experience with this prototype, start up a knowledge base to their previous life experience and an initial PLE must be formed.

**Forming an initial knowledge base about previous life experiences:** In order to form a knowledge base which contains records of people's previous life experiences we need to create suitable lists for people, places, events, behaviors, emotions, assets, specifications and all the items together with all the comments related to these items must be entered to these lists:

- Lists of people (family members, friends, colleagues, school friends, etc.)
- Lists of place (the places we have lived, visited, worked, studied, etc.)
- Lists of events (educational events, healthcare events, family events, business life events, memories, journals, etc.)
- Lists of behaviors (habits, routines, culturel behaviors, etc.)
- Lists of emotions (happiness, regrets, doubts, etc.)
- Lists of assets (objects, properties, cultural assets, etc.)

- Lists of specifications (hobbies, achievements, abilities, issues, priorities, etc.)

Seven fundamental list groups have been suggested as a starting point. Individuals can re-arrange these groups according to their needs. As the cycle is being used at learning experience management stage, upper information knowledge base will be enriched.

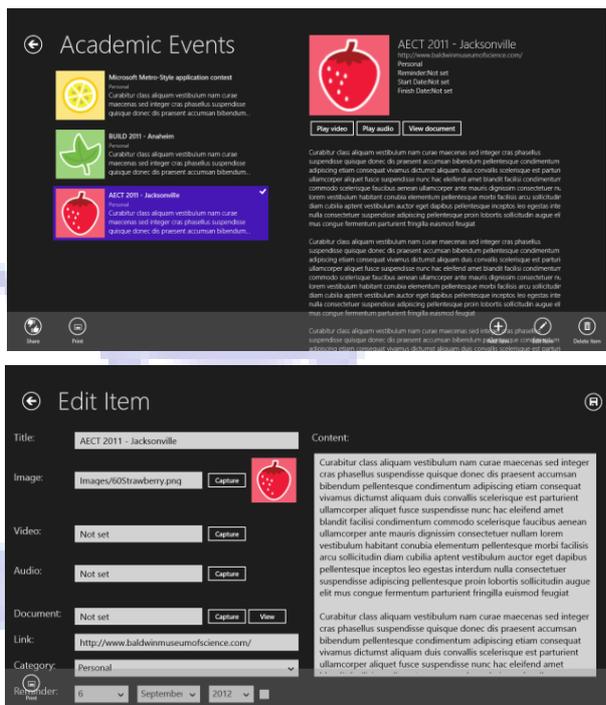
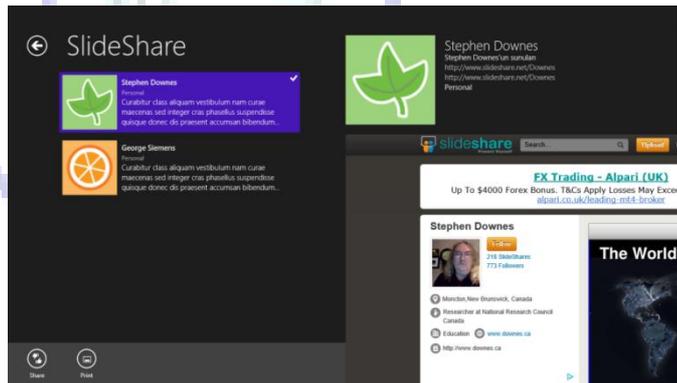


Figure 7: “Event List” and “Event List Item” sample

**Create The Initial PLE: Users** can form useful “start pages” by adding the web 2.0 that they are used to tools to the prototype. The tools we added will be browsed on internet browser embedded inside the prototype. At this stage, the PLE will be enhanced as the learner gained more experience. The lists below can be suggested as start pages:

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- Blog and Wiki lists
- E- portfolio and VLE lists
- File share lists (SlideShare, Scribd, Youtube, Flickr, etc.)
- Open Educational Resources (MIT Courseware, OpenLearn, TÜBA Open Course, Yunus Emre, etc.)
- Social Networks (Twitter, Facebook, LinkedIn, Google+, etc.)
- Social Bookmarking Websites (Diigo, Delicious, etc.)



**Figure 8:** “PLE Start Page” list sample

**Management of Learning Experiences:** After users completed two starting stages, they can manage the learning experience by completing the cycle below:

*Plan:* Define goals, aims, duties, task lists, meetings and appointments about learning. If there are no lists to enter these items, form them.

*Apply:* Do your planned learning activities by using PLE tools. Record the content, which happens outside the PLE (document, audio, Picture, video, etc.) as long as it is possible. In order to record unplanned learning activities to PLE carry your mobile device with you. At this stage when you need tools, which are not a part of starting PLE, create lists for them. (At this stage, the content, which has been recorded to PLE, will be stored on Web 2.0 services, not on local drives of the computer). Get

Bloom's higher order thinking abilities by using PLE tools on content that belong to formal, non-formal and informal learning processes (Churches 2012).

*Record:* Prepare items related to people, places, events, behaviors, attitudes, emotions, assets, and enrich the knowledge base of your personal experiences.

*Evaluate:* Evaluate your personal and professional development by interpreting your lifelong learning experiences. As a result of the evaluation enrich the lists and knowledge bases that contain issues, emotions, features, assets and priorities, at the planning stage.

### **Prototype Properties**

In order to simplify and easy management of the process a design in which users can store their own life and learning experiences “manually” is made. In a similar way evaluation system is done “intuitively” at that stage.

In this version data will be stored in AllMyListsMetro Application's local folders. With a small modification, this data can be stored and accessed in cloud storage environments such as Microsoft SkyDrive, Google Drive or DropBox. In AllMyListsMetro prototype individuals can store the entire PLE as a document. They can form and manage more than one PLE document at the same time. However, it is assumed that any PLE will cover all the lifelong learning activities of a person, it is suggested to duplicate PLEs lifelong (time line) not life wide. So, PLEs such as K12 PLE, graduate PLE, undergraduate PLE, business life PLE all of which is formed in different time lines and by time the education level of a person increases and differentiates they will be closed and archived.

Reflection, e-portfolio and personal publishing are some of the important learning activities of PLE. In traditional PLE applications, users may grant access on their private or personal information deliberately or accidentally. Prototype puts PLE and PIM into different layers so the information security is provided and it blocks to access private information via PLE.

## **Discussion and Conclusion**

In this study formal, non-formal and informal learning experiences in lifelong learning process have been suggested within a personal information management framework in which the individual can record and evaluate them together with his/her other experiences. With PLE, as a part of this framework, individuals can do and support their learning experiences.

The PLE framework suggested by other authors can manage evaluation cycle of setting goal, effective implementation, evaluating the results about planned learning experiences successfully. The problem lies beneath the unplanned learning experiences. At most situations learners do not want to interrupt an unplanned learning experience to record it. Moreover, they may not realize that they are having a learning experience at that moment. They start many of the learning experiences on their own initiative and make a progress according to their interests because of that their motivation and goals are closely related to their other experiences a person has. The framework we suggest enable the learner to enhance his/her awareness towards life experiences and learning experiences and manage them together.

Eventhough the suggested framework is not tested empirically, it has been assumed that it can be a postulate in which learners' can balance their personal and professional development and set their learning targets more efficiently. In future AllMyListsMetro software can be tested on main life-wide Learning fields (for example face to face education class of students, the students of a certificate programme who study on their own, the students of an open source education) and with evaluation of results of these tests suggest architecture can be tested and developed too.

Although, PLEs must be integrated with ever developing lifelogging systems in order to make process of recording of place, time, content, event, comment and ideas of individuals' learning experiences simultaneously or later on more efficiently. So, with recording system of learning experience can be transformed form manual to automatically. On the other hand, studies must carry on in order adding social learning

processes to architecture.

## **References**

1. Atwell, G. (2007), Personal Learning Environments – the future of eLearning? *Elearning Papers*, vol.2 no. 1. ISSN 1887-1542, Retrieved from <http://www.elearningeuropa.info/files/media/media11561.pdf>
2. Attwell, G., Cook, J., & Ravenscroft, A. (2009), Appropriating Technologies for Contextual Knowledge: Mobile Personal Learning Environments. In: *Best Practices for the Knowledge Society. Knowledge, Learning, Development and Technology for All Communications in Computer and Information Science*, Volume 49, Part 1, 15-25.
3. Badia, A. (2008), Personal information management for intelligence tasks. In: *Intelligence And Security Informatics: Studies in Computational Intelligence*, Volume 135/2008, 215-226.
4. Banks, J., Au, K., Ball, A., Bell, P., Gordon, E., Gutierrez, K., et al. (2007), Learning in and out of school in diverse environments: *Life-long, life-wide, life-deep*. Seattle, The LIFE Center (The Learning in Informal and Formal Environments Center), University of Washington, Stanford University, and SRI International, Retrieved from [http://life-slc.org/docs/Banks\\_etal-LIFE-Diversity-Report.pdf](http://life-slc.org/docs/Banks_etal-LIFE-Diversity-Report.pdf)
5. Barreau, D. (2006), Personal Information Management in Context. *A SIGIR 2006 Workshop* (pp. 6–7). Retrieved from <http://pim.ischool.washington.edu/pim06/files/barreau-paper.pdf>
6. Barrett, H. C., & Garrett, N. (2009), Online personal learning environments: structuring electronic portfolios for lifelong and life-wide learning. *On the Horizon*, 17(2), 142–152.
7. Bouzeghoub, A., & Do, N.-K. (2010), Active Sharing of Contextual Learning Experiences among Users in Personal Learning Environments Using a Peer-to-Peer Network. In N.-K. Do (Ed.), *ICALT '10 Proceedings of the 2010 10th IEEE International Conference on Advanced Learning Technologies*, Pages 78-82.
8. Castañeda, L., & Soto, J. (2010), Building Personal Learning Environments by using and mixing ICT tools in a professional way. *Digital Education Review*, 18(18), 9–25. Retrieved from <http://greav.ub.edu/Der/index.php/der/article/viewArticle/163>
9. Chen, W.-P., Millard, D. E., & Wills, G. B. (2008), Mobile VLE vs. Mobile PLE: How Informal is Mobile Learning? (J. Traxler, Ed.) *mLearn 2008 Conference*, 82–88. Retrieved from <http://eprints.soton.ac.uk/266158/>
10. Chen, W.-P., Millard, D. E., & Wills, G. B. (2011), Using Scrutable Learning Models to Support Personal learning Objectives on Mobile Devices. *Proceedings of the The PLE Conference 2011*, Southampton, UK, 11 - 13 Jul 2011.

**4th International Future-Learning Conference on  
Innovations in Learning for the Future 2012: e-Learning  
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11. Campbell, C. & Maglio, P., (2003), Supporting notable information in office work. In *CHI '03 extended abstracts on Human factors in computing systems* (CHI EA '03). ACM, New York, NY, USA, 902-903.
12. Churces, A. (2012), Blog Post. Bloom's Digital Taxonomy, Retrieved from <http://edorigami.wikispaces.com/Bloom%27s+Digital+Taxonomy>
13. Clark, T. (2005), Lifelong , life-wide or life sentence? *Australian Journal of Adult Learning*, 45(1), 47-62.
14. Corlett, D., Chan, T., Ting, J., Sharples, M., & Westmancott, O. (2005), Interactive Logbook: a Mobile Portfolio and Personal Development Planning Tool. In *mLearn 2005, 4th World conference on mLearning (2005)*, University of Birmingham. Retrieved from <http://www.mlearn.org.za/CD/papers/Corlett.pdf>
15. Dabbagh, N., & Kitsantas, A. (2012), Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *The Internet and Higher Education*, 15(1), 3–8.
16. Giovannella, C., Iad, S., & Tor, R. (2011), “ Learning is experience . Everything else is just information.” *Proceedings of the The PLE Conference 2011*. Southampton, UK, 11 - 13 Jul 2011.
17. Bell, G. (2012), MyLifeBits Project, Retrieved from <http://research.microsoft.com/en-us/projects/mylifebits/default.aspx>
18. Ballantyne, L. D. (2012), (lif)e-Protfolio a framework for implementation, Blog post, <http://leelarning.wordpress.com/2012/05/17/life-portfolio/>, Retrieved from <http://dl.dropbox.com/u/46596911/Research%20Study%20Lee%20Ballantyne.pdf>
19. Häkkinen, P., & Hämäläinen, R. (2011), Shared and personal learning spaces: Challenges for pedagogical design. *The Internet and Higher Education*, 1–6.
20. Hong Kong (2012), Life-wide Learning Contextual Matrix, Education Bureau of the Government of the Hong Kong Special Administrative Region, Retrieved from <http://www.edb.gov.hk/index.aspx?nodeID=3764&langno=1>
21. Ivanova, M. (2009), Use of Start Pages For Building a Mashup Personal Learning Environment to Support Self-Organized Learners. *Serdica J. Computing*, 3, 227–238.
22. Jisc/Cetis (2004), Personal Learning Environments Session, *JISC/CETIS Conference 2004*, Retrieved from [http://www.jisc.ac.uk/uploaded\\_documents/Personal%20Learning%20ppt](http://www.jisc.ac.uk/uploaded_documents/Personal%20Learning%20ppt)
23. Jones, W. (2007), Personal Information Management. *Annual Review of Information Science and Technology*, 41(1), 453–504.
24. Jones, W. (2008), *Keeping found things found: the study and practice of personal information management*. Burlington, MA, Morgan Kaufman Publishers, 430 p. ISBN 978-0-12-370866-3.
25. Kalz, M., Koper, R., Hornung-, V., & Luckmann, M. (eds) (2008), Preface, *1st Workshop on Technology Support for Self-Organized Learners (TSSOL08), in conjunction with 4th Edumedia Conference 2008*.

26. Leslie, S. (2012), A Collection of PLE diagrams, Blog post. Retrieved from <http://edtechpost.wikispaces.com/PLE+Diagrams>
27. Life Center (2005), "The LIFE Center's Lifelong and Lifewide Diagram", Retrieved from <http://life-slc.org/about/about.html>
28. Lubensky, R. (2006), Ron Lubensky's Blog, " The present and future of Personal Learning Environments (PLE)", Retrieved from <http://www.deliberations.com.au/2006/12/present-and-future-of-personal-learning.html>
29. Miller, P. (2012), Blog post, Project Glass and the epic history of wearable computers - how we've tried to become more than human. Retrieved from <http://www.theverge.com/2012/6/26/2986317/google-project-glass-wearable-computers-disappoint-me>
30. Milligan, C., Beauvoir, P., Johnson, M., Sharples, P., Wilson, S., & Liber, O. (2006), Developing a Reference Model to Describe the Personal Learning Environment. (W. Nejdil & K. Tochtermann, Eds.) *EC-TEL 2006*, 4227, 506 – 511.
31. Mott, J., & Wiley, D. (2009), Open for Learning: The CMS and the Open Learning Network. In *Education*, 15(2). Retrieved from <http://ineducation.ca/article/open-learning-cms-and-open-learning-network>
32. Mutlu, M. E. (2012a), "Eğitimde Yeni Teknolojilerin Kullanımı", Hakan, A (ed) *Eğitim Biliminde Yenilikler*, Açıköğretim Fakültesi Yayınları, Eskişehir, 2012. (In Turkish)
33. Mutlu, M. E. (2012b), "Yaşam Günlüğü (CARPE) Uygulamaları ve Yaşam Deneyimleri Yönetimi İçin Bir Bilgi Mimarisi", *XVII. Türkiye'de İnternet Konferansı*, 7-9 Kasım 2012, Eskişehir. (In Turkish) (Accepted)
34. M.E. Mutlu, (2012), "Technological Developments Observed in the PLE Diagrams and Sustainability", *2012 AECT International Convention*, Louisville/Kentucky, ABD, 30 Ekim - 3 Kasım 2012. (Accepted)
35. Perifanou, M. (2011), My Personal Mobile Language Learning Environment. *International Journal of Virtual and Personal Learning Environments*, 2(4), 49–62.
36. Pérez-Sanagustín, M., Santos, P., Moghnieh, A., & Blat, J. (2008), A conceptual framework for the integration of the 2 . 0 Web Tools in Lifelong Learning Scenarios. *5th TENCompetence open workshop: Stimulating personal development and knowledge sharing*, Sofia, Bulgaria.
37. Sha, L., Looi, C.-K., Chen, W., Seow, P., & Wong, L.-H. (2012), Recognizing and measuring self-regulated learning in a mobile learning environment. *Computers in Human Behavior*, 28(2), 718–728.
38. Sharples, M. (2000), The design of personal mobile technologies for lifelong learning. *Computers & Education*, 34(3-4), 177–193.
39. Services, M. (2011), Map Services and AR for Mobile PLE. *Proceedings of the The PLE Conference 2011*, Southampton, UK, 11 - 13 Jul 2011.
40. Steve, M. (2012), Wearbale Computers Project, Retrieved from <http://wearcam.org/pictures.html>.

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Innovations in Learning for the Future 2012: e-Learning  
Future-Learning 2012, Nov. 14-16, İstanbul**

41. Teevan, J., Jones, W., Bederson, B.B. (2006), "Introduction: Personal Information Management," *Communications of the ACM*, 49 (1), 40-43.
42. Teraoka, T. (2012), Toward personal experience management in a socially networked world. *PIM Workshop 2012, affiliated with CSCW 2012, the Conference on Computer-Supported Collaborative Work, held in Seattle in February 2012*. Retrieved from [http://pimworkshop.org/2012/pdf/teraoka\\_2012\\_toward.pdf](http://pimworkshop.org/2012/pdf/teraoka_2012_toward.pdf)
43. Thüs, H. (2011), Mobile Personal Environment for Higher Education. *Proceedings of the The PLE Conference 2011*, Southampton, UK, 11 - 13 Jul 2011.
44. Torres, L., Gonzalez, H., Ojeda, J., & Monguet, J. M. (2010), PLEs from virtual ethnography of Web 2.0. *Proceedings of the The PLE Conference 2010*, Barcelona, 8-9 Jul 2011.
45. Vavoula, G., & Sharples, M. (2009), Lifelong Learning Organisers : Requirements for tools for supporting episodic and semantic learning. *Educational Technology & Society*, 12 (3), 82–97.
46. Vogten, H., & Martens, H. (2009), Personal Development Planner. In R. Koper (Ed.), *Learning Network Services for Professional Development* (pp. 369–377). Berlin, Heidelberg: Springer Berlin Heidelberg.
47. White, D. C. (2010), Design and Implementation of a Personal Knowledge Integrator Federated with Personal Knowledge Environments. *Proceedings of the The PLE Conference 2010*. Barcelona, 8-9 Jul 2011.
48. Wikipedia, (2012a), Experience, Retrieved from [http://en.wikipedia.org/wiki/Experience\\_\(disambiguation\)](http://en.wikipedia.org/wiki/Experience_(disambiguation)).
49. Wikipedia, (2012b), Episodic Memory, Retrieved from [http://en.wikipedia.org/wiki/Episodic\\_Memory](http://en.wikipedia.org/wiki/Episodic_Memory).
50. Wilson, S., Liber, O., Johnson, M., Beauvoir, P., Sharples, P., & Milligan, C. (2006), Personal Learning Environments: Challenging the dominant design of educational systems. (M. Memmel, E. Ras, S. Weibelzahl, D. Burgos, D. Olmedilla, & M. Wolpers, Eds.) *Journal of e-Learning and Knowledge Society*, 3 (june 2007), 27–38.
51. Zhao, H., Yang, L., & Wang, Y. (2010), The personal learning environment (PLE) based on web2.0. *Web Society (SWS), 2010 IEEE 2nd Symposium*.

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## Design and Implementation of an E-Learning Evaluation System with Software Test Techniques

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**Abstract:** *Software Test Techniques are widely used in finance, space science, defense industry and insurance sectors. Software test techniques provide software usability, durability, optimum system performance and minimum cost. Different testing methods have been developed for E-learning Testing and Evaluation. In this study, we have developed an e-learning testing and evaluation system which is supported with software testing techniques. Validation and verification methods have been used for developing such a system. In e-learning testing, we have a checklist for page structure, question types and module transition standards. Then we validate these standards. White-box testing will be used for internal structure of the E-Learning System. Classes, functions and procedures will have been prepared for White-Box Testing. Unit testing is a procedure used to validate that individual units of source code are working properly. Overall system performance is generally assessed in terms of response time and throughput rates under differing processing and configuration conditions. E-learning system performance is measured by computing e-learning page response time and data load time. Our system is developed for measuring e-learning page load time, response time, and average waiting time. We propose an E-learning system with test driven development. Results show that test techniques should be used for development of e-learning applications.*

**Keywords:** E-Learning, Software Test, Evaluation, Testing, Test Techniques, V-model.

### Introduction

Software engineering life cycle models have different phases. Software testing is one of the phase of software engineering and an important aspect of ensuring the quality of the end product (Cynthia et al, 2004). Software tests are available entire operations for meet the requirements and needs with controlling of developed system (Demir, 2003). Test techniques;

- Provides project team and inform users and workers more information on what is happening on the project development (Yurga, 2009).
- Reduces the software project costs,
- Keep project information consistently,
- Reduces the project maintenance costs,
- Allow developer to modular coding and

- Allow developer to design a reliable e-learning system.

With the innovation of test techniques, it is possible to design robust and reliable systems. Automated test can allow developer and tester to trace system completely (Harman et al, 2009). Innovation of automated test provides differential effects of testing as compared to traditional testing (Harman et al, S. 2009).

In this study, we have developed an e-learning testing and evaluation system which is supported by software testing techniques. White-box testing will be used for internal structure of the E-Learning System. Classes, functions and procedures will have been prepared for White-Box Testing. Unit testing is a procedure used to validate that individual units of source code are working properly. Overall system performance is generally assessed in terms of response time and throughput rates under differing processing and configuration conditions. E-learning system performance is measured by computing e-learning page response time and data load time. Our system is developed for measuring e-learning page load time, response time, and average waiting time. We propose an E-learning system with test driven development. Results show that test techniques should be used for development of e-learning applications. In section 2, software test techniques have been explained.

## **Software Testing Techniques**

### **Static Test**

Static tests are different at some aspects because don't demand application (Ricca &Tonella, 2001). Static test is not in-detail; instead it is interested in algorithm, document and code. Static test is applied for finding code syntax and code errors. This kind of test code is written by developer. While control process is being performed on static test, test control is performed from a preset control list. Static test control list can be seen on Table 1.

**Table 1:** Static test control list

<b>Reliability</b>	<b>Performance</b>	<b>Usability</b>
Are reliability requirements determined?	Are answers and delay time determined?	Is usability requirement determined?
Are robustness requirements determined?	Are output requirements determined?	Are color schemas and standards convenient?
Are service requirements determined?	Are data capacity requirements determined?	

In the framework of this test, written code is read instead of executing. During reading, the code is examined and analyzed statically with reviewing (Ricca & Tonella, 2001). Importance of static test is assuring of exception handling early in software lifecycle phase (Fagan, 1986).

#### **System Test**

In system test various topics are considered such as reliability, security and sustainability. How software working with different hardware is emphasized. At this point black box approach can be dealt with, while software internal structure is not considered. These tests evaluate performance, reliability, functionality of developed software. Developed software is confirmed according to software's design in unit/class and integration tests. On the other hand, system test aims at confirming user demands.

#### **Performance Test**

Performance test is used for evaluating system test outputs that can be produced on determined and acceptable period of time (Demir, 2003). Performance test is examining system conformity of software transaction time. Performance examining is performed on every level of the test procedures. However system performance can be figured out after system integration (Software Testing - Testing Tutorials, 2012).

#### **Unit Test**

Unit testing is a method by which individual units of the software such as source code, a class, procedure or full program are taken into consideration. Unit test enhance the confidence and reliability of a system in which units of it works as expected (Perscheid et al., 2012). Unit testing can be conducted as creating suitable testing procedure. A unit

is the smallest testable part of an application. In procedural programming, a unit may be an individual program, function and a procedure while in object-oriented programming; the smallest unit is a method; which may belong to a base/super class, abstract class or derived/child class. The goal of unit testing is to isolate each part of the program and show that the individual parts are correct. A unit test provides a strict, written contract that the piece of code must satisfy. As a result, it affords several benefits. Unit tests can be applied step by step manner. First of all, an essential procedure is selected and then the upper level procedures are tested respectively.

### **User Acceptance Test**

It is performed whether a system satisfies its acceptance criteria, enable the customer to determine and inform whether accept the system (Veenendal, 2010). User Acceptance test should be performed on every intermediate product to validate acceptance of system.

User acceptance test objectives are sorted as below:

- Validate system set-up for transactions and user access,
- Confirm use of system in performing business processes,
- Verify performance on business critical functions,
- Confirm integrity of converted and additional data and,
- Assess and sign off go-live readiness.

In Figure 1, user acceptance test cycle can be seen which we have used on E-Learning Testing and Evaluation System.

### **The Strength of Testing**

Various test techniques allow user to develop robust software design. Static test is applied on system coding level. We can determine and remove defects according to static test results. E-learning system is composed of classes, procedures and statements. So, we can eliminate software defects via static testing. E-Learning system has not only several web pages but also has a database management system to hold required data. At this point, a system test should be used on overall system. System performance is generally assessed in terms of response time and throughput rates under differing

processing and configuration conditions (Veenendal, 2010). The performance problems are most often come from the result of the client or server being configured inappropriately. An E-Learning System generally works based on client-server architectures. We can increase E-Learning System transaction efficiency via performance testing. E-Learning System is consisted of software modules. Each module should be tested with unit testing method. The E-Learning System has different roles. These roles use E-Learning with various authentications. To design a consistent E-Learning System, user acceptance test should be used.

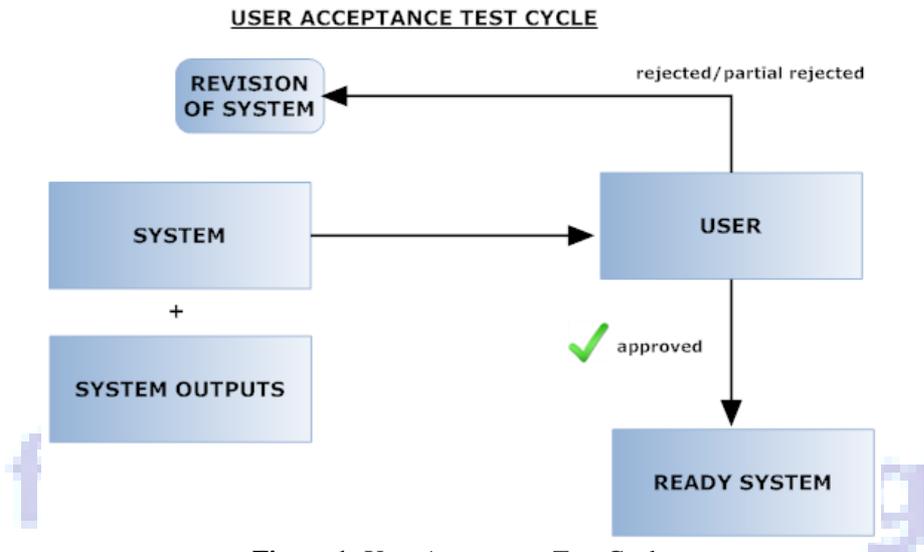


Figure 1: User Acceptance Test Cycle

### V-Model

V-model as a software life-cycle model is a development of the waterfall mode. Testing activities are started with beginning from first level of the project. The process steps are determined after the coding phase to form the typical V shape and tested with required testing techniques (Mittal & Chopra, 2011). In Figure 2, a V-model phase diagram is depicted. The V-Model demonstrates the relationships between each phase of the development life cycle and its associated phase of testing.

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In requirements analysis, the requirements of the proposed system are collected by analyzing the needs of the user. This phase is related to establishing what the ideal system has to do. However, it does not determine how the software will be designed or built. Usually, the users are interviewed and user requirements document is generated. The user requirements document will typically define the system's functional, physical, interface, performance, data, and security requirements as expected by the user.

In system design phase, system designers analyze and understand the business of the proposed system by studying the user requirements document (Balsamo et al, 2004). They figure out possibilities and techniques by which the user requirements can be implemented. If any of the requirements are not feasible, the user is informed of the problem. As soon as a solution is found, the user requirement document is edited accordingly. The architecture phase can also be called as high-level design. The baseline in selecting the architecture is that it should realize all which typically consists of the list of modules, brief functionality of each module, their interface relationships, dependencies, database tables, architecture diagrams, technology details (Gallagher & Offutt, 2009). The integration testing design is carried out in this phase. The module design can be called as low-level design. In module design phase, the functions and procedures which will be used in system, are designed and coded. So, the unit test procedures are developed in this phase. We have used V-model for E-Learning Testing and Evaluation System design and tested every intermediate product according to V-model steps.

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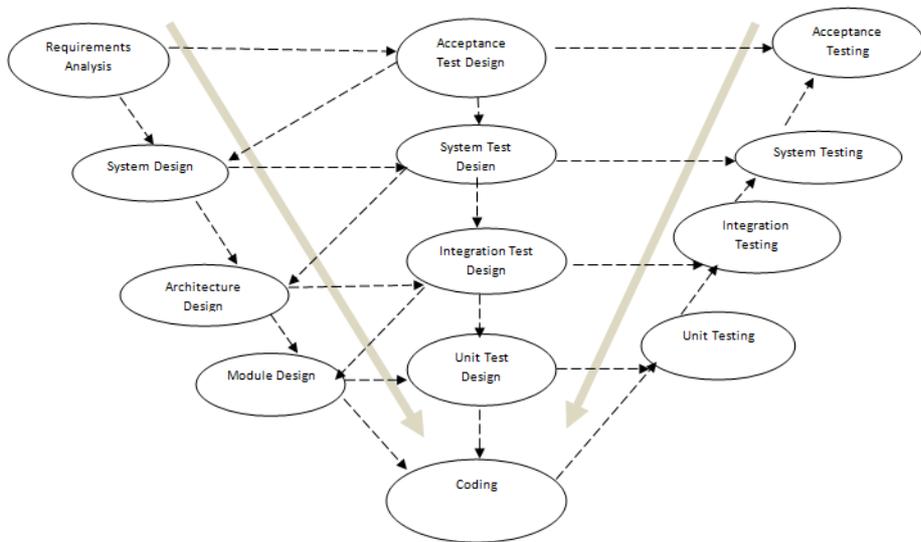


Figure 2: Software Development Life Cycle V-model (Martin et al. 2012).

## Design and Implementation of E-Learning Testing and Evaluation System

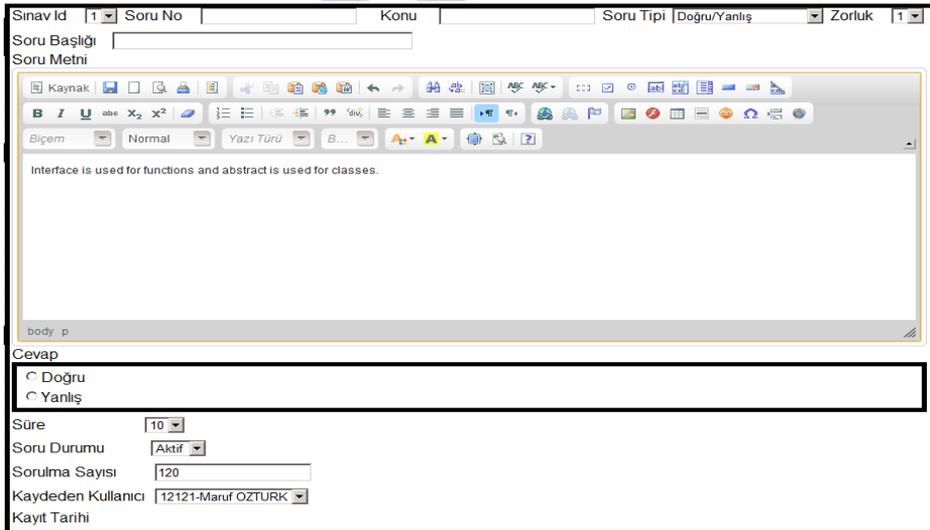
E-Learning Testing and Evaluation system has been designed by applying software test techniques on distance education software and defining required methods while this application. The following steps which we should use while designing an E-Learning Testing and Evaluation System;

- Designing E-Learning database with database normalization techniques.
- Designing E-Learning Testing and Evaluation System with tracing an eligible software development lifecycle.
- After the completion of E-Learning system design, testing web pages with software testing techniques.
- Testing E-Learning database with software testing techniques.

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Measurement and evaluation system has been developed with Asp.net framework 4.0. System works based on web. SQL Server 2005 has been used on database part. On database design, four roles have been defined: administrator, teacher, student and managerial personals. Each of roles has different authorization for different E-Learning pages. To use E-Learning Testing and Evaluation System efficiently, a walkthrough guide can be prepared for all roles. Users should know that the system constraints. E-Learning Testing and Evaluation System entry page has a login page. Users can enter web pages with user name and password. Session information is hold via “Session” structure.

For question addition process CKEditor has been used on pages. Role of a teacher can do various operations such as question addition and exam opening. In addition, according to wanted question type, question addition options change by choosing question type option. If role of student wants to do these operations, a JavaScript alert is taken that clarify whether an authority exists and this page entry cannot be done. Question addition page is seen in Figure 3.



Sınav İd | 1 | Soru No | | Konu | | Soru Tipi | Doğru/Yanlış | Zorluk | 1 |

Soru Başlığı | |

Soru Metni

Interface is used for functions and abstract is used for classes.

body p

Cevap

Doğru

Yanlış

Süre | 10 |

Soru Durumu | Aktif |

Sorulma Sayısı | 120 |

Kaydeden Kullanıcı | 12121-Maruf OZTURK |

Kayıt Tarihi

**Figure 3:** Question addition page

After the login entry, default page has four different test operations which are seen in Figure 4.

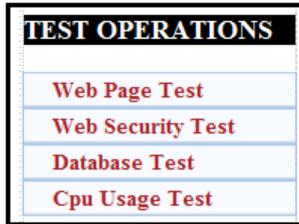


Figure 4: E-Learning Test Operation Menu

The test operation authentication is given to administrator. The other roles can't see any of test operations. With "Web Page Test" menu, we can test and automate web page component and functions via Selenium IDE. Selenium IDE is an open source test tool which used for web page elements that works with Firefox compatibly (Selenium Ide Plugins ,2012). With Selenium IDE user login operations, link fault and web page properties have been tested on web pages. Selenium IDE test operations can be evaluated as unit test category. A user login test which has been performed with Selenium IDE is seen in Figure 5.

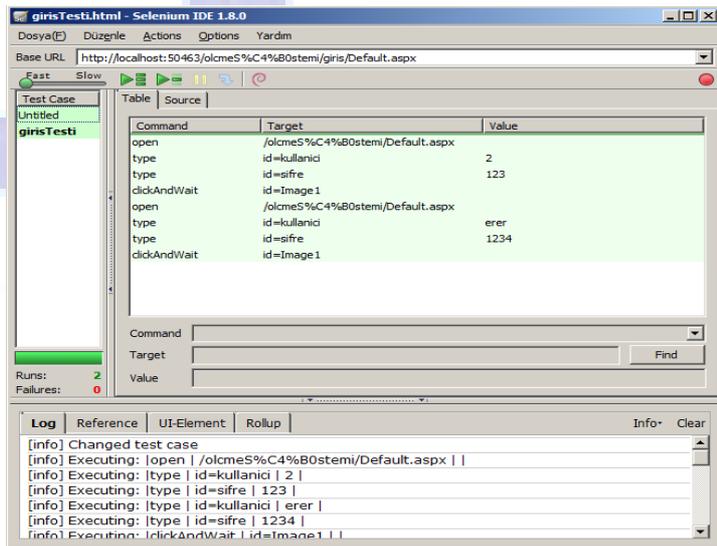


Figure 5: Selenium IDE login test operation screen

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With “Web Security Test” menu, we can determine E-Learning web pages security vulnerabilities via Vega Subgraph. Vega Subgraph is an Eclipse based test tool which helps to finding security deficiencies (Subgraph Vega, 2012). Both wanted URL addresses can be entered singly and operations which are done Vega Proxy can be tested simultaneously. Taken alerts classified as “Low”, “Intermediate” and “High”. Two “Low” level security deficiencies have been found while Vega Subgraph tests operations. The result which related to this security deficiency is seen Figure 6.

Unmasked page links have brought “Low” level security deficiency. Url rewrite methods have been applied to web pages to recover this deficiency.

SqlQueryStress tool has been used for E-Learning system database queries. By increasing number of query and number of threads, database answer time and average answer time have been determined (SQLQueryStress, 2012). Example query screen is seen at Figure 7.

▶ AT A GLANCE

Classification	Information
Resource	/olcmeS%C4%B0stemi/
Risk	Low

▶ DISCUSSION

Vega has discovered references to internal hosts or networks in publicly accessible content. These addresses may reveal information to an attacker about the internal network structure, increasing the likelihood of success for blind attacks involving other vulnerabilities.

▶ IMPACT

- >> May reveal internal network structure to outside attackers.
- >> Internal IP addresses that have been disclosed could be used as targets in otherwise blind attacks.

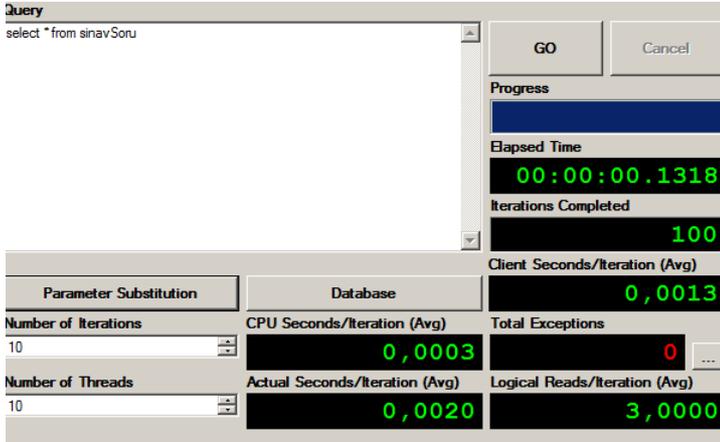
▶ REMEDIATION

- >> The cause may be related to the code, content, or due to the configuration of the server environment.
- >> It is recommended that the discovered page be inspected to determine where the exposed address originates.

▶ DETAILED FINDINGS

Resource	/olcmeS%C4%B0stemi/
----------	---------------------

**Figure 6:** Vega Subgraph security test result screen



**Figure 7:** Vega Subgraph security test result screen

With CPU usage test, we can obtain CPU usage rate while E-Learning system operations. CPU usage test measured with Performance Analyzer which exists in Visual Studio Ultimate and Premium distributions. Performance test results which have been done for measurement and evaluation system have been explained as following. Blue color lines which seen at Figure 8 symbolized used class and CPU usage percent functions while Project is working. Working result is seen for 862 (class, function) examples. When the system works firstly, CPU usage percent reaches out to %100 then shows variability according to used function and classes.



**Figure 8:** PerformanceAnalyzer results

## **Conclusions and Future Remarks**

In our world, E-Learning is spreading dramatically. Therefore, E-Learning evaluation system security is very important. In this work, we have used V-model for designing E-Learning Testing and Evaluation System. According to testing results, in web based coding, a web based test automation tool should be used for web security. According to database test results, more query length means more query timekeeping. So, the database normalization should be done for optimum data transmission. Performed test processes have been applied via different software test tools. If security, performance and exception analysis can be done, system coding and verification will take less time.

According to database test results, more query length means more query timekeeping. So, in database transactions, more of a code part, trigger and procedure should be used and database normalization should be given on importance. Also, performance results usually depend on system features. Therefore, to obtain an optimum E-Learning database performance, a suitable operating system should be used.

Nowadays software test is considered as fundamental activity of software lifecycle (Shahid& Ibrahim, 2011). In this work, software test techniques and their goals have been clarified. Performed test processes are expected to be a model for software test and distance education works which will be performed then. Programs which have been used for testing can be accessed via E-Learning test menu. With this menu, we have performed these tests. As the E-Learning system test programs increases, E-Learning system maintenance costs will decrease.

## **References**

1. Balsamo, S., Di Marco, A., Inverardi, P., Simeoni, M. (2004). Model-Based Performance Prediction in Software.
2. Development: A Survey. IEEE Transactions on Software Engineering, 30(5), 295-310.
3. Cynthia F. Cohen Stanley J. Birkin, Tampa Monica J. Harold W. (2004). Webb, Managing conflict in software testing, Communications of the ACM, 47.
4. Demir, D. (2003). Endüstride yazılım test ve kalite güvencesi etkinlikleri, I. Ulusal Yazılım Mühendisliği Sempozyumu, İzmir.

5. Fagan, M. E. (1986).Advanced in software inspection, IEEE Transactions onSoftware Engineering, 12(7).
6. Gallagher, L., Offutt, J. (2009). Test Sequence Generation for Integration Testing Of Component Software, The Computer Journal, 52(5).
7. Harman, M., Islam, F., Xie, T., Wappler, S. (2009). Automated test data generation for aspect-oriented programs, AOSD '09 Proceedings of the 8th ACM international conference on Aspect-oriented software development, 185-196, Virginia.
8. Martin Mc Hugh, Fergal McCaffery, Valentine Casey, MinnaPikkarainen (2012).Integrating Agile Practices with aMedical Device Software Development Lifecycle, European Systems and Software Process Improvement and Innovation Conference, Vienna.
9. Mittal, V., Chopra, C. (2011). Potter Model - A Change Compliant Software Development Lifecycle Model, Intelligent Systems, Modelling and Simulation (ISMS), 66-70, India.
10. Perscheid, M., Cassou, D., Hirschefeld, R. (2012). Test Quality Feedback Improving Effectivity and Efficiency of Unit Testing, The Tenth International Conference on Creating, Connecting and Collaborating through Computing (C5) Institute for Creative Technologies, University of Southern California, CA, USA January, 18-20.
11. Ricca, F., Tonella P. (2001). "Analysis and Testing of Web Applications", 23rd International Conference on Software Engineering (ICSE'01), 25-34.
12. Selenium Ide Plugins (2012). <http://seleniumhq.org/projects/ide/>.
13. Shahid M., Ibrahim S.(2011). International Conference on Telecommunication Technology and Applications, 5, 216, Singapur.
14. Software Testing - Testing Tutorials, Testing Tools, Testing Softwares, Testing Jobs,Testing Techniques (2012), <http://www.onestoptesting.com>.
15. SQLQueryStress (2012), sql server query performance testing tool, <http://www.datamanipulation.net/sqlquerystress/>, 2012.
16. Subgraph Vega (2012), Free and Open Source Web Application Vulnerability Scanner Site, <http://www.subgraph.com/products.html>.
17. Tuna, O. (2005).Software testing according to development process and architectural description, Ms. Thesis, Dokuz Eylul University, İzmir.
18. Veenendaal, E.(2010). Standardglossary of termsused in Software Testing, Netherland.
19. Yurga, D. (2009). A Metrics-Based Approach to the testing process and testability of object-oriented software systems, 30, Ms. Thesis, METU, 2009.

## **About EU Erasmus Mundus Master's Program in Virtual Education**

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**Abstract:** The term "virtual" comes from the Latin word "virtualis", which means "possible, so that may or must appear under certain conditions". Under the virtual online learning we mean learning that is based on the use of special computer technology and the Internet, providing an optimal (in terms of educational performance) management of the learning process.

The objective of international Master in Virtual Education is to establish competitive European Master Program to be able to attract students from Third Countries, European countries and all around the world. The need of the program in following: the graduate student will be unique as a Virtual teacher, applying nowadays technologies in education. New specialization and new skills for graduates: possibility to implement educational work in virtual environment (virtual teacher).

**Keywords:** Avatars in Virtual Learning Environment, Virtual Informatics, Collaborations in Higher Education Management, Continuing Professional Education, "hhh" Technology of Service-Oriented Interactions in Learning.

### **Introduction**

The term "virtual" comes from the Latin word "virtualis", which means "possible, so that may or must appear under certain conditions." In psychology used the terms "virtual image", "virtual object". For example, the virtual object is the union of man and machine. The functions of the virtual object cannot be reduced to functions of any person, or to the functions of the machine, and itself is a virtual object possible only if the interaction of real objects - man and machine. Under the virtual online learning we mean learning that is based on the use of special computer technology and the Internet,

providing an optimal (in terms of educational performance) management of the learning process [1,8-10,12]. We also differ in the concept of "virtual education" as a new form of training, and "virtual learning" as a new method of didactics. In line with the above interpretation of the nature of the virtual learning it as a complete didactic system, imposed a number of requirements that:

- Optimization of course content;
- The development of learning technologies that optimize the learning activities and intensifying the process of mastering the material;
- Establishment of monitoring system of learning, providing continuous and effective control of the learning process [2]. Today, education is known as basic human rights, social progress and change agent. World of today is the world of science, knowledge and progress in any society and is based on the information. With the development of IT and telecommunications equipment to the depth of penetration, as well as teaching tools and methods has evolved [3]. Development this tools and methods in the sense that every person in every time and place, with facilities that can provided, that will determine the timeframe in which to engage in science learning. During the learning process and depending on events happening in the environment, learner's emotions are changed. In this situation, learning style should be revised according to the personality traits as well as the learner's current emotions. Virtual Learning, is one of the most frequently used terms associated with information technology has entered the educational field and Many educational institutions, especially universities, this part of the training programs have long term and do they mainly on investments in this category [11]. Therefore, efforts and experiences related to this type of learning in the worldwide is highly regarded. In world, most universities are using this technology extensively. Some universities also accept students who take distance education. Virtual Education, a new field of communication technology and education which improve for learners, lifelong learning can provide at any time and place. In world, virtual education is widely

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considered. So with this kind of training will overcome many limitations of traditional education:

In recent years, increasing demand for entry to university and study in any field is not hidden from anyone. Growing population of young professionals on the one hand and country needs for the proper design of industrial, agricultural and other areas on the other hand, will turn on given the need, new methods of training. Volunteers to respond to growing demand in the universities used the different strategies. So far, the quantity of academic development is the continued presence and Part-time. Development courses at night school, correspondence courses development, and participation by the private sector with the opening of foreign universities, including the way things are common. During recent years, use of virtual education, has been working in the universities program. This new technique is so promising, that even a young university, fully formed as a virtual. The University to that before the Web-based virtual training did not exist, now has several thousand Virtual students.

In the lexical, refers to all educational activities, using electronic tools, including audio, video, computer, network, and is virtual. In the conceptual, active learning and intelligent, the way in which developments in teaching and learning process and knowledge management, in develop and sustain cultural information and communication technology, the role will be pivotal. In fact, virtual education, distance education is based on technology. Virtual Learning system emphasizes on the available content to all learners irrespective of their knowledge level and relevance. In other words, course content presented using voice and text files which using double relation between learner and teacher or among students, provides quality training to its highest reaches. Using advanced equipment and facilities to provide information and knowledge, better quality and higher provides.

The growing needs of education, lack of access to education, lack of economic resources, lack of qualified educators, and many costs that are spent on education, the experts on that, with the help of information technology, new methods must be devised

for both economic and quality and can be used to it, simultaneously a multitude of learners were trained. People want to continue college education has increased and with the current education system, only a few percent of the volunteers, they found an entry to the University. Given the recent developments and new global information age in which the highest value-added knowledge provides us with a major challenge has been met only with the benefits of virtual education can be overcome. The need for the development of virtual education in the country, there is no doubt; importance is the way how to achieve effective training. In general, the goal of virtual education, providing equal access, low cost and searchable in courses and creating uniform educational space for different classes of materials provided at any point and optimization methods for learning is deeper and more serious. In the educational environment unlike traditional education, those issues may take advantage of their ability.

Virtual Education has many features that can be the most important ones include: Complete mastery of the material: Teachers in this way, always subject to question and criticize the competition with others, therefore, the issue of teacher training is not enough control, will not survive in the educational system; Fair look to the knowledge seekers: All segments of society to expand access to learning and opportunity, a great step forward for social justice in education; Flexibility and tolerance: In this manner, speed and talent of the courses offered is comprehensive and has changed and repeated discussions, there is no waste of time; Audience Groups: In the Virtual Education there are particular tools for audience group. Some of these tools include: assessment of candidates and determine the type of access set specific limits for each class of learners, the academic requirements to achieve some of the texts; Free Education: In learning there are a lot fields and conditions to closer to a free public education.

## **The Study**

When we had taken into the consideration of these needs and the tendencies in educational theories, we organized a preliminary study in HHH University [1-4, 8-11].

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Our own pedagogical experiment aimed to obtain answers to the questions: a) what are the features of teaching as a form of human activity in the virtual education, and b) what are the psychological, pedagogical and psychological factors have a significant impact on the effectiveness of the cognitive activity of students, carried out by a computer c) What are the features of teaching learning process in the system of virtual education. Experimental observations were recorded on the following criteria: completeness of the performance of the student teaching assignment; intensity of cognitive activity (it is evaluated in terms of students with the knowledge of the material and time spent), psychological and physiological fatigue (it was estimated by the number of errors made by the student while performing the task, and the number of unnecessary distractions from his execution). Finding ways to effectively presenting students with new knowledge was carried out taking into account the specificity of virtual learning in three areas: 1) in the learning process, which was implemented on the basis of the electronic textbook; 2) machine-learning program, which is designed on the basis of a special tutorial on paper; 3) the learning process, which was implemented on the basis of a standard textbook. The experiment before us, above all, has shown that cognitive activity in the virtual learning occurs most effectively when these activities are implemented through a variety of forms of organization, for example, about 15-20 minutes with the theoretical material, and then 5-7 minutes with the appropriate self-test level of learning, then 20-25 minutes of case studies and 5-10 minutes of communication with the computer on-line in order to verify the quality of learning and further consolidate the acquired knowledge. Experimental observations have also shown that a single dose of educational information, digested with a student virtual learning, in contrast to the staff of the principle of programmed instruction, does not depend on its size (it can contain one, two, five or more pages of typescript). However, the dose of information imposed in the virtual learning fundamental requirement - a single dose should have a complete and logically coherent character (this may be, for example, Theorem, Section textbook, logically complete a separate issue entirely the whole topic or theme). The optimal single

dose of the same educational information for digestible student in a virtual learning is lies somewhere within 40 minutes of work with the material and 5-10 minutes of testing [11]. Checking the quality of students with the knowledge of the experimental groups, educational material, the level of complexity that does not exceed the estimate "average" is not found significant differences in the knowledge students have mastered the material in electronic textbook or a textbook, prepared for a system of virtual education in the paper. At about the same and the average time these students to assimilate the material of the same themes [8,11]. Experimental observations also showed that the total amount of educational information offered by the employee or student to master over a fixed time depends mainly on two factors:

1. the complexity of the educational material;
2. from the didactic presentation of the features of its students

Thus, the results of experimental studies have confirmed the hypothesis - the projected virtual learning should not only implement the relevant principles of classical didactics, but also quite fully its specific principles. Among the latter we include the following: Principles of interactivity, reflection, nonlinear information structures and processes, combined use of different forms of learning, integrated use of multimedia [5-8].

The first of the above-mentioned specific principles, namely the principle of interactivity, disclose, in our opinion, lead a virtual claim didactics of education - the student must have a real feel for the entire period of the course, that his teaching activities take place in conjunction with the relevant activities of the teacher.

It is known that, in essence, learning task determines the content and methods of learning. The principle of reflection of job demands that it cooperate fully with the activation of cognitive processes. Leading the requirement of this principle can be formulated as follows: learning task should be put before the student's need for self-completion of the formation of a certain system of knowledge, thus encouraging him to

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actively and consciously comprehend those mental schema and regulations, in accordance with which it operates[4,8].

### **The results - Case of Master's Program in Virtual Education**

The objective of international Master in Virtual Education is to establish competitive European Master Program to be able to attract students from Third Countries, European countries and all around the world. The need of the program in following: the graduate student will be unique as a Virtual teacher, applying nowadays technologies in education. New specialization and new skills for graduates: possibility to implement educational work in virtual environment (virtual teacher). This study program is a two-year full-time Master program (120 ECTS credits) in Virtual Education. The language of study is English. Learning of three European Languages (Russian, Bulgarian and Slovenian) as part of a cultural language program at each institution is provided during staying at the country. Students will study at Astrakhan State University and Penza State University, practice in Bulgaria and Slovenia. The last semester dedicated for Master Thesis preparation and responsible partner-Vilnius Gediminas technical university in Vilnius (Lithuania). The students will be awarded with degrees from the two universities: Master of Informatics Engineering from Vilnius Gediminas Technical University and Master of Education from PLOVDIV University "Paisii Hilendarsky". Such degrees provide the large opportunity for employability within EU and also outside in educational sector and also in the field of informatics. Also they will have a possibility to continue studies in a doctoral level in all countries participating in the project. Each module has to be finalized with the final exam (in a written form). If the students will be not successful from the first time, they will have a possibility to take an exam additionally. After the practice students have to prepare final report about fulfilled works and presented to the responsible teacher and defend it. All results of the exams and practice works will be sent to the coordinator of the project. After finishing all exams and practices, the students will be allowed to prepare the final thesis. Students

will have a possibility to select the supervisor of Master thesis from each participating partner institution. The study of Master degree will be finalized with Master thesis (in a written form according to the rules of responsible university) and the thesis has to be defended in a committee composed of specialists of consortium. It will be oral presentation with the slides about 15 minutes for each student. The successful students will be awarded with double degree (from the two universities): Master of Informatics Engineering from Vilnius Gediminas Technical University and Master of Education from PLOVDIV University "Paisii Hilendarsky". In Lithuania the official name of degree is "Master of Informatics Engineering", it is recognized and the end of validity date is 2016. In Bulgaria the official name of degree is "Master of Education", it is recognized and the end of validity date is 2018.

## **Conclusions**

1. Virtual education is closely related to distance learning, but is not limited thereto. It can happen (and is) in the normal full-time interactions of teachers, students, and the objects of study. Distance learning technologies can extend the capabilities of full-time education by increasing the mutual accessibility of distant students, teachers, professionals, and information files. The main purpose of virtual education, as well as the education of man in general - is the identification and achievement of man's destiny in the real world, including the virtual component.
2. Skills that students need it for learning in Masters of Virtual Education, including interpersonal skills, study skills, general work skills with computers and the Internet
  - Interpersonal skills

The nature of education at university level is changing. Increasingly, students are taking responsibility for learning. Students tend to give them all the questions teachers, should try to act as an active learner. The person responsible for learning, increasing motivation and discipline has its own, now more than ever has the opportunity to participate in learning, not just be a passive recipient. Students can

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make use the Internet to access a global community of students and teachers, therefore can be used of its benefits.

- **Study Skills**

Although online education may be a new phenomenon for students, but some new cases, there are about education that despite the new technology, remain the same. Things like time management, motivation, expectations are clear and ready for the exam, are still as important aspects. Online education is related to reading and writing skills. Many of the thematic content of the reading material and offered an amount of correspondence, students will be in written form. If students do not have the ability to know that this relationship should be looking to develop these skills.

- **General Computer Skills**

Students at the basic level of computer skills they need to succeed in online education act. Skills such as word processing, file management, storage, and publishing, although it is not necessary for students, would be helpful.

- **Internet Skills**

Students for online study will need some skills to the Internet. Go to a specific address, search, save and print Webpages, are important skills. Advanced skills such as searching and evaluating Web site also will be useful for most students.

## **References**

1. Mkrttchian V., Modelling and Simulation of the Framework for the Effective Implementation of “hhh” Technology in Armenia. *Simulation-Based Decision Support, Volume 1*, Toronto, 2010.
2. Mkrttchian V., E-Learning in Armenia has established the Pioneering Usage of “hhh” Technology. *E-Learning Practices: Cases on Challenges Facing E-Learning and National Development-Institutional Studies and Practices, Volume 1*, Eskisehir, 2010.
3. Mkrttchian V., Use “hhh” Technology in the Transformative Models of Online Education. *Handbook of Research on Transformative Online Education and Liberation: Models for Social Equality*, IGI Global, New York, 2011.

4. Mkrttchian V., Stephanova G., Description of the Meta-Communication Model and Design Web-based Courses which are implemented in Reflective Pedagogies in Russia. *Simulation-Based Decision Support, Volume 2*, Toronto, 2011.
5. Mkrttchian V., Patent of Russian Federation #2011614922. 2011.
6. Mkrttchian V., Patent of Russian Federation # 2011613106. 2011.
7. Mkrttchian V., Patent of Russian Federation # 2011614923. 2011
8. Mkrttchian V., Avatar Manager and Student Reflective Conversations as the Base for Describing Meta-Communication Model. *Handbook of Meta-Communication for Reflective Online Conversations: Models for Distance Education*, IGI Global, New York, 2012.
9. Ponomariova O., Professional development of teachers: problems and solutions in Russian education // Izv. Penz. gos. pedagog. univ. im.i V.G. Belinskogo. Penza, 2012.
10. Zaynutdinova L. Creation and application of electronic textbooks / after the example of traditional technical disciplines/ Astrakhan: 1999.-364pp
11. Mkrttchian V., Stephanova G., Training of Avatar Moderator in Sliding Mode Control Environment for Virtual Project Management. *Handbook of Research on Project Management Approaches for Online Learning Design, 2012*, IGI Global, New York, 2012.
12. Lepkova N., Rimkuvienė S. E-Learning in Lithuania-I. *E-Learning Practices: Cases on Challenges Facing E-Learning and National Development-Institutional Studies and Practices, Volume 1*, Eskisehir, 2010. pp. 437-462.



## **The Integration of Innovative New Media Technologies into Education: A Comparison Study: FATİH Project in Turkey and ISTE-NETS\*T**

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***Abstract:** New media switching the paradigms of traditional education with innovative technology oriented education environments requires the change of national education systems as well. Reaching international (world) standards under the globalization environment created by the new media will facilitate adaptation of educational systems to global change and innovation. E-learning as a component of flexible learning describes a wide set of applications and processes which use any available new media in education (Belanger,2005). The portable and on-demand nature learning environment makes technology with potential for e-learning (Meng,2005). The nature of new media technology oriented interactive learning is a reform to strength globalization of education system. This educational model will educate individuals who can compete with the knowledge and skills in globalized business environment and will be able to find job opportunities all over the world. In Turkey, some projects has been performed about the use of technology in education in the recent past. The last project designed for integrating innovative technology supported education environments in education is Firsatları Artırma Teknolojiyi İyileştirme Hareketi (Increasing Opportunities Improving Technology Movement) (FATİH) Project, which is a countrywide, is now in the pilot application phase. In the scope of this pilot application, 52 schools in 17 cities have been provided tablet computers, interactive boards, document cameras and multifunctioning printers as new media technologies. But, there are not any standards leading teachers of FATİH Project about how to reorganize e-learning applications in their lessons under new media oriented innovative technology supported education environment. International Society for Technology in Education's (ISTE's) National Education Technology Standards for Teacher (NETS\*T) are universal and very significant for all teachers. Teachers of FATİH Project should comply with ISTE's NETS\*T which has been accredited by many countries and has issued standards for teachers on 2008 to benefit from advanced technology in education. The aim of this research is to determine the level of compliance between FATİH Project teachers' usage of new media oriented innovative technology supported education environment and what ISTE's NETS\*T actually required. For this purpose, opinions of teachers in FATİH Project have been compared with ISTE's NETS\*T. Through the coordination of Innovation and Education Technology General Directorate, 1005 teachers who are using the new media provided by FATİH Project in 52 schools located in 17 cities have been asked to fill in an online survey composed of 162 items, which has been prepared and analyzed by Atatürk University staff: (Göktaş & at all. 2012) to identify their opinions about pedagogical usage of the new media technologies. Results of this analysis reflect the opinions of teachers about how much the learning and teaching process have been affected by innovations arising with FATİH Project. Survey items related to NETS\*T were selected among them. These related items were classified in tables according to standards that they comply with. The average, standard deviation, frequency and percentages of survey questions were also included into the tables. The statistical analysis results of the items were comparatively analyzed to determine the level of compliance of these responses to the standards. It has been observed that teachers' pedagogical applications in innovative technology supported education environments of FATİH*

*Project can not comply with ISTE's NETS\*T. Therefore, new strategies should be determined to harmonize teacher traits with standards on the following periods of FATIH Project.*

**Keywords:** New Media Supported and Oriented Education, FATIH Project, ISTE'S NETS\*T, Innovative Technology.

## **Introduction**

The new media oriented technology usage in education converts an information sharing classroom to a global information sharing classroom. Today, adoption of technology-oriented method of training has become a requirement rather than a need. New media is a communication tool, and communication with new media is one of the concepts put forward the information society. New media includes web sites, multimedia applications, such as interactive broadcasting content with a large number of documents, images, audio, and text converted into digital data that can be accessed at any time and be transmitted from point to point over the network on the basis of the principles of modularity and variability. One of the main characteristics of the new media oriented education is bringing together the use of digital tools when compared to traditional education system, students, teachers and parents increase the interaction between them. For example, video chat software, audio and image, image with text, sound, image, and text gather together and provided as an alternative to the teaching and learning process. E-learning as a component of flexible learning describes a wide set of applications and processes which use any available new media in education. It includes computer-based learning, web- based learning, virtual classrooms and digital collaboration. E-learning improves course content dissemination; classroom recording; field recording; study support; file storage and transfer (Belanger, 2005). The supporting technologies of e-learning are relatively inexpensive and easy to use. Like blogging, students can be producers of content, rather than passive receivers. The portable and on-demand nature learning environment makes technology with potential for e-learning (Meng,2005).

Standards form the basis of accreditation. Technology-based education programs with technology-assisted education model that is designed to be accredited

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must include standards at the international level. What should be the minimum specifications of qualified teachers' pedagogical practices to demonstrate success in technology-assisted education model at the application level. To respond to this question standards must be established. The quality of the education system and teacher development process as a whole will improve with the creation of standards and accreditation of technology-aided education.

International Society for Technology in Education (ISTE) was founded in 1979. ISTE's mission is to advance excellence in learning and teaching through the innovative and effective uses of technology. ISTE is the premier educational technology membership association for educators and leaders. More than 100.000 ISTE members are located across the globe. ISTE has become the trusted source for professional development, knowledge generation, advocacy, and leadership for innovation. ISTE supports its members with information, networking opportunities, and guidance as they face the challenge of transforming education. ISTE developed the National Education Technology Standards (NETS) with input from the field and pioneered their use among educators. The NETS are the standards for learning, teaching, and are widely recognized and adopted worldwide. The NETS are important because of the technology has forever changed not only what we need to learn, but the way we learn. The NETS set a standard of excellence and best practices in learning, teaching, and leading with technology in education. ISTE has three type of NETS: 1) Advancing digital age learning for students, 2) Advancing digital age teaching for educators, 3) Advancing digital age leadership for administrators and leaders. ISTE's NETS for Teachers (NETS\*T) are the standards for evaluating the skills and knowledge educators need to teach, work, and learn in an increasingly connected global and digital society (ISTE, 2008). Indicated five standards determining the qualifications and proficiencies of educators must have. According to these standards, teachers should demonstrate the knowledge, skills and processes relating to the new media environment as the representatives of an innovative profession and encourage learning and creativity of students as well as being role model for them on

designing digital learning, self-improvement, using resources effectively based on performance criteria and life-long learning. In this way, this education will enable the conversion of an entrepreneur student profile to a sustainable and willing citizen profile.

In Turkey, some projects have been performed about the use of technology in education in the recent past. The last project designed for integrating innovative technology supported education environments in education is FATİH Project, which is a countrywide, is now in the pilot application phase. In the scope of this pilot application, 52 schools in 17 cities have been provided tablet computers, interactive boards, document cameras and multifunctioning printers as new media technologies. It is aimed that interactive boards purchased in this project used by teachers to provide learning experiences to every student in their classrooms. The tablet computers provided students and teachers to make connection to the internet and study e-books approved by Ministry of National Education. Document cameras were provided to teachers to enable them to show 2D, 3D content to their students. Multifunctioning printers are aimed to be used to take printouts for educational purposes. Moreover, the construction of Educational Information Network (Eğitim Bilişim Ağı) (EBA) e-learning platform for providing the e-content materials related to courses for learners still in progress. Therefore, It is very significant to adapt International Educational Technology Standards for Turkey and complete missing aspects regarding implementation in order to resolve this deficiency.

FATİH Project aims to integrate the technology-assisted education into educational system. Teachers of FATİH Project should also comply with ISTE's NETS\*T standards which has been accredited by many countries and has issued Standards for teachers on 2008 to benefit from advanced technology in education. However, there is insufficient data about compliance of the new media oriented environment of FATİH Project with international standards. For this reason, this study was needed to determine to what extent teachers' pedagogical practices in FATİH Project has complied with a collection of NETS\*T standards developed by ISTE.

## **Purpose of the Research**

The aim of this research is to determine the level of compliance between FATIH Project teachers' usage of new media oriented innovative technology supported education environment and what ISTE-NETS\*T standards actually required. Following Research questions were defined for this purpose;

1. What is the level of compliance of FATIH Project teachers pedagogical applications in the pilot project with the facilitate and inspire student learning and creativity ISTE NETS\*T?
2. What is the level of compliance of FATIH Project teachers pedagogical applications in the pilot project with the designing and developing digital age learning experiences and assessments ISTE NETS\*T?
3. What is the level of compliance of FATIH Project teachers pedagogical applications in the pilot project with the modeling digital age work and learning ISTE NETS\*T?
4. What is the level of compliance of FATIH Project teachers pedagogical applications in the pilot project with the promoting and modeling digital citizenship and responsibility ISTE NETS\*T?
5. What is the level of compliance of FATIH Project teachers pedagogical applications in the pilot project with the engaging in professional growth and leadership ISTE NETS\*T?

## **Research Method**

In this study, FATIH pilot project teachers' pedagogical practices based on a survey conducted to the them for the evaluation of the pilot project were compared with ISTE-NETS\*T. 1005 teachers involved in the implementation of FATIH Project were responded to 162 item questionnaire to identify their perceptions of FATIH Project. Document analysis method was used to find answers to the questions. Teacher survey data analysis results which have been prepared and analyzed by Atatürk University staff

(Göktaş & et al., 2012) were used to identify their opinions about pedagogical usage of the new media technologies of teachers in FATİH Project pilot study. The results of data analysis of questionnaire surveys were prepared in May 2012. Results of this analysis reflect the opinions of teachers about how much the learning and teaching process have been affected by innovations arising with FATİH Project. These related items were classified in tables according to standards that they comply with. The average, standard deviation, frequency and percentages of survey questions were also included into the tables. The statistical analysis results of the items were comparatively analyzed to determine the level of compliance of these responses to the standards. Compliance of these teachers' pedagogical applications with ISTE NETS\*T standards have been analyzed under the coordination of Innovation and Educational Technology General Directorate. 52 of these 162 items were determined to be compliant with the standards and performance indicators of teacher ISTE-NETS\*T. Percentages and frequencies of responses to the items in the questionnaire were analyzed descriptively, the level of teachers' compliance with ISTE-NETS\*T standards were identified.

### **Data Analysis and Findings**

In this section, research questions will be answered according to five ISTE-NETS\*T standards and their 20 performance indicators. Data analysis results and findings about the comparison of ISTE-NETS\*T standards and teacher pedagogical applications identified from teacher survey applied to FATİH Project teachers will be presented.

#### **First Standard: Facilitating and Inspiring Student Learning and Creativity**

The first question of this study is to find out if FATİH Project pilot school teachers facilitate and inspire student learning and creativity. Items related to this standard were identified and percentages and frequencies of responses of teachers to these items were analyzed in order to compare teachers' opinions about this standard. Comparative descriptive analysis was performed to identify to what extent the teachers facilitate and inspire student learning and creativity were determined. Facilitating and inspiring

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student learning and creativity standard includes four performance indicators. These performance indicators were shown in Table 1. Table 1 also shows the comparison analysis results of teachers' opinions with the performance indicators.

**Table 1:** Comparison Results of First ISTE NETS\*T Standard

<b>“Facilitate and Inspire Student Learning and Creativity” ISTE NETS*T Standard Performance Indicators</b>	<b>Teachers’ Opinions on Pedagogical Usage of The New Media Technologies in FATİH Project</b>	<b>Comparison Results</b>
Promote, support, and model creative and innovative thinking and inventiveness	Teachers mostly state that they comply with being model to innovative thinking.	Firmly Participation/ Undecided
Engage students in exploring real-world issues and solving authentic problems using digital tools and resources	No Related Item	No Related Item
Promote student reflection using collaborative tools to reveal and clarify students’ conceptual understanding and thinking, planning, and creative processes	Teachers are undecided on ability to teach students use technology to solve the original problems, help conceptual understanding and creative thinking	Undecided
Model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments	Teachers are disagree on having knowledge construction skills with their stakeholders	Rarely Participation

Teachers showed mostly firmly participation and undecided participation to promoting, supporting, and modeling creative and innovative thinking and inventiveness performance indicator. Teacher opinions about engaging students in exploring real-world issues and solving authentic problems using digital tools and resources performance indicator cannot be identified since no related item was found in questionnaire data analysis results for comparison. Teachers are mostly undecided on promoting student reflection using collaborative tools to reveal and clarify students’ conceptual understanding and thinking, planning, and creative processes performance indicator.

Teachers also rarely participate to modeling collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments performance indicator.

Comparison results showed that teacher' responses support and be in harmony with mostly the first performance indicator of facilitating and inspiring student learning and creativity standard. On the other hand the other performance indicator of this standard was not supported by teachers. FATIH Project teachers are mostly rarely participating and undecided about compliance with facilitating and inspiring student learning and creativity standard.

### **Second Standard: Designing and Developing Digital Age Learning Experiences and Assessments**

The second question of this study is to identify the level of FATIH Project pilot application school teachers' compliance with designing and developing digital age learning experiences and assessments standard. To identify the level of alignment of FATIH Project pilot school teachers to this standard, teacher survey items related to this standard were identified and the frequency and percentages of responses of teachers were used to compare teachers' opinions with the performance indicators of the standard. Designing and developing digital age learning experiences and assessments standard includes four performance indicators. Comparative descriptive analysis done and results of to what extend performance indicators of this standard are determined to be compatible with teacher opinions were shown in Table 2.

Teachers commonly show undecided and rarely participation to design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity performance indicator. Teachers' opinions also show occasionally participation to developing technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their

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own progress performance indicator. Teachers rarely and occasionally participate to customizing and personalizing learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources performance indicator.

**Table 2:** Comparison Results of Second ISTE NETS\*T Standard

<b>“Design and Develop Digital Age Learning Experiences and Assessments” ISTE NETS*T Standard Performance Indicators</b>	<b>Teachers’ Opinions on Pedagogical Usage of The New Media Technologies in FATİH Project</b>	<b>Comparison Results</b>
Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity	Most of the Teachers are undecided on designing and adapting learning experiences with digital audio and visual materials	Undecided/Rarely Participation
Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress	Teachers occasionally participate to developing technology based learning environments to improve curiosities of their students	Occasionally Participation
Customize and personalize learning activities to address students’ diverse learning styles, working strategies, and abilities using digital tools and resources	Most of the teachers rarely and occasionally participate on personalizing learning activities to students by using technologies provided to them.	Rarely/Occasionally Participation
Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching	Most of the teachers do not provide varied technology based assessment tools to their students or are undecided on this	Rarely/Undecided Participation

And for the last performance indicator, providing students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching performance indicator, teachers showed rarely and undecided participation. These results indicates that FATIH Project teachers are mostly rarely participating and undecided about compliance with designing and developing digital age learning experiences and assessments standard.

### **Third Standard: Modeling Digital Age Work and Learning**

The third question of this study is to find out to what extend FATIH Project pilot school teachers model digital age work and learning standard. Items related to this standard were identified and percentages and frequencies of responses of teachers to these items were analyzed in order to compare teachers' opinions about this standard. Comparative descriptive analysis was performed to identify to what extent the teachers model digital age work and learning were determined. Modeling digital age work and learning standard includes four performance indicators. These performance indicators were shown in Table 3. Table 3 also shows the comparison analysis results of teachers' opinions with the performance indicators.

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**Table 3:** Comparison Results of Third ISTE NETS\*T Standard

<b>“Model Digital Age Work and Learning” ISTE NETS*T Standard Performance Indicators</b>	<b>Teachers’ Opinions on Pedagogical Usage of The New Media Technologies in FATİH Project</b>	<b>Comparison Results</b>
Demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations	Most of the teachers rarely state that they have good skills on adapting to new technologies.	Mostly Rarely Participation/ No Participation
Collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation	Most of the teachers are undecided on collaborating with students, other teachers and families by using technology	Mostly Undecided Participation
Communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital age media and formats	Teachers occasionally communicate information with students, parents and other teachers by using technology provided to them.	Mostly Occasionally Participation/Rarely Participation
Model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning	No Related Item	No Related Item

Teachers are mostly rarely participate and do not participate to demonstrating fluency in technology systems and the transfer of current knowledge to new technologies and situations performance indicator. Teachers have mostly undecided participation to collaborating with students, peers, parents, and community members using digital tools and resources to support student success and innovation performance indicator. Teachers show mostly occasionally participation and rarely participation to communicating relevant information and ideas effectively to students, parents, and peers using a variety of digital age media and formats performance indicator. No related items were found for the modeling and facilitating effective use of current and emerging digital tools to locate,

analyze, evaluate, and use information resources to support research and learning performance indicator.

Comparison results indicated that teachers' responses do not support modeling digital age work and learning standard. FATIH Project teachers are mostly rarely participating and undecided about compliance with modeling digital age work and learning standard.

#### **Fourth Standard: Promoting and Modeling Digital Citizenship and Responsibility**

The fourth question of this study is to identify the level of FATIH Project pilot application school teachers' compliance with promoting and modeling digital citizenship and responsibility standard. To identify the level of alignment of FATIH Project pilot school teachers to this standard, teacher survey items related to this standard were identified and the frequency and percentages of responses of teachers were used to compare teachers' opinions with the performance indicators of the standard. Promoting and modeling digital citizenship and responsibility standard includes four performance indicators. Comparative descriptive analysis done and results of to what extend performance indicators are determined to be compatible with teacher opinions were shown in Table 4

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**Table 4:** Comparison Results of Fourth ISTE NETS\*T Standard

<b>“Promote and Model Digital Citizenship and Responsibility” ISTE NETS*T Standard Performance Indicators</b>	<b>Teachers’ Opinions on Pedagogical Usage of The New Media Technologies in FATİH Project</b>	<b>Comparison Results</b>
Advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources	No Related Item	No Related Item
Address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources	No Related Item	No related item
Promote and model digital etiquette and responsible social interactions related to the use of technology and information	Teachers are mostly undecided on the items related to promoting and modeling digital social collaboration on learning with digital tools	Undecided Participation
Develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital age communication and collaboration tools	No Related Item	No related item

Teachers only show undecided participation to promoting and modeling digital etiquette and responsible social interactions related to the use of technology and information performance indicator. No related items were found for advocating, modeling, and teaching safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources, Addressing the diverse needs of all learners by using learner-centered

strategies providing equitable access to appropriate digital tools and resources and developing and modeling cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital age communication and collaboration tools performance indicators. Comparison results indicated that teachers' responses mostly do not support promoting and model digital citizenship and responsibility standard.

#### **Fifth Standard: Engaging in Professional Growth and Leadership**

The fifth question of this study is to find out to what extent FATIİH Project pilot school teachers engage in professional growth and leadership standard. Items related to this standard were identified and percentages and frequencies of responses of teachers to these items were analyzed in order to compare teachers' opinions about this standard. Comparative descriptive analysis was performed to identify to what extent the teachers engage in professional growth and leadership were determined. Engaging in professional growth and leadership standard includes four performance indicators. These performance indicators were shown in Table 5. Table 5 also shows the comparison analysis results of teachers' opinions with the performance indicator.

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**Table 5:** Comparison Results of Fourth ISTE NETS\*T Standard

<b>“Engage in Professional Growth and Leadership” ISTE NETS*T Standard Performance Indicators</b>	<b>Teachers’ Opinions on Pedagogical Usage of The New Media Technologies in FATİH Project</b>	<b>Comparison Results</b>
Participate in local and global learning communities to explore creative applications of technology to improve student learning	No Related Item	No Related Item
Exhibit leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others	Teachers mostly do not demonstrate an attitude for community building and leadership on teaching technology usage skills to other teachers.	Non-participation/Undecided Participation
Evaluate and reflect on current research and professional practice on a regular basis to make effective use of existing and emerging digital tools and resources in support of student learning	No Related Item	No Related Item
Contribute to the effectiveness, vitality, and self renewal of the teaching profession and of their school and community	Teachers’ responses in the questionnaire showed that teachers are undecided on self-improving skills on their teaching profession by using technology.	Undecided Participation

No related item were found for participating in local and global learning communities to explore creative applications of technology to improve student learning and evaluating and reflecting on current research and professional practice on a regular basis to make effective use of existing and emerging digital tools and resources in

support of student learning performance indicators. Teachers showed non participation and undecided participation to exhibiting leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others performance indicator. Teachers showed undecided participation to contributing to the effectiveness, vitality, and self-renewal of the teaching profession and of their school and community performance indicator.

Comparison results indicated that teachers' responses mostly do not support engaging in professional growth and leadership standard. FATIH Project teachers are mostly non-participating and undecided about compliance with engaging in professional growth and leadership standard.

### **Conclusions and Recommendations**

Comparison results showed that FATIH Project teachers are mostly rarely participating and undecided about compliance with the first standard; facilitating and inspiring student learning and creativity. FATIH Project teachers are mostly rarely participating and undecided about second standard; designing and developing digital age learning experiences and assessments. FATIH Project teachers are mostly rarely participating and undecided about third standard; modeling digital age work and learning. Teachers' responses mostly do not support fourth standard; engaging in professional growth and leadership. FATIH Project teachers are mostly non-participating and undecided about fifth standard; engaging in professional growth and leadership.

As a result of these findings, it is possible to say that technology integration of FATIH Project pilot school teachers do not comply with ISTE NETS\*T standards. Therefore, complying with standards accepted by International Society for Technology in Education-ISTE requires more attention in Turkey. ISTE anticipates that teachers should efficiently use technology in their teaching process as well as arrange classroom environments for optimum use of technology. The most important deficiencies of Turkey

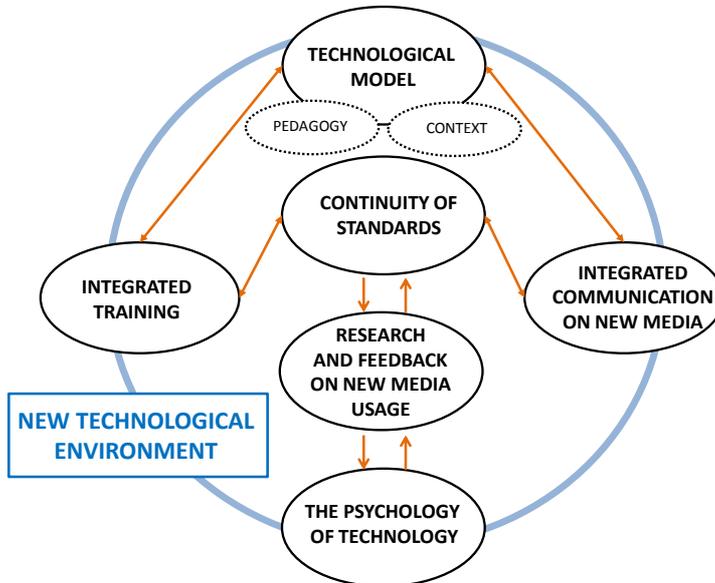
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regarding this area is the lack of standards about training of teachers, leading investments about use of technology in education and shaping education system depending on technology supported educational environment. Teachers in pilot schools of FATIİH Project are feeling difficulty about integrating their pedagogic oriented applications to new technologies as required by ISTE.

In order to solve these problems, firstly knowledge and skills of teachers about local, social and international concepts of technology integration in education, responsibilities in the developing digital culture and compliance with legal and ethical requirements should be improved. Secondly, digital tools and resources with updated features should be provided to teachers within the scope of FATIİH Project. Thirdly, It is also required that teachers should cooperate with their colleagues regarding the use of these tools, participate to technology oriented learning environments, and improve their knowledge and skills on technology supported on the job trainings and application models to increase learning capabilities of students. Therefore, teachers who are showing the vision to integrate technology to education as an alternative to pedagogic applications will provide a role model for their students about taking role of social environment and improvement of their technology and leadership skills.

### **Recommendations for Innovative New Media Technologies into Education Environments**

At the end of this study Eda's Integration of Innovative New Media Technologies into Education Model was developed as shown in Figure 1. Eda's Integration of Innovative New Media Technologies into Education Model requires: Integrated Training, Integrated Communication on New Media, Technological Model, New Technology Environments, The Psychology Of Technology, Continuity of Standards, Research and Feedback on New Media Usage.



**Figure 1:** Eda's Integration of Innovative New Media Technologies into Education Model

**INTEGRATED TRAINING:** Effectiveness of new media supported innovative learning environments are based on student achievement and student achievement depends on the teacher. The existence of a new media tool in classrooms will have functionality if they are integrated into education and training system. Teachers should be given gradual in-service trainings by expert to develop their knowledge and skills. These expert of the new media supported innovative learning environments can advance: a) what is the new media environment, b) what are the global standards active learning tools, c) what level and what extent they will integrate pedagogical practices into the education system.

**INTEGRATED COMMUNICATION ON NEW MEDIA:** If a project could not express itself well, unfortunately it is not possible to reach all of its goals. New

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media supported innovative learning environments should be able to express themselves by the influence of social media. Advertisement activities should be carried out to improve the understanding of public towards the strategic objectives of these new learning environments.

**TECHNOLOGICAL MODEL:** In the integration process of new media supported innovative learning environments into education system, we must deviate from the traditional teaching models. Therefore, a model should be produced in which effective teaching / learning methods and techniques is a priority and technology is not independent from usage of pedagogy and content knowledge.

**NEW TECHNOLOGY ENVIRONMENTS:** By taking advantage of the power and flexibility of time and place independency of technology using mobile technologies, continuous and high quality learning environments should be created. While integrating new media supported innovative learning environments into education the responsibilities should be organized by coordinating activities.

**THE PSYCHOLOGY OF TECHNOLOGY:** Technology is a dynamic and multi-dimensional system. Socio-psychological theories of human behavior should be considered important in new media supported innovative learning environments and students and teachers' attitudes towards technology, personal norms, perceptions and intentions that affect the success of the new learning environment should be taken into account. The determination of psychological factors affecting the use of technology is very important.

**CONTINUITY OF STANDARDS:** Universal standards that reflect the qualifications required from teachers on the new media-based learning environment, 21st century skills and the power of technology on education processes should be identified and adapted to changing technologies and constantly updated to provide continuity of innovation.

**RESEARCH OF FEEDBACK ON NEW MEDIA USAGE:** To bring the qualities of new media supported innovative learning environments to the world

standards, evaluation research units should perform researches by using new media and technology-supported tools and researchers and decision-makers should have interactive feedback mechanisms. In this way, needs emerging during the implementation of new media supported innovative learning environments can be met quickly and reliably theoretical background by selecting a model that has produced from literature.

## References

1. Belanger, Y. (2005). Duke University Ipod First Year Experience Final Evaluation Report, Duke University. Available At: [Http://Cit.Duke.Edu/Pdf/Ipod\\_Initiative\\_04\\_05\\_Pdf](http://Cit.Duke.Edu/Pdf/Ipod_Initiative_04_05_Pdf)
2. Çağlar E. (2012). “The Comparison of FATİH Project Teachers’ Pedagogical Applications in New Media Oriented Education Environment With International Teacher Standards” Unpublished Master’s Thesis, Kadir Has University Social Sciences Institute, İstanbul , Turkey
3. Gökteş Y., Kurşun E., Karakuş T., Çelik S., Özben M. (2012). FATİH Projesi Pilot Uygulamasının Değerlendirilmesine Yönelik Anket Uygulaması Analiz Sonuçları Raporu (Öğretmen, Öğrenci, Yönetici ve Veli Anketleri). Available At:<http://ortakhafiza.meb.gov.tr>
4. ISTE (2008). International Society For Technology in Education, (ISTE) National Educational Technology Standards (NETS) for Teachers (NETS\*T). Available At:[Http://www.iste.org/standards/nets-for-teachers](http://www.iste.org/standards/nets-for-teachers)
5. Mayes, T. (2002). Pedagogy, Lifelong Learning And ICT: A Discussion Paper Fort He Scottish Forum On Lifelong Learning. Available at: [www.usq.edu.au/electpub/e-jist/docs/html2002/pdf/mayes.pdf](http://www.usq.edu.au/electpub/e-jist/docs/html2002/pdf/mayes.pdf)
6. Meng, P. (2005). Podcasting And Vodcasting- Definitions, Discussions And Implications. A White Paper, University of Missouri. Available at: [edmarketing.apple.com/adcinstitute/wp-content/missouri\\_podcasting\\_white\\_paper.pdf](http://edmarketing.apple.com/adcinstitute/wp-content/missouri_podcasting_white_paper.pdf)

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## **Technology-Enriched Puzzles in Identifying Missing Curriculum Links: Innovative Teacher Training**

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**Abstract:** *The static curriculum and its sequential structure is often debated in the context of its authentic implementation. Thus, practitioners often hold it as the only way of steering the teaching and learning process, without much question. This has raised doubts as to why students still face problems of linking basic concepts even though the concepts were introduced in the early years of schooling. Thus, the aim of this study is to explore alternative strategies in the curriculum development and the curriculum implementation to shed light on sustaining the understanding and the linking of concepts in the curriculum at the primary and secondary level.*

*In this article, the researcher has developed technology-enriched puzzles in the form of “images” which are stored in folders and the teachers have to build the curriculum developed and available in the primary school and in the secondary school. This might seem as a “building block” task but in actual fact there are identified links that need to be matched between the simple concepts, complex concepts, multiple concepts, simple branched concepts and branched complex concepts. When the primary school curriculum and the secondary school curriculum is envisioned as two separate entities, the concepts in the mind of the students too are disjointed or does not seem to have a link whatsoever. This similar situation experienced by teachers when the teacher trained only for teaching secondary school syllabus is not exposed to the primary school syllabus. Thus, links and connections are hardly made when a particular level teacher is ignorant of the other interrelated levels/interdependent levels. Based on this rationale, the researcher embarked on this technology-enriched puzzles which were randomised to ascertain whether the teachers are able to connect the basic missing links provided. The implicit brainstorming activity to provide the big picture for the teachers is to identify specific details and scrutinise concepts that are tightly linked, tightly and closely linked, loosely linked, distantly and tightly linked, distantly and loosely linked is to inculcate high-order thinking skills. Though, this provides a platform for teachers to rationalise the curriculum at the primary level and at the secondary level, the brainstorming activity provided for in this research is not just to collect data about curriculum mapping and identifying the missing links but also to identify and extrapolate the other missing links and to connect the links between the primary and secondary links that are not available. This is a tool that is significant for a training programme as it “trouble shoots” the deficiencies in the teachers’ content knowledge, pedagogical knowledge and technological knowledge. At the same time, it has a multiple purpose of ascertaining the teachers’ pedagogical content knowledge, technological content knowledge, technological pedagogical content knowledge. From the findings, a “follow-up” training programme can be devised to ascertain the deficiencies, pitfalls and enhancing the teachers’ perspective of teaching from a mere “compartmentalised” conceptual dissemination of pre-determined curricular requirements to the holistic understanding of the continuity of the curricular development and its complementary implementation.*

*What is expected from the teachers during the training programme is not just to ascertain and match the missing links but the construction of links that is deemed necessary at the different levels to ensure that the teachers’ grounded understanding of conceptual foundations. Thus, this is an entirely new training programme which operates on a “self-determined learning” endeavour to determine the maximum possible linkages that can be made for steering the teaching of science. The learning of science can be made significant if only the current curriculum layout is viewed in a holistic critical manner by the teachers rather than to view it as “bits and pieces”.*

*The use of technology would expedite the process of ensuring that the teachers would be able to see the relevance of the interdependence/interrelationships of the concepts disseminated at the primary level and the secondary level. The learners would now not only operate on the paradigm of constructivism but also constructionism. This is the extension of the existing knowledge which can be of significance and meaningful to the teachers. This research was carried out adopting an action research model where teachers who were pursuing studies in curriculum were given the curricular resources and they just accepted it without much*

*debate. Although there were other links that were deliberately omitted to ascertain whether the teachers themselves were “high-order thinkers” of conceptual linkages. One needs to take note that actual classroom teaching becomes emulated when the teachers “indulge in the research process”, too. The researcher rationalised the use of technological-enriched puzzles rather than a mundane quantitative data collection using paper and pencil or interviews as this is a realistic and authentic “hands-on approach” to observe and trace the thinking process of “concept mapping” and “concept linking” when the teachers are involved in the process of ascertaining links and creating links that were not evident on the curriculum documents. The study cannot be generalisable as the data collected was of from a particular cohort of teachers pursuing the postgraduate programme in a university in the central region of Malaysia. The findings revealed that the science teachers at the primary level were unable to determine the direction of the complex concept linkages at the secondary school science level. The secondary school science teachers made concept linkages with that which was closely related to concepts disseminated in the highest level of the primary school science. However, the missing element that was evident is that the secondary school teachers did not “back track” the complex concepts to the initiation of the concept development at the lower primary levels. This meaningful data collected is significant for strategising the planning of training science teachers in the future. The implications of the study revealed that science teaching and learning should not operate on a mere “acceptance” and “conformist” approach but rather the “constructionism” thinking element of the teacher. The customised technological-enriched puzzles for authentic curriculum development and implementation is to ensure the sustainability of meaningful science teaching and its “construction” learning with its applicability to the current situation and demands.*

**Keywords:** continuity; sustainability; high-order thinking in curriculum development; teacher training; flexibility of curriculum implementation;

## **Introduction**

The development of the “new” curriculum is constantly happening locally and internationally. This is a result of the demand for existing skills and knowledge to be “up-graded” and the crucial interdependence on the other related areas. The “new” curricula may be crafted with high ambitions to be attained for a particular level but when the new curricula is developed for a particular level only, there is a pitfall that the curriculum developers need to be cautious about. This is the continuity of the knowledge and skills development. The skills and knowledge expected at a particular level may not be sufficient for continuity to take place if there has been an omission of certain skills and knowledge at a particular level due to curriculum revision. This can be viewed as a chain reaction that can involve fragmentation of concepts, assimilation of concepts pertaining to direct linkages and indirect linkages. Thus, the actual implementers i.e. teachers may not be aware that the “so-called” revision or change has occurred and thus the implementation is carried out as they were trained for the particular level. This has

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serious implications as there is when the addition, subtraction, multiplication and division at a particular level would cause the sinkholes to fall into or steep mountains to climb. This happens when there is a need for a “uniform” change involving all levels and the change should be realistic and manageable.

As innovations prevail at a rapid pace, the science education and reform education has to be authentic. Authenticity forms the basis of science learning and it is difficult to ascertain whether the teachers themselves have acquired the basic scientific concepts through authentic learning situations in the schooling years. The training institutions in science education probably might have adopted different paradigms as there are different perspectives of training that science teachers uphold. Authentic activities are activities that are related to real life situations. Why is the term authenticity being emphasized in this context is because science is deeply linked to many essential aspects in the span of life. Thus, curriculum developers and implementers should think beyond the box to incorporate issues that are scientifically related or has a premise of scientific foundation although one is viewing aspects in a non-science discipline. In this manner, the development of the science curriculum would explicitly and implicitly encompass a broad perspective of science related disciplines.

A detailed analysis of the science curriculum at the primary and secondary level reveals the time lapse in the continuity of the scientific concepts and the mere fact that the science topics are rigid, sequential and compartmentalized into topics rather than themes and or systems. Themes or systems which are similar will be in continuum and this would be in contrast from themes which are dissimilar. To address this issue, the curriculum development has to be viewed in a broad perspective beginning from the primary to the secondary school science. In this manner, clarifying and specifying science curriculum content and the sequencing in such a way that texts are meaningful, propositions are manageable and workable, and the learning outcomes are evaluable. Though research findings and significant teaching and learning strategies could significantly improve teaching and learning in science, the learning of science is

process-driven and significantly contextual in nature. Technology can be an enabler in this teacher training programmed to expedite the acquisition of scientific concepts from the initiation of concept to the development of the concepts. Thus the question of how, what, why, when and where these concepts can be applied is questionable.

### **Background of the Study**

In the local context, the curriculum is developed by the Curriculum Development Center, Ministry of Education. This is collaboratively developed by a panel involving experts, teachers and professionals. In the conventional method of curriculum development, the first step is for the teacher to write down the list of content that will be taught. In the backward design, the teacher starts with goals, then assessments and finally lesson plans (McTighe, J., & Thomas, R. S. 2003). Curriculum maps are used to serve as a framework and a guide for learning objectives in mapping out classroom activities and experiences that will meet the stipulated objectives. According to Jacobs (2003), electronic curriculum maps offer “ease of aligning directly to state standards and integration of lesson planning and mapping tools into Internet programs”, among other convenient advantages. Curriculum maps are created for each grade and each subject area. “E-curriculum maps” can also help teachers ensure specialized students’ needs are addressed for each grade and each subject area.

However, the curriculum maps for teacher training and development has to be looked at a broad scope across levels, encompassing relevant subject areas and bridging primary and secondary levels. Curriculum maps are dynamic in nature with pre-determined “additional” destinations from a “bird’s eye” view of the curriculum which occurs as the knowledge and skills develop with through teachers’ own learning experiences. Teachers and students would connect learning to students’ real lives and emotional experiences. When teachers record their students' actual learning experiences, teachers "own" the curriculum as they have implemented and sustained learning (Burns 2001).

## **Methodology**

This research was carried out adopting an action research model where students who were pursuing studies in curriculum were given the materials and curricular resources and they just accepted it without much debate. Teachers selected were from a particular cohort of teachers pursuing courses at the post graduate level in a university in the central region of Malaysia. Both primary and secondary school teachers are involved in this research. The teachers had the option to use the technology-enriched puzzles to form concepts from any folder to that they deemed necessary for concept initiation and the concept development. The following procedure is explicitly designed by the researcher.

**Phase I:** The teachers were presented with the technology-enriched puzzles. The puzzles were stored in folders and were named as A, B, C, D, E, F, G. The teachers were informed that the themes were random in each puzzle and the alphabetical order has no significance whatsoever for the sequencing of the puzzle or for determining the continuity of the concept development. The themes involved the concept initiation at the primary level and the secondary level and proceeded with the concept initiation and the concept development at the secondary level. The teachers have to open the puzzle and determine the link of the related concepts whether it is closely linked, distantly linked, indirectly closely linked, indirectly distantly linked.

**Phase II:** Then there are images that have been captured in the authentic situations that depict the scientific concepts either explicitly or implicitly. The links were either closely linked or distantly linked with linear or branched features. The teachers had to ascertain the target destination of the images by “back-tracking” the planning of the concept linkages.

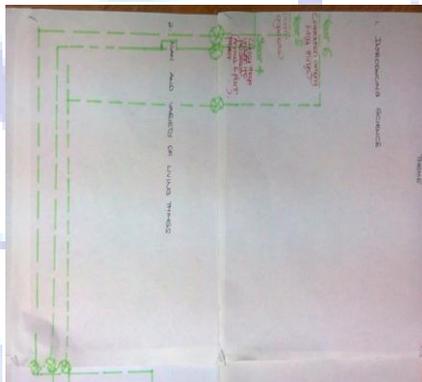
**Phase III:** The teachers need to “add-on” to the existing images the destinations that students can go based on the routes taken by the concept initiation and the concept development.

The three phases of the study involved observation “on-site” when the teachers were involved in doing the tasks and was followed by interviews based on the puzzle of images formed. Images which were in the form of excerpts and exhibits were then

analyzed to determine whether the missing links were ascertained using only these significant images which would unveil the simple concepts, simple and direct concepts, simple and indirect concepts, complex concepts, complex and direct concepts, complex and indirect concepts. In this manner, the continuity of the concepts were determined when the teachers produced linkages that were deemed necessary for primary and secondary school.

### **Results and Findings:**

**Phase I:** The following are the excerpts of the puzzles that are stored in the folders. The teachers are required to extrapolate the links to where it should eventually lead to a target destination i.e. what are the students are expected to have acquired.



**Figure 1.** Excerpt 1

Teacher *S*, a primary school teacher began with Excerpt I as the initiation point. Excerpt II, Excerpt III and Excerpt IV were the puzzle images that have been postulated to be linked with the theme of introducing science and the variety of living things (Figure 1-2).

Teacher *S*, when interviewed regarding the “picture of links” that was formed based on the theme puzzle of introducing science and the variety of living things. The rationale for the links and the grouping of this particular image puzzle is that introducing science would involve basic concepts of float and sink that is evident in everyday life.

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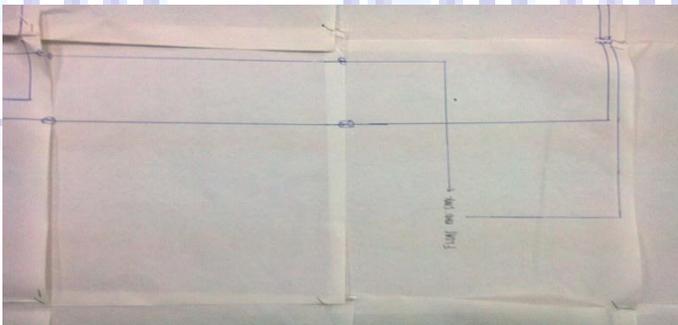
The example quoted is that the children have experienced this when they play and when any object drops into the water, they have noticed that the object can remain afloat or sometimes it disappears to the bottom of the water. However, Excerpt II revealed that the distant links for the development of the relevant concepts and concept development in Year 6, which involves interdependence among living things. Teacher *R* and Teacher *T* emphasized the importance of concrete concepts to be emphasized at the primary level which utilises the sensory organs. Teacher *R* was able to link the concrete concepts to the interdependence of living things which was mapped to the upper primary level. However, Teacher *T* was only able to map concrete concepts to the closely related links at the lower primary level.



Excerpt II



Excerpt III



Excerpt IV

**Figure 2.** Excerpt II, Excerpt III and Excerpt IV

The excerpt IV reveals the images of the initiation of the concepts. Teachers would need to determine the concept initiation at the primary level and the concept development at the secondary level. However, the findings revealed that the primary school teachers who were involved were unable to extrapolate the concept development thereafter for the secondary school science. This reveals the compartmentalization of the concepts and the ceiling of the concept attainment of the primary school teachers.

The secondary school curriculum begins with the similar theme of introduction to science and cell as unit of life which is illustrated in the Excerpt V (Figure 3). However, the aspects that are emphasized are different and requires formal thinking based on the concrete experiences of the introduction of science in the primary school. Teacher *P*, a secondary school teacher was unable to “back track” the mapping of these related concepts in the primary curriculum. Thus, they are unable to ascertain the point of concept initiation and the interdependence of these aspects in the continuity of the concept development at the secondary school level. Teacher *Q* was able to ascertain the interdependence among living things but was unable to “back track” to the concept initiation at the lower primary level.

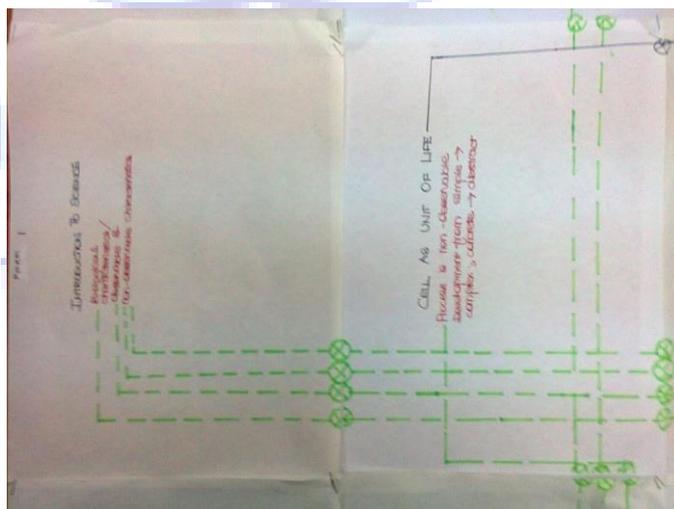


Figure 3. Excerpt V

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**Phase II:** The images were analysed beginning with the basic foundation to assess teachers' knowledge of fundamentals that need to be incorporated in the teaching and learning process. The exhibits depicts particular situations that prevailed in the everyday context. These are images that need to be matched with the themes after they have done the entire picture. For this purpose, the authentic images of situations that prevailed in the learning environment that portrays the "picture of links" was observed. The real life situation would definitely reveal the concept initiation and the concept development through routes taken by Teacher *S*. The following are the exhibits of the of the authentic situations. The probes used were as follows: (i) What do you see in the picture? (ii) Why did you link the "picture of links" with the Excerpt 1? (iii) Scientific terminology used in the description of the links, whether it is direct or indirect links. (iv) Target destination beginning with the concept initiation and then the concept development.



**Figure 4.** Exhibit 1

The image on Exhibit 1 reveals the everyday real life situations. Teacher *S* has used Exhibit 1 to match the theme of introducing science (Figure 4). The teacher revealed that the use of the terms "light and dark" could be used just as the same way to differentiate the concepts of float and sink. During the interview, Teacher *S* revealed that introducing the basic concepts is significant and the differentiating line between the concepts is more significant. In the same way the teacher mentioned that this would be an opportunity to think about the type of light source and the possible range the image was taken.



Figure 5. Exhibit 2

The image on Exhibit 2 reveals the real life situations in everyday life. Teacher *S* has used Exhibit 2 to match the theme of introducing science (Figure 5). The teacher revealed the use of the terms light and dark which could be used just as the same way to differentiate the concepts of float and sink. During the interview, Teacher *S* revealed that introducing the basic concepts is significant and the differentiating line between the concepts is more significant. In the same way the teacher mentioned that this would be an opportunity to think about the type of light source and the possible range the image was taken to differentiate between Exhibit 1 and Exhibit 2.

Teacher *S* and Teacher *R* raised the theme of living things which emerged from Exhibit 2. The birds were seen resting on a wire/cable/window panel. Teacher *S* stated that Exhibit 2 could be linked with Exhibit 1 as there is a disparity between light and darkness. Teacher *S* stated that the interdependence of the light for the process of plants to manufacture their own food which is linked to Exhibit 3 (Figure 6).



**Figure 6.** Exhibit 3

The image on Exhibit 3 was linked with Exhibit 2 as it displays the theme of living things i.e. plants which contrast from the Exhibit 3. The leaves of the plants are partially destroyed due to insects that might have eaten the plants.

**Phase III:** Based on the authentic real life concepts of the Excerpts and the Exhibits, the teachers need to add on “extra destinations” by exploring different routes that are accessible for concept development (Figure 7).

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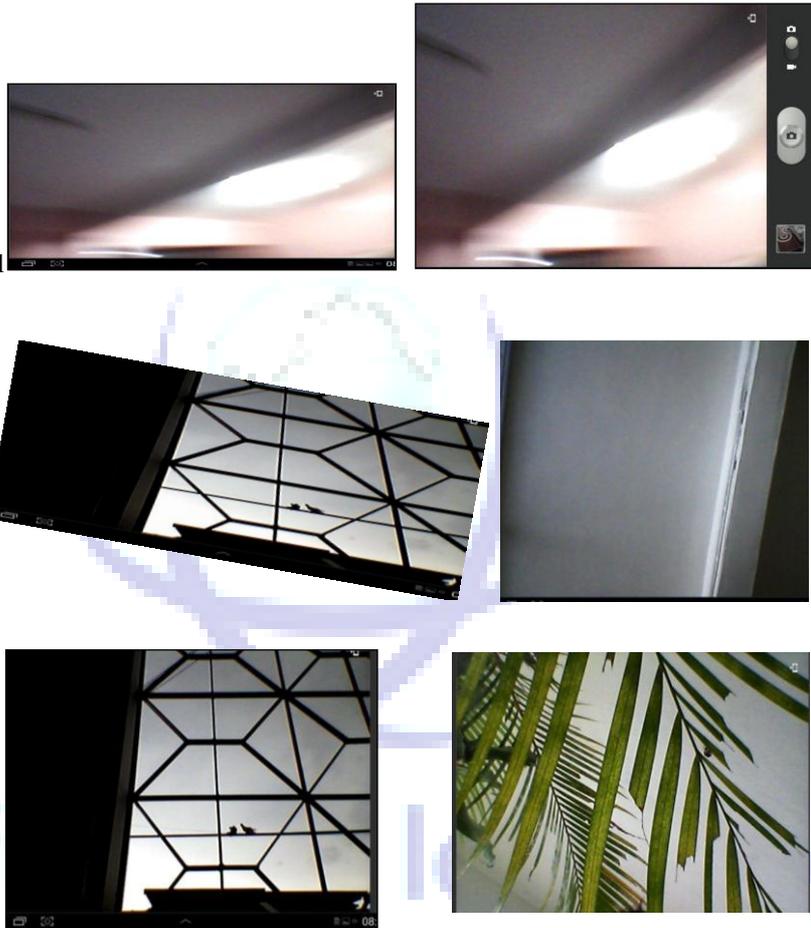


Figure 7. Exhibit 4

The extra destinations put forth by Teacher S would be the development of the introduction of science i.e. the states of matter involving solids as seen in the accumulated exhibits. The solid state is exhibited in the window panel which has a geometric shape . The solid structure is of a metallic nature and can be differentiated from the non-metallic substances. The characteristics of metals and its existence in a solid form and its exceptions can be highlighted as a route to reach the destination of the

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three states of matter and its variability. The solid concrete forms the basic foundation of the structure for which the structure of the window panel is hinged on. Thus, the next destination would be the components of the concrete and what would make the structure rigid and firm withstand over a period of time withstanding the weather conditions. Teacher *R* only mapped the interdependence of living things i.e. birds on the plants for the source of food and also to make their homes. Teacher *R* and *T* were unable to ascertain the extra destinations that the exhibits and the excerpts could lead them to.

The next destination Teacher *S* routed is the light source and its fluorescence nature. The properties of the light emitted from a fluorescent lamp in contrast with the neon bulb will give rise to the theme of the properties of the gases in relation with the state of matter. The physical and chemical properties of gases and the purpose of the gases in everyday life. The next “extra” destination would be the structure of the plants and the different classes of the plant kingdom. The processes that plants undergo in manufacturing their own food with the necessary prerequisites. This could lead further into the protection of the plants from pests or insects that can potentially attack plants. This is the further destination of the categories of the pests that attack plants and pests that are essential for plants. This could be carried further to the next destination to explore the various types of plant protection involving pesticides, herbicides, fungicides etc. The characteristics of the plant and the appropriate use of the chemicals that protect it from attack can be the next destination for the study for protection. Chemicals and its usage has to be appropriate and relevant to be used depending on the type of the pest attack.

## **Conclusion**

The findings revealed that there is uncertainty of the concept development at the higher level among the primary school science teachers. There is “structured limitation” with what has been disseminated, implemented and attained at the particular level with existing practices. The possible progression and extra destination a route for the development of the concepts does not seem to be critical as the curriculum requirement

is fulfilled for the level. The concept initiation at the primary level is significant as the “base” for the concept development at the secondary level. Similarly, the assumed developed concept at the secondary level could be back tracked to its concept initiation as it seems that it is not significant. The differing concept initiation foundations would lead to differing concept development at the higher level and the possibility of a “concept breakdown” can occur at the higher level if the foundation/base cracks with lines of weakness. The missing links could be ascertained with the technological-enriched puzzles which address the issue of customization, suitability, relevance and sustainability. This meaningful data collected is significant for strategizing the planning of training science teachers in the future. The implications of the study revealed that science teaching and learning has to be “deeply grounded” to operationalise on a “constructionism” thinking element of the teachers. With the selected technological puzzles, one would be able to determine the “metacognitive processes” of the teacher in determining the extra destinations to reach. The different destination could take different routes/links to address the different concepts across different scientific disciplines.

### **Reference**

1. Benade, L. (2008). Curriculum mapping—The road ahead, or more bumpy terrain? *New Zealand Principals' Federation Magazine*, 23(1), 10–11.
2. Burns, R. C. (2001). *A Leader's Guide to Curriculum Mapping and Alignment*. Charleston, WV: AEL, Inc.
3. Jacob, H.H. (2003). Connecting Curriculum mapping and Technology. *Curriculum Technology Quarterly*, 12(3), Retrieved 16 July 2012, from: <http://www.pbs.org/teacherline/courses/inst310/docs/inst310>

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## **GeoGebra as a Motivational Tool for Primary Education**

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**Abstract:** *In our article we present GeoGebra as a motivational tool for primary education for Slovak minority schools in Hungary. Content and Language Integrated Learning (CLIL) can support the using of minority language in different subjects. In our paper we present this method in the case of school mathematics. First, we describe the process of gaining knowledge in teaching mathematics. We will present some students' works of future Slovak minority teachers. According CLIL (2006) the acronym CLIL (Content and Language Integrated Learning) started to become the most widely used term for this kind of provision during the 1990s. This method was developed in the teaching of certain subjects in the curriculum may be offered in a foreign, regional or minority language have existed in Europe for several decades. During the 1970s and 1980s, development of this kind of provision has been influenced in particular by the Canadian experiment with immersion teaching. This first began as a result of English-speaking parents living in the province of Quebec who considered that proficiency in French was vital in a French speaking environment. In our condition in the environment of Slovak minority schools we use this method by the teaching tangrams. We use software GeoGebra for making tangram pictures. The future teachers of elementary schools prepared different figures of objects, which names we used later for creating sentences in Slovak and Hungarian languages. According to Beardsmore (2008) the results of CLIL researches show that the monolinguals seemed to be stronger in their acquisition of knowledge of facts, whereas the bilinguals were better in acquiring the mathematical operations. These activities can support e-learning teaching activities between minority schools and schools in mother country (for example in the form of eTwinning).*

**Keywords:** Content and Language Integrated Learning (CLIL), Slovak minority school, primary education, mathematics education, eTwinning.

### **Introduction**

The information and communication technologies bring according Weigand & Weth (2002) new evolution and successive and meaningful integration to educational process. This is possible to see also in the new Slovak Curriculum ISCED 1, 2 or 3 for primary and secondary schools. This curriculum suggests giving during the education transversal topics (for example multicultural education – number systems, medial education – interpretation of graphs). These topics are possible to present not only in the classroom, but also in the computer room.

The curriculum defines also competencies in the using of information and communication technologies. The pupil must

- know the using of ICT in everyday live
- understand, that using of ICT need to have critical and considered approach to available informations
- responsible to use interactive media – understand the possible risks, which they bring
- through the ICT realize partial tasks and outputs in the frame of project and cooperative learning (see Jablonský (2006))

According Weigand & Weth (2002) the new technologies bring new accent to some goals in the Mathematics education. Calculating and mechanical skills by the pupils are less important, but the skills of mathematical processing of the task, development of algorithms, interpretation of the task results, numerical experiments and work with graphical representations are more important.

### **Factors for using of ICT in education**

According to Oldknow & Taylor (2003) we can identify at least three reasons for promoting the integration of Information and Communication Technologies (ICT) in Mathematics teaching in schools:

- **Desirability:** In terms of students, the use of ICT may stimulate their motivation and curiosity; encourage them to develop their problem-solving strategies. In terms of teachers, the use of ICT may improve their efficiency, release more time to address students individually, stimulate re-thinking their approach to teaching and understanding.
- **Inevitability:** Many fields of publishing have moved from printing to electronic form. This applies to conference proceedings, reference works such as encyclopaedias, small-circulation textbooks, special journals, etc.
- **Public policy:** In Slovak National Curriculum ISCED 1, 2 and 3 there is defined that Mathematics as a subject belongs to the group Mathematics and Working with Information.

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In last years it will be more used the open source software GeoGebra. Nowadays it is accessible in 60 language versions. This system joins together computer algebra system, dynamical geometrical software and spreadsheet. Big advantage is user's friendly character and possibility to create dynamical HTML WebPages with interactive pictures. Software is downloaded from the [www.geogebra.org](http://www.geogebra.org). Teaching materials developed by this software is possible to find on the GeoGebra Wiki. Its Slovak version is step by step created now and we have interest to cooperate in this developing process with teachers in schools, pupils and students – future teachers at universities. Some examples are possible to find also by Billich (2008), Tkačik (2007) and Wittmann (2008). Important aspect of ICT aided education is the visualization. This process supports the developing of new versions of GeoGebra with new functions.

In the next part we present using GeoGebra as a motivational tool for primary education for Slovak minority schools in Hungary. We used in our mathematics teaching the CLIL method for supporting of the Slovak language. For this reason we describe first this method.

### **CLIL - Integrated teaching of minority languages and non-language subjects**

CLIL (Content and Language Integrated Learning) is an educational method for teaching non-language subjects through a minority language. It's an innovative approach that changes ways in which students are introduced to the curriculum, and that accelerates the acquisition of basic communication skills in a minority language.

Project results and comparisons show that this way of learning accelerates and increases the quality of teaching in general - educational and vocational subjects, as well as language training. CLIL strikes a balance between language and vocational training. Non-language subject is developed through a minority language and minority language by non-language subject. Minority language is used as an educational tool, not only as the result of teaching.

The objective this method of teaching is to improve the abilities and skills of students in minority language by the language as a tool of communication and not as a separate subject. CLIL can be considered as an educational method by which the EU promotes the linguistic diversity, and has a positive impact on language learning.

Integration of minority language with non-language content into one piece seemed to be as a suitable solution, which is creating a dual-focused education; education focused on the subject or topic as well as on the minority language. This educational approach has been known in different countries under different names - bilingual, dual focus, enhanced language learning, teaching through a foreign or minority language. In the mid 90-ties, the European Commission in collaboration with expert groups accepted a single name with acronym CLIL. This teaching method has several advantages within minority schools. At this point we want to mention a few.

- When teaching with CLIL method, the aim is on the particular activity and not the minority language itself.
- This approach provides the opportunity to learn to think in that language and not only learn the language as such. CLIL allows students to practice the minority language in learning another subject.
- This approach provides the opportunity to learn to think in that language and not only learn the language as such. CLIL allows students to practice the minority language in learning another subject.
- CLIL is the opportunity for graduates to develop their skills using foreign or minority languages and therefore to increase their personal potential for an advantageous position in the labour market.
- The curriculum can be explained first in Hungarian and later extended in the Slovak language, or vice versa.
- The activities in both languages should be complementary.

From advantages that CLIL brings, we can mention following ones:

- Overall improvement of student communication skills in a minority language,

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- Deepen awareness of the minority language, official language and other languages
- Increased student motivation through real educational situations in the teaching of minority languages
- A positive attitude towards the minority language,
- CLIL provides opportunities that allow students to use a minority language naturally, in such a way that they gradually forget about the use of minority languages and focus only on content.
- In the CLIL method the minority language is associated with other objects. In the classroom there are two main goals: one is the subject, topic, and another one is the language.
- This is the reason why CLIL is sometimes called a dual-focused teaching.
- CLIL can really do a lot, increases the willingness, wanting and ability to learn both - language minority and non-language subject.

### **CLIL method in school mathematics and GeoGebra**

This method is applicable also in mathematics both in the preparation of future minority teachers of mathematics and also in Slovak primary and secondary schools in Hungary. We have experience with work in this method at the Faculty of Applied Humanities and Education of the Szent István University in Szarvas, Hungary. The existence of a bilingual grammar is an inspiration for new teaching methods of application of the Slovak language in the educational process at Slovak minority school in Hungary.

According to Beardsmore (2008) the results of CLIL researches show that the monolinguals seemed to be stronger in their acquisition of knowledge of facts, whereas the bilinguals were better in acquiring the mathematical operations. In other words, the research revealed a difference between informational knowledge and operational knowledge for the two groups of subjects. Informational knowledge refers to the capacity to memorise, or « knowing that », whereas operational knowledge refers to the capacity to apply what one knows to new circumstances, or « knowing how ».

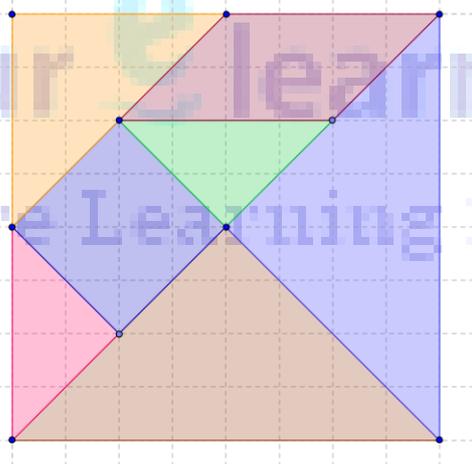
Operational knowledge is significant for creativity, whereas formational knowledge serves more as a tool on which creativity must be built up. The studies on the learning of mathematics in a bilingual context were confirmed amongst different school populations, both in primary and secondary education, and even amongst beginners in second language programs.

The study Domínguez (2011) shows one example the using CLIL method in mathematics teaching with text tasks. This teaching was in English and Spanish (Table 1):

**Table 1.** Using CLIL method in mathematics teaching

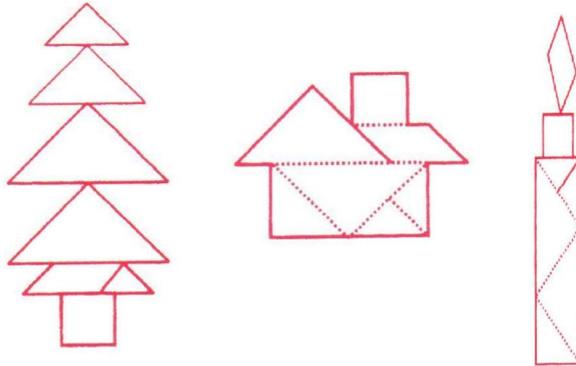
Spanish	English
Tu maestra de arte te dio 3 paquetes de papel construcción para que hagan banderitas de México. Un paquete es de hojas verdes, uno es de hojas blancas, y uno es de hojas rojas. ¿Cómo podrías hacer 60 banderas de México?	Your art teacher gave you 3 packages of construction paper to make flags of Mexico. One package has green paper, one has write paper and one has red paper. Each package has 25 sheets. How can you make 60 flags?

In our case of mathematics teaching we used the figures prepared from tangram parts. These parts are possible to prepare in GeoGebra.



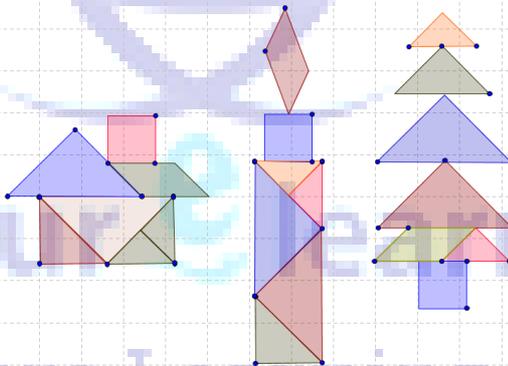
**Figure 1.** Tangram

We have following plane figures – pictures of following objects:



**Figure 2.** Tangram

We try to make them in GeoGebra. The following figure shows objects from Figure 2:



**Figure 3.** Tangram

First we analyze the tangram parts from mathematical point of view and find their names in Slovak and Hungarian language (Table 2):

**Table 2.** Names of Tangrams in Slovak and Hungarian language

<b>Slovak</b>	<b>Hungarian</b>	<b>English</b>
Štvorec	Négyzet	Square
Trojuholník	Háromszög	Triangle
Pravouhlý trojuholník	Derékszögű háromszög	Right triangle
Rovnoramenný trojuholník	Egyenlő szárú háromszög	Isosceles triangle
Obdĺžnik	Téglalap	Rectangle

Later we find the names of pictures and try to formulate sentences in both languages (Slovak and Hungarian) (Table 3):

**Table 3.** Names of Tangrams and try to formulate sentences in Slovak and Hungarian language

<b>Slovak</b>	<b>Hungarian</b>	<b>English</b>
Dom	Ház	House
Komín	Kémény	Chimney
Strecha	Tető	Roof
Smrek	Fenyő	Spruce
Strom	Fa	Tree
Sviečka	Gyertya	Candle
Prasiatko vyšlo z domu a vyliezlo na vrchol stromu. Vlky ho nechytíli.	A kis malac kiment a házból és felment a fenyő tetején. Farkasok nem csapták őt be.	The pig came out of the house and climbed to the top of the tree. Wolves did not catch him.
V dome svieti sviečka.	A házban ég a gyertya.	The candle shines in the house.

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These activities support not only the building of mathematical notions by the students, but they have possibility to express their knowledge in Slovak and Hungarian language and develop their communicative abilities. According Beardsmore (2008) bilingual children have a greater faculty for creative thinking at their disposal. They perform significantly better in tasks which require not the finding of the single correct answer to a question, but where they are asked to imagine a number of possible correct answers, for example, giving the maximum number of interesting and unusual uses for a cup. The activities with future Slovak minority teachers can prepare them for bilingual work with pupils. The mathematics serves it not only for Slovak language teaching, but also for developing of pupils activities. Such examples are possible to find by Krech (2003) and Gazdíková & Mišút (2007).

### **Conclusions**

The GeoGebra research community has already international character which brings the opportunity to exchange the experiences in the field of motivation of pupils and students in Mathematics education. We describe in our article some possibility to use multilingual character of the GeoGebra software. There is suitable for this kind of activities the eTwinning initiative. This is a European action that promotes school collaboration and networking through the use of ICT between schools in Europe. eTwinning encourages the use of all ICT tools as long as they are safe and useful for your collaborative work. The webpage of this initiative is <http://www.etwinning.net>

The Faculty of Education of Catholic University in Ružomberok is a partner in the network CEEPUS HU 28 *Active Methods of Teaching and Learning of Mathematics and Informatics* coordinated by University of Miskolc (see Körtesi (2009)). This is an network of 35 universities in Central and South Europe, which organize several conferences and seminars about ICT in mathematics education and about informatics education.

GeoGebra and using of others open source software are useful also for teachers of some natural sciences, for this reason it is interesting to make research in the

interdisciplinary dialogue between mathematics education and education of natural sciences (see English version of the webpage <http://oddid.ku.sk>). We finish with some recommendations for teacher according to Pólya (1971).

Teacher should:

1. know to the core of teaching and know that the best way for the teacher is the one teacher discovers.
2. know the expectations of students: What do they expect? What is difficult for them?
3. not only pass on the expertise to students, but he should develop their working skills (such as the proper order and fairness of the procedure).
4. teach students to discuss in between themselves.
5. develop pupils' heuristic method for solving a problem, show them general hidden structures in specific situations.
6. not show students a solution ahead of each task, but should let students themselves to discover, so their thinking skills are strengthen.
7. not force students with many theses curriculum, but to encourage and motivate them to learn with understanding.

### **Acknowledgement**

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### **References**

1. Beardsmore B. H. (2008). Multilingualism, Cognition and Creativity. In: *International CLIL Research Journal*, Vol. 1 (1), Jyväskylä University, p. 4 – 19.
2. Billich M. (2008). The use of geometric place in problem solving, In: *Teaching Mathematics: Innovation, New Trends, Research*, Ružomberok, KU, p. 7 – 14.
3. *Content and Language Integrated Learning (CLIL) at School in Europe*. (2006). Eurydice European Unit, Brussels,
4. ISBN 92-79-00580-4. In: <http://www.eurydice.org>
5. Domínguez H. (2011). Using what matters to students in bilingual mathematics problems. In: *Educational Studies in Mathematics*, Vol. 76, Nr. 3, p. 305 – 328.

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Innovations in Learning for the Future 2012: e-Learning  
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6. Gazdíkóvá V., Mišút M. (2007). Preparing of Teachers for Using of ICT in Teaching. In: *Information and Communication Technology in Natural Science Education – 2007*. Šiauliai : NSREC, Šiauliai University, ISBN 978-9986-38-823-4, p. 60-66.
7. Jablonský T. (2006). Cooperative Learning in School Education. Kraków, FALL, 2006, ISBN 83-60117-31-4
8. Körtesi P. (2009). GeoGebra Institute of Miskolc Didactical Research Group of the Department of Analysis of the University of Miskolc in the framework of the European Virtual Laboratory of Mathematics. In: *IMEM 2009*, Catholic University, Ružomberok, p. 582-585.
9. Krech I. (2003). Awaiting the series of colours - stochastic graph as the means of mathematical treatment and argumentation. In: *Ann. Acad. Paed. Cracov. 16 Studia Mathematica III*, p. 119-124.
10. Oldknow A., Taylor R. (2003). *Teaching Mathematics using Information and Communications Technology*. Continuum, London – New York, ISBN 0 – 8264 – 7059 – 9.
11. Pólya G. (1971). *A problémamegoldás iskolája*. Budapest: Tankönyvkiadó,.
12. Tkačik Š. (2007). Why logarithms? In: *Matematyka XII prace naukowe*, AJD, Czestochowa, p. 429 – 434.
13. Weigand H.G, Weth T. (2002). *Computer im Mathematikunterricht: Neue Wege zu alten Zielen*, Heidelberg Berlin, SpektrumAkademischer Verlag
14. Wittman Ch. E. (2001). The Alpha and Omega of Teacher Education: Organizing Mathematical Activities, In: *The Teaching and Learning of Mathematics at University Level: An ICMI Study*, Kluwer Academic Publishers, Netherlands, p. 539—552.

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## Learner Profile Management in a Smart Learning Management Environment

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**Abstract:** Learner profile typically represents individual learner's needs and preferences. The desire to build better learning management systems (LMSs) has driven many researchers to focus on learner profile so the system can provide more relevant learning contents to their learners. Often times, learners are overwhelmed by more than enough learning materials, which made learners difficult to focus on their learning. The provided learning materials can be irrelevant and beyond their comprehension even though they are within the topic of their interests. In such environment, getting more detailed information about the learner would help eliminate learning contents that don't match with learner's knowledge level. When a LMS is lacking the information about the learner's characteristics in its learner profile, it is difficult for the LMS to deliver suitable learning contents to its learners. Even though many attempts have been made to solve these problems, the problem of finding relevant contents that match the required knowledge level of the learner still exists. It is thus important for a LMS to have the learner's characteristics such as knowledge level, learning style, preferences, etc., to provide suitable contents to its learners.

In our paper, we propose a learner profile model which can characterize a learner in learning environment. The learner profile model contains two sections - static and dynamic. Static part contains explicit information provided by the learner, which are considered mostly unchanged, whereas dynamic part contains dynamic data that is updated frequently over time as the learner uses the system. In our approach, learner's dynamic profile is built and maintained by some software agents. The software agents consist of an event listener and an event analyzer. The event listener observes learner's activities while the event analyzer builds and updates up-to-date information to the dynamic profile utilizing the data from static profile and observed learner's behaviors and activities. Since the profiles reflect the learner's characteristics, the content fetcher module of the smart LMS utilize the profile to retrieve and filter more relevant and personalized search results to individual learner. We incorporate two industry learner profile standards - IMS Learner Information Packaging (LIP) and IEEE Personal and Private Information (PAPI) - for the sake of interoperability and flexibility among the LMSs. It can also be used to characterize learners so the learning management system can provide customized learning contents that suit the learner's needs. Such learning management system is considered smart. In this paper, we also present a prototype smart learning management system framework, where proposed learner profile models are utilized.

**Keywords:** Learner Profile, Smart Learning Management System, LIP and PAPI

### Introduction

Recent advances in the Internet technologies have made e-learning management systems more accessible to the learners. Learning management systems (LMS) can help customize the learning contents to individual learners' needs. Since most of e-learning learners are under time constraint and/or geographical constraint, learners expect LMS to

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provide customized learning materials so they can learn with their own learning style. The materials that are available to the learners can be more than enough in quantities and sometimes that confuses and overwhelms the learners, which makes it hard for the learner to focus on desired contents. It is not an easy task to find learning contents that are right for the learner's knowledge level, without being too easy or too difficult. In such environment, it is necessary to know more about learner's characteristics such as knowledge level, learning style, accessibility, etc. to narrow down the learning contents. The LMS with such capability can be termed as a smart learning management system (SLMS). The aim for such SLMS is to understand learner's characteristics and to provide suitable contents that match the learner's needs. It is thus important to have the learner's characteristics in the form of learner profile.

As discussed, learner profile plays a significant role in building any personalized learning content (Wei 2009). Since learner profile describes learner's characteristics, it is important to build a suitable learner profile model and maintains it in such a way that it can be used to retrieve relevant learning contents for the learner. According to Gauch (2007), a profile may include information from demographic, e.g. name, age, education level, etc., to interests, goals, and preferences of either a group of learners or a single person. In our research we present a learner profile model and a smart learning management system framework that can facilitate in the delivery of the relevant contents based upon the information in the profile.

In the proposed learner profile model for smart LMS environment, we incorporated the industry standard learner profile models such as IMS LIP and IEEE PAPI. We have added new features to enhance the intelligence and smartness of the system. When a search is performed, the SLMS references learner profile and retrieves the suitable contents that match with the learner's characteristics are delivered to the learner. Our learner profile model consists of two parts - static and dynamic. In our framework, dynamic learner profile is updated with the help of software agents that keep track of learner events while the learner is using the system.

The rest of the paper is organized as follows: the next section explores the related works; followed by our proposed framework and learner profile structure and finally we present our conclusion and future research directions.

### **Related Works**

There are two industry standards on how to record the learner's learning information: Learner Information Packaging (LIP) proposed by IMS and Personal and Private Information (PAPI) specified by IEEE. The PAPI focuses on six categories (IEEE PAPI 2012) whereas the LIP (IMS Learner 2012) deals with eleven categories as shown in Table 1. These standards allow the reuse and exchange of learner information between heterogeneous learning systems. Many authors utilized these standards in their work on learner profiles including Yen et al. (2010), Song et al.(2012), Wei et al.(2009) and Bouzeghoub et al. (2011).

Table 1: Existing Profile Standards

<b>IEEE PAPI</b>	<b>IMS LIP</b>	
Personal	Identification	Competency
Relations	Goal	Affiliation
Security	Qualification, Certification, License (QCL)	Accessibility
Preference	Activity	Security
Performance	Transcript	Relationship
Portfolio	Interest	

Schiaffino et al. (2008) developed an intelligent agent named eTeacher. eTeacher provides personalized assistance to the students. The author shows how to generate the student's learning style using Bayesian Network and Felder and Silverman model. The paper mostly portrays the survey of the student's feedback and the accuracy of eTeacher in assisting the students. Wan et al.(2010) shows initial work on mapping each learner's existing knowledge with keywords to generate the learner profile to a content-based recommender system. Jeon et al. (2010) shows the comparison of the experimental search results using collaborative filtering method. The user profile in this

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paper reflects the web search results that were selected by the users. The dynamic updating policy was used to update the changes of the user's preferences. Wan et al. (2010) talked about learner's comprehension degree and proficiency level in the learner profile. The paper says that both features of the learner play an important role to filter out the irrelevant learning materials and recommend the relevant one using the keyword map based approach. Yen et al. (2010) developed a system that can provide relevant learning resources based on the learner's profile and learner's current geographical location. The design pattern of learner profile is based on IMS LIP and OpenID. In the profile, the following elements of LIP were used: goal, activity, competency and affiliation. Alian et al. (2010) develops an adaptive e-learning system called AdaLearn. The system records navigation behavior of learner in the profile that helps to recommend the best course that fits learners' needs. Each learning course is assigned with different weights and will receive different focus (bigger sized icon) based on the time spent by the learner. Dung et al. (2012), Zaina et al. (2010), Schiaffino et al. (2008) and Garcia et al. (2005) each describe an approach on how to identify the learning style of a learner using the Felder-Silverman model and Bayesian Network with the help of the intelligent agent while Graf et al. (2008) identifies learner's learning style using "simple rule based mechanism" with the Felder-Silverman model.

The above research papers have talked little about the model of a learner profile. Wei and Yan (2009) proposed a design model of a learner profile by extending the IEEE PAPI specification but our proposed learner profile model combines IEEE PAPI and IMS LIP specifications along with the concept of static profile and dynamic profile. According to Gauch et al. (2007) "profiles can be modified or augmented are considered dynamic, in contrast to static profiles that maintain the same information over time".

## **Proposed Learner Profile Approach**

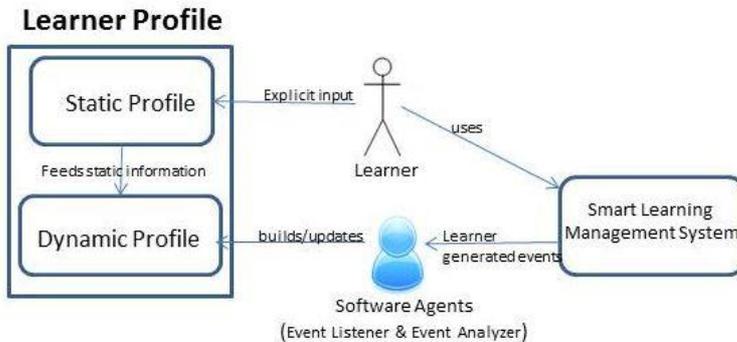
### **Learner Profile**

Delivering relevant learning materials to their learner is the most important thing for any LMS. For that, it is required to know about learner's characteristics such as knowledge level, learning style, accessibility, etc. to find the relevant learning contents to meet the learner's needs and preferences. The LMS with such capability can be termed as smart learning management system (SLMS). The aim for such SLMS is to understand learner's characteristics and to provide suitable contents that match the learner's needs. Learner's information that characterizes individual learner can be stored in the form of learner profile.

In our proposed learner profile model, we suggest two types of profiles - static and dynamic. Static profile contains the static or mostly static information about the learner, which can be provided explicitly by the learner, and the dynamic profile contains information about the learner's dynamic characteristics that can be acquired during the learning process. As Jeon et al. (2010) suggested in their paper - "user's preferences may vary over time, context or domain, so the information in the static profile has a high chance of having incorrect learner's preferences", by using static information alone, it may not be possible to provide correct information about the learner, which necessitate the use of dynamic profile. In our approach, we propose the use of software agent to keep track of learner's activities by collecting their events as they use the LMS and analyze the collected events to come up with the update of the learner's dynamic profile so the dynamic profile always has up-to-date information about the learner. The LMS makes use of the profiles when retrieving the relevant learning objects for a particular learner to meet the needs and preferences of the learner.

Our proposed software agents consist of event listener and event analyzer. Events generated by the learners while accessing the LMS are captured with the help of event listener. Collected events are then analyzed by the event analyzer. It identifies which attributes in the dynamic profile are relevant and updates the corresponding attributes. Dynamic profile is in turn used by learning material searching module. In our

proposed framework, it is known as learning material fetcher. The fetcher references dynamic profile and customizes the learning materials for individual learners so only the relevant learning materials can be provided. Our proposed profile is depicted in Figure 1.



**Figure 1:** Learner Profile-Static and Dynamic

To provide only the relevant materials to the learners, the LMS needs to have the following features: one is to build learner profiles – static and dynamic - and the utilization of the learner profile in retrieving the learning materials in such a way that the resulting learning materials match with the learner’s needs and preferences. So our proposal includes a learner profile model and a smart learning management framework. The subsequent sections discuss the details of the proposed profile model and the framework.

### **Learner Profile Model**

Our proposed learner profile model is shown in the Figure 2 and Figure 3, respectively. They show the required fields for the static profile and dynamic profile in characterizing the learners. The static profile fields include learner’s key biographic and demographic information, accessibility preferences, learning objectives and goals, education level and learner’s security credentials. The dynamic profile contains learner’s knowledge level about topics, search topic, learner’s learning style, relations between the other core data structure such as transcript, certification providers, and relationships with outside entities and security information, and security information.

Dynamic profiles are maintained and updated by software agents as learners use the system. Learners generate events while they use the system. The agents then capture the events and store those for analysis. The collected events are analyzed by the analyzer and update corresponding fields in the dynamic profile.

In our dynamic profile, there are new fields on top of the referenced standards, which include learning style, knowledge level identifier, search topic and security features that are added so the learning object fetcher module in our proposed SLMS framework (see **Figure 4**) can retrieve the relevant learning contents. The fetched learning contents will match with the learner’s knowledge level of the searched topic, preferred resource presentation format, preferred language and learning style. The metadata part of any learning objects will be used to match the contents in the profile with that of the related learning objects. Once the learning objects are fetched, the sequencer in the proposed framework will sequence and rank the learning objects in the order of dependency among them and relevancy to the topic and delivers the search results of the topic to the learner.

Personal Information
Formatted Name : First, Last, Middle & Preferred Name
Address: Apt/House#, Street/Road Name, City, State/Province, Zip Code, Country
Contact Information: Email, Cell #, Home #, Fax#
Demographic: DOB, Gender, Age
Education: Level, Major, Minor, Skillsets, QCL
Accessibility Preference
Language Preference
Technology Preference: preferred device
Disability Preference: color blind, large font display, preferred study time, etc.
Resource Format: pdf, html, doc, ppt, multimedia
Goals
1. Primary Objective: Description, Priority set (1,2,3)
2. Secondary Goal: Description, Priority set (1,2,3)
3. Third Goal: Description, Priority set (1,2,3)
Authentication / Identification
Learner ID: username/ source name
Password: protected

**Figure 2: Learner Static Profile Structure**

Performance & Evaluation
Learners ID
Learner’s Knowledge Level and Topic
Learning Style
Performance
Relationship
Transcript
Affiliations
Transcript
Reference: teachers, proctors, etc.
Security
Login & Logout
Device
Location
Status

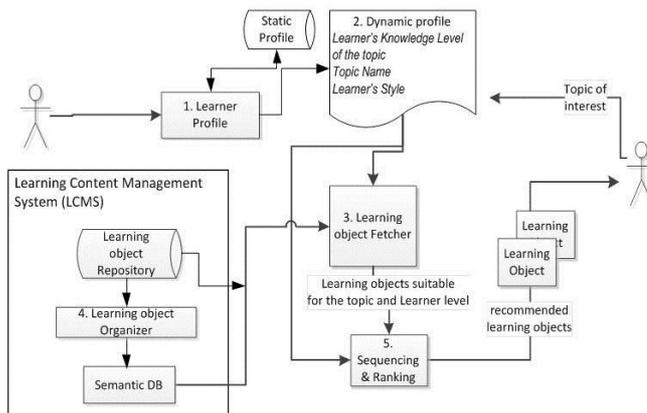
**Figure 3: Learner Dynamic Profile Structure**

## Smart Learning Management System Framework

Figure 4 presents the smart learning management system (SLMS) framework proposed by Song et al (2012). The smart LMS is said to be smart as it can provide only the relevant learning materials to the learners. Such smart actions can be possible by maintaining precise learner information. In the framework, there are four main factors that enable such actions:

- learner profile – static and dynamic
- software agent – event listener and event analyzer
- learning object fetch that utilizes the learner profiles
- Semantically organized learning contents management system

The concept of intelligent agent has been proposed by many researchers (Bouzeghoub 2011, Wan 2010, Wei 2009, Pankratius 2004, Agarwal 2004). In our approach, we mainly focus on HTML 5 events in updating the dynamic profile fields. The process of update should be carried out with no supervision or interventions from the learners. So the updated information can be self-organized and utilized by the LMS automatically.



**Figure 4:** Smart learning management system (SLMS) Framework

The event listener – a part of the agents in the Figure 4 - observes and collects the learner’s interactions while the learner is accessing contents in the smart LMS. The interactions are monitored by listening to the events that are associated with those. These events are stored in the database by the event listener. A sample list of captured learners’ events is shown in the Table 2. The left column represents the raw HTML5 (HTML5 2012) events and the right column shows the captured learner events by the agent listener. The event analyzer updates dynamic profile by analyzing the collected events and the information from the static profile. It keeps track of any changes made by the learner over time in an iterative manner. The process starts when the learner logs on to the system and ends with log out or time out.

The smart learning process works as follows: When a learner logs into the system for the first time, the LMS creates the profiles – static and dynamic. The learner fills out the necessary information in the static profile. This profile is considered to be mostly static so the learner provides the information only once. The event listener will be activated as soon as the static profile is created. Dynamic profile is then updated by referencing the content of the static profile and the analyzed data from the collected events. Every interaction the learner makes with the system is captured by the event listener and stored in the database. The dynamic profile is saved in XML format. A sample data in XML format of technology preference field which is a part of dynamic profile is shown in Figure 5.

```
<learnerinfo>
  <sourceid>
    <id>101</id>
  </sourceid>
  <accessibility>
    <contenttype>
      <referential>
        <indexid>accessibility_01</indexid>
      </referential>
    </contenttype>
  </preference>
  <typename>
    <typevalue>Input Tech Pref</typevalue>
  </typename>
  <contenttype>
    <referential>
      <indexid>Pref_01</indexid>
    </referential>
  </contenttype>
  <prefdesc>Large Font Display Device</prefdesc>
</preference>
</accessibility>
</learnerinfo>
```

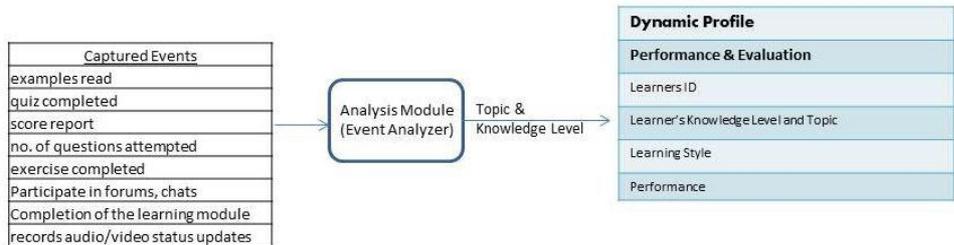
**Figure 5: Technology Preference field in XML format**

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**Table 2:** Comparison of raw events vs. captured events

<b><u>Raw HTML5 Events</u></b>	<b><u>Captured Learner Events</u></b>
onload and onclick	examples read
onsubmit on complete button	quiz completed
onsubmit on complete button	score report
onclick on individual questions	no. of questions attempted
onsubmit on complete button	exercise completed
onclick on a link	select the items from search results
onsubmit on search button	search keyword
Onsubmit	Submit static profile
onmousewheel/onscroll	reading materials-page is moving
onplaying, onended, ondurationchange	records audio/video status updates

XML format provides flexibility, interoperability, simplicity between systems and applications. Learners' interactions with the system such as searching for the topics, studying the searched topic modules, taking exams and so on, the event listener collects all these behaviors and saves it in the database. The collected events and the user's log information will be used by the event analyzer to analyze and generate the appropriate data for the corresponding dynamic profile fields. As the learner is studying the course modules, Qualifications or Certifications or License information, performance report on quiz/ exams, exam delivery time, number of time answer changes, number of questions attempted, access to examples, completion of the total units of the module, etc. will be analyzed by the analyzer to evaluate the knowledge level of the learner about the searched topic. Once the knowledge level of the learner about the topic is identifies, it is updated in the dynamic profile as shown in the Figure 6. The learning style is evaluated with the help of Bayesian Network and Felder and Silverman model as described by Garcia (2005), Schiaffino (2008) and using literature based method combing Felder-Silverman model by Dung (2012). All the captured events will be analyzed to figure out the learning style of the learner.



**Figure 6:** Event Analysis Example

## Conclusion

For any smart LMS, a learner profile plays an important role in providing the learning materials that satisfies learner's needs, and reflects learner's characteristics. In this paper, we proposed such a model for a learner profile while maintaining the industry standards. We have divided our profile information into static which is explicitly provided by the learner and the dynamic that is maintained by the software agents by utilizing the data from the static profile and the interactions of the learner with the system during their learning activities. Such profile model not only helps the system to retrieve the relevant contents but also makes the system smart enough to update any changes done by the learner with the help of software agents. Each field in the profiles plays a role in retrieving the most precise and relevant learning contents to the learner. Our research work is to facilitate the development of a smart LMS. We also have shown our prototype architecture called smart LMS (SLMS).

## Future Work

Our future research directions involve effectiveness of dynamic learner profiling in achieving the personalization, and learning adaptation for the disability learners. We will also work on Bayesian Network or other similar processes to evaluate the learner's knowledge level and the presentation of the learning objects using ontologies and semantic search.

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## **References**

1. Agarwal, R., Deo, A., & Das, S. (2004). Intelligent Agents in E-learning. *ACM SIGSOFT*.
2. Alian, M., & Al-Akhras, M. (2010). AdaLearn: An Adaptive E-Learning Environment. *ACM*.
3. Bouzeghoub, A. & Gancarski, A.L. (2011). An Agent based service architecture for user profiles dynamic share. *Seventh International Conference on Semantics, Knowledge and Grids*.
4. Dung, P. Q. & Florea, A. M. (2012). An approach for detecting learning styles in learning management systems based on learners' behaviors. *International Conference on Education and Management Innovation: 30, IACSIT Press, Singapore*.
5. Garcia, P., Amandi, A., Schiaffino, S., & Campo, M. (2007). Evaluating Bayesian networks' precision for detecting students' learning styles. *Computers & Education 49*, 794-808.
6. Gauch, S., Speretta, M., Chandramouli, A., & Micarelli, A. (2007). User Profiles for Personalized Information Access, *The Adaptive Web, Methods, and Strategies of Web Personalization*( pp.57-89). Springer.
7. Graf, S., Kinshuk, & Liu, T.-Chien. (2008). Identifying Learning Styles in Learning Management Systems by Using Indications from Students' Behaviour.
8. HTML5. (2012). Retrieved from [http://www.w3schools.com/html5/html5\\_ref\\_eventattributes.asp](http://www.w3schools.com/html5/html5_ref_eventattributes.asp) on September 7, 2012
9. Jeon, H., Kim, T., & Choi, J. (2010, December). Personalized Information Retrieval by Using Adaptive User Profiling and Collaborative Filtering. *Advances in Information Sciences and Service Sciences*. Vol.2, No.4.
10. IEEE PAPI. (2012). Retrieved from <http://www.cen-ltso.net/Main.aspx?put=230> on September 7, 2012
11. IMS Learner Information Package Specification. (2012). Retrieved from <http://www.imsglobal.org/profiles/> on September 7, 2012
12. Pankratius, V., Sandel, O., & Stucky, W. (2004). Retrieving content with Agents in Web Service E-learning Systems.
13. Schiaffino, S., Garcia, P., and Amandi, A. (2008). "eTeacher: Providing personalized assistance to e-learning students". *Computers and Education*.

14. Schiaffino, S., Amandi, A., Gasparinni, I., & Pimenta, M.S. (2008). Personalization in e-learning: the adaptive system vs. the intelligent agent approaches. *IHC*, 21-24
15. Song, Y-Tae., Wang, Y., Hong, S., & Yoon, Y-Ik. (2012). Smart Learning Management System Framework. *International Conference on Data and Technologies and Applications*.
16. Wan, X., Jamaliding, Q., Anma, F., Zhao, X., & Okamoto, T. (2010). Using comprehension degree to improve the quality of recommender system for group learning support. *Second International Workshop on Education Technology and Computer Science*, 3-6.
17. Wan, X., Jamaliding, Q., Anma, F., & Okamoto, T. (2010). Applying Keyword Map Based Learner Profile to a Recommender System for Group Learning Support. *Second International Workshop on Education Technology and Computer Science, IEEE*.
18. Wei, X., & Yan, J. (2009). Learner Profile Design for Personalized E-learning Systems.
19. Wei, X., & Yan, J. (2009). An E-learning System Architecture Based on Web Services and Intelligent Agents.
20. Yen, N. Y., Shih, T. K., & Chao, L.R. (2010). Adaptive Learning Resources Search Mechanism. *ACM*.
21. Zaina, L. A. M., Rodrigues, J. F. Junior, & Bressan, G. (2010, September). An Approach to Design the Student Interaction Based on the Recommendation of e-Learning Objects. *ACM*.



## **Critical Issues of Instructional Design and Development Process in the Creation of Learning Materials for Teaching Mathematics Concepts to Students via Multi-Touch Table**

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**Abstract:** *Development in technology and computers affects each part of our life. Also, development in technology and computers affects Information and Communication Technology (ICT) so ICT leads to innovative change. Especially, researchers try to integrate and apply these innovative changes of ICT into education environment. Education with ICT provides opportunities to students learn independently and have equality in learning environment. This study is prepared to serve this purpose and presents the critical issues of instructional design and development process about material for learning mathematics by using multi-touch table for elementary students. The aim of this study is to understand how multitouch screen technology is used by elementary school students in math lesson and explore what critical usability issues are. This study is carried out with a multi-touch screen and data are collected from 70 students from 1<sup>st</sup> graders to 5<sup>th</sup> graders in math club in a private elementary school. Observations made during the students' usage of multitouch table technology and three math teachers' opinion are used as data source of the study. Tangrams and math concepts such as less- more, geometric shapes are used as learning materials for math lesson to improve spatial skills of students. The Tangram application which is used as a learning material offers puzzles choices of simple and complex level. Tangram can play multiuser so in implementation of study, students work in pairs for both of the simple and complex levels. Also, less-more concept can study multiuser, too. For that application, four students use multitouch table at the same time. Other math concept, geometric shapes, students study individually. According to observation results, there are some differences about students' desire and behavior from 1<sup>st</sup> to 5<sup>th</sup> graders. First graders need to clear and simple verbal instruction to use technology correctly. On the other hand, 5<sup>th</sup> graders need to more challenging and adventurous materials for Tangrams and the math concepts to provide their interest on material. General usability issues of this study are that the height of multitouch table is a problem for small graders to see and do practices. Another issue is that free practice is needed to understand how that technology works. In addition to these findings, it is observed that students are willing to use multitouch technology. As a result, using multitouch technology in math education seems to have promising future. While developing new materials for students, these critical issues such as doing free practice, adjustable table height, suitable materials for grade levels and other findings are taken into consideration.*

**Keywords:** Math learning materials, technology integration, critical designing issues, Multitouch table, collaborative work

## **Introduction**

Technology and computers are developing constantly and take more part in our lives day by day. As development of Information and Communication Technology (ICT) in other areas, innovation in ICT are followed closely and tried to be applied in educational environment. The integration of ICT into education provides help to students to learn independently and to have equal opportunities. In this study, multi touch screen technology is used to improve Tangram puzzles material in math education. The aim of this study is to understand how this technology in math lesson is used by elementary school students and explore critical usability issues.

## **ICT and Mathematics Education**

In mathematics teaching and learning Wiest (2001) states that computers can be great aids and so using computers in math education is considered a part of the evolution of mathematics education. Using ICT in math education makes changes on the nature of math education and also the nature of learners' mathematical skills. Technological developments make impact on mathematic education in terms of the nature of learner's mathematical thinking and understandings (Heid, 1997). Van deWalle (cited in Wiest, 2001) states three issues that using technology in math education affects the nature of math education. These three issues are losing ground of some math skills, having more reachable and accessible math topics and skills, and the idea of that math can be learnt easily with using computers visualization tools to improve students' spatial visualization skills.

Evidence from prior research suggests that spatial ability can be improved through the use of appropriate instruction (Ben-Chaim, Lappan, & Houang, 1988). Many studies indicated that spatial ability of an individual can be improved with the help of some instruction, using concrete materials (Battista, Clements, Arnoff, Battista, & Borrow, 1998), manipulative (Bishop, 1973), digital manipulative (Dixon, 1995; Olkun, 2003), various toys (Roorda, 1994) and computer programs (Onyancha, Derov, & Kinsey, 2009, Raquel, 2001). In helping children with spatial ability, recent

technologies provide useful alternatives. Recently, ICT have even more potential to have an impact on instruction by making concepts and skills more accessible. Touchscreens with multitouch capabilities are examples of such recent media that have potential in educational environments.

Another point using technology in math education provides that using technology helps education to be more student-centered in powerful way (Heid, 1997). In addition to that, Heid (1997) stated that technology gives opportunities to students to have more math experiences and learning from their experiences. Noss (cited in Heid, 1997) explain that when compared with other technologies, computer is suitable for giving feedback in an interactive way to take learner's attention on math. In addition, Boyd et al; Light and Blaye (cited in Heid, 1997) indicate that working collaboratively with computers affect students' high level of task related interaction and higher achievement.

### **Multitouch Screen Technology and Applications**

In this study, instructional materials are developed by using multitouch screen technology. The developed learning materials are about less-more concept, geometric shapes and Tangrams separated into two: simple and hard. The instructional materials were developed by using Adobe Flash versions. The study was performed with a six-point multi touch table as can be seen Figure 1.



**Figure 1:** Six-point enabled Multi Touch Table

Multitouch screen was chosen for that study because of its easy use and more authentic interaction capabilities. In addition, students can use that ICT technology with their fingers on touch-screen technology instead of using keyboard or mouse. That feature also provides flexibility to users. Another feature of Multitouch screen is that it provides a collaborative learning environment. Because of six-point touch ability, children can work together and do their tasks collaboratively by improving their social interaction with group.

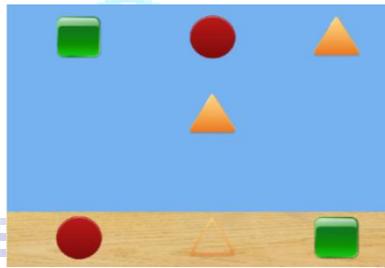
As seen Figure from 1 to 7, learning materials are about less-more concept, geometric shapes and Tangrams (separated into two: simple and hard).

One of the screens of less-more concept teaching step can be seen in the Figure 2. The task is dragging and dropping the less or more group into the basket according to instruction given in both verbally and in written form. After the task is finished, the characters get in spaceship and fly.

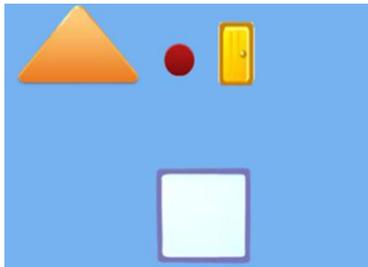


**Figure 2:** Less- More Concept via Multi Touch Table

Another screen is about geometric shapes. Triangle, square and circle were used to develop that material (Figure 3). According to instruction, drag and drop the geometric shapes on the correct place. After each correct placement, clapping sound as a positive feedback is given. If there is a wrong placement, there is only a soft beep sound. After that material, students go through another geometric shapes material (Figure 4). Here, the task is that a student make a house with using shapes according to given instruction. When the task is finished, a cat goes out from the house and claps the student (Figure 5).



**Figure 3:** Geometric Shapes Concept

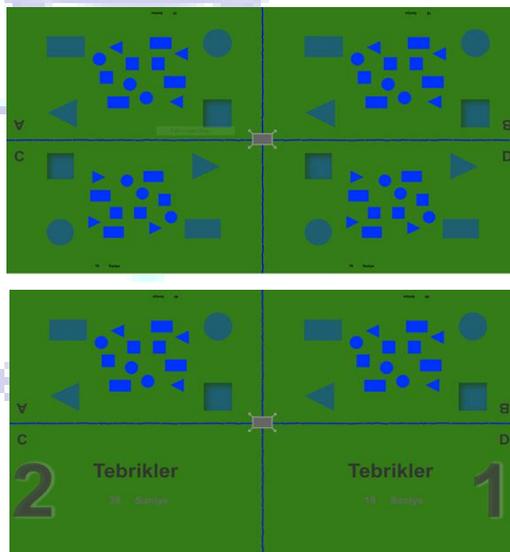


**Figure 4:** House with Geometric Shapes



**Figure 5:** Clapping cat for Feedback

The other material for geometric shapes required multiple studies on the same screen (Figure 6). Here, screen is divided into four parts. Four students go their location and start together to do their tasks. Students drag and drop the shapes in suitable place in their screen. At the end of the task, students hear clapping sound. In addition, when the student finishes his/her task before others, time and order are written in screen.



**Figure 6:** Categorizing Geometric Shapes

The screen is about Tangrams. This material provides students to work collaboratively. In this part, simple and hard Tangrams were developed as materials. For simple Tangram (Figure 7), there is line on the picture to give clue which piece should be put in that location. When the shape is dragged to correct place, it automatically locate there. After completing the Tangram puzzle, clapping as positive feedback is given to students and statistics about the puzzle completion is shown.



**Figure 7:** Simple Tangram Sample

For hard Tangram (Figure 8), there is no line on the picture to give clue which piece put in each place. When the shape is dragged to correct place, it is not automatically located the correct place. After completing the Tangram puzzle, clapping as positive feedback is given to students and statistics about the puzzle completion is shown.



**Figure 8:** Hard Tangram Sample.

Observation was used to collect data and nonparticipant observation study was conducted. In this study totally 70 students from different grade levels participated in the study with 3 mathematic teachers. Participants were 1<sup>st</sup> to 5<sup>th</sup> graders from school mathematics club. The study was practiced in a math laboratory. Participants were observed to see what they like or not like using Multitouch screen in math lesson, whether they can use that technology easily or not, and whether that technology affect students' motivation, interaction and collaboration skills while using the learning materials.

### **Findings**

In this study, observations and at the end of the study teachers' opinions were used as data source. Math club hours were observed. 3<sup>th</sup>, 4<sup>th</sup> and 5<sup>th</sup> graders) studied with Multitouch screen applications for one lesson hour while 1<sup>st</sup> and 2<sup>nd</sup> graders studied for 2 lesson hours.

According to observation result and teacher feedbacks, some differences from 1<sup>st</sup> graders to 5<sup>th</sup> graders were identified. Firstly, clear and understandable verbal instruction is required for 1<sup>st</sup> graders to use the learning material on multi touch screen. Since many of 1<sup>st</sup> grade students are illiterate and researchers do not know exactly how they can read and write on the screen. Secondly, 5<sup>th</sup> graders needed more challengeable Tangram and concept application because of their prior knowledge about concept and skills of solving Tangram puzzle are more developed than lower graders. Thus, more challenging and adventurous Tangrams and other concept application will be able to satisfy students' interests and demands. Thirdly for grade level difference is about hardware usability issue that using touch table is a problem among students because of difference of students' height. Teachers suggest that the height of multitouch table should be adjustable for students. For example, 1<sup>st</sup> grade students need short multitouch table.

We observed that students in all grade levels are needed to do free-practice before the study with Multitouch screen in order to understand how it works and how

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they can touch on it. Many of them in all grades do not have experience on using touch or multi touch screen. So, they try to use touch screen with their finger nail and pinch. These types of usage are difficult to drag – drop and turning the shape in learning material via multitouch screen. Hence, doing free practice on multitouch screen can improve skills of using it.

In addition to individual activity, students worked in a group for Tangrams (Simple and Hard). In this part, students were asked to study in groups of two. After a few seconds, they can organize and work together. While working together, students finished Tangrams quickly and regularly. During the study, in general, students seemed to be willing and exciting while working on this technology.

### **Suggestions**

Suggestions and feedbacks that were taken from teachers will shape our material into a more suitable one. Math teachers' opinion about using this technology in their lesson seems positive. Teacher stated that they want to use this multi touch screen technology for practice and evaluation parts of their lessons.

Especially, teachers also suggest that some abstract subjects such as graphs, 3D objects, parallel or eclipsed can be embodied with using this technology because converting an abstract thing in a concrete thing in students mind is too difficult. Spatial ability of students can be improved using concrete materials developed by technology. Their suggestion is that if this technology used in lesson, students will improve their learning skills about abstract topics. They think that if they used that technology in their lesson, students' interest, curiosity and demands towards lesson could be increased. Moreover, students can learn how to work collaboratively through related activities.

### **Conclusion**

In this study, researchers worked with 1<sup>st</sup> to 5<sup>th</sup> graders in math club and three math teachers in a private elementary school. The goal of this study is to understand how this technology in math lesson is used by elementary school students and to explore critical

usability issues. The study investigates critical issues and findings to be taken into consideration, when creating a new multi-touch visual learning material for elementary students.

Observation for this study showed that technology can be used in math education. If the materials are appropriate for the level of student and capability to use, they are willing to use these materials repeatedly. In addition, teachers emphasize that students' interest, curiosity and demands towards lesson can be increased. Teacher suggestion is that this technology can facilitate abstract topic transform into concrete mode so that technology can be used for that.

## **Reference**

1. Battista, M. T., Clements, D. H., Arnoff, J., Battista, K., & Borrow, C. V. A. (1998). Students' spatial structuring of 2D arrays of squares. *Journal for Research in Mathematics Education*, 29, 503-532.
2. Ben-Chaim, D., Lappan, G., & Houang, R. T. (1988). The effect of instruction on spatial visualization skills of middle school boys and girls. *American Educational Research Journal*, 25(1), 51-71.
3. Bishop, A. J. (1973). Use of structural apparatus and spatial ability: A possible relationship. *Research in Education*, 9, 43-49.
4. Dixon, J. K. (1995). *English language proficiency and spatial visualization in middle school students' construction of the concepts of reflection and rotation using the geometer's sketchpad* (Unpublished doctoral dissertation). University of Florida, Florida.
5. Heid, M. (1997). The Technological Revolution and the Reform of School Mathematics. *American Journal of Education*, 106(1), 5-61.
6. Olkun, S. (2003). Making connections: Improving spatial abilities with engineering drawing activities. *International Journal of Mathematics Teaching and Learning*, April, 1-10.
7. Onyancha, R. M., Derov, M., & Kinsey, B. L. (2009). Improvements in Spatial Ability as a Result of Targeted Training and Computer-Aided Design Software Use: Analyses of Object Geometries and Rotation Types. *Journal of Engineering Education*, 98(2), 157-167.
8. Raquel, A. J. (2001). *Thinking in three dimensions: Exploring students' geometric thinking and spatial ability with the Geometer's Sketchpad*. Unpublished Doctoral Dissertation, Florida International University.
9. Roorda, J. (1994). Visual Perception, Spatial Visualization and Engineering Drawing. *Engineering Design Graphics Journal*, 58, 12-21
10. Wiest, L. R. (2001). The Role of Computers in Mathematics Teaching and Learning. *Computers In The Schools*, 17(1/2), 41.

## **EduNET : Learning Cloud for Primary and High School Education using Tablet PC's**

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**Abstract:** *New technological improvements and rapid development in smart devices occupied every instance of daily living. Business world using these systems since 80's. However future users of these systems nowadays students continued to educated by the traditional methods. This paper explains the new frontiers of technological tools for primary and high school education in order to improve the static education programs to support relevant strategies in order to scaffold education through organic processes. These organic processes will combine systems in order to make education a unique solution even a unique program and path for every student. To provide diversified educational content, combine different contents under a common frame and transfer them to students under teacher supervision through using effective technologies. This paper explains the term "Learning Cloud" which is an unlimited area in which all the data is kept via cloud computing architecture. Cloud computing refers to the delivery of computing and storage capacity as a service to a heterogeneous community of end-recipients. The name comes from the use of clouds as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts services with a user's data, software and computation over a network. It has considerable overlap with software as a service, hardware as service, infrastructure as service or in other words x as a service. All these services combined for a unified educational solution. The server structure and concept of the Learning Cloud is designed to support both the vertical and the horizontal enlargement of the education process. All the applications on the learning cloud system architecture are connected to an internationally safe and valid database via services.*

*Students use intelligent tablets with mobile abilities to reach the cloud, so this paper explains a roadmap for choosing the optimum tablet with operating system requirements. After choosing the proper operating system hardware requirement analysis key issues defined and explained. Learning cloud concept includes major level subjects such as technology level, application level and academic level. Technological level includes telecommunication infrastructure, server topology, security, sustainability issues explained with implementation concerns in the paper with a best application practices. Application level based on four minor areas. And all these minor areas also have some sub levels. Minor areas are safety, sustainability, manageability and scalability areas. Each area has more sub levels should be analyzed and modeled for proper solutions. International standards are also another focus area for choosing and implementing the academic standards and interoperability issues. Since "Learning Cloud" concept based on sharing hardware*

*and software resources based on the standards under the limitations of user rights. These limitations also controlled by proper policies defined on the cloud level. The paper also includes the best practices, results and sample cases with statistics from a pilot school.*

**Keywords:** Cloud computing, tablets in education, organic education, learning cloud, mobile learning

### **Introduction**

Certainly education is the most important part of the human evolution and may be crucial part of shaping the future of human beings. Within all those years of evolution everything around the human nature has a rapid changing structure, form and complexity. As a result of these education process also should have a self-adapting structure in order to fit in the evolutions complexity and sustainability. There are common stages in the education according to source and the media of the knowledge in simple the evolution can be summarized as from weak signals to rich imaginaries of educational futures.(Gidley, 2012) After the invention wide use of the printing press, the education become more global and shared process. Use of digital media, all kind of microprocessor handled electronic devices and the huge spanning of internet transforms the source and the shape of knowledge in to a totally new form. Also the context and the aim of the education is also shaping into new forms and having new boundaries. A famous quote by Albert Einstein also remarked by once again by Gidley, explains the situation in a different way “the significant problems we have cannot be solved at the same level of thinking with which we created them.” so as the education needs a continuous sustainable development with higher level of globalization.

The role of education in development is also substantially changed by the process of globalization in as much as it is associated with the tendencies above. As it is generally argued, knowledge and skills become more important for economic development as countries compete internationally in knowledge-based goods and services. Education and skills become more important also as a means of attracting the

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foreign direct investment which is one of the primary engines of development for many countries. (Little & Green, 2009) The success of the future nations shaped by the level of their success in the sustainable education. Since the whole structure of the economy transforming itself from human power oriented work to service, information and quality oriented structure expectations of the new economic trends from the future employees will be totally different. There are several studies in the literature shown that differentiated and adaptive learning will be only key factor for obtaining the need of future economy (Tulbure, 2011; Tseng, Chu, Hwang, & Tsai, 2008; Peredo, Canales, Menchaca, & Peredo, 2011; Beldagli & Adiguzel, 2010; Hsu & Ho, 2012).

The idea of improving, enriching and supporting the education with the use of intelligent technologies especially the various mobile devices is a very hot topic in many countries. The keyword “Mobile electronic devices” is used as a collective term for all mobile phones, laptops, personal digital assistants (PDAs), tablet PCs and data acquisition devices like GPS receivers (Bleck, Bullinger, Lude, & Schaal, 2012). The idea behind the need for mobility is same as the need for differentiated and personalized learning. Mobile devices best fit for personalization. Common use devices supports personalization by the aspect of the intersection of common needs of education. However one fits all is not accepted idea in the future education. As a result differentiated and adaptive education can be obtained by not only with the proper hardware also with the aid of intelligent software applications.

Mobility comes with lightweight devices, nowadays ultrabooks and tablets as mobile weights less than 1 kg and have a battery life of 6-10 hours which is comparably enough for primary and high school education. However mobility have a very common disadvantages namely weakness in speed, capacity, security, durability and data synchronization problem between mobile device to servers and desktops. As the technology improves there are various improvements for these disadvantages however solving nowadays problems does not help us to totally remove the ones that will raise in the future since the requirements will also changing. In the middle of 80’s MIDI is one

the most well know file format for sound files and music devices. However if you try to sold midi players instead of mp3 players the profit will be distressing. People cannot imagine the mobile phones even the video calls from mobile devices however making the HD quality calls will be stay in part with 4G starting from 2015. To overcome the inability of the mobile devices with the increasing speeds in internet communication the “Cloud Computing” concept takes the responsibility of solving the disadvantages of mobile devices. Providing the needs and adopting the solutions by means of various services is the main idea behind the cloud computing.

Cloud computing as mentioned above provides the solutions as services. The major idea behind the cloud is its big enough to satisfy all you requirements but affordable as you pay without making an investment just “Pay as you use” motto. There are several definitions, types of services and payment models can be found in the literature (Barrie Sosinsky, 2011; Sultan, 2010; Paul & Ghose, 2012; Peter Mell & Timothy Grance, 2011).

### **Adopting the Cloud in Education**

Using the cloud services in education is not a highly creative idea. The needs of education like the flexibility, sustainability, rapidly changing environment and requirements are the major benefits of cloud computing. Schools are highly distributed among the different locations of the civilizations. So the sharing of physical resources among the schools under the control and support of some authority like Ministry or Department of Education depending on the country policies. Making the same investment by means of IT infrastructure like firewalls, file servers, backup units moreover the 7/24 IT support by different levels of IT knowledge is not feasible. However the information that a school will track and store is vital, losing any part of the educational background of a student unacceptable if you transfer the educational process to paperwork to digital media. Since the adaptive and differentiated learning makes every student unique, their information date will also be unique and can't be replaced or restored from a similar student.

## **Ideal Approach and Pilot : Learning Cloud For Education Using Tablets**

An ideal approach for should include the following steps as shown in the figure planning, preparation and implementation steps. One of the common and vital mistake that has been made by many decision makers is to start with “Choosing the Tablet” stage. Since the hardware cost especially the cost of the tablets for every student is more than the 75% of the project budget in common sense starting with the tablet selection looks wise however the reality is on the contrary and result in the failure of the project. The results and best practices have been test in e pilot school in Ankara with 1000 students using tablets. In Figure 1 an ideal Roadmap for the project has been shown. The other details and focus areas can be stated as follows;

### **Hardware Requirements**

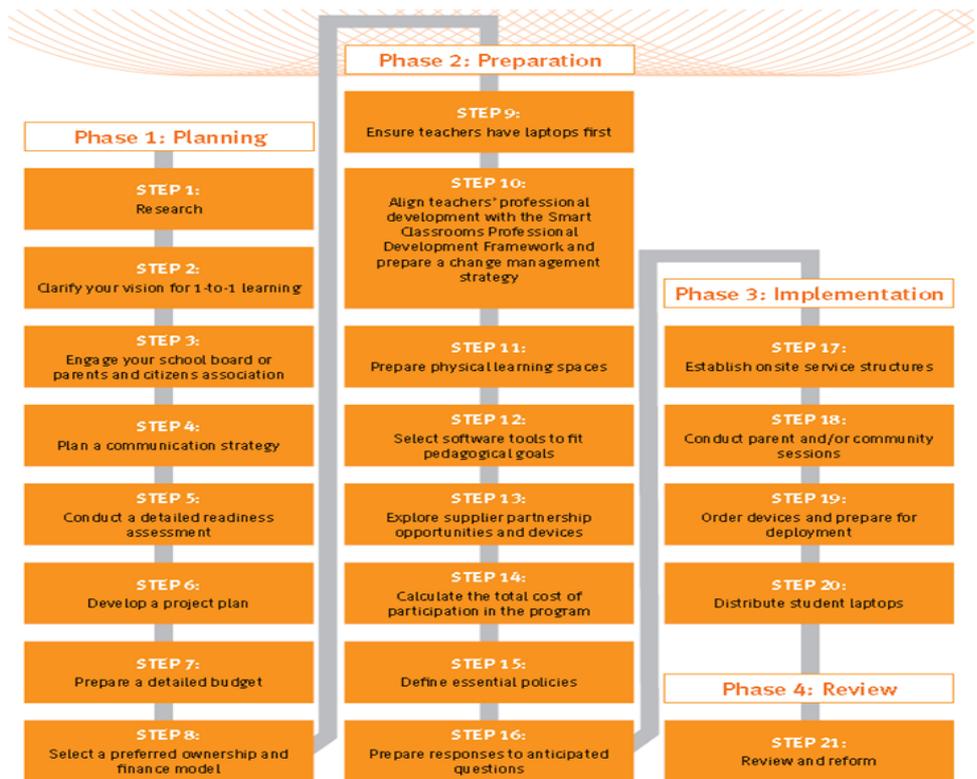
Most appropriate hardware for the combining the mobile devices and the education is the tablets. Lighter than any ultra-book, netbook, notebook but more capable then the e-book readers so that they are actually mobile workstations for students and supporting the idea of “Always on Education” (U.S.Department of Education, 2010). The requirement analyses for the tablet shown that the major capabilities of the tablet should include the following details like screen resolution, battery capacity, connection types but the most important ones are;

**Keyboard:** Students expected to use the tablets to write essays and reports. Use of onscreen keyboards are not effective as physical keyboards.

**Dock :** While reading or following a lecture, tablets should stay in a proper angle and distance from the students. Docks will used for this ergonomic position and also provide HDMI connection for connecting bigger LCD or LED displays also providing charging utility with extension slots like USB.

**Digital Pen :** Multi touch screens can handle finger movements and interaction, but what happens when the student put his hand on the screen and wants to write handwriting, most of the tablets in the market first detects the hand and cannot write

afterwards, however digital pens overcome this issue and student can use the tablets as ordinary note taking environment without changing their writing position.



**Figure 1: Roadmap for Tablets in Education**

## **Software Requirements** *Operating System*

There are several operating system alternatives for tablets and most common ones are Windows 8, Android and IOS. Windows 8 has been developed by Microsoft especially for mobile devices, Android is an open source application and widely used by different hardware manufacturers, IOS is the operating system developed by Apple for iPads and

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other mobile devices. There are also other operating systems can be found for mobile devices like GSM phones, handhelds or organizer this paper focuses on the tablets for education. According to the requirement analysis an ideal operating systems should include the higher manageability and security policies can be defined in the operating system level. Any management software working over operating system can be blocked or disabled by any other application working over the operating system Among those operating systems only Windows Operating system with special editions have an option for management inside the operating system with higher scalability. One another issue is the data and document sharing within the cloud and the tablet. In other words students can make an document in a software and then reads that document from another software and both can be active in the screen at the same time, which can be classified as multitasking. A good example for this is that student may have a homework that he'll read from his study book and answer some questions according to text. So both programs should be share the same screen horizontally or vertically. Only windows operating system can be able to that, both IOS and Android in tablets only one program can be active on the screen, the other program may continue to work in the background. A good operating system will also be ready for virtual learning environments. Virtual Learning Environment s (VLEs) are computer-based environments that are relatively open systems, enabling interactions and encounters with other people and providing access to a wide range of resources. VLE s can supplement face-to-face teaching methods, or totally replace these teaching methods in the case of distance learning. VLEs offer a number of advantages over traditional teaching environments in terms of convenience and flexibility.(Xu & Wang, 2006) . Interaction with smart boards software, lab equipment and other common applications is also another must for the operating system.

***Personalization and Single Sign On***

There are many personalization strategies used for adapting learning scenarios to the learner profiles, and most of the available personalization systems allow the application

of very few if not just one predefined personalization strategies. Furthermore, pedagogues and researchers can identify other needs for implementing new personalization strategies (Essalmi, Ayed, Jemni, Kinshuk, & Graf, 2010) . Personalization comes with personal accounts and settings in different software applications in the tablet since the areas of interest differs from student to student and their levels in the lectures are also different. A student in the basketball teams will be more concerned in an example with famous basketball players or a science student will be more attractive to the self working duties related with renewable energy and hybrid cars. So not only their study sheets or homeworks their applications in the tablet should also personalized even there are some common ones. A single password can be used for a campus license for an application however if the software applications are different so as username and passwords. Single sign on idea is the key solution for this problem. Students will enter one username and password to login the system and the rest of the communication have been made by the application seamlessly.

### ***Measurement, Classroom Management and Connected Teaching***

The model of learning requires new and better ways to measure what matters, diagnose strengths and weaknesses in the course of learning when there is still time to improve student performance, and involve multiple stakeholders in the process of designing, conducting, and using assessment. In all these activities, technology-based assessments can provide data to drive decisions on the basis of what is best for each and every student and that, in aggregate, will lead to continuous improvement across our entire education system. In a connected teaching model, classroom educators are fully connected to learning data and tools for using the data; to content, resources, and systems that empower them to create, manage, and assess engaging and relevant learning experiences; and directly to their students in support of learning both in and out of school. The same connections give them access to resources and expertise that improve their own instructional practices and guide them in becoming facilitators and collaborators in their students' increasingly self-directed learning (U.S.Department of

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Education, 2010).

All the student and teacher activities should be tracked by the system which will be reported for analyze. Using the tablets integrated with education; distributing the homework and worksheets among the tablets improve two main issues. The time to distribute and the homework return rate from 60% to over 90%. Since there is no physical paper collecting and recording event, control of works returned by students are more faster and also recorded automatically by the servers. By the help of 3G connectivity students even look their duties on school busses where in normal conditions is a lost time due to high traffic especially in big cities. Most of the students spend at least one hour in school busses in transportation.

***Copyright and Data Protection***

DRM Digital Rights Management is the key factor in this project in order to take the support of the publishers. Since there wont be any physical copy of the education material income of many publishers will decrease dramatically. Most of the publishers start developing enriched and interactive learning materials instead of the classical books. They are planning to reach the same income since the research and development of these materials should increase the cost of material. Since all these materials digital and easy to copy and distribute if not protected. Moreover all the books and supporting materials should be personalized and licensed. Storing these information and books on the tablets is not secure since the users primary and high school students are not safe data and hardware protectors.

***Software Licenses and Cost***

One of the questions frequently asked is how Cloud computing affects the purchase of software licenses. (Stein, Ware, Laboy, & Schaffer, ) The cloud computing decreases the overall cost of software licenses especially for the initial investment of the school, because nearly all of the servers and as a result licenses stay in the cloud, school and students pays as they use them as a service.

*Networking and Data Usage : Unicast, Broadcast, and Multicast*

Communication and networking is one of the crucial and vital part of this solution. Since the cloud computing starts with a healthy and stable high speed internet connection all kinds of data packet losses, delays, collisions can affect the education. There are three types of communication need occurs in the project so that all the infrastructure routers, access points switches and the software applications should be designed according to that;

Unicast is the term used to describe communication where a piece of information is sent from one point to another point. In this case there is just one sender, and one receiver. For example teacher to one student private communication is a unicast communication.

Broadcast is the term used to describe communication where a piece of information is sent from one point to all other points. In this case there is just one sender, but the information is sent to all connected receivers. When a teacher uses his/her tablet to share the lecture to the students broadcast have been used, in this type of connection students only receives the information they can't feedback or interact.

Multicast is the term used to describe communication where a piece of information is sent from one or more points to a set of other points. In this case there is may be one or more senders, and the information is distributed to a set of receivers (there may be no receivers, or any other number of receivers) A good example of this is an interactive lecture between students and teacher when both sides interacts with the lecture.

**Conclusion**

Using tablets in education is the one of the most talked issue nowadays in many countries. There are some countries already announced a full transformation of education from classical to tablet supported education like Turkey and Fatih Project. This paper explain the main concerns and issues related with tablets in education and also extends the subject by including the cloud computing in this project. Most valuable information in these types of project is the experience from similar or previous works since a

requirement analysis for a tablet for personal use is totally different from a tablet that will be used by students. Many of the mobile device producers focus on connecting to internet anytime anywhere, easy use of camera, connectivity with social networks, sharing all your data and information with friends and society with a click or simple key combination. These primary needs are totally different in education, like connecting to social networks in the lecture hour, taking the picture or video of the teacher or sharing exam answers to friends is not acceptable anytime. A tablet for education should be a mobile device specially shaped and organized by means or proper software for education only.

### **Acknowledgements**

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### **References**

1. Barrie Sosinsky (2011). *Cloud Computing Bible*. Wiley Publishing, Inc.
2. Beldagli, B. & Adiguzel, T. (2010). Illustrating an ideal adaptive e-learning: A conceptual framework. *Procedia - Social and Behavioral Sciences*, 2, 5755-5761.
3. Bleck, S., Bullinger, M., Lude, A., & Schaal, S. (2012). Electronic Mobile Devices in Environmental Education (EE) and Education for Sustainable Development (ESD) GÇô Evaluation of Concepts and Potentials. *Procedia - Social and Behavioral Sciences*, 46, 1232-1236.
4. Essalmi, F., Ayed, L. J. B., Jemni, M., Kinshuk, & Graf, S. (2010). A fully personalization strategy of E-learning scenarios. *Computers in Human Behavior*, 26, 581-591.
5. Gidley, J. M. (2012). Evolution of education: From weak signals to rich imaginaries of educational futures. *Futures*, 44, 46-54.
6. Hsu, C. C. & Ho, C. C. (2012). The design and implementation of a competency-based intelligent mobile learning system. *Expert Systems with Applications*, 39, 8030-8043.
7. Little, A. W. & Green, A. (2009). Successful globalisation, education and sustainable development. *International Journal of Educational Development*, 29, 166-174.
8. Paul, P. K. & Ghose, M. K. (2012). Cloud Computing: Possibilities, Challenges and Opportunities with Special Reference to its Emerging Need in the Academic and Working Area of Information Science. *Procedia Engineering*, 38, 2222-2227.

9. Peredo, R. n., Canales, A., Menchaca, A., & Peredo, I. (2011). Intelligent Web-based education system for adaptive learning. *Expert Systems with Applications*, 38, 14690-14702.
10. Peter Mell & Timothy Grance (2011). *The NIST Definition of Cloud Computing* (Rep. No. Special Publication 800-145 ). NIST.
11. Stein, S., Ware, J., Laboy, J., & Schaffer, H. E. Improving K-12 pedagogy via a Cloud designed for education. *International Journal of Information Management*.
12. Sultan, N. (2010). Cloud computing for education: A new dawn? *International Journal of Information Management*, 30, 109-116.
13. Tseng, J. C. R., Chu, H. C., Hwang, G. J., & Tsai, C. C. (2008). Development of an adaptive learning system with two sources of personalization information. *Computers & Education*, 51, 776-786.
14. Tulbure, C. (2011). Do different learning styles require differentiated teaching strategies? *Procedia - Social and Behavioral Sciences*, 11, 155-159.
15. U.S.Department of Education (2010). *Transforming American Education: National Educational Technology Plan 2010*.
16. Xu, D. & Wang, H. (2006). Intelligent agent supported personalization for virtual learning environments. *Decision Support Systems*, 42, 825-843.



## **Project-Based e-Learning and Application**

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**Abstract:** *Project-based learning and the application model was created based on this study, university students when they are recorded by the university with their electronic mail addresses by using the user code "project-based e-learning" system to register and create passwords, via e-mail password to complete approval processes, and the same course over the web to carry out projects in electronic media aimed to examine the projects by other students.*

*Software program code on the C# programming language is used for the study. Determined for the different authorizations for each user group, and the system in order to increase the security level for the image verification code section was added to log into the system. Moreover, between the dates specified by the system administrator login to the system via the web, making each user to register the pre-determined projects, another wants to work on issues of pre-determined project wants to work with the system administrator to report this topic, project group wants to work through the system to send messages to friends and people who registered in the system gives the opportunity to take up posts. Last login time of users who registered in the system with the system whether on-line information system was to be visible to all users. For each section of the study was originally written in C # source code. Furthermore, application part of this study, software is open source code in C# programming language, originally through the system using "social networking" in the subject project were carried out. The project is to prepare the display/perform the package or software program is selected, the screen automatically come through the system and in the environment is to enable the preparation of the project. Stages of the project is saved or when changes are made to the final status of the project are recorded in the system database. Thus, each phase can be observed that the student's project, the project evaluation process is provided, allowing you to more objectively.*

*A project of social networking, web media in the Visual Studio 2010 installed on the computer through the program by calling the source code was originally written in C #. Project-based e-learning and the application made in accordance with the model, this study is working to develop an open, students carry out under the virtual control projects implemented by the project manager you control methods and their errors, and allows a quick correction. Students made many errors made the observation errors of different methods in the development stages, will allow for learning.*

*Students will make processes more efficient project development and application of information learned in this study an awareness of the students arrive, with a contribution towards the industry will gain knowledge and experience to projects.*

*In accordance with project-based learning and the application model, this study is to develop a clear work, which allows graduate students to share the social and professional experience will provide infrastructure support projects.*

**Keywords:** Project-Based e-Learning, e-Learning, e-Learning Application, Open Source Code, C# Source Codes.

## **Introduction**

Project-based learning method is defined as "a learning style" by Engel, "a basic teaching strategy" by Walton and Matthews, "The design of a training program" by Boud and Feletti. Project-based learning process; students ask questions, they do prefer, are designed studies, collect and analyze the data together, share ideas and reach conclusions. At the same time project-based learning applications, providing a strategy for culturally diverse students in the classroom, allowing a variety of learning opportunities (Thomas, 2000; Railsback, 2002; Mergendoller, 2006).

Many educators struggle to discover proper teaching and assessment strategies for their students. A large number of research studies are conducted and various teaching and learning strategies are proposed to answer the question, "How can we teach more effectively?" This process started with the behaviorist approach, continued with cognitivism, and ended up with constructivist approach for the time being. Constructivism gained attention for several reasons, such as its learner-centered approach and active participation of students (Frank, Lavy, and Elata, 2003; Richardson, 2003). In classes where constructivist approaches are implemented, students have a chance of learning by doing, enhancing their critical skills, and shaping their learning process by being active participants. Project-based learning is one of the methods grounded in constructivism by supporting student engagement in problem-solving situations (Doppelt, 2003).

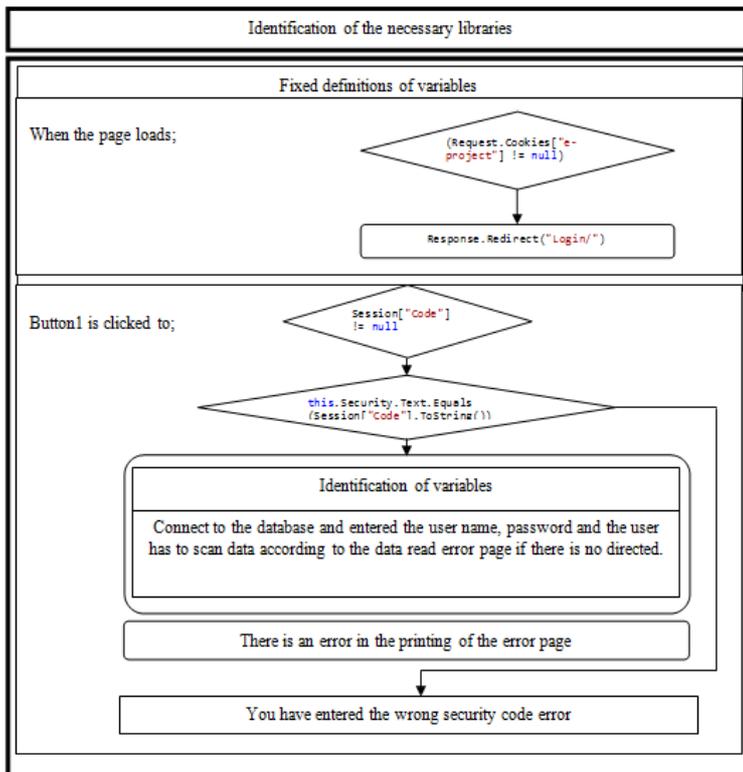
This study, conducted in accordance with project-based learning model, using the students' e-mail addresses, and user codes are intended to be registered to the system. Then students create passwords, e-mails, via the password to complete the approval process and electronically via the web is to create their own projects.

Software program code on the C # programming language is used for the study. Determined for the different authorizations for each user group, and the system in order to increase the security level for the image verification code section was added to log into the system. Project-based learning model, made in accordance with this study, examining each stage of the projects done by the students, and the process to be

controlled is provided.

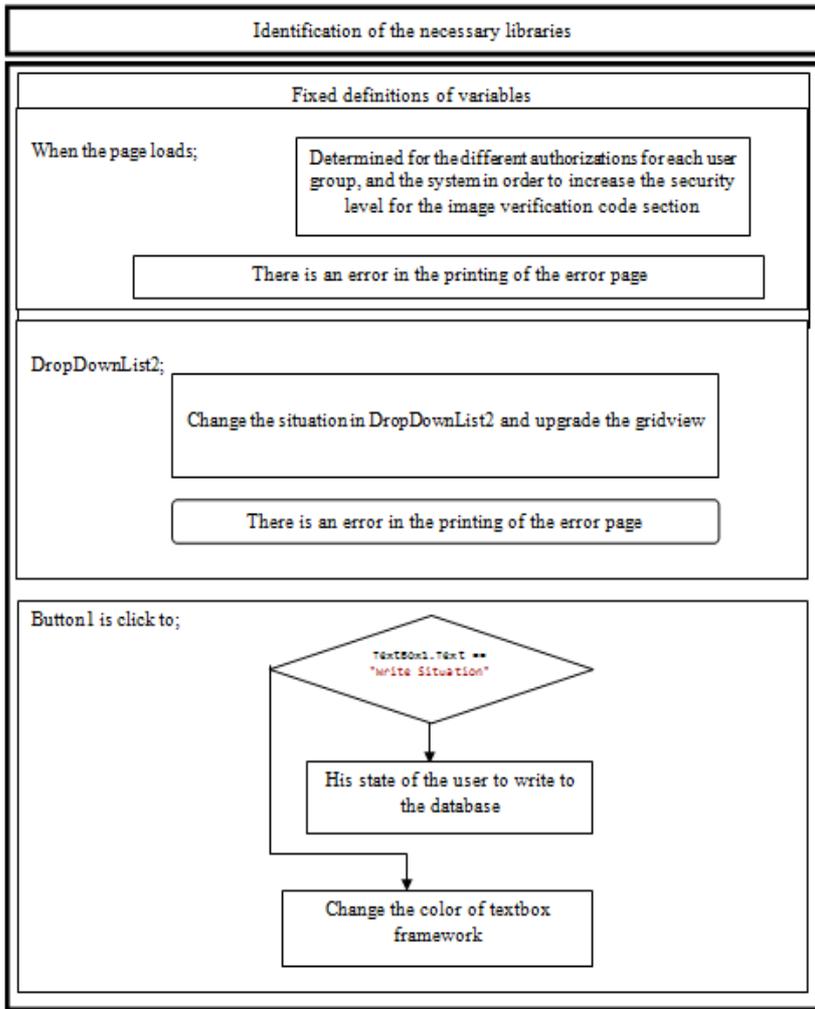
### **The Source Code Algorithm with C# Programming Language**

In this study, software is open source code in C # programming language for each module separately.



**Figure 1: Main Page C# Language Program Algorithm**

Care was taken in the design of the modular structure of the project. The source codes are formed for each module.



**Figure 2:** User Page C# Language Program Algorithm

The main program flow chart in Figure 1, the user page program flow diagram shown in Figure 2. The methods section of the program code is expressed with the help of flow charts. User page and the main program written in the C # programming language, how each sub-program associated with the main program with the flowcharts

shown in Figure 1 and Figure 2.

C # source code is generated for each sub-program interfaces for the visually "experimental results" section is presented.

## Experimental Results

C # source code has been compiled, the project has been visualized in the following ways.



**Figure 3:** Approve Information Panel of Application Project



**Figure 4:** Input Panel Project Home Page



Hitit e-Yıllık  
Account Validation Panel

Confirmation Code:

Figure 5: Approval Display Each Project

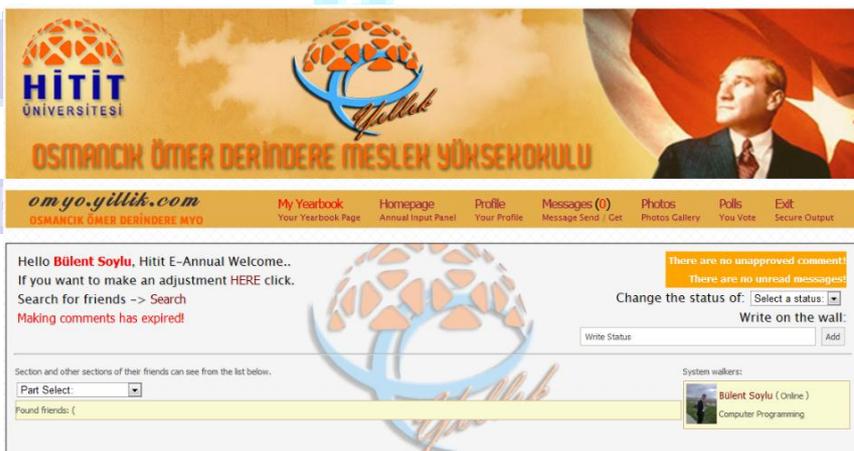


Hitit e-Yıllık  
Annual Input Panel

? Your account is not approved! Please confirm your account!

Figure 6: Account Approve Display.

Every part of the application project "approval" of the process of visual interfaces are presented in Figures 3,4,5 and 6. The general approach of the project, the interface is shown in Figure 7.



Hitit ÜNİVERSİTESİ  
OSMANCIK ÖMER DERİNDERE MESLEK YÜKSEKOKULU

om.yo.gillik.com  
OSMANCIK ÖMER DERİNDERE MYO

My Yearbook Annual Input Panel  
Homepage Annual Input Panel  
Profile Your Profile  
Messages (0) Message Send / Get  
Photos Photos Gallery  
Polls You Vote  
Exit Secure Output

Hello **Bülent Soylu**, Hitit E-Annual Welcome..  
If you want to make an adjustment HERE click.  
Search for friends -> Search  
Making comments has expired!

There are no unapproved comment!  
There are no unread messages!

Change the status of: [Select a status: ▾]  
Write on the wall:  
Write Status:

Section and other sections of their friends can see from the list below.  
Part Select:

Found friends: (

System walkers:  
Bülent Soylu (Online)  
Computer Programming

Figure 7: Approximation Interface to Project

## **Conclusion**

In accordance with project-based learning and the application model, this study is to develop a clear work, which allows graduate students to share the social and professional experience will provide infrastructure support projects. Students hands-on training processes can be followed effectively, interactive learning method for the retention of the information provided. Observation of the errors committed by the student, the possibility to learn the wrong information will not be held to a minimum.

## **References**

1. Doppelt, Y. (2003). Implementation and assessment of project-based learning in a flexible environment. *International Journal of Technology and Design Education*, 13, 255–272.
2. Frank, M., Lavy, I. and Elata, D. (2003). Implementing the project-based learning approach in an academic engineering course. *International Journal of Technology and Design Education*, 13, 273–288.
3. Mergendoller, J. R., Markham, T., Ravitz, J. and Larmer, J. (2006). *Pervasive Management of Project Based Learning: Teachers as Guides and Facilitators*. [http://www.bie.org/files/Managing\\_PBL\\_Chapter\\_22-2.pdf](http://www.bie.org/files/Managing_PBL_Chapter_22-2.pdf).
4. Railsback, J. (2002). *Project-based instruction: Creating excitement for learning*. Portland, OR: Northwest Regional Educational Laboratory. <http://www.nwrel.org/request/2002aug/index.html>.
5. Richardson, V. (2003). Constructivist pedagogy. *Teachers' College Record*, 105(9), 1623–1640.
6. Thomas, J. W. (2000). "A Review Of Research On Project-Based Learning. This Research Review and the Executive Summary are available on the web at: <http://www.autodesk.com/foundation>.

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## **The Cloud Computing Preferences of University Students**

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***Abstract:** With the rapid development of technology, mobile technologies have become widely used. Beside of the smartphone and tabletpc that are taking the firts place among today's communication tools, also various application softwares are started to be developed. Cloud computing system is one of those applications and its popularity is increasing day by day. The research was conducted within the frame of general survey model. This study was applied to selected sample of 113 fourth class undergraduate students at the ending of the 2nd term of 2011-2012 academic year, department of Computer Education and Instructional Technology (CEIT) at Near East University. This research was carried out with 97 students because of 16 students do not use cloud computing services. As total, students of this research are 68% male and 32% female. The average age of the students also participated in the study was determined as 21. In this research, authors developed a data collection form for determine preferences of students towards cloud computing services. The data obtained by the survey was commented upon using the SPSS program with the percentage and frequency. Survey was applied online in laboratory courses. Data were collected using this form. Frequency and percentage methods were used during the analysis process. Besides, the literature review shows that there is not any study that determine the student preferences towards cloud computing services. As mentioned above, there are many cloud systems. So the aim of this study was to determine the university students' most preferred cloud computing services. Most of the students use Dropbox, Open Drive and Evernote cloud computing services. Docs, images, presentation, video and audio are the most commonly shared items on Cloud computing services. We believe that in future days more research will be prepared on the usage of cloud computing services in education due to its increasing importance and students' increasing interest in mobile technology. In addition, it is believed that, this study will guide the following studies to be prepared related to this subject.*

**Keywords:** cloud computing, university students, m-learning, mobile devices, cloud systems

### **Introduction**

Hwang et al., (2009) indicated that traditional class-learning is a method of authentic learning however; it is difficult for those instructors to support personalized learning. Educational institutions have undergone rapid changes especially for the last decade years (Wurst et al. 2008; Boukas et al. 2009; Uzunboylu & Ozdamli, 2011; Aboderin et al., 2012). Liu (2007) thanks to advances in wireless and mobile technologies in his

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research paper because due to those technological advances, now there exist new learning environments especially out of school.

Uzunboylu & Ozdamli (2011)'s study results demonstrated that, teachers want to use mobile learning applications to support traditional education. Accordingly, it could be said that teachers should use blended learning approach, which combines classroom instruction with m-learning. Blended learning approach combines different advantages of classroom education and m-learning. Therefore m-learning is becoming more popular, however not all students have mobile devices to support it (Ozdamli, 2011). Nevertheless Schepman et al. (2012) argued that cross-platform software that has the potential to allow instructors to provide mobile support to students' learning, offering the same function to users which use traditional computing platforms. The cloud computing services enables the learners to achieve information from their mobile devices or desktop computers. The National Institute of Standards and Technology described cloud computing services as a model that enables a convenient and on demand network access to a shared pool of configurable computing resources that could be rapidly provisioned and released with minimal management effort or service provider interaction. Sultan (2010) explained cloud computing as clusters of distributed computers (largely vast data centers and server farms) which provides on-demand resources and services.

Cloud computing is a new emerging computing paradigm that delivers computing services. Powell (2009) described cloud as an on-demand computing, for anyone that has a network connection. It is possible to access applications and data anywhere and anytime, from any device. Aziz et al. (2012) indicated that cloud system is future of the internet. Cloud system users are able to access documents, photos or other data and use applications through their terminal devices such as PDAs, smartphones, tablets, PCs etc. that are connected to the network. According to Cruz (2011), cloud computing provides an innovative alternative to traditional education, that creates

individual learning environments and interactive learning for learners. Also, it allows learners to collaborate with their peers, regardless of geographical location.

Katz, Goldstein & Yanosky (2009) suggested in their study that cloud computing is a natural technical progression to a standards- and Internet-based IT architecture that more fully exploits economies of scale. Main characteristics of a cloud computing services as follows:

- Independence from any device and platforms,
- It should be used without internet connection,
- Limitless number of users and authority,
- The possibility to synchronize with local data (Bal, 2010).

There are many types of cloud system in the literature. When we searched we found a lot of cloud system. Some of them free some of them commercial. The most popular cloud systems in the literature are Dropbox, Evernote, Google Drive, SkyDrive.

Dropbox application is available for Windows desktop, Mac and all mobile platforms. Users need only a single account and achieve account from all devices. If user back up a file on a pc, it will automatically sync in Dropbox account when connect to internet. It accounts for mobile and desktop are free with up to 18 GB of free space. If users want more space then they will pay \$9.99 monthly for 100 GB. And also students use Dropbox as a team and share workspace.

SkyDirve is Micorsoft's homebrewed cloud service which is not limited to Windows users. Users should create account and access from any device. It provides 7GB free spaces. But users can add up to 100GB by paying a price. Files and photos store in system are protected. It includes secure sockets layer to encrypt files when upload or download.

GoogleDrive is Google's cloud. It is offering while using any Google products such as Gmail. Moreover, users should create and edit new documents, spreadsheets and presentations instantly and also share. Google drive lets learners to study together at the

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same time on the same doc. Users should use system on any mobile platform along with PC and Mac. It offers 5GB free space for data.

Evernote system is available for Windows Desktop, Mac and all mobile platforms. It has a lot of features. It has some tools such as Skitch, Voice2Note, CallNote, MindJet and EyeFi. It provides 5GB free spaces to users. Also Users can share Evernote notes on Facebook or Twitter.

- In parallel with these developments, the need for qualified students in this particular field also increases. Successful integration of these technologies in education primarily requires students' preferences in order to determine such technologies. Therefore, the preferences of learners are playing a key role. When both the national and international literature was reviewed, it was found that there is not any study related to this topic which aims to determine the student preferences towards cloud computing services. As mentioned above, there are many cloud systems. So the aim of this study was to determine the university students' most preferred cloud computing services. The study attempted to find answers to the following questions:
  - Did students use cloud computing applications previously?
  - Which cloud computing services are the most preferred by university students?
  - Which cloud computing features are used by students?
  - Which mobile devices are preferred by students while connecting to cloud computing systems?
  - Do students want to use Cloud Computing Services in education?

## **Method**

The research was conducted within the frame of general survey model. This study was applied to selected sample of 113 fourth class undergraduate students at the end of 2nd term of 2011-2012 academic years in department of Computer Education and

Instructional Technology (CEIT) at Near East University. This research was carried out with 97 students because of the reason that 16 students do not use cloud computing services. As total, 68% of the students were male and 32% were female in the research. The average age of the students participated in the study was determined as 21. In this research, authors developed a data collection form to determine preferences of students towards cloud computing services. The comments on the data obtained from the survey were made according to the SPSS program with the percentage and frequency. Survey was applied online in laboratory courses. Data were collected by using this particular form. Frequency and percentage methods were used during the analysis process.

## **Results**

The results and the comments obtained through the aims of the research have been explained.

### **Cloud Computing Services**

CEIT students on their using these applications are given in table 1.

**Table 1:** Cloud computing services

	<b>F</b>	<b>%</b>
Used	97	85.4
Not Used	16	14.6
Total	113	100.0

As shown in the table above 85.4% of the students used cloud computing applications and 14.6% never used. According to the findings large majority of students took place in the research were familiar with cloud computing applications.

### **Preferred cloud computing services**

Frequency (f) and percentage (%) distribution of the cloud computing preferences of students who form the sample of the study.

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**Table 2:** Preferred cloud computing services

Cloud computing services	TOTAL	
	F	%
Dropbox	58	22.2
Open Drive	47	18.0
Evernote	44	16.9
iCloud	38	14.6
Google drive	34	13.0
Sky drive	25	9.6
Clouidon	12	4.6
Diigo	1	0.4
Zotero	1	0.4

According to the Table 2, most of the students use the Dropbox, Open Drive and Evernote which is a cloud computing services. The only %0.4 use of them Diigo and Zotero.

**The students' reasons of using Cloud Computing Services**

Frequency (f) and percentage (%) distribution of the main reasons for using the cloud computing services of students who form the sample of the study.

**Table 3:** The most preferred usage habits of students on Cloud Computing services

The most preferred usage habits	TOTAL	
	F	%
Docs	66	26.1
Images	62	24.5
Presentation	55	21.7
Video	32	12.6
Audio	21	8.3
Sticky Notes	12	4.7
Bookmarks	5	2.0

As it can be seen from Table 3, docs (F=66, 26.1%), images (F=62, 24.5%), presentation (F=55, 21.7%), video (F=32, 12.6%), audio (F=21, 8.3%), sticky notes (F=12, 4.7%) and bookmarks (f=5, 2.0%) are the most commonly shared items on Cloud computing services. Therefore, Table 3 suggests that students use Cloud computing services for store the documents and images.

**Devices used by students for using cloud computing services**

Table below shows us most commonly used devices by students for using cloud computing services.

**Table 4:** Devices which Cloud computing services is used

Devices which Cloud computing services is used	TOTAL	
	F	%
Smartphone	72	51.8
TabletPC	35	25.2
Laptop	22	15.8
PC	10	7.2

According to the Table 4, 51.8% of students use the cloud computing services on their smart phone, 25.2% on their TabletPC, 15.8% on their Laptop and 7.2% on their PC. When the results were examined, it was observed that majority of the participants use the Cloud computing services via their smart phones. And only %7.2 of them using Personal Computers for using Cloud Computing services.

**Do students want to use cloud computing services for educational purposes ?**

CEIT students to use cloud computing applications to determine whether they are in the analysis results in Table 5.

**Table 5:** Cloud computing services

	N	Percent
Want	102	90.2
Don't Want	11	9.8
Total	113	100.0

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As shown in the table above, 90.2% of the students want to use cloud computing services for educational purposes.

## **Conclusion and Recommendations**

With the rapid development and technology, the communication tools and methods are also changing. Considering the fact that mobile internet technology is being used very effectively, it could be said that Smart Phones and Tablet PCs have an important place. The users are getting chance to reach more substantial content with the developing communication applications each passing day. For example, through various applications, photos, videos or audios recorded with mobile equipments could be shared with people from all over the world immediately. The results of this study is proving that cloud computing services are being used very effectively with mobile equipments by most of the students. The students were using these services mostly with smartphones, tabletpcs and laptops. Beside of this result, it was found that students are mainly using documents, images, presentation, video and audio amongst other cloud computing tools. The most used four cloud computing services according to the results are; Dropbox, Open Drive, Evernote and iCloud. Students' use of Cloud Computing Services is spreading day by day and students are thinking that those services should be used for educational purposes. Thus, experimental studies are suggested to be done beside of in-service trainings in order to persuade teachers to use cloud computing services for educational purposes.

## **References**

1. Aboderin, O., Fadare, O., & Kumuyi, G. (2012). A pedagogical appraisal of internet and computer usage among secondary school teachers and students in the Southwest Nigeria. *WORLD JOURNAL ON EDUCATIONAL TECHNOLOGY*, 4(1), 56-65.
2. Bal, S. (2010). Cloud Computing. <http://www.salihbal.net/paylasimlar/bulut-teknolojisi-cloud-computing-nedir-ve-ne-degildir/>

3. Boukas L., Kambourakis G.& Gritzalis S. (2009). Pandora: an SMS-oriented m-informational system for educational realms. *Journal of Network and Computer Applications* 32, 684–702.
4. Cruz, L. (2011). How Cloud Computing is Revolutionizing Education. Cisco, The Network. Available at <http://newsroom.cisco.com/feature-content?articleId=460910> on 15 September 2012.
5. Hwang, G.J., Yang, T.C., Tsai, C.C., & Yang, S.J.H., (2009). A context-aware ubiquitous learning environment for conducting complex experimental procedures. *Computers & Education*, 53 (2), 402-413.
6. Katz,R., Goldstein, P., & Yanosky, R. (2009). Cloud Computing in Higher Education. Available at [http://net.educause.edu/section\\_params/conf/ccw10/highered.pdf](http://net.educause.edu/section_params/conf/ccw10/highered.pdf) on 17 September 2012.
7. Ozdamli, F. (2011). Mobile learning perception and competence of teachers and learners according to the geographical areas in North Cyprus. *International Journal of Learning and Teaching*, 3 (2) 35-46.
8. Ozdamli, F. (2012). Pedagogical framework of m-learning. *Procedia - Social and Behavioral Sciences*, 31 927 – 931.
9. Powell, J. (2009). Cloud computing – what is it and what does it mean for education? Available at <http://erevolution.jiscinvolve.org/wp/files/2009/07/clouds-johnpowell.pdf> on 17 September 2012.
10. Schepman, A., Rodway, P., Beattie, C., & Lambert, J. (2012). An observational study of undergraduate students’ adoption of (mobile) note-taking software. *Computers in Human Behavior* 28, 308-317.
11. Sultan, N. (2010). Cloud computing for education: A new dawn? *International Journal of Information Management*, 30, 109-116.
12. Wurst C., Smarkola C. & Gaffney A.M. (2008). Ubiquitous laptop usage in higher education: effects on student achievement, student satisfaction, and constructivist measures in honors and traditional classrooms. *Computers & Education* 51, 1776–783.
13. Uzunboylu, H. & Ozdamli, F. (2011). Teacher perception for m-learning: scale development and teachers’ perceptions. *Computer Assisted Learning* 27, 544-556.

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## **Requirement analysis for designing of an LQ based adaptive dynamic courseware**

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**Abstract:** *The customized web based courseware emerged as one of the major alternative in global E-Learning scenario. Traditional concept of static pre-designed content are being replaced by use of adaptive dynamic courseware like Learner Quanta (LQ)[9] based system. In order to introduce more adaptivity in the LQ based adaptive dynamic courseware LQ cloud has been represented in graphs and subsequently in matrix [22]. In this paper we first try to identify detail requirements for designing an LQ based adaptive dynamic courseware from various pedagogical and computational perspectives. This will help in designing an efficient data organization for handling various queries submitted by learner at any point of time. Some of the computational requirements are: whether a learning request submitted by an user is serviceable or not, if for a query more than one result data exist then choose optimal one, at the time of selection of LQ consider various parameter like user level, network connection type, financial implication, course duration, preferred learning style etc. Pedagogical issues like emotion of learner, learning preferences, learning styles, tie up with other knowledge are also addressed in this paper. Issues like continuous up gradation of result data set, adaptation in assessment and evaluation techniques are also considered in this paper.*

**Keywords:** Adaptive Courseware, Learner Quanta, Requirement Analysis, LQ graph

### **Introduction**

Now a days design and development of Adaptive Web-based educational courseware is a growing area of research. Adaptive Learner Quanta Based Dynamic Courseware [9] is a new contribution in this research to make the research more intelligent and meaningful to the society. Idea of personalized and adaptive e learning was devised in [14] as assuring of “e-learning content, activities and collaboration, adapted to the specific needs and influenced by specific preferences and context of the learner”. In [4, 6, and 7] authors try to show that till date efforts are mostly course-centric. Revolution in the hypertext technology brings rapid changes in the teaching learning process [1, 2, 3, 5, 7, and 12]. In [11] Deters designed a dynamic courseware generator tool based on AI Planning techniques. In [8, 10] John and Teber at the University of Cambridge & University of Melbourne put forward two different projects aimed to integrate English

and Science standards using technology as a vehicle for identification of requirements. Guanon Zhang [13] has designed a computer based knowledge system for assisting persons in making decisions and predictions upon human or data-mining knowledge. Amongst recent works Shahin, Barakat, Mahmoud & Alkassar [18] tried to develop adaptive course which deals with previous knowledge and preferences. However it does not deal with any graph model. Other works like [19, 20, 21] deal with other various issues including courseware authoring, technology standards etc. In [23] author tries to present adaptive requirements in light of pedagogical perspective in more formal manner.

### **Related work**

A Learner's Quantum (LQ) of study is a measured part of a topic with a specific set of output objectives and requires a specific set of input knowledge on part of the learner. In [9] an algorithm has been proposed which ensures the proper learning sequence of the selected LQs so that the learner can navigate through it. Besides, the pool of LQs is so designed that it would be adaptive to cater to a wide spectrum of learners with varying requirements.

In [17] we tried to present the proposed algorithm through UML representation, which elicits the methodology in a simple way. The modular and incremental architecture of the LQ based algorithm makes it an ideal analytical model for UML based analysis, design and development.

Our earlier works [9] [15] [16] & [17] has been extended and an appropriate graph model for Learner Quanta Cloud has been developed [22], which would help us in optimizing request of learners. We tried to present Learner Quanta Cloud as a directed graph  $G(V, E)$  whose vertex set can be thought as collection of all input elements or source vertices & output elements or destination vertices of LQ and edges can be thought as directed path from one input element to other output element under certain conditions. Learner Quanta Graph has been represented in [22] through a matrix representation in

order to find possible LQ set against a request submitted by learner with a proper graph theoretical analysis. The matrix helps us in analyzing whether a student from one input state can reach to an output state from the LQ cloud. In [24] analysis of Learner Quanta Graph revealed properties like prerequisite LQ, alternate prerequisite LQ (if any), appropriate post study LQ, test of inconsistent state and test of isolation. These new sets of properties would help us in processing various queries from the LQ Cloud.

### **Identification & Analysis of requirements of LQ based adaptive dynamic courseware**

Design of an adaptive dynamic courseware can be considered as an important phenomenon towards development of a “customized” web based learning system. Pedagogy and computation are important aspects for all facets of adaptive learning from the creation of the courseware and the application of a web based learning system to the evaluation of the learning progress.

In this paper, relevant requirements from the pedagogical aspects [23,26,27] of adaptive learning process, e.g. attention, motivation, emotional aspects, learning styles, analyzed according to LQ based adaptive dynamic courseware[21]. In other section of the paper relevant computational aspects for the adaptive learning process e.g. content centric issues like content delivery, content sequencing, LQ storage issues, LQ delivery issues analyzed according to LQ based adaptive dynamic courseware.

Requirement Analysis for designing of an LQ based adaptive dynamic courseware may be classified into two broad categories:

#### **1. Pedagogical perspective :**

- a. Focus of attention
  - i. Illustration: Focus of attention determines if a student mentally follows a lecture and, therefore, if the intended behavioural change affects a learner at all. Adaptive courseware particularly requires a strategy for getting and keeping the learner’s attention.

- ii. Requirement: LQ based adaptive courseware requires a strategy for getting and keeping learner's attention.
  - iii. Analysis: To judge focus of attention learner login duration, course LQ selection etc meta data may also be collected for better results
- b. Motivational states
- i. Illustration: Motivational states of students are of importance when questioning how the stimuli given by the teacher promotes the learning process.
  - ii. Requirement: LQ based adaptive courseware requires focus on the course authoring part in preparation and improvement of LQ based on learner's interaction with the LQ.
  - iii. Analysis: One content may be represented both as audio content and video content and offered to the learner parallel. Intermittent interaction of the learner with the teacher may improve the learning experience of the learner and change the motivational states
- c. Emotions of Learner
- i. Illustration: Emotion has a strong impact on the learning process points out findings on students' performance depending on anxiety
  - ii. Requirement: LQ based adaptive courseware requires focus what types of test students are preferring in terms of preparing themselves
  - iii. Analysis: LQ based adaptive courseware may require study on the data about a LQ and its associated test parameters. It takes input from the learner that what type of test and content type they are comfortable with and allow them with such data

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- d. Tie up with prior knowledge
  - i. Illustration: Tie up with prior knowledge can help learner to transfer knowledge in the same or in the similar context
  - ii. Requirement: LQ based adaptive courseware requires attention on the learner and deliver them course as per his/her prior knowledge
  - iii. Analysis: LQ based adaptive courseware may takes input knowledge level of the learner [9] and take decisions about the LQ based on that metadata
- e. Learning Preferences
  - i. Illustration: Learning preferences usually result from predispositions or orientations to learning and can be seen as influences by the context
  - ii. Requirement: LQ based adaptive courseware requires attention in designing and delivery of the LQ with respect to the learning preferences of the learner
  - iii. Analysis: LQ based adaptive courseware creates outline of the LQ offering sequence to better understanding of the learning so that catalog metadata may help learner to choose it content according to it choices.
- f. Learning Styles
  - i. Illustration: Cognitive and learning styles are related to intellectual capabilities and preferences. Both kinds of styles try to provide more practical models for teacher
  - ii. Requirement: LQ based adaptive courseware must judge knowledge level of the learner and try to devise metadata

- iii. Analysis: Learner of different level of input knowledge (Novice/Beginner/Expert) may be served by the LQ based adaptive dynamic courseware differently
- g. Learning Progress
  - i. Illustration: The learning progress-based adaptive courseware pedagogy emphasizes personalized course content delivery depending on a student's learning aptitude and learning progress rules.
  - ii. Requirement: LQ based adaptive courseware must judge learning progress with respect to objective submitted by learner and try to devise rule for customized content delivery
  - iii. Analysis: Learning progress analysis may be thought as tracking of learner achievement based on test results and creation of LQ sequence for delivery

## **2. Computational perspective :**

- h. Reachability [22,24] of Learner Query
  - i. Illustration: Reachability is a technique by which a learner may know beforehand whether a requested query is serviceable by present LQ cloud or not
  - ii. Requirement: To do this LQ cloud may be represented as graph model [22] and subsequent represented in a matrix to meet the above objective
  - iii. Analysis: Based on learner input knowledge level and output objective level suitable reachability of a learner query may be satisfied
- i. Optimality in LQ delivery & sequencing



- ii. Requirement: Learner should have their choice regarding flexible course timings and flexible course duration. System must allow learner to do so
- iii. Analysis: Some learners are fast paced learner and some learners are slow paced learner. Learning pace of the learner may be judged by analyzing different data collected from the learning experience of the learner and based on that LQ offering sequence is prepared.
- m. Network bandwidth Information
  - i. Illustration: In view of design of content network bandwidth is a very important component because it determines size of the LQ
  - ii. Requirement: Learner may have different level Internet connection speed like Broadband/DSL/Dialup. Selection of content may be done based on connection speed
  - iii. Analysis: This information is important because based on the internet connection speed type of content selection is done e.g. For a normal dialup connection LQ with normal HTML content and plain text can be delivered
- n. Learner fund information
  - i. Illustration: Learner fund information is important because it focuses on cost effective delivery model of LQ based adaptive dynamic courseware.
  - ii. Requirement: Learner must have some objective with limited fund strength.
  - iii. Analysis: Each LQ is associated with a cost. Customizable course will be configured based on the fund information.
- o. Hardware/Software/Operational Environment information

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- i. Illustration: Choice of Hardware/Software/Browser determines correct working of LMS under cross platform environment.
  - ii. Requirement: Learner should have choice regarding Hardware/Software/Browser.
  - iii. Analysis: LQ is authored in such a manner so that under any circumstance same LQ requested from computer and mobile may be served in same manner
- p. Learner Assessment
- i. Illustration: Learner assessment may be summative or formative and that choice also made by learner
  - ii. Requirement: LQ may be authored in such a manner so that for a particular LQ there may be more than one assessment tool
  - iii. Analysis: Selection of assessment tool for particular LQ depends on the learning preferences of the learner
- q. Evaluation and Goal Analysis
- i. Illustration: Evaluation and goal analysis[25] determines how a learner achieved his/her goal with respect to its objective
  - ii. Requirement: Goal analysis also judge metadata about learner performance with respect to objective
  - iii. Analysis: LQ based adaptive dynamic courseware must give focus on input requirement analysis and output objective requirement analysis

## **Conclusions**

Identification and analysis of requirement for LQ based adaptive dynamic courseware generation is a challenging issue in recent E-Learning scenario. The paper aimed at identifying and analyzing requirement from various pedagogical & computational

perspectives. The requirements have been identified and analyzed keeping in mind implementation issues for LQ graph and LQ matrix. Most of the requirements are identified here are specially designed to support adaptability. This paper discusses a pedagogy based learning requirements, and gives a direction towards development of a semi-structured data model for it. So we can construct the standardized courseware on pedagogy layer which is easy to use and change, and can support the dynamic generation. On the other hand, it supports computational requirements we have explained which in turn help a lot in preparing efficient data organization towards design of a query processor.

## **References**

1. Abdel H., et. al. : Multimedia Integration into a Distance Learning Environment: Proc. of the 3rd International Conference on Multimedia Modeling, Toulouse. (1996)
2. Braun T. : Multimedia Application in Networks in Multimedia Communications – Protocols and Applications edited by Kuo. Franklin, Wolfgang Effelsberg, J. J. Garcia-Luna-Aceves, Prentice Hall PTR (1998).
3. Chang C. K., Chen G. D. : Constructing collaborative learning activities for distance CAL systems: Journal of Computer Assisted Learning, Vol. 13, No. 1 (1997).
4. Cockerton T., Shimell R. : Evaluation of a hypermedia document as a learning tool: Journal of Computer Assisted Learning, Vol. 13, No. 2 (1997).
5. Crook C. K.: Making hypertext lecture notes more interactive: undergraduate reaction in the Journal of Computer Assisted Learning, Vol. 13, No. 4 (1997).
6. IEEE LTSC: Learning Technology Systems Architecture (LTSA), Version 4.00. URL: <http://www.edutool.com/ltsa> (1998).
7. Kuo F. : Introduction to Multimedia in Multimedia Communications – Protocols and Applications edited by Kuo Franklin, Wolfgang Effelsberg, J. J. Garcia-Luna-Aceves – Prentice Hall PTR (1998).
8. Munro John: Facilitating Effective Learning and Teaching: Proc. of Technology Colleges Trust Online Conference(2002). [www.cybertext.net.au/tct2002/keynote/printable/munro.htm](http://www.cybertext.net.au/tct2002/keynote/printable/munro.htm)
9. Ray S., Chaki N., Dasgupta R. : Design of an adaptive web-based courseware : Proc. of IASTED International Conference on Intelligent Systems & Control (ISC 2004), Honolulu, Hawaii, USA, (2004).
10. Taber K. S. : Development of Student Understanding: A Case Study of Stability and Lability in Cognitive Structure, Research in Science & Technological Education, Vol 13 (1), (1995) pp.87-97.

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Innovations in Learning for the Future 2012: e-Learning  
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11. Vassileva J., Deters R. : Dynamic Courseware Generation on the WWW : British Journal of Educational Technology, Vol. 29, No.1 (1998).
12. Wiles N., Wright D. : A hypermedia system to aid teacher understanding a pupil preconceptions: Journal of Computer Assisted Learning, Vol. 13, No. 1, (1997).
13. Zhang George Guanon : Computer Based Knowledge System in the USPTO United States Patent Office, September, 2004. URL: <http://www.uspto.gov/Patents/United States Patent 6,795,815.htm>
14. Dagger, D., Wade, V. & Conlan, O., 2005, Personalization for All: Making Adaptive Course Composition Easy. Special issue of the Educational Technology and Society journal, IEEE IFETS.
15. S. Ray, R Dasgupta, N Chaki; "A Learner's Quant Model based Framework towards Building Dynamic Web-based Courseware"; Proc. of the fourth International Conference on Multimedia and ICTs in Education m-ICTE2006) - "Current Developments in Technology-Assisted Education", Seville, Spain, pp. 238-242, November 2006
16. N. Chaki, R. Dasgupta, "A Learners' Quanta Based Framework for Identification of Requirements and Automated Design of Dynamic Web-based Courseware" Invited Talk, 14th International Monterey Workshop, Monterey, California, USA, September, 2007.
17. Halder K, Pal S, Chaki N , Dasgupta R " UML modeling of Adaptive course ware algorithm" 2008 in World Science Congress on Computer Science & Engineering-2008 San Francisco, USA (ICEIT-08) 2008
18. Reem Shahin, Lina Barakat, Samhar Mahmoud, Mohammad Alkassar."Dynamic Generation of Adaptive Courses" Information and Communication Technologies: From theory to applications2008, IEEE 2008
19. C. Hong,C.Chen,M Chang,S Chen: Intelligent Web-based Tutoring System with personalized Learning Path Guidance-7th IEEE International Conference of Advance Learning Technologies(ICALT 2007)
20. B.Bontechv,D Vassileva: Courseware authoring for adaptive e-learning-International Conference on Educational Technology and Computer-2009 DOI10.1109/ICETC.2009.59
21. J Zhang : Dynamic Generation of the Adaptive Courseware Based on Learning Technology Standards- Proc. Of the 5th International Conference on Computer Science & Education, Hefei China August 2010 pp.741-745
22. Halder K, Chaki N , Dasgupta R " Design of Graph based model for LQ based Adaptive Dynamic Courseware" 2011 in World Congress on Computer Science , Computer and Applied Computing Engineering-2011 LASVEGAS, USA (WORLCOMP-2011)FECS-2011
23. Felix Modritscher " Implementation and Evaluation of Pedagogical Strategies in Adaptive E-Learning Environments" Institute for Information Systems and Computer Media (ICM), Graz University of Technology A-8010 Graz, Austria

24. Halder K, Chaki N , Dasgupta R “Analysis and design of Learner Quanta Graph Properties for efficient query processing in an adaptive dynamic courseware” published in IEEE explore Digital Library and Proceedings of the ICTEE 2012, IEEE Conference on Technology Enhanced Education, Amritapuri, Kerala, India
25. C Mulwa, S Lawless, M Sharp, V Wade “A Web-based Framework for User-centred Evaluation of End-User Experience in Adaptive and Personalized E-Learning Systems” 2011 IEEE/WIC/ACM International Conferences on Web Intelligence and Intelligent Agent Technology
26. V'itor E. Silva Souza “A Requirements-Based Approach for the Design of Adaptive Systems”, ACM Student Research Competition ICSE 2012, Zurich, Switzerland
27. Anita Diwakar, Mrinal Patwardhan, Sahana Murthy” Pedagogical Analysis of Content Authoring tools for Engineering Curriculum”, 2012 IEEE Fourth International Conference on Technology for Education
28. Vincent Tam, Edmund Y. Lam and S.T. Fung Toward A Complete e-Learning System Framework for Semantic Analysis, Concept Clustering and Learning Path Optimization, 2012 12th IEEE International Conference on Advanced Learning Technologies.



## **The Effect Of Computer And The Internet On The Reading Habit Of Teacher Candidates**

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**Abstract:** Reading is one of the most important factors for mental and social development of individuals. Teachers are effective role models to get students adopt reading habit. It is quite important that especially teachers at schools must have behaviors and use discourse which will be samples to the students and direct them about reading suitable books according to their age and area of interest. The role of the teachers about providing reading habits with the students is very important. First of all, teachers shouldn't limit the reading with the coursebooks only. Moreover, it is an obligation that teachers must support students about having and reading books which will be helpful for them to know the life and the world better, make them think and at the same time dream about, and give them happiness. Teachers who have regular reading habits and have the ability of directing his/her students and their parents about this issue will found a reading culture to be carried through the generations. However, the technological developments of today can cause change in the reading habits of people. In this study, it is aimed to determine the effect of computer and internet on teacher candidates' reading habits. For this purpose, the convenient answers were sought to the following questions: Is there a relationship between the gender of the students and the reading printed newspaper or newspapers on the electronic media on a regular basis every day?, Is there a relationship between the gender of the students and reading the books such as novels, poetry, etc., beside the coursebooks and newspapers?, Is there an association between the reasons of having their own computers and not reading the printed daily newspapers?, Is there a relationship between the types of their computers and not reading the printed daily newspapers?, Is there a relationship between the types of computers of the students and reading the books like novels, poetry, etc., beside the coursebooks and newspapers?, Is there a relationship between the living spaces of the students (home, dormitory, hostels, etc) and the reasons for not reading daily printed newspapers?. This study was realized with 405 teacher candidates. According to the findings, the ratio of daily newspaper reading habit of male students is higher than the female students'. Female students read the books more often other than coursebooks and newspapers. Students who have their own computer and internet connection prefer to read internet news portals and TV instead of reading the printed newspapers. More than half of those who have their own computers regularly read printed or electronic newspaper every day. While all of the teacher candidates who have tablet state that they don't read daily printed newspapers since they do not have money to devote to a daily newspaper, only 40% of them read novels, poetry except coursebooks and newspapers. 36.23% of the students who have internet connection in their places, 33.33% of the students who don't have internet connection where they live state that they can watch the news available in the printed newspapers on TV. Additionally, because 37.68% of the students who have internet connection, and 11.11% of the students who don't have it state that they can read the news available in the newspapers on the news portals on the internet, they don't read printed daily newspapers.

**Key words:** Teacher training, reading habit, teacher candidates, reading and computer, reading and internet.

## **Introduction**

Acquiring knowledge and skill, namely learning, lasts from birth to death. This process includes various different activities. Reading is one of the basic activities that is necessary to do for fulfilling the learning. Turkish Language Association (2012) has defined reading as looking at letter and signs which form a script, analyzing or vocalizing those. In the strict sense, reading means deciphering the code of a written text or decoding a diagrammatically coded pronouncement. In a broad sense, reading means interpreting a literary text (Arslan et al., 2009). Reading provides great contributions upon the language achievement, mental, social and cultural development of the individual. Development of high level skills such as communication, meeting the requirements of a modern society, making conscious decisions and maintaining to learn can be possible with reading (Coşkun, 2010). An individual whose reading skill has adequately improved can show success at speaking and writing skills because of having improved vocabulary knowledge (Temur, 2001). Reading is the leading of beneficial habits that should be acquired in terms of both providing personal development and meeting the expectations of the society adequately.

When reading has been fulfilled consistently and regularly, it turns into a habit. According to the general definitions determined by UNESCO, reading habit has been defined as the acquisition skill of this action wishfully after learning to read. Reading's being fulfilled with a critical point of view depending upon different views and sources and constantly is Odabaş et al.'s (2008) definition of the reading habit. According to Yılmaz (1993), reading habit is individual's fulfilling reading lifelong, constantly, regularly and critically as result of perceiving it as a source of requirement and delight. Having reading habit has also become crucial for the individuals to perceive themselves, their surrounding and the world correctly and for adaptation (EARGED, 2007). According to Özçelebi and Cebecioğlu (1990) reading habit is learned but hard to acquire. For acquisition, there should primarily be an atmosphere where this habit exists and it should be supported by other sources. Among those supports, there can be listed

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books or magazines compliance to reading, the social surrounding that has been lived in, educational and cultural level of the family, family members who read, teachers who guides them around reading and educational institutions that provide fund. Yılmaz (2004) has mentioned that individuals acquire the reading habit being affected from the parents during the childhood and from teachers and friends during adulthood.

In the literature, there have been studies carried out upon reading habits and preferences of the students. According to the results of the study carried out by Odabaş et al. with 153 female and 151 male university students studying at various different departments of Ankara University, 24% of the students have mentioned that spend their at least half an hour at most one hour time on the computer. Nearly half of the students (49%) said that they have spent at least one hour of their time on the computer. The rate of students who spend more than two hours of their time on the computer according to individual preferences increases significantly to a level as 25%. Only nearly 37% of the students' spending only at most one hour of their time for reading reveals that they spare more time for leisure activities than reading. There has been determined in the study of Balcı (2003) carried out among the students of Ankara University that only two of the 803 students read books on their free time. Students mostly prefer popular sports such as football and basketball and spare the most time for activities such as going to the cinema, listening to music, using the computer or surfing the net (EARGED, 2007). In his study carried out with 110 students studying at Dumlupınar University, Arıcı (2008) has aimed to determine whether students like reading or not and the reasons of this. According to the findings obtained from the research, the young people who do not love reading have mentioned as reason that they find some of the books as boring and expensive, they have not acquired this habit in their childhood, they do not have free time and they find reading newspapers or magazines and television, movies and the Internet more entertaining.

A society that includes individuals who have reading habit is the one that is thinking. The thinking society is the producing society. And the producing society is the

developed one in terms of sociability, culture, economy and science. Family members and teachers share the leading role on acquisition of the reading habit which is the essential of a developed society. Parents at home and friends and teachers at school are the people whom children and the young take as role model. For this reason, it is really important for teachers to display an exemplary behavior and discourse to children about reading books and motive them to read books in accordance with their interests.

### **Importance of the Study**

Acquisition reading habit of the teachers who are the basic part of the educational system will facilitate transferring this habit from generation to generation. It can be possible to create a modern society including learning, knowing, thinking, teaching, listening, criticizing and producing individuals and to keep this society alive for ages by transferring the reading habit from generation to generation. For this reason, to determine reading habits of the pre-service teachers and to reveal the effect of computers and the Internet which they use intensely upon reading habits are of vital importance.

### **Purpose of the Study**

In this study, there has been aimed to reveal reading habits and preferences of the pre-service teachers and determine the effects of variables such as gender, having computer and the Internet connection upon these habits and preferences. In accordance with this purpose, answers to the questions below have been sought:

1. Is there a relationship between students' gender and their reading printed newspapers or newspapers in an electronic environment every day regularly?
2. Is there a relationship students' gender and their reading genres such as novel, poem, etc. except from the course book and newspaper?
3. Is there a relationship between students' having their own computers and the reasons of their not reading daily newspapers sold as printed to paper?

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4. Is there a relationship between the type of the computer and the reasons of their not reading daily newspapers sold as printed to paper?
5. Is there a relationship between the type of the computer and students' reading books such as novel, poem, etc. except from the course books and newspapers?
6. Is there a relationship between students' having Internet connection at places where they live (home, dormitory, hostel, etc.) and the reasons of their not reading newspapers sold daily as printed to paper?

## **Method**

### **Population and Sample**

The study population included students studying at various different departments of Trakya University Faculty of Education in 2010-2011 academic years. Totally 405 students from the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> grades studying at different departments of the Faculty have voluntarily participated in the research. 284 (70.12%) of the students were female and 117 (28.89%) were male. 4 of the students who participated in the study did not mention their gender. Distribution of the students according to gender has been shown in Table 1.

**Table 1:** Distribution of the students according to gender

	<u>f</u>	<u>%</u>
<u>Female</u>	<u>284</u>	<u>70.12</u>
<u>Male</u>	<u>117</u>	<u>28.89</u>
<u>Unanswered</u>	<u>4</u>	<u>0.99</u>
<u>N</u>	<u>405</u>	

### **Data Collection Tools**

The questionnaire including 15 questions and developed by the researcher has been used as the data collection tool. The first 8 of these questions are to take demographical

knowledge of the students. And the other questions have been prepared to determine reading habits and preferences of the students.

## Findings

There has been a relationship ( $\chi^2:8.06$  df:1,  $p<.01$ ) between the gender of students and their reading newspaper in an electronic environment or newspaper printed on paper every day regularly. 36.66% of female students and 52.21% of male students answered yes to the question of “Do you read printed or electronic newspaper regularly every day?”. Daily newspaper reading rate has been higher at male students than the female students.

**Table 2:** Printed or electronic newspaper reading situation of the students regularly every day according to gender

n= 405	Female		Male		Total	
	f	%f	f	%f	f	%f
Yes	103	36.66	59	52.21	162	41.12
No	178	63.34	54	47.79	232	58.88
<b>Total</b>	<b>281</b>	<b>71.32</b>	<b>113</b>	<b>28.68</b>	<b>394</b>	<b>97.28</b>
CHI-SQUARE		df	p	%fe<5	fe=0	
8.06		1	p<.01	0	0	

There has been a relationship ( $\chi^2:20.17$  df:1,  $p<.01$ ) between the gender of students and their reading books on novel, poem, etc. genres except from the course books and newspapers. 92.83% of the female students and 76.58% of the male gave positive answers to the question of “Do you read books on novel, poem, etc. genres except from the course book and newspaper?”(Table 3) The number of female students reading books on the other genres rather than the course books and newspaper is higher than the number of male students.

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**Table 3:** Students' reading books on different genres apart from the course book and newspaper according to gender

n= 405	Female		Male		Total	
	f	%f	F	%f	f	%f
Yes	259	92.88	85	76.58	344	88.20
No	20	7.17	26	23.42	344	11.84
<b>Total</b>	<b>279</b>	<b>71.54</b>	<b>111</b>	<b>28.46</b>	<b>344</b>	<b>96.30</b>
CHI-SQUARE      df      p      %fe<5      fe=0						
20.17      1      p<.01      0      0						

There has been a relationship between ( $\chi^2$ :12.67 df:3,  $p<.01$ ) the gender of students and frequency of reading books on novel, poem genres excluding the course books and newspaper. 38.15% of the female students and 38.10% of the male students answered as once or twice a week to the question of "How often do you read books except from the course books and newspapers?" (Table 4). Female students read books except from the course books and newspapers more frequently than the male students.

**Table 4:** Students' reading a book frequency on different genres apart from the course book and newspapers according to gender

n= 405	Female		Male		Total	
	f	%f	f	%f	f	%f
1-2 days in a week	28	11.24	21	25.00	49	14.71
Once in a week	31	12.45	12	14.29	43	12.91
Haftada 1-2 gün	95	38.15	32	38.10	127	38.14
Hergün	95	38.15	19	22.62	114	34.23
<b>Toplam</b>	<b>281</b>	<b>71.32</b>	<b>113</b>	<b>28.68</b>	<b>394</b>	<b>97.28</b>
CHI-SQUARE      df      p      %fe<5      fe=0						
12.67      3      p<.01      0      0						

There has been a relationship ( $\chi^2$ :12.90 df:5,  $p<.05$ ) between students' having their own computers and the reasons of them for not reading daily newspapers sold as printed to paper. 36.62% of the students who have their own computers and 12.00% of the ones who do not have their own computers have mentioned that "they can read the news from the news portals on the Internet to which they learn from the newspaper"; 8.45% of the

ones that have their own computers and 32.00% of the ones who do not have their own computers have mentioned that “*they get bored of reading newspapers*”; and 33.80% of the ones who have their own computers and 40.00% of the ones who do not have their own computers have mentioned that “*they can watch the news on TV to which they can learn from the newspaper*” (Table 5).

**Table 5:** The reasons of the students for having their own computers and not reading printed newspaper

n= 405	Female		Male		Total	
	f	%f	f	%f	f	%f
I cannot afford to buy daily newspaper.	5	7.04	2	8.00	7	7.29
I can watch the news on TV instead of learning from the newspaper.	24	33.80	10	40.00	29	35.42
I can read the news from news portals on the net instead of reading from the newspaper.	26	36.62	3	12.00	2	30.21
Daily news comes to my I-phone or mobile phone as message.	1	1.41	1	4.00	2	2.08
I am not interested in current news.	9	12.68	1	4.00	10	10.42
I get bored of reading newspaper.	6	8.45	8	32.00	14	14.58
<b>Total</b>	<b>71</b>	<b>71.32</b>	<b>25</b>	<b>28.68</b>	<b>96</b>	<b>23.70</b>
CHI-SQUARE      df      p      %fe<5      fe=0 12.90                  5      p<.05      42                  0						

There has been a relationship between ( $\chi^2:3.94$  df:1,  $p<.05$ ) students’ having their own computers and their reading newspapers in an electronic environment or as printed every day regularly. 56.16% of the students who have their own computers and 67.31% of the ones who do not have their own computers haven’t read newspaper on electronic environment or as printed “*every day regularly*” (Table 6).

**Table 6:** Regular newspaper reading of the students according to having their own computers

n= 405	Female		Male		Total	
	f	%f	f	%f	f	%f
Yes	128	43.84	34	32.69	162	40.91
No	164	56.16	70	67.31	234	59.09
<b>Total</b>	<b>292</b>	<b>73.74</b>	<b>104</b>	<b>26.26</b>	<b>396</b>	<b>97.78</b>
CHI-SQUARE      df      p      %fe<5      fe=0 3.94                  1      p<.05      0                  0						

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There has been a relationship ( $\chi^2:26.87$  df:10,  $p<.01$ ) between the type of the computer that students have and their reasons for not reading daily newspapers sold as printed to paper. 40.54% of the students who have desktop computer and 31.48% of the students who have laptop computers have mentioned that “*they can watch the news on TV instead of reading from the newspaper*”; 37.84% of the students who have desktop computer and 37.04% of the students who have notebook computer have mentioned that “*they can read the news from the portals instead of reading from the newspapers*”; and whole of the students who use computer do not read daily newspapers sold as printed to paper because “*they do not have adequate money to afford daily newspapers*” (Table 7).

**Table 7:** The reasons of the students for not reading printed newspaper and the type of the computer they have

	PC		Laptop		Tablet		Total	
	f	%f	f	%f	f	%f	f	%f
n= 405								
I cannot afford to buy daily newspaper.	4	10.81	2	3.70	2	100	8	7.29
I can watch the news on TV instead of learning from the newspaper.	15	40.54	17	31.48	0	0.00	32	35.42
I can read the news from news portals on the net instead of reading from the newspaper.	14	37.84	20	37.04	0	0.00	34	30.21
Daily news comes to my I-phone or mobile phone as message.	0	0.00	1	1.85	0	0.00	1	2.08
I am not interested in current news.	2	5.40	8	14.81	0	0.00	10	10.42
I get bored of reading newspaper.	2	5.40	6	11.11	0	0.00	8	14.58
<b>Total</b>	<b>37</b>	<b>39.79</b>	<b>54</b>	<b>58.06</b>	<b>2</b>	<b>2.15</b>	<b>93</b>	<b>23.70</b>
CHI-SQUARE      df      p      %fe<5      fe=0								
26.87      10      p<.01      72      0								

**Table 8:** The situations of students for their reading book on different genres apart from the course book and newspaper and the type of computer they have

	PC		Laptop		Tablet		Total	
	f	%f	f	%f	f	%f	f	%f
n= 405								
Yes	147	89.09	162	88.04	4	40.00	313	87.19
No	18	10.91	22	11.96	6	60.00	46	12.81
<b>Total</b>	<b>165</b>	<b>45.96</b>	<b>184</b>	<b>51.25</b>	<b>10</b>	<b>2.79</b>	<b>359</b>	<b>88.64</b>
CHI-SQUARE      df      p      %fe<5      fe=0								
20.59      2      p<.01      0      0								

There has been a relationship ( $\chi^2:13.92$  df:5,  $p<.05$ ) between having Internet connection at the place where students live and their reasons for not reading daily newspapers sold as printed to paper. 36.23% of the students who have Internet connection at the place they live and 33.33% of the students who do not have Internet connection have mentioned that they do not read daily newspapers sold as printed to paper because “*they can watch the news on TV instead of reading at newspaper*”; 37.68% of the students who have Internet connection and 11.11% of the ones who do not have mentioned that they do not read because “*they can read news on portals on the Internet instead of learning from the newspaper*”. 7.29% of the students do not read daily newspapers sold as printed to paper because “*they cannot afford to buy a newspaper*”, 10.42% do not read because “*they are not interested in current issues*”; and 14.58% do not read because “*they get bored of reading newspaper*” (Table 9).

**Table 9:** The reasons of the students for not reading printed newspaper according to their having Internet connection

	Yes		No		Total	
	f	%f	f	%f	f	%f
n= 405						
I cannot afford to buy daily newspaper.	6	8.70	1	3.70	7	7.29
I can watch the news on TV instead of learning from the newspaper.	25	36.23	9	33.33	34	35.42
I can read the news from news portals on the net instead of reading from the newspaper.	26	37.68	3	11.11	29	30.21
Daily news comes to my I-phone or mobile phone as message.	1	1.45	1	3.70	2	2.08
I am not interested in current news.	5	7.25	5	18.52	10	10.42
I get bored of reading newspaper.	6	8.70	8	26.93	14	14.58
<b>Total</b>	<b>69</b>	<b>71.88</b>	<b>27</b>	<b>28.12</b>	<b>96</b>	<b>23.70</b>
CHI-SQUARE      df      p      %fe<5      fe=0 13.92      5      p<.05      42      0						

## Conclusion and Discussion

According to the findings obtained in the research, the rate of male students who read printed newspapers or the ones in the electronic environment every day regularly is

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higher than the rate of female students. On the other hand, the number of female students who read books on rather than the course books and newspapers is more than the number of male students. Moreover, the female students who read books apart from the course books and newspapers read more frequently than the male students. There has been information in the literature that supports those findings. In the research carried out by Gömleksiz (2004), there has been determined that female students in the Faculty of Education have more positive reading attitudes than the male students and there has been mentioned that female students have more adapted efficiency and usefulness of the reading habit. In the study carried out by Batur et al. (2010) with 420 students studying at Uşak University Faculty of Education, there has been deduced that reading a book habit of the female students better than the habits of the male students. In the study carried out by Koca et al. (2011) with 100 students studying at Atatürk University Physical Education and Sports Vocational High School and Faculty of Education Sports Department, there has been determined that female students spare more time for reading than the male students, read more books and like reading books more than the male students.

According to another finding of this students, a very important part of the students whether they have computers or not, do not read printed or electronic newspaper “regularly”. As is known to all, an action is called habit when it has been performed regularly and voluntarily. Having reading habit requires performing this action voluntarily and regularly. According to this finding, there can be deduced that having computer negatively effects the habit of newspaper reading.

When the reasons for not reading printed to paper daily newspaper have been asked to the students who have computer and Internet connection, they have mentioned that they prefer news portals on the net and television to follow daily news. Because the news portals on the Internet have been updated at short intervals, national and international news have been announced to readers in a shorter time than printed to paper newspapers. Having both computer and Internet connection facilitates access to news

portals. Televisions can also broadcast the news in a short time to audiences from the whole corners of the world owing to the advanced informational technologies. For this reason, it is natural for students to prefer news portals and televisions as news source instead of reading a daily newspaper. Another result that can be deduced from this finding is that students answer considering the newspaper as the daily news following means. A study that is compatible with these findings is the research carried out by Ayhan and Balcı (2009) with university students in Kyrgyzstan. According to the result of the study, the Internet has a partly negative effect upon reading newspaper and magazines and watching television. Another study carried out with the young about reading newspaper has been performed with 220 students studying at different faculties and vocational high schools of Selçuk University in May 2007. The mostly followed media organs by the students are 49.3% television, 21.5% Internet and 15.6% newspaper, respectively. 35.1% of the answers given to the section where frequency of reading newspaper has been asked are as I read every day regularly, 28.8% as I read 2-3 times in a week, 10.2% as I read once a week. Students have mentioned with at most 23.4% that they visit newspaper and news portals on the Internet (Toruk, 2008).

Some of the students (10.42%) in this study have mentioned that they are not interested in current news whether they have Internet connection or not at the place they live in. It is not adequate for teachers to only improve themselves on their field. The teacher should also follow the latest improvements, have opinion, make analysis and set a good example to students. For this reason, it is necessary to decrease the rate of students who are not interested in current news and the world as soon as possible. For that purpose, training about both gaining the reading habit and following printed and electronic news sources at early ages will be favorable. Moreover, Computer I and II course content teaching at Faculty of education should be provided to include more practices and examples on “Areas of Internet Usage, Proper and Efficient Use”.

In this study, whole of the pre-service teachers who have tablet computer have mentioned that “they do not read daily newspapers printed to paper because “*they cannot*

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*afford to buy daily newspapers*”. Moreover, the reading rate of the students on different genres apart from the course books and newspapers is lower than the reading rate of the students who have desktop and laptop computers. According to this finding, as the model of the computer becomes more portable, the rate of reading printed sources such as printed newspaper, novel and poetry decreases. Printed source reading rate can be decreased because of having a great number of and various different written sources (z-book, e-book, etc.) on the Internet and e-book readers which can easily be downloaded to mobile means of communication. However, it is meaningful to make inadequate money excuses in order not to read daily newspaper.

The role which teachers play about getting their students adopt reading habit is definitely very important. It is compulsory for teachers not to limit reading only with course books, obtain printed books that will help students know the world and life at all points, will make them consider, will encourage them to dream and will make them happy and to support their students about reading. The teachers who get into the habit of regular reading and have the skill of guiding to their students and parents about this will lay the foundations of a reading culture that will be conveyed to other generations.

### **Suggestions**

As the continuation of this study, there can be offered those suggestions to the researchers and implementers:

1. This study can be extended including associate degree and undergraduate students who have higher education.
2. Effect of the computers and the Internet upon the reading habit can be compared in terms of associate degree and postgraduate students who have higher education.
3. Effect of the computer and The Internet upon the reading habit of the pre-service teachers can be researched in terms of various different endogenous variables.

4. Effect of the computer and the Internet upon the reading habit of the pre-service teachers can be researched in terms of different demographical properties of the students.
5. The relation between the effect of computer and the Internet upon the reading habit of the pre-service teachers and attitude towards computer using can be compared.
6. The relation between the effect of computer and the Internet upon the reading habit of the pre-service teachers and attitude towards Internet using can be compared.
7. The relationship between the effect of computer and the Internet upon the reading habit of the pre-service teachers and information literacy can be researched.
8. There can also be carried out studies to determine the effect of the reading habit of pre-service teachers upon academic success.
9. There can be carried out studies to determine the effect of reading habits of university students upon the academic success.
10. The reasons and preferences of university students for reading printed book and e-book can be researched.
11. Reading habits of the students studying at equivalent higher educational institutions in abroad and students studying in our country and the effect of informational technologies upon this habit can be analyzed comparatively.

## **References**

1. Arıcı, A. F. (2008). Okumayı Niye Sevmiyoruz? Üniversite Öğrencileri İle Mülakatlar. *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, Cilt: 5, Sayı: 10.
2. Arslan, Y., Çelik, Z. & Çelik, E. (2009). Üniversite Öğrencilerinin Okuma Alışkanlığına Yönelik Tutumlarının Belirlenmesi. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, Sayı 26, 113-124.

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3. Ayhan, B., Balcı, Ş. (2009). Kırgızistan'da Üniversite Gençliği ve İnternet: Bir Kullanımlar ve Doyumlar Araştırması. *Bilgi Dergisi*, Kış 2009, sayı:48, 13-40.
4. Batur, Z., Gülveren, H. & Bek, H. (2010). Öğretmen Adaylarının Okuma Alışkanlıkları Üzerine Bir Çalışma: Uşak Eğitim Fakültesi Örneği. *Uşak Üniversitesi, Sosyal Bilimler Dergisi*, 3/1, 32-49.
5. Coşkun, İ. (2010). "İlköğretim 4. Sınıf Öğrencilerinin Okuduğunu Anlama Ve Yazılı Anlatım Becerilerindeki Gelişimin Birbirini Etkileme Durumu: Eylem Araştırması." Gazi Üniversitesi Eğitim Bilimleri Enstitüsü İlköğretim Ana Bilim Dalı Sınıf Öğretmenliği Bilim Dalı Doktora Tezi, Ankara.
6. EARGED (2007). *Öğrencilerin Okuma Düzeyleri*. Milli Eğitim Bakanlığı Eğitimi Araştırma ve Geliştirme Dairesi Başkanlığı, Ankara.
7. Gömleksiz, M. N. (2004). Geleceğin Öğretmenlerinin Kitap Okumaya İlişkin Görüşlerinin Değerlendirilmesi (Fırat Üniversitesi Eğitim Fakültesi Örneği). *Yüzüncü Yıl Üniversitesi, Elektronik Eğitim Fakültesi Dergisi*, 1 (1), 1-21.
8. Koca, N., Ulus, F., Okay, S. & Taş, M.S. (2011). *Spor Tutkusu ve Spora Olan Düşkünlüğün Okuma Davranışı ve Kütüphane Kullanımına Yansımaları*. Atatürk Üniversitesi Edebiyat Fakültesi, Bilgi ve Belge Yönetimi Bölümü, Sosyal Bilimlerde Araştırma Yöntemleri Dersi Projesi. <odabashuseyin.files.wordpress.com/2011/04/son-sc3brc3bcm2.docx> (10.02.2012)
9. Odabaş, H., Odabaş, Z.Y. & Polat, C. (2008). Üniversite Öğrencilerinin Okuma Alışkanlığı: Ankara Üniversitesi Örneği. *Bilgi Dünyası*, 9 (2), 431-465.
10. Özçeşlebi, O. S., Cebecioğlu, N. S. (1990). *Okuma Alışkanlığı ve Türkiye*. İstanbul , Milliyet Yayınları.
11. Temur, T. (2001). "İlköğretim 5. Sınıf Öğrencilerinin Yazılı Anlatım Beceri Düzeyleri İle Okul Başarıları Arasındaki İlişki." Yayınlanmamış Yüksek Lisans Tezi, Ankara: Ankara Üniversitesi.
12. Toruk, İ. (2008). Üniversite Gençliğinin Medya Kullanma Alışkanlıkları Üzerine Bir Analiz. *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, Sayı 19, 475-488.
13. Turkish Language Institution (2012) <<http://www.tdk.gov.tr>> (02.01.2012)
14. Yılmaz, B. (1993). *Okuma Alışkanlığında Halk Kütüphanelerinin Rolü*. Ankara, Kültür Bakanlığı Yayınları.
15. Yılmaz, B. (2004). Öğrencilerin Okuma Ve Kütüphane Kullanma Alışkanlıklarında Ebeveynlerin Duyarlılığı. *Bilgi Dünyası*, 5 (2), 115-136.

## Fostering Innovative Teaching : The Use of Blended Learning.

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**Abstract:** To make from language learning more effective and help teachers attain their objectives, different teaching tools and aids have been suggested. Indeed, the research literature has witnessed an increasing interest in finding out what can make from the language classroom a stimulating learning atmosphere, where a variety of teaching supports are provided. This is because the teachers' role is no longer limited to their talk, the use of textbooks and the board, but rather, it requires more flexibility in teaching to match students' learning needs and styles. Therefore, the use of e-learning materials in language teaching has been widely advocated for a variety of purposes. Sustaining learners' motivation, enhancing their reflection, interaction as well as autonomy are among the promising results behind the use of these tools. Indeed, to make from teaching more flexible and meet learners' needs, styles and learning goals, an integration of e-learning tools with traditional course materials have emerged under the name of blended learning. Hence, to make from this mode of learning more effective, teachers need to know how to blend effectively these learning technologies into the teaching learning process. Otherwise, introducing technological tools in the classroom may be conceived as a threat by some teachers, instead of a supporting language means. The question, which remains addressed in this respect is how to make blended learning more effective?. In other words, how can teachers integrated e-learning tools in the classroom while achieving the intended pedagogical objectives?. In attempt to answer this question, this paper introduces first the term blended learning., then highlights some research questions concerning how to blend the classroom session and the online work and how to provide feedback and support along this learning process. Furthermore, to help teachers attain this goal, the present article also provides a set of teaching ideas and tips through which teachers can make the right selection of the teaching materials, integrate them properly with the face-to-face teaching while enhancing learners' interaction and reflection along their learning process. Thus, these teaching tips include the need to become aware of the course objectives, to know how to analyse students learning needs and styles, how to manage time, to select and vary the course content , to decide the mode of content delivering, to link face-to-face learning with online learning, and promote learners' interaction and reflection through blended learning. Finally, to make from the blended course more effective there is a need to carry out assessment and tutoring process along the teaching learning process ,besides evaluating this course through developing reflective teaching and questioning as it will be shown through this work. In addition to that, In order to enhance the use of e-learning in the classroom, this article also suggests some of the e-learning tools to include in traditional classes such as web-sites, blogs, web-quests, M-learning, etc, to give more opportunities to learners to get benefit from using electronic materials in their learning .These materials concern English language teaching classes, but their use can cover other subjects and teaching contexts.

**Keywords:** blended learning, e-learning tools , Interaction, reflection.

### Introduction

The use of e-learning materials in language teaching has been widely advocated for a variety of purposes. Sustaining learners' motivation, enhancing their reflection,

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interaction as well as autonomy are among the promising results behind the use of these tools. Indeed, to make from teaching more flexible and meet learners' needs, styles and learning goals, an integration of e-learning tools with traditional course materials have emerged under the name of blended learning. Hence, to make from this mode of learning more effective, teachers need to know how to blend effectively these learning technologies into the teaching learning process. In attempt to help them attain this goal, the present article provides a set of teaching ideas and tips through which teachers can make the right selection of the teaching materials, integrate them properly with the face-to-face teaching while enhancing learners' interaction and reflection along their learning process. This article also suggests some of the reflection, e- learning tools to include in traditional classes to give more opportunities to learners to get benefit from using electronic materials in their learning .Before dealing with these tips, an overview of blended learning is also provided to make clear this mode of learning.

### **An Overview on Blended Learning**

Implementing technology in language teaching is gaining momentum with the increasing innovations and development which are being achieved within the digital world. This is due to the growing interest in technology and the common consensus upon its benefits in people's life. Indeed, education has become no longer limited to a given context, i.e., schools/ institutions, it is rather a long life process that cannot be restrained by time or space. In fact, globalization has imposed a set of demands on society where renewing and developing once skills is regarded as a prerequisite for the world of work. As a matter of fact, lifelong learning has become a need to achieve employability and respond to the changing needs of society. In this light, blended learning has emerged where the aim is to create an optimum training programme for a specific audience through combining traditional learning with media-rich, interactive online technology (Tenberg, 2009). Blended learning has been defined by Watson (2008, p.04) as the mode of learning which “*combines online delivery of educational content with the best features of*

*classroom interaction and live instruction*". Thus, within this learning there is a mixture of face-to-face and online learning via the use of e-learning tools, i.e. electronic media such as CD-ROMs, DVDs, internet, mobile devices. Blended learning has a set of benefits which can be summarized as follows:

- It recognizes different learning styles and preferences through providing an online course component which can be accessed at any time and space.
- It promotes learner autonomy and provide them with opportunities to focus on their perceived weaknesses in a given language area.
- It provides learners with choices since the learning platform renders the courses menu-driven. (Ibid)

Research has also proved the effectiveness of blended learning courses. For instance, a study investigating the impact of an online blended learning course (B10LC) at Italian universities by The Cambridge ESOL has shown that students have benefited from this course in terms of their language proficiency, in addition to their positive views on its content, approaches ,assessment and technical quality (Hawkey,2009). Similarly, Thomson's research, which has investigated the business skills of two groups of participants: one group has received training through pure e-learning while the other one through blended learning, has revealed that more productivity, speed and accuracy of performance was noticed from the part of the blended learning group (stated in Lee and Chong,2007). Indeed, it has been reported that several institutions are gathering information about students' satisfaction with the use of blended learning (see the Report on the ELI Focus Session, November, 2010).

Hence, in spite of its benefits in language learning, blended learning has a number of challenges. Online resources can cause confusion among learners who may be wandering over their use so that personal guidelines and study models are needed ( Lee and Chong,2007). Also, e-solution may not enhance learners' interaction which is required in language learning (Ibid). For that purpose, a set of teaching tips are suggested

below to help teachers make effective use of blended learning through promoting learners' interaction in and reflection over their learning.

### **Blended Learning: Teaching Tips and Ideas**

As in any other mode of learning, in blended learning teachers are engaged in making and taking decisions concerning designing courses and activities, selecting materials, assessing learners' performance, etc. There are cases where the blended course has been already designed and is ready to be implemented. Still, teachers' innovation and attempt to create their own materials and content remain always demanded. Indeed, this mode of learning requires more teachers' reflection, understanding of the learning context and its objectives and above all taking learners' needs and styles at the forefront. Teachers' reflection needs to cover the following decisions.

**Being Aware of The Course Objectives:** Before selecting the e-learning tools, i.e., the online materials, teachers need to be aware of the intended objectives of the course. This is through revealing the competences targeted and the language skills learners need to develop through the course. Moreover, learners' language level, including their learning strengths and difficulties as well as their learning styles and technical skills in using electronic materials need also to be considered. Therefore, analysing learners' needs is important and needs to be the first step to undertake before involving in other tasks.

**Analysing Students learning needs and styles:** There has been a general consensus that integrating learning technologies into the classroom may create an interesting learning atmosphere where learners' interests and motivation can be enhanced. Yet, the availability of different e-learning tools are likely to make teachers confused and unable to make their selection of the right tools. This choice may get difficult to determine in case of blended learning since teachers need to select e-learning tools and integrate their use with other traditional course materials. Therefore, identifying learners' learning needs and styles is of paramount importance in blended

learning since it is likely to unveil learners' strengths and weaknesses in language areas, in addition to their learning styles. In doing so, teachers can decide the content as well as the type of the selected e-learning tool. Furthermore, conducting this needs analysis should also cover students' views on using learning technologies and the extent to which they are familiar with them. This helps as well teachers in their selection of e-learning materials. This could be done through asking learners to fill in needs analysis checklists or through interviewing them.

**Managing Time:** Teachers need to be aware of the time allocated to online self-study and to face-to-face teaching. They need to manage their teaching accordingly. This means that they need to cover face-to-face components within the allocated time and make sure that the hours devoted to online materials are enough to achieve their teaching objectives. Thus, there needs to be a matching between time and the materials to be covered whether they are online or face-to-face. This is of crucial importance mainly in case the content of the blended learning course is designed by the teacher. Yet, teachers need to bear in mind that more materials need to be provided online and learners are free to decide the time they need to spend on such work according to their own needs which is not the case in face-to-face lessons. It needs to be noted also that indicating when and for how long teachers are available online is necessary for learners to know mainly in case of chat or providing a direct feedback.

**Selecting and Varying The Course Content:** After finding out about learners' learning needs, styles, their goals, technical skills and the objectives of the course, teachers need to select electronic materials and the content of both online and face-to-face learning. Before doing so, they need to be aware of the facilities the institution provides. For example, is there a self-access center for this online learning?. What kind of materials are provided?. Is internet access of a good quality?.etc. Also, a decision needs to be made concerning the language level of the course content and the e-learning tools .This language should not be too difficult or easy for learners. Instead, learners need to find it challenging and interesting because there are new things to be learnt.

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Teachers also need to make the course content varied including audio, video files, emails and different electronic tools. Indeed, learners' motivation needs to be sustained and their interest in learning needs to be maintained. Indeed, as stated above learners are exposed to several activities in online learning to practice more and improve their language proficiency. Therefore, to make such activities interesting they need to vary in terms of content and format. But, they need to serve the same purpose. Besides, it would be worth to integrate different language skills (writing, reading, speaking and listening) even if there is one particular language skill which is targeted .This is because learners need to feel that such learning is contributing to their language development which can be a stimulus to their interest and motivation.

***Deciding The Mode Of Content Delivering:*** Teachers need to decide how the online components need to be delivered. Is it by emails?. Chat via a VLE (Virtual Learning Environment) ?. Skype ?. In fact the content of the online components determines the way they are delivered .If for example the aim is to teach pronunciation, selecting emails as a mode of delivery would not work. Chat or VLE are worth in this case. Similarly, in case the online course contains lessons with different activities or exercises to practice which contain a variety of e-learning materials like podcasts, it would be worth to use a VLE. The latter is *“a web-based platform on which course content can be stored. It is accessed by learners on the internet, and they can not only see course content such as documents, audio and video lectures , but also do activities such as quizzes, questionnaires and tests, or use communication tools like discussion forums or text and audio chat”*(Dudeny & Hockly,2007:137) . Furthermore, teachers need to consider *“what elements of the course content are delivered online, and what elements are delivered face-to-face?”* (Ibid). To do so, they need to understand what kind of activities are favoured by each learning context and how they can be linked to achieve the intended aim. In other words, teachers need to think about the features of each learning mode and how he can design activities accordingly.

*Linking face-to-face learning with online learning:* The online course activities need to be linked to the classroom sessions. This is of great importance in blended learning since learners need to perceive that face-to-face learning is supporting online learning or vice versa. Indeed, there needs to be a continuum between these two modes of learning. Learners can be assigned tasks online which they can perform when they are face-to-face. Thus, if for example, the objective is to enhance communication strategies, the online learning needs to make learners listen to dialogues by native speakers and identify how language is used in different contexts. When students meet face-to-face, they can practice such strategies and involve in dialogue with their teachers and peers. It needs to be noted also that face-to-face lessons need to introduce learners to online work or activities. Thus, in face-to-face learning, teachers need to make clear to their learners the components of the online course or materials and what is expected from them and how it relates to face-to-face lessons.

*Promoting Learners' Interaction and Reflection Through Blended Learning :* Not only are teachers required to enhance learners' interaction in the classroom, but also in online learning. Indeed, the online work or course needs to encourage them to use their language to communicate their thoughts and ideas with their teacher and peers. Therefore, social software such as Wikis, blogs, etc, need to be among the elements of the online learning since they provide a space for this interaction. Moreover, face-to-face learning needs to reinforce this interaction through providing a learning atmosphere where learners can display what they have learned and practiced online through communication. Thus, a channel linking the online and face-to-face learning needs to be created and reinforced through learners' interaction. In fact, through interaction learners are likely to develop more a feeling of responsibility over their learning since their ideas and decisions are exposed to others and this in turn is likely to make them more confident about their abilities in managing their learning without depending on their teachers. Besides, teachers and learners interaction is necessary because it assists learners in monitoring their own progress and in identifying specific language areas to

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develop further through revealing their strengths and weaknesses and guiding them towards better performance .“*continuing interaction provides a basis for increasing reliable internal cognitive feedback, which helps the learner to plan and self-correct the message bearing features of utterances*” (Arnold,1999:53). It is likely also to enhance learners’ motivation since it can lead to understanding oneself as a learner. “*discovering what you are really like and being that self are two highly motivating forces. Indeed, the most fascinating subject we can learn about and talk about is ourselves. And we learn about ourselves through others .So communication which satisfies these deep innate needs develops from sharing about ourselves while others actively listen to us, showing understanding and accepting us as we are*”. (Ibid:178)

Similar to interaction is the notion of learners’ reflection over their learning process, which needs to be enhanced in both modes of learning. Through the online work, learners need to be encouraged to reflect over their learning through providing them with:

- The choice to select which activities to perform.
- Activities and tasks which are thought provoking and involve their decision making.
- The self- marking system which shows them to what extent they have understood the course, thus what is required from them to improve their performance.
- The chance to monitor their progress over time through providing them with continuous feedback from their teacher.
- Collaboration with their classmates or peers which include peer assessment, exchanging views and plans for conducting projects, etc.

When meeting face-to-face with their teacher, learners need to provide him/her with a feedback which shows what they have gone through their process of reflection and what kind of decisions they have made and taken to improve their learning. The teacher can as well get learners’ opinions concerning online materials and why they have had such

assessment and grading results. Thus, through learners' interaction and reflection teachers are likely to get "*a wealth of information to guide classroom practice, and to manage learning and learners*" (Hedge, 2000: 397). Likewise, learners are also likely to get continuous constructive feedback from their teacher which enables them to understand more their learning process.

**Assessment and Tutoring:** Part of the educational process is the process of assessing learners' progress to find out whether teacher's objectives and expectations have been met. In blended learning, learners can be assessed both online and face-to-face. Teachers can thus use different types of assessment practices to get an idea about their learning process and outcome. In fact, it has been argued that "*blended learning courses, with the emphasis on student self-marking and correction online and monitoring by the teacher through the LMS are often seen as in tune with tendencies towards formative assessment*" (Hawkey, 2009: 26). Therefore, to make from assessment the engine that derives learning (Cowan, 1998), teachers or tutors need to take into consideration the following points along their assessment process:

- They need to make clear to their learners their role.
- They need to make clear the criteria used in their assessment.
- They need to provide support and guidelines for the tasks suggested.
- They need to include both summative and formative assessments. So, social software are required to help learners collaborate and involve in peers assessment.
- They need to specify "office hours" when they are available online for audio (or text) chat.
- They need to determine the time they spend to respond to learners' online work.
- They need to reflect on their tutoring and see if they need more training into tutoring or designing courses.

**Evaluating The Blended Learning Course:** As Frenco says: "*Evaluation is of critical importance in supporting and shaping how teaching is done. It involves asking*

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*questions, collecting relevant information, and making judgements, and all within a context of specific purposes and goals” (:2005:123). Thus, teachers need to address the following questions concerning both the online and the face-to-face teaching:*

- To what extent the content meets learners needs and styles and the course objectives?.
- Is face-to-face learning linked to the online learning?.
- Are learners getting more autonomous and involved in their learning?.
- Is learner assessment providing them with enough feedback and supporting them to identify their strengths and weaknesses in their learning?.
- Are the materials used and the way of integrating them (both in face-to-face and in online learning) enhancing learners’ reflection over and interaction in their learning?.

***Using E-learning Tools: Creating Opportunities For Blended Learning***

Integrating online learning in traditional classrooms where teachers and students meet face-to-face can be quite interesting and useful. There are learners who spend most of their time outside classes using internet resources like emails, websites or chat, etc. Indeed, if learners needs analysis reveals their interest in using e-learning materials, why not including them in the course?. What needs to be considered is that such e-learning tools meet learners’ needs, likes and learning goals. Hence, the question to be addressed is what kind of e-learning tools need to be integrated and how?.

**Coursebooks with E-learning Materials:** There are some coursebooks which contain other extra resources materials such as CDs/audio cassettes DVD materials, etc. It has been found that “...students like coursebooks too, since they foster the perception of progress as units and then books are completed. Coursebooks also provide material which students can look back at for revision and, at their best, their visual and topic appeal can have a powerfully engaging effect”. (Harmer,2007:181). Since these extra materials are designed within each units of the course book and they are shown clearly in teacher’s guides, integrating them may not be difficult for teachers to achieve. Hence,

following the same units and lessons as they are designed within the coursebook can make teachers and learners de-motivated, besides the topic may not be of interest to students or culturally appropriate as Harmer states: *“Units and lessons often follow an unrelenting format so that students and teachers eventually become demotivated by the sameness of it all. And in their choice of topics, coursebooks can sometimes be bland or culturally inappropriate”*. (Ibid:182) Therefore, being flexible and not relying entirely on the coursebook is necessary. The teacher can decide which tasks/lessons to omit and which to maintain or change and which extra materials to design instead of the one already proposed. Thus, whether the coursebook contains e-learning materials, or not, there is always a need for teacher’s innovation since the latter can make his/her teaching interesting and admired by his learners and more likely to achieve the intended objectives of the course.

**Creating Online Courses :** How to create an online course?. Moodle is a popular source VLE which is free to use to create online courses. An example of an online course is The Cambridge Financial English Course, 75% of which is delivered online, while 25% is done through face-to-face teaching (Tenberg,2009). The course aims to help learners develop financial English language skills through the 20 thematically organized modules (Ibid). It is available at <http://www.financialenglish.org/cfe>. Online courses aim to provide learners with interesting and interacting learning environment which are geared towards developing learners’ ability and skills in a given language area.

**E-learning Tools For Activities and Homework:** There are many electronic tools which can be used for activities or tasks to perform either in class or at home. With the growing innovations in technology, more tools are being introduced with different functions and purposes, providing thus teachers with more options for teaching resources, ideas and materials. Among these tools, one has proposed the following one to assign as activities and homework, as a support for the traditional course.

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**Podcasts:** Before starting the course, the teacher can introduce his learners to that course through providing them with an online task as a warm up .This e-learning tool can be a podcast, i.e., an audio or a video file which can be sent through email. In this case, teachers need to make sure that all learners have their email account as well as access to the internet. Teachers can also have access to these files from some English Teaching websites like The BBC Learning English website (<http://www.bbc.co.uk> ) so that he can give them just the website address when they are in class to do the task at home. What is important here is that the e-learning tool can be accessed and its content can prepare students to the intended lesson or course. Furthermore, to provide learners with more practice at home, teachers can use podcasts in case their aims are for instance to teach pronunciation, reading and writing strategies or communication strategies. Furthermore, to provide learners with more practice at home, teachers can use podcasts in case their aims are for instance to teach pronunciation, reading and writing strategies or communication strategies. Examples of podcasts are:

<http://www.listen-to-english.com/index.php?cat=podcasts> .

<http://learnenglish.britishcouncil.org/en/elementary-podcasts>

[http://www.eslpod.com/website/index\\_new.html](http://www.eslpod.com/website/index_new.html)

<http://www.podcastsinenglish.com/index.shtml>

<http://www.anglaisfacile.com/free/podcast-apprendre-anglais.php>

<http://www.bbc.co.uk/podcasts/genre/learning>

<http://australianetwork.com/learningenglish/vodcast.htm>

They can also ask learners to create their own podcasts at home, to record themselves at home and make the others listen to their English in class. To do so, learners can use the software Audacity which is available at <http://www.audacity.sourceforge.net/> .They can delete sounds, change and manipulate the sound file. For instance, teachers can ask learners to describe pictures on a webpage, to read a text or a passage or answer questions orally. They can encourage more learner interaction and collaboration through

asking them to compare their notes in small groups concerning their classmates' podcasts. This can also be motivating to these students.

**Websites:** There are also other websites which provide exercises and also lessons in different language areas like grammar, listening, reading, writing, etc. These are arranged according to learners' language level in English and teachers can either direct learners to their addresses or download them and print them to use as handouts. Among these websites:

<http://www.a4esl.org> Contains activities and lessons on different skills.

<http://www.barbican.org.uk> Contains ideas and resources to inspire creative writing.

<http://www.teacher.ash.org.au> For writing composition.

<http://www.education.ex.ac.uk> For note taking skills from lectures and reading.

<http://www.claweb.cla.unipd.it> Defines written style: formal and informal with interactive exercises.

<http://www.teachit.co.uk> How to write a book review.

<http://www.englishgambler.over-blog.com> Ho to write letters and emails.

<http://www.grammar.about.com> Figures of speech with a glossary of grammatical and rhetorical terms

<http://www.galaxy.bedfordshire.gov.uk> How to write newspapers articles.

<http://www.eslgold.com> Exercises and lessons about speaking, writing, reading, listening, grammar, vocabulary, business, pronunciation, idioms.

<http://www.speak-english-today.com> For speaking practices.

<http://www.free-english-study.com> For different language skills.

<http://www.besig.or> For Business English lessons and exercises.

**Web-based Exercises:** There are other resources for creating a web-based exercises which can store these exercises such as Hot Potatoes which can be available at : <http://www.hotpot.uvic.ca/>.The teacher can install this programme on his computer and create different types of activities such as:multiple choice, short answer, jumbled

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sentence, crossword, matching/ordering and gap-fill, in addition to including audio files in MP3 format (Dudeny & Hockly,2007).

**Blogs and Webquests:** To assign projects and homework, social software can be used such as blogs and webquests. Teachers can assign homework through the class blog as well as his recommendations and a review of the lesson or interesting ideas he finds useful for the assigned homework. One thinks the main advantage of class blog is that teachers can get learners' feedback on the assigned work or the studied lesson. Even their views concerning their learning can be obtained since students can post their comments to the same class blog. Moreover, to enhance learners' reflection over their learning and get an idea about how they are learning, learner blog can be used where they can describe daily activities, their views, etc. ( e-portfolio can be included here). Creating a blog is not difficult. There are many sites like blogger.com. learners can add pictures, include audio files (at <http://www.audioblog.com> ), as well as videos (at <http://www.freeblog.org> ) Webquests can be used similarly .These tools require learners to use internet resources to look for the information needed (Ibid). They contain four parts which are: Introduction, task, process and evaluation. Creating webquests can be done through going to <http://www.webquest.org> .An example of a webquest is the one of David Smith.

**Using Chat:** Outside classes teachers can use text or voice chat with his learners to join them in any place using the Skype software. They can indeed ask questions on particular topics which are worth discussing and can enhance communication strategies. Learners can also be encouraged to use chat to practice a particular language skill or strategy. This is called practice chat. (Dudeny & Hockly,2007).

**Online Dictionaries:** There are many dictionaries which are available online like The Macmillan English Dictionary. For advanced and intermediate levels: thesauruses is available at <http://www.thesauruses.references.com>. This electronic dictionary “*can encourage learners to be more adventurous in their creative writing at the same time as*

*helping them to analyse their output more critically*".(Dudeny & Hockly,2007:104). To support students in writing their projects encyclopedias are also available online at:

<http://www.encyclopedia.com>

<http://www.britannica.com>

<http://www.wikipedia.com>

**Using M-Learning** : Using mobile devices to practice exercises and tasks outside classes, can be motivating. Learners can subscribe to a service such as Gapfillers (<http://www.gapfillers.co.uk> ) through which they can receive a word of the day message sent via SMS (Short Message Service or Text), or a short grammar quiz on their mobile phones. Besides, A mobile version of the well-known book of English Grammar In Use (CUP) has been developed for iPhone. Among the published ELT digital material which has a mobile component is the general English course : Global (Macmillan). YouTube Downloader can be used here. Indeed, to upload and share materials on video, the most popular and well known website is: YouTube available at: <http://www.youtube.com> YouTube videos can be linked to or embedded in web pages such as blogs, pages on university/school websites. It can be used for M-learning so that learners using mobile devices can get access to them outside their lesson time. The well known site Jami Keddie's TEFL clips contain teaching ideas for using YouTube (<http://www.lessonstream.org>)

## **Conclusion**

Using blended learning can be a source of learners' motivation and a space for teachers' innovations and creative ideas. Within this learning, teachers' flexibility is no more questioned and students' reflection and interaction can be enhanced along the process. Hence, despite the availability of different e-learning tools, making the right choice and blending properly the course remain an important issue to be addressed. Therefore, analysing learners' needs and being aware of the course objectives and the available learning conditions need to be done before making and taking any decision. Then,

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linking the online and face-to-face learning , varying the content to meet learners' learning needs and likes and deciding the mode of delivery are all important decisions teachers need to make within blended learning.

In addition to that, since assessment and evaluation are part of the educational process, teachers should reflect over these practices over time to make from their teaching more effective. It would worth to support learners to achieve their learning potential through these tools since technology is fascinating and stimulating further interest among the young and even the adults. Therefore, teachers can create opportunities for blended learning through promoting their interaction with learning technologies outside classes ( and even inside ). Still, it needs to be noted that learners should not be overloaded with the use and content of these tools. Instead, teachers need to select the e-learning tool(s) and content which can serve their objective and which can be of interest to their learners. Meanwhile, they need to switch to other traditional course materials while maintaining such objectives and interests in mind. Thus, a combination of both modes of learning is required. For that purpose, teachers need to be trained to deal with these issues in order to make from blended learning more successful.

Finally, to make from blended learning more effective, continuous evaluation is necessary through collecting data on learners' views and attitudes towards the blended course. i.e., its content, mode of delivery, teaching approach and assessment process. The institution's role cannot be negated in this case since it needs to provide technical support and the necessary funding to achieve good quality blended courses and bring innovation into their use when required. Thus, a question which can be posed for further research is: How can the institution assure the quality of the blended learning course?.

## **References**

1. Arnold, J.(1999).Affect in Language Learning. Cambridge :Cambridge University Press.
2. Cowan, J.(1998).On Becoming an Innovative University Teacher. Buckingham: RHE and Open University Press.

3. Diaz,V. and Brown, M. (2010). “Blended Learning: A Report on the ELI Focus Session”. EDUCAUSE, ELI Paper 2, pp 01-17. Retrieved, November 2010, from <http://creativecommons.org/licenses/by-nc-nd/3.0/>
4. -Dudeney, G and Hockly, N. (2007). How To Teach English With Technology.England :Longman
5. -Frendo,F.(2005). How to Teach Business English.England: Longman.
6. - Gardner, D. and Miller,L.(1999). Establishing Self-Access. From Theory to Practice. Cambridge: Cambridge University Press.
7. Harmer.J.(2007). The Practice of English Language Teaching. England: Longman.
8. Hawkey,R.(2009). Impact of a Blended Learning Course: Observation and Stakeholder Views, Research Notes36,23-28.Cambridge University: Cambridge ESOL Examination.
9. Hedge, T.,(2000).Teaching and Learning in The Language Classroom. Oxford: Oxford University Press.
10. Lee, K.C. and Chong, P.M. (2007). “An Observational Study on Blended Learning for Japanese Language Studies in a Local University in Hong Kong”. Workshop on Blended Learning 2007, Retrieved from:
11. [http://www.cs.cityu.edu.hk/~wbl2007%20/WBL2007\\_Proceedings\\_HTML/WBL2007\\_PP088\\_100\\_Lee.pdf](http://www.cs.cityu.edu.hk/~wbl2007%20/WBL2007_Proceedings_HTML/WBL2007_PP088_100_Lee.pdf).Online
12. Tenberg,R.(2009). Linking Learning and Assessment:Cambridge ESOL’s Blended Learning Approach, Research Notes36,18-22.Cambridge University: Cambridge ESOL Examination.
13. Watson,J.(2008). “Blended Learning: The Convergence of Online and Face-to-Face Education”. NACOL. Retrieved from: [http://www.inacol.org/research/promisingpractices/NACOL\\_PP-BlendedLearning-Ir.pdf](http://www.inacol.org/research/promisingpractices/NACOL_PP-BlendedLearning-Ir.pdf)

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## **A Sociological Critique of Information Technology: Rethinking the Role of Teacher in e-Learning**

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**Abstract:** *This study critiques and reviews Information Technology (IT) on a sociological level and explains the role of teacher in e-learning according to the presented review. In order to fulfill the purpose of the study, this study takes a critical approach and method. According to the ideas of some critical thinkers of education, critical studies of educational technologies could be led on two levels of “political-economical” and “sociological”. The present study which is conducted on a sociological level, has examined the nature and ideological applications of IT as an educational technology. The findings of the study indicate that the instrumentalist and technical approach toward IT is not able to explain and illuminate the normative and value backgrounds for generation and expansion of e-learning. In the process of e-learning, taking a technical viewpoint, the teacher might provide the grounds for domination of technical logic instead of critical, political, moral, and creative understanding. Accordingly, the discourses of the classroom would be mainly focused on technique rather than content. In contrast, taking a cultural view instead of a technical one could, on the other side, facilitate understanding the value grounds for generation of e-learning as well as the ideological motivations and aspects which might lead to re-producing the present educational inequalities. It could, on the other side, change the present business-oriented and normalizing conditions. In this way, it could be concluded that IT is not merely a set of machines and the relevant software. Rather it involves a form and way of thinking that could direct the individual's viewpoint toward the universe. A cultural view could help changing the materialistic and business-oriented basis, and following that the class- based structure, in the society. Also, it could balance the relationship as well as the mutual effects between economy and culture. According to the findings of the study, it is recommended that the role of teacher should change from an expert to an expert intellectual. Such a teacher could provide the essential grounds for a cultural viewpoint instead of a merely technical viewpoint in learners regarding the cultural and social issues. This teacher understands the significance and the need to attend to the questions regarding the nature (what) and reason (why) of e-learning and addresses these types of questions in the classroom. In this way, it could be said that one of the main and basic issues to consider in electronic education is the role that education plays in order to expand democracy and prepare the citizens for valuation and discussion about the social conflicts and problems such as equality and freedom. These discussions and trainings could prevent determinism and social reproduction. The teacher might even pose questions from the manner (how) of electronic education according to the previous questions. In this viewpoint, technical issues are also taken and defined as part of political and moral issues. For example, the teachers and learners would face various educational, moral, economical, ideational, and political questions during the process of e-learning. In this way, free and creative thinking also takes on a new definition. In the process of e-learning, freedom does not signify the one-dimensional involvement of learners in more efficient application of information in line with the economical and business life. Rather it means a creative cooperation in cultivating public virtue. In these conditions, along with applying the e-learning, the teacher encourages learners to review and consider the associated obstacles and problems.*

**Keywords:** Critical theory, e-learning, sociological critique, democracy

## **Introduction**

These days, along with the development of technology and Information Technology (IT) in the field of education, various theoretical, philosophical, and cultural studies have been conducted on the role of these technologies in education (for example see Lyotard, 1984; Feenberg, 1991; Bromley and Apple, 1998; Cohen, 2002; Blacker and Mckie, 2003; Dreyfus, 2009; Erneling, 2010; Zarghami Hamrah, 2012). Considering IT from a philosophical point of view is important for some reasons. First, applying IT in education is a rather novel idea and the capabilities, effects and consequences are not investigated vastly from a philosophical viewpoint. Second, the application of IT in education is more significant and delicate in comparison to other fields such as industry and economy because in this field the subject is not just one aspect of human life, but human being and his education.

The different theoretical approaches and views toward IT play a principal role in determining the viewpoints toward the place, goals, and methods of employing IT in education. One of the philosophical-sociological views toward IT in education is the critical view. As Bryson and de Castell (1994) mention, the critical view was originated as a reaction to the technicist view. In technicist view two main assumptions are accepted as fixed and definite: a) the possibility of the effects and changes imposed by the technology on human being and his life; b) the necessary and useful role of IT and techniques resulted from the natural sciences such as the force for “progress” and rethinking and solving the important social issues which lead to increasing the public life quality.

Accordingly to the technicist view information and data are factual and objective, hence it is empty of values; that mean IT is human’s primary and natural action to satisfy his needs. Therefore, the development of technology is not a function of cultural, social, and value issues. Obviously, the opposite of this process is also possible; that is the independent development of technology affects social and cultural aspects. As a result, there should be cautions in applying IT to minimize the destructive and unfair effects. This is the reason technicians warn about the methods of employing IT in

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education.

In this way, from a technicist point of view, the main goal of education is preparing the cultivating the economic abilities that is considered as a capital that could be called as cultural capital (Sullivan et. al., 1994). If the main goal of education is growing the economic abilities, IT would be promising in two ways: a) the electronic commerce that is a by-product of IT would lead to considerable changes in economy; therefore, if education follows major economic goals, IT would take on an essential role; b) if knowledge is regarded as capital, IT plays a leading role in developing and supporting this capital. In other words, for dominating various fields of knowledge that is capital we need new data and information.

The technicist view merely emphasizes the skills but due to the neutral view it fails in defining the normative, social, and political grounds that create the unequal learning environments. For example, in this view the educational inequality is only defined as equal accessibility to the new educational chances. The critical view was originated as a reaction to the technicist view and according to the problems caused by the value neutrality of this approach in using IT.

Consequently, the place and role of IT in the process of education could be considered from a critical point of view. But, in order to impose define and limit the scope of the study, the present study focuses on viewpoints of some particular theoreticians, such as Apple, who maintain a rather sociological view. Due to the significance of the role of teacher in comparison to other elements at work in the process of education (Mac Comas et. al., 2000), the role of teacher is examined in the process of electronic learning. In other words, the purpose of the present study is to review and investigate IT on a sociological ground and to explain the role of teacher in e-learning with regard to the presented review.

## **Method**

This study adopted the critical method as the approach to attain the abovementioned research goals. But, the critical method in education has faced fluctuations that could be

traced in critical studies of Neo-Marxist as well; the encounter between structuralism and the economic-political review by Marx, on the one side, and attending to the human and cultural factors on the other side. In the studies that draw on the first view, the class analysis is main path and education, as part of the class structure, would create and reinforce the class relations. This type of analysis, on account of social or cultural reproduction, could be clearly seen in works by Althusser, Bourdieu, Bowles and Gintis. As Apple (1996), one of the critics of the first view indicates, the analysis which follows the first view mainly disregards the role of school in creating inequalities. This view overlooks the reproduction of the inequalities as well as the resistance against them. In this way, in the second mentioned view, the analysis with an economic-political method receives less importance and more emphasis is placed on culture. Freire, Giroux, Bernstein, and Apple are among the scholars who followed this view in their works.

On the other hand, as Bryson and de Castell (1994) believe, the critical studies could investigate educational computing from two aspects of access to and utilization of technologies by the marginal groups of the society. In most of the critical studies technology is viewed as a material commodity that is distributed unequally which has led to the unequal accessibility of various social groups and classes. This could be considered as “political-economic” critique of IT. In the second level, the critical study focuses on how the dominant social class uses the social development and progress to maintain their control on the novel forms of knowledge in order to reproduce the unequal and unfair structures which demonstrate the potential for change and freedom. This level of critique is called “sociology of knowledge”.

The critical approach adopted in this study, that follows the critical approach proposed by Apple, is sociological. This critical approach aims to review the ideological functions of IT as an educational technology and to reconsider the position and role of teacher in electronic education.

### **IT in education as an ideology of reproduction**

In the critical view education is regarded as a political institution that performs a leading

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role in social reproduction of knowledge and power as well as in establishing dominance. In this process a specific social group or class impose their interests and preferences on a vast group of people from other classes and groups. In such a process the schools are at service of reproducing social and cultural inequalities through the curricula. In this way, the curricula are not neutral rather it works as an ideology that evokes emotions and brings about social, economic, and cultural reproduction; thus it seeks to fulfill the right wing and the neo-conservative goals. Therefore, in contrast to the common idea that curriculum facilitates development and progress, it reproduces the unequal social relations in practice. In this regard, Apple (2012) claims that education reproduces adverse social and cultural elements through various instruments and methods (pp. 25-40). For example, in capitalist societies education reproduces and fosters inequalities through teaching methods such as encouraging the racist behaviors, elitism, merely following the teaching instructions, and failure in connecting the curriculum and real life. Education also fosters obedience to the authorities, class dominance, racism, and unequal relations. This condition that results from the authoritarianism of those in charge of schools that in combination with the dominance of politicians and governors has led to a system of production, distribution, exchange, and consumption of knowledge that is considered rightful and legitimate. In such conditions the other approaches and view that fall out are known as illegitimate and wrong.

In this way, Apple (2000) believes that the formal knowledge is formed in the process of interactions among school, social institutions, and government and plays a hidden role of symbolic control. This knowledge, that is the product of external process of knowledge evolution, is different from knowledge in its real sense that is originated in an internal process from the efforts by scholars and researchers. In other words, knowledge in formal form is created and organized in a different way from the original form of knowledge. As an example, Apple mentions that in such conditions the curriculum mainly aims to prepare learners for economic life in agreement with the neo-conservative traditions. Likely, the idea of democracy also reduced from a political

concept to an economic one that emphasizes freedom of action at the service of consumption and reinforcing specific consumption patterns. Another example to be mentioned is reducing the concept of citizenship to monopolistic individualism as one of the goals of formal knowledge. The result of this process is “marketizing” the schools and curricula that ignores public interest and ensures the profit making for private section.

According to the presented discussion, it is of high significance to analyze the role of IT in reproducing the unequal social conditions. As it was mentioned, in Apple’s view, curricula reinforce the existing inequalities on an ideological level. But, as Young (1992) states, ideology is represented not only in the system of thoughts, but also, in the form of ideological apparatuses. Likewise, IT might also work as ideology in the field of education. As the educational course of actions is not merely thematic and rather it is value-laden and political (Apple, 2000), it is true for IT as well. That is, IT could act the ideology for reproducing and encouraging the current inequalities. Considering IT as ideology would open up the possibility of criticizing the negative aspects of employing IT in an extensive range of applications: first, employing IT in education is not simply a technical subject without profit-seeking motivations; rather it might be laden with economic and even other motivations. Scott (in Bromley and Apple, 1998) offers a relevant analysis for this discussion. Relying on the sociological review, he proposes that the external forces that endeavor to join education and IT is not rooted in educational needs and concerns. He also adds that as the result of the effects brought about by the external forces the education is changed to an instrument serving computerizing and economy in terms of IT that might satisfy the economic advantage of a limited minority. Addressing this subject deeply and historically, he believes that using IT in education could be traced in military sources. For further illumination he refers to Nobel’s studies and mentions that the word “computer” means a person who works with the numbers and performs calculations and since one of the necessities of military is doing difficult and complex calculations, it has been assigned to the machines. He says: “in the present

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time, the wide application of computers for non-military purposes is in fact the modified form of those military goals” (Scott, 1998, p. 59).

The second point is that if the normative aspects of IT are overlooked, its technical logic would dominate the classroom discourses in the form of concepts like rationalizations (Apple, 1991). In these conditions, the technique is emphasized and the teachers depend on IT and its large technical capabilities increasingly so that they lose their authority gradually. In this way, IT includes a form of thinking that directs individuals’ views toward universe. In other words, at first IT enters the classroom and adapts it to its specific logic and consequently the technical logic replaces the critical, political, and ethncal understanding; therefore the discourses of lessons are based on mainly the technique rather than content. Therefore, as Apple and Jungck (1990) also mention, IT reproduces the manner of function as well as the goal of education. in these circumstances, as Lyotard (1984) says knowledge is reduced to information and also IT takes major role in generating and expanding information with the aim of improving, optimizing, and enhancing the economic conditions that is in agreement with the capitalism that rules the societies. As a result, the goals such as focusing on public interest, justice, and freedom are either abandoned or lose the original meaning and take on new ones that satisfy the mentioned goals. In this educational process, teachers play a marginal role consistent with the wide application of IT in achieving goals that are mainly economic. Apple and Jungck (1990) point out that such a process of education is a specific variation of business process in which the teachers offer the prepackaged curricula including software and hardware designed by engineers. Consequently, the teacher is no more a powerful professional with educational and ethncal abilities rather s/he is deskilled and dependent on the engineers and IT. Apple and Jungck believe that this process that leads to devaluation of teaching skills follows from the traditional and negative idea that teaching is a feminine and insignificant job.

Finally, the third point is related to the concept of computer literacy as a cultural capital. Bourdieu (1997) claims that cultural capital is a mixture of linguistic and

cultural capabilities that are distributed in the society unequally and the learners in upper classes receive a greater share. Such a capital, along other types of capitals, allows the upper classes to reproduce their status in the society. In this process the relevant information and technologies, including cultural capital of upper classes, serve the reproduction of status and the higher computer literacy could guarantee learners' achievement from these classes. Apple (1991) also states that learners from upper classes have higher computer literacy due to their higher wealth, not higher abilities; accordingly further expansion of technological expertise, particularly computer literacy, perpetuates increasing class inequalities. He even goes beyond the educational discussion and refers to the gender and racial inequalities. Similarly, Bryson and de Castell (1994) also note that the quality and quantity of using computers differ among the classes, races, and genders. For more clarification of the relationship between technological literacy and gender inequalities, Weinman and Haag (1999) say that there are considerable differences between using IT in girls and boys schools. They argue that some believe that computer and the hypertext are cultural symbols that are not feminine. They indicate that boys largely describe computer as enjoyable, unique, friendly and important while most of the girls do not have the same ideas. Weinman and Haag also warn that this issue would later cause the economic inequalities between men and women since man are able to get high-paid and professional jobs due to the higher computer literacy. According to the mentioned "sociological reviews of knowledge", as Bryson and de Castell (1994) also state, the critical theoreticians conclude that the discriminatory assumptions and activities of curricula with regard to IT is rather like the traditional curricula from the aspects of form and content.

### **Redefining the role of teacher in e-learning: resistance**

Some critical theoreticians propose that, in the circumstances described above, education and knowledge could not counteract and neutralize the reproduced social relations. In order to counteract, there is a need for a critical understanding of school functions. For example Feenberg (1991) says that neither the instrumentalist views, such as technicist

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view, not the substantive views, like the ideas by Ellul and Heidegger, are not able to change the current conditions. The instrumentalist approach takes IT as having no cultural or ethnical values since it regards application of IT in education in relation to the goals that are to be attained through IT, not the nature of IT. Therefore, it could not be said that the development of IT by nature leads to or inhibits more educational equalities and freedom; but it is a matter of the manners of IT application in education. Hence, this approach is not capable of determining the social and political grounds that create unequal learning environments. This approach describes the issue of inequalities in terms of equal access to new educational chances which would not result in changing the present conditions.

On the other hand, in substantive views, such as those of Ellul and Heidegger, IT is constructed and expanded based on specific philosophical and value standpoints; hence it introduces an independent power into the field of education so that the consequences are inevitable. Heidegger (1977) adds that the process of the development of novel technologies is in fact the process of production, accumulation, and consumption of energy that takes efficiency as the only criterion to be satisfied. Subsequently, he claims that the nature of technology strive to order the energy resources toward further flexibility and efficiency. In Heidegger (Dreyfus, 2004) views, the new technology is the last stage of Western understanding of being so that with stabilization of the nature of new technology changes human being to subject and the universe to object. Therefore, it could be said that the nature of technology is independent form share of subject from object and the current relation between subject and object is produced by the stabilization of the nature of technology. Accordingly, even subject is not able to resist the development of IT. Heim (2003), also mentions that in Heidegger views technological understanding of universe is human destiny and he is not optimistic about escaping this condition. As Feenberg (1991) believes Heidegger thinks that “only a God can save us now!”

Ellul (1967) also states that in the present conditions the human aspect of life is

regarded as marginal and dependent on the technical wisdom which grants unlimited power to technology. In other words if the “logic” of technology is supposed as the synonymous to “wisdom”, the result would be enslavement of human being by technology. He argues if technological thought dominates the society, human cognition, action, and learning would take on a technological sense and following that human life would lead a technical life while the prevalent belief would be that technology is independent from human behavior (pp. 14-15).

According to the abovementioned views, there is no possibility of changing the current conditions. This fact inspired Young to criticize the two mentioned views and claim that only a critical view could alter the present technological circumstances. But Apple follows a different direction. In order to explain his critical and practical view on the active role of school in changing the present condition, he starts with criticizing the Neo-Marxist substantive views, including the theories proposed by Bowles and Gintis. He (1982) believes these theories take on an economistic and functionalist position, hence they deny the independence of schools from the capitalism and regards schools as unable to counter the structural powers in the society. In this manner, the educational system only works for reproduction of capitalism. These theories include structuralist implications since they suggest that hidden structures and power regulate and determine the social life and the human beings are not capable of producing effects on those structures. According to these theories, since the structures choose human fate the only possible way to change is the contradictions in the structure. As it could be understood from the discussion these theories fail in recognizing and explaining the factors that perform a role in changing the society.

Criticizing the economic-oriented view of Marx and his followers and emphasizing the culture and ideology, Apple (Scott, 2008) seeks to redefine the structure and the contributing factors in constructing the society. In his explanation of the structure two types of relationship should be addressed: first, the relation between the economic and cultural systems; second, the relation between the material and cultural

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structures and the social factors. Taking into account the relation between structure and factor from a historical point of view, he suggests cultural view instead of economic one for resistance and believes that change could be attained through continuous and persistent actions. Therefore, in the cultural view changing the present conditions is possible in two ways: first, this view could alter the material foundation and eliminate the class-oriented structure in the society. Second, the economic and cultural relations could be altered by working on the economic foundations and balancing the mutual effects between these two aspects. This is a responsibility that schools could undertake. Therefore, schools do the reproduction task on the one side and provide the grounds for change, on the other side.

In short, taking a deeper look, Apple assigns some role to culture and ideology in forming the social structure and underlines the power and abilities of learners and teachers as effective factors for controlling and directing the economic structures and the role they play in human life. In agreement with Freire, He (2000) advises that education should head toward goals; hence it should be established on ethnical and political principles so that learners along with the teachers could construct their lives as well as the history.

He offers some recommendations for applying technology in the field of education that fulfill the mentioned goal. He (1991) declares that focusing on the positive and useful aspects of technology in education without a critical discourse results in the reduction of nature and essence of knowledge to a technical subject. On the other hand, by providing the learners with social-critical literacy and by offering the analysis of ethnical, social, and political issues surrounding the technology, the teachers and learners acquire the essential skills to control those issues.

In line with the presented discussion some points are highlighted regarding the role of teachers in the process of electronic learning. First, in the process of e-learning teacher plays a basic and significant role. This role is prominent since the majority of proposed reforms for employing IT are based on accepting the paradigm of IT. That is to

say that accepting the potentials of IT in improving the educational system would lead to questioning the manners of IT application. But the more basic and fundamental question to be raised is relevant to the “why” of IT paradigm. This approach addresses the advantages and disadvantages of IT paradigm and the range of application. As an example of this type of questions we can refer to the fundamental question posed by Apple that “who benefits?” (pp.59-60). It should be mentioned that, in such conditions, while setting the goals for using IT in education and in the process of e-learning the teacher is recommended to transcend the technical aspects. S/he should avoid concentrating on questions from “methods” and confront the learners with questions of “why” and “in what situation” types. For example s/he could explain that the role IT performs a facilitative that than a generative role. In other words, IT assumes no role in generating the knowledge of education and determining the elements of education including basics, principles, methods, contents, and goals. For instance, IT should not determine the goals to be attained through education. The goals are the results of standpoints of the educational systems toward universe, human being, nature, and the representations such as wisdom, emotion, freedom, equality, and human achievements like things. In this view the technological paradigm would be reduced to educational instrument that is used for facilitating the educational development and do not go beyond this scope. Therefore, if we merely attend to the common role of IT and believe that it has opened up considerable opportunities for learners and be fascinated by the numerous promises that it makes, we would overlook the foundations of our technological actions that is nature and its representations, such as important tasks and things. In this case, the important tasks and things in the history of human life would appear to be monotonous, limiting, tough, and intolerable. But, by attaching fundamental importance to nature we obtain a criterion for evaluating “IT as instrument”. For further illumination it could be added that IT is arises from human thoughts and could merely provide the learners with information for thinking. But, this technology is neither thinking and knowledge nor the instrument for evaluating knowledge; rather it is another form of human action that

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could be criticized and challenged by him. As a result, with the introduction of IT to education the prophecy of teachers that is encouraging the learners to think still remains and even gains higher importance because the easy access to information through IT might be considered as knowledge. But, knowledge in original sense goes beyond a wealth of information and production of knowledge necessitates complex perceptual experiences by the learners and this is the teacher who is responsible for directing the learners through this process.

For example, when we discuss “designing educational software according to the learning theories of dialectical constructivism”, the linguistic theory by Vygotsky about the mental development and learning is taken as the basis and this theory is used in education through IT. Consequently, when the educational problems are rooted in foundations, IT could not solve them. The fundamental problems in educational systems, such as inequalities, lack of freedom, and profit-seeking motivations, that exist before the integration of IT into education would not be solved by the help of electronic learning.

The other relevant point to be addressed is about the increasing significance of teachers’ role in the process of electronic learning. The teachers are recommended to discuss IT in relation to the concepts such as education, the meaning of life, the nature of social communications, equality, freedom, and the value of ethnics; the issues that have been present throughout the human social life and fate. That is to say, IT should not be merely discussed according to the technical aspects. One of the representations of this process is the ethnical, political, educational, and social consequences of IT that adopt the universal as well as local criteria that could be evaluated in the formation stage as well as other stages. In other words, teachers face numerous ethnical, economic, religious, and political questions in relation to IT and its non-technical dimensions. Hence, further than using IT in education, the curricula should provide the grounds for discussing these questions in the classroom by the teachers. Teachers should lead critical discussions on the present technical conditions and with reference to real and tangible

examples (including the cultural, social, and ethnical consequences of using cell phone and Internet) beside using e-learning and teaching the technical skills related to computer and IT. Such discussions and analyses should involve the positive and negative outcomes of IT development in human social and individual life.

## **Conclusion**

The results of this study reveal that the instrumentalist view toward IT fails in explaining and illuminating the normative and value grounds for formation and development of electronic learning. In most of the cases, in the process of e-learning the teacher provides the grounds for domination of a technical logic rather than critical, political, ethnical, and creative understandings. Therefore, the classroom discourses mainly focus on techniques not the content.

But, adopting a cultural view instead of a technical one it is shown that IT is not simply a set of machines and relevant software but it maintains a form and a way of thought that could shape the individual's view toward the universe. Though such a view we could understand the value grounds for formation of IT as well as the motivation and ideological aspects of the development of e-learning with the aim of reproducing the current educational inequalities and we could also resist those inequalities and change the business-oriented and normalizing condition. Through the cultural view, we might remove the material and business basis of society and following that the class system of the society. As a result, the relation between economy and culture and their mutual effects would also be balanced.

Finally, according to the results of this study it is recommended that the role of teacher in the process of e-learning should alter from that of an expert to an intellectual expert. The teachers are in charge of creating the essential grounds for cultural view instead of technical one about the cultural and social issues. Such teachers understand the significance and priority of questioning the "what" and "why" of electronic education and discusses these questions in his class. For example, the teachers and learners encounter numerous educational, ethnical, economic, religious, and political

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questions in relation to electronic learning. The teachers might even raise questions on the manner of e-learning according to the previously mentioned questions. In this manner, the technical issues are also considered as part of the political and ethnical issue.

From this point of view, the major problem of e-learning is also related to the role that education should perform to develop democracy and to prepare the citizens for valuating and discussing the social conflicts and problems such as equality and freedom. This type of discussions and education prevent the growth of determinism and social reproduction. On the other hand, and creative free thinking also take on new meanings. In the process of e-learning freedom is not a one-way participation of learners in efficient application of information in economic life; rather it is defined as creative cooperation in fulfilling the public interest and constructing the life and history by the learners.

## References

1. Apple, M. (1982). *Education and power*. New York: Routledge.
2. Apple, M; Jungck, S. (1990). "You don't have to be a teacher to teach this unit": Teaching, technology, and gender in the classroom. *American educational research Journal*. 27(2). 227-251.
3. Apple, M. (1991). The new technology: is it part of the solution or part of the problem in education? *Journal of computers in the schools*. 8(1-3). 59-82.
4. Apple, M. (1996). *Cultural politics in education*. New York: Teacher's College Press.
5. Apple, M. (2000). *Official Knowledge: Democratic Education in a Conservative Age*. (2<sup>nd</sup> Ed). New York: Routledge.
6. Apple, M. (2012). *Ideology and curriculum*. (Third edition). New York: Routledge.
7. Blacker, D; Mckie, J. (2003). Information & Communication Technology. In Nigel Blake; Paul Smeyers; Richard Smith; Paul Standish. *The Blackwell guide to the Philosophy of Education*. Oxford: Blackwell.
8. Bourdieu, P. (1997). The forms of capital. In A.H. Halsey; H. Lauder; p, Brown; A, Stuart Wells. (Eds). *Education: culture, economy, and society*. Oxford: Oxford University Press.
9. Bromley, H; Apple, M. (1998). *Education, Technology, Power: educational Computing as a Social Practice*. New York: State University of New York Press.
10. Bryson, M; de Casttel, S. (1994). Telling Tales Out of School: Modernist, Critical & Postmodern "True Stories" about Educational Computing. *JOURNAL OF EDUCATIONAL COMPUTING RESEARCH*, 10(3), 199-221.

11. Cohen, E. (2002). *Challenges of information technology education in the 21<sup>st</sup> century*. London: idea group publishing.
12. Dreyfus, H. (2004). *Highway Bridges & Feasts: Heidegger & Borg man on How to Affirm Technology*. Available on:[http://www.technology.ed/~Dreyfus/philosophyoftechnology/highway Bridges.html](http://www.technology.ed/~Dreyfus/philosophyoftechnology/highwayBridges.html).
13. Dreyfus, H. (2009). *On the Internet: Thinking in Action* (2<sup>nd</sup> Ed). New York: Routledge.
14. Ellul, J. (1967). *The technological society*. Trans. J. Wilkinson. Ney York: Vintage.
15. Erneling, C.E. (2010). *Towards discursive education: philosophy, technology, and modern education*. Cambridge: Cambridge University Press.
16. Feenberg, A. (1991). *Critical theory of technology*. Oxford: Oxford University Press.
17. Heim, M. (2003). Heidegger & Mc Luhan & the Essence if Virtual Reality. In R, Scharff;V, Dusek. *Philosophy of Technology: The Technological Condition & Ontology*. Oxford: Blackwell publishing.
18. Heidegger, M. (1977). *The question concerning technology & other essays*. Trans. W. Lovitt. New York: Harper Press.
19. Lyotard, J-F. (1984). *The Postmodern condition: A report on knowledge*. Trans. G. Bennington & B. Massumi. Minnesota: University of Minnesota Press.
20. McComas, W. F.; Clough, M. P.; Almazroa, H. (2000). The role & character of the nature of science in science education. In W. F. McComas. *the nature of science in science education: rationals and strategies*. London: Kluwer academic publishers.
21. Scott, A. (1998). The Everyday Aesthetics of Computing Education. In Bromley, H; Apple, M. *Education, Technology, Power: Educational Computing as a Social Practice*. New York: State University of New York Press.
22. Scott, D. (2008). *Critical essays on major curriculum theorists*. New York: Routledge.
23. Sullivan, T; Hartley, J; Saunders, D; Montgomery, M; Fiske, J. (1994). *Key Concepts in Communication & Cultural Studies*. New York: Rout ledge.
24. Weinman, J; Haag, P. (1999). Gender Equity in Cyber Space. *Educational Leadership*. Vol. 56, No. 5, pp. 44-49.
25. Young, R. (1992). *Critical theory and classroom talks*. Bristol: Multilingual Matters Ltd.
26. Zarghami hamrah, S.( 2012). Role of virtual education in higher education from the view of existence philosophy.*Journal of social sciences*. 8(2). 207- 215.

## **Student's Satisfaction from e-learning System: A Case Study of Virtual University of Pakistan**

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***Abstract:** Information technology innovations in educational system have immense impact on establishing the access to higher education for the students all over the world. In case of far off areas and remote villages where the mainstream education system cannot work effectively, this system is helpful. This is especially true with reference to Pakistan where majority of the youth has limited access and inadequate resources to get higher education. This learning system is nothing short of a blessing as for students, e-learning means increased access; it may also mean a more learner-centered approach, enriched knowledge and higher quality. To examine the mode of e-learning and its perceived usefulness, an in-depth study of student's point of view is very critical in order to reveal many important facts that could determine and shape the new and affective ways of e-learning. Present study intended to highlight the importance of on-line learning system in developing countries with special reference to Pakistan. In this regard, an effort was made to explore the satisfaction level of the students enrolled in e-learning system of Virtual University of Pakistan. The main objectives of the study were to investigate the major reasons behind students' selecting Virtual University for the purpose of getting higher education, assessment of the impact of students-instructors interactivity pattern on student's overall satisfaction and an overview of the overall satisfaction level of students from the e-learning mode. The method adopted for the present study was survey. The sample comprised of 240 students which were selected by using simple random sampling method. Total 24 campuses were selected from all over the Pakistan, 6 campuses from each province and from each campus 10 students were randomly selected. A questionnaire containing close-ended questions on five-point Likert Scale with 25 items was deployed. Descriptive statistics, regression analysis and one sample t-test were applied to measure student's satisfaction from the system. Results showed that students prefer this system due to its high teaching standards. Regression analysis explained interactivity pattern as an important indicator of overall satisfaction from e-learning mode. One sample t-test revealed that students were highly satisfied from e-learning system of Virtual University. The results concluded that unconventional mode of learning is as powerful tool of education as conventional. Findings of the study lead to the practical implications to further ensure its affectivity and identified the need of introducing useful alternatives of face to face communication in order to abridge the gap between instructors and students.*

**Keywords:** E-learning, Students' Satisfaction, Virtual University of Pakistan (VUP), Interaction

## **Introduction**

Modern revolution of information technology has turned our wishful thinking into reality. It is facilitating the people in every walk of life by making communication fast and free from geographical boundaries. The advancement in information technology has opened up new avenues in education sector as well. It has undoubtedly infused a new spirit in the conventional concept of distance learning. These communication gadgets have directed us to move towards a new mode of learning i.e. e-learning. Now the education is in access of every student either the student is full time or part time. E-learning provides the students a freedom to learn from anywhere, at any time, any place and at their own pace (Keegan, 1995; Wu et al., 2008; Mantyla & Woods, 2001; Oubenaissa et al., 2002; McGorry, 2003).

In developing countries where literacy rate is low, it seems difficult to change the situation of illiteracy via traditional modes. In this regard, a Meta-survey on the Use of Technologies in Education conducted by UNESCO (2004) identified that same patterns to change literacy situation of the developing countries will not work any more. It will be unrealistic and unachievable target to build more physical infrastructure and arrange more teachers. Many countries are already spending enough Gross Domestic Product (GDP) on education and have no more room for steering. In this situation, traditional educational mode will be least effective to meet the challenges of emerging knowledge societies. E-learning is often suggested as an effective alternative in these circumstances. The potential benefits of this learning system for developing countries include easy access, cost-effective education, and valuable mean to get higher education and more exposure (Abdon, Ninomiya & Raab, 2007).

While it has many benefits, this learning mode is facing many challenges as well. It is especially true with reference to the developing countries where literacy rate is very low and acceptance to new interventions in education is also not encouraging. In this regard, acceptance of online university as learning organization in comparison with conventional mode of learning is a big challenge (Kamsin & Is, 2005; James and Miller 2005; Gulati, 2008).

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Passmore (2000) and Ayub & Iqbal (2011) argue that in order to measure satisfaction and perception of students on e-learning, student's input can be assessed from their response on effectiveness of overall program including technological acceptance and provision of basic facilities at their respective place of learning. Multiple factors contribute towards users' satisfaction from e-learning which includes perceived ease and usefulness, flexibility of e-learning mode and interaction patterns followed by instructors for the purpose of communication with the students (Arbaugh, 2000). Further, Sun, Tsai, Finger, Chen, & Yeh, (2008) identify flexibility as an important indicator of students' satisfaction from e-learning. This system offers maximum facilitation to the students to fulfill their study needs surpassing the limitations they would face in conventional mode. It is commonly perceived that e-learning provides ease of use and learner friendly environment making learning an enjoyable process for students. In this regard, perceived value of this system contributes further in student's satisfaction from e-learning (Wu, Tennyson, & Hsia, 2010).

Another study conducted by Drennan, Denny, and Pisarski (2005) explores that freedom in learning environment and positive perceptions towards use of technology facilitate learning and also affect the level of satisfaction. Malik and Mubeen (2009) found students' and instructor's interaction pattern as another important indicator of student's perceived satisfaction from e-learning system. Further, provision of proper facilities and technological help contributes towards student's perceived usefulness of e-learning system. Student teacher frequent interaction, in time solution of student's problems and proper understanding of system are the indicators affecting student teacher relationship and perceived satisfaction of the students from teacher and system (Volery & Lord 2000; Sorebo, 2009).

E-learning generally lacks the element of live interaction between student and teacher and restricts the students to ask the questions at the spot in case of any ambiguity whereas this is the strength of conventional mode of learning. In e-learning, it is also difficult to conduct detailed discussions over students' queries as both students and

instructors are physically separated from each other (Berge, 1999; Saunders & Weible, 1999). Students generally face difficulties in this mode of learning as they do not have proper access to computer learning environments. At the same time, infrastructural problems such as electricity failure and availability of inadequate number of computers at campuses are among the constraints of e-learning ( Hussain, 2007). Owing to many such limitations, it becomes very important to empirically investigate the level of students' perceived learning, satisfaction, student-instructor interaction and student-student interaction within a web-based distance learning environment (Sher, 2008).

Learning through information technology leads to innovation in mainstream education and may even have effects beyond the realm of education itself. For instance, this form of teaching and learning has the key advantage of reaching many geographically distant people at a single instance thus playing a significant role in the creation of a global knowledge-based society. But, it is a challenge to convince the students to adopt a new mode who previously belonged to conventional mode of learning. This is worth exploring that even with multifaceted problems; the e-learning system has played a significant role in winning the trust and satisfaction of many people across the world. This paper aims at bringing these underlying factors which determine and effect students' perception regarding e-learning system in Pakistan. In this regard, the researchers are determined to measure the satisfaction level on the basis of acceptance of Virtual University of Pakistan (VUP) as e-learning organization, learning provisions for students, interactivity issues and effectiveness of e-learning as compared to conventional mode.

### **Research objectives**

This research intends:

- To investigate the major reasons behind students' choosing Virtual University for the purpose of getting higher education.

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- To assess the impact of students and instructors interactivity pattern on student's overall satisfaction towards e-learning,
- To assess the overall satisfaction level of students from the e-learning mode.

### **Hypotheses**

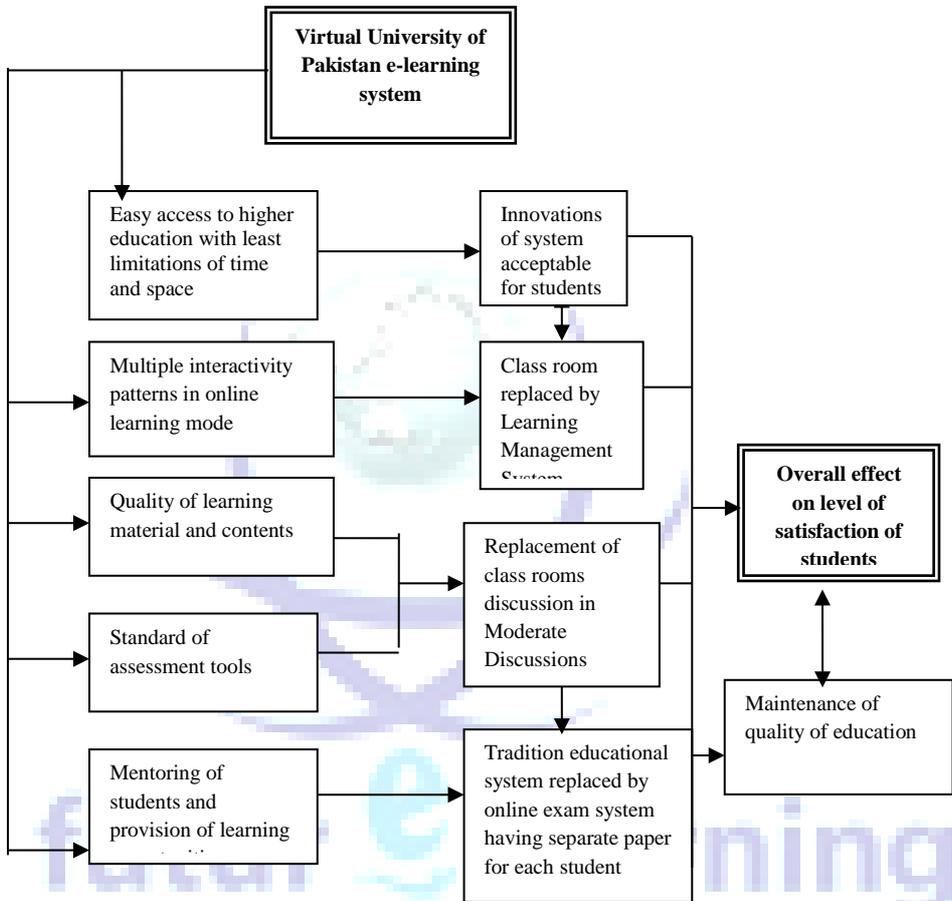
- **Hypothesis:** There would be a significant relationship between student-instructor interactivity pattern and overall satisfaction of students from e-learning.
- **Hypothesis:** Students would be significantly satisfied with e-learning mode of teaching.

### **Conceptual framework**

Computer mediated learning creates a unique set of opportunities and challenges for today's students. Individual can pursue advanced degrees with help of flexible instructions that leads them to continue academic goals. In this regard VUP is the first University based completely on modern Information and Communication Technologies. E-learning system is a technological tool which will help to change the traditional concept of education and learning. Online education is a complete package of education.

It is a flexible system which lessens the limitations of time and space and provides innovative opportunities for knowledge and opinion sharing. By using multiple interactivity patterns (e.g. Learning Management System (LMS), moderated discussion boards (MDBs), e-mails) VUP tries to abridge the communication gap between students and instructors.

In e-learning, the students can approach the materials at any time and different assessment tools are used to assess their ability, level of learning and understanding of concepts. It replaces the conventional class room into an electronic moderate discussion board. Students use Internet in order to approach the latest didactic materials as well as for communication with competent experts and gurus. In VUP, students have to attempt unique exam paper eventually reduces the chances of cheating. It gives positive reinforcement to the students that they are being fairly assessed.



**Figure 1:** Education through e-learning system in Pakistan and its impact on students' satisfaction

### Method and Procedure

The methodology adopted for the study was quantitative, capturing a deductive approach. A survey of 240 students of VUP was conducted. The simple random sampling technique was adopted to conduct survey. Total 24 campuses were selected out of 175 campuses from all over the Pakistan, 6 campuses from each province and from

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each campus 10 students were randomly selected. Total 238 questionnaires were returned with proper responses, two were incomplete which were not considered. A questionnaire containing close ended questions on five-point Likert Scale was deployed as a data collection tool. The researchers took the insight and assessed the satisfaction of the students on the basis of acceptance of new e-learning university, learning provisions offered to the students, interactivity dynamics and effectiveness of e-learning mode as compared to conventional mode of education. The alpha reliability coefficient of the instrument was .86 which shows that instrument was highly reliable.

In order to rectify the problems in designed tool, five questionnaires were pre-tested. On the basis of the responses, six questions were modified and two were excluded due to poor understanding of the questions by respondents. Further, to ensure the validity of questionnaire, researchers consulted five experts working in e-learning mode in order to validate the questionnaire as per their suggestions.

For data collection from all selected campuses, questionnaires were e-mailed to Virtual university representatives working in its campuses. These representatives have strong background of e-learning system and they were also properly guided to collect data from students. Students were approached and guided individually by these representatives and data was collected within time limits.

### **Data Analysis**

After collection of data, data was entered in Statistical Package for Social Sciences (SPSS) 16 version for analysis. Descriptive statistics, regression and one sample T-test were applied for analysis.

### **Results**

The data shows students' more positive response towards e-learning opportunities ( $M=2.43$ ,  $SD=.598$ ) than their satisfaction with interactivity pattern ( $M=2.11$ ,  $SD=.525$ ). Students' satisfaction with learning provision was comparatively low ( $M=2.13$ ,  $SD=.573$ ) than learning opportunities provided by e-learning system. Overall students'

response was very positive on effectiveness of e-learning system in comparison with conventional mode of teaching ( $M=2.58, SD=.636$ ). Student's satisfaction from overall system was moderate ( $M=2.40, SD=.585$ ).

**Table 1:** Descriptive statistics of constructs

Items of questionnaire	Mean	Standard deviation
E-learning opportunities	2.43	.598
Interactivity pattern	2.11	.525
VU learning Provisions	2.13	.573
Effectiveness of e-learning mode as compare to conventional	2.58	.636
Satisfaction with VU e-learning mode	2.40	.585

$N=238$

**Table 2:** Cronbach Alpha of Total items of the Questionnaires on Students Satisfaction from E-learning

	No. of Items	Alpha Coefficient
Students Satisfaction Questionnaire	25	.86

Cronbach Alpha of Total items of the Questionnaires on Students Satisfaction from e-learning was computed and table showed that total item correlation is .86 which is highly reliable in social sciences (Field, 2009).

**Table 3:** Reasons to choose VU for higher studies

(Priorities)	F	%
Affordability	26	10.9
HEC recognized	32	13.4
Teaching standards high	109	45.8
Suits business/job	55	23.1
Convenience to interact from any where	16	6.7
Total	238	100.0

$N=238$

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Table 3 shows that out of total sample of 238, about 10.9% of the students said that they chose VUP due to its low fee structure. About 13.4 % percent of the students preferred VUP because its degree was HEC recognized. About one half of the students 45.8 selected VUP because of its high teaching standards.23.1 % students were of the view that it was manageable to study from VUP along with their business and job as it is suitable for professionals to continue their study in this system. About 6.7% of the respondents preferred VUP because it was convenient to interact from any where in this learning mode.

**Table 4:** Interactivity Pattern as a Predictor of Satisfaction

Variables	<i>B</i>	<i>SE B</i>	$\beta$
Interactivity Pattern	2.04	.61	.21*

*Note.*  $R^2 = .045$ . \* $p < .001$

Linear regression analysis was carried out in order to see either interactivity pattern is a predictor of overall satisfaction or not. Results showed that interactivity pattern between the students and instructors cause 4.5% variability in criterion variable which is overall satisfaction from e-learning. The value of  $F(1,236) = 11.13, p < .001$  reflects the overall significance of the model. Standardized and un-standardized b values reflects the highly significant predictability between the interactivity pattern and students' overall satisfaction.

**Table 5:** Student's satisfaction with VU e-learning mode

Constructs	High		Medium		Low		Total
	F	%	F	%	F	%	
E-learning opportunities	115	48.3	108	45.4	15	6.3	100%
Vu E-learning system	60	25.2	153	64.3	25	10.5	100%
Interactivity pattern	50	21.0	167	70.2	21	8.8	100%
Effectiveness of e-learning mode	157	65.96	62	26.05	19	7.98	100%
Student's overall satisfaction	107	45.0	119	50.0	12	5.0	100%

Data presented in table 05 shows that almost half of the respondents' i.e. 48.3 % were highly satisfied with e-learning opportunities offered by VUP while 45.4 % of the respondents had medium level of satisfaction. It is evident from the results that people acknowledge new opportunities and feel comfortable to get education with the help of new communication technologies. Majority of the respondents were found moderately satisfied with VUP learning system. Almost 25.5 % of the respondents were highly satisfied.

Data presented in the table also explains the student's satisfaction level with VUP learning provisions and interactivity. About 21 % of the respondents were highly satisfied with learning provisions which was very much encouraging response whereas 70.2 % were moderately satisfied. Students were asked about their level of satisfaction and effectiveness of e-learning system in comparison to conventional system. Data presented in the table shows that an overwhelming majority of the respondents 66% were highly satisfied with this system and felt it was a better mode of learning. The data in given table reveals that almost half of the respondents 45 % were highly satisfied with VUP e-learning mode which depicts that students enjoy the new learning system and were satisfied with its standard of education.

**Table 6:** One sample t-test of student's level of satisfaction on e-learning mode

<i>Variable</i>	<i>M (SD)</i>	<i>t(237)</i>
Satisfaction Level	87.03(14.85)	17.69*

$p > .000$

One sample t-test was carried out and results indicated the significant mean differences in students' scores on satisfaction level from e-learning mode. The average scores of students significantly differ from the test value which is 70. Test value is a standardize score provided by researcher against which the calculated mean is compared and resulted that the students' average satisfaction is quite high as compared to the cut off score.

## **Discussion and Conclusion**

Advent of information technology in the realm of education has undoubtedly opened up new horizons to explore but at the same time this amalgamation in education with information technology in the form of e-learning has given rise to a lot of challenges as well. This is especially true with reference to the developing nations like Pakistan where shortage of resources and reluctance to accept new mode of learning are considered to be the major issues. Previous researchers conducted on e-learning mode also report the similar trends (Chang & Fisher, 2001; Sher, 2008; Sun et al. 2008). In this context, this study is an attempt to explore students' satisfaction from e-learning mode and identification of the predictors which influence their level of satisfaction.

As first objective of the study was to investigate the reasons of selection of e-learning mode for getting higher studies, the results revealed the fact that high teaching standard was one of the most prominent reasons for the selection of VUP, research conducted by Ehlers (2004) also showed similar results. The second major factor identified by respondents was the convenience and ease to access to the system. Studies conducted on effectiveness of e-learning system prove that e-learning provides an opportunity to get education beyond the boundaries of time and space (Arbaugh, 2000; Pituch & Lee, 2006).

There are multiple factors which effect students' satisfaction but in e-learning mode the interaction patterns and its constraints have always been a major area of concern for researchers. Johnston et al. (2005) found student-instructor interaction as important point of consideration in e-learning mode. The second objective of the study was to see the impact of student-instructor interaction on students' overall satisfaction from the system, as it was hypothesized that there is a significant relationship between interactivity patterns and overall satisfaction from this system. The results confirm the hypothesis that interactivity patterns are important predictor of overall satisfaction from the system. Studies conducted previously have also depicted similar trends (Wu & Wang, 2005; Garrison, 2005). Moore, (1997) explored that in e-learning, element of

face to face communication between the instructor and student is missing. In this situation, students feel communication gap and lack of self-confidence. There are few chances for personality grooming and students are not mentored properly. At the same time, students feel isolation in this system as they miss the class room environment of conventional teaching. It hinders the ability to develop good communication skills which ultimately create problems in correspondence with their instructors leading to anxiety and dissatisfaction ( Soon, Sook, Jung & Im (2000)).

Second hypothesis of the study assumes that students are significantly satisfied from this system. Results obtained from one-sample t-test explain that overall students are highly satisfied from this system. Researches conducted by Dewhurst, Macleod & Norris (2000) and Tweddle et al. (2000) also described the same findings of high satisfaction from e-learning system. It provides an opportunity to those who are otherwise unable to continue their studies in conventional mode due to various constraints.

E-learning is the need of time as world is transforming into global village and use of technology in every walk of life has changed the way people communicate and interact. This mode of study has great scope for serving the education sector. Although certain deficiencies are pointed out but it is right time to work on overcoming these discrepancies to make it even more effective mode of learning. Awareness regarding e-learning mode is also essential as people may have certain misunderstandings and lack of information as it happens in case of accepting any innovation. In this regard, proper advertisement and publicity could be effective tool for its promotion so that people could switch over to e-learning with no reservations in their mind regarding this system. It would also contribute further in increasing the satisfaction level of its prospect students. In order to get more in-depth information, future researches may also use qualitative approach. In Pakistan, e-learning is a recent phenomenon. This learning mode needs attention not only because it is a new learning mode but Pakistan's; literacy rate is still very low. This study will be helpful for academicians and the researchers to understand

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the effectiveness of e-learning system in Pakistan and its impact on students' satisfaction.

## References

1. Abdon, B. R., Ninomiya, S., & Raab, R. T. (2007). E-Learning in Higher Education Makes Its Debut in Cambodia: Implications of the Provincial Business Education Project. *The International Review of Research in Open and Distance Learning*, 8(1).
2. Arbaugh, J. B. (2000). Virtual classroom characteristics and student satisfaction with internet-based MBA courses. *Journal of management education*, 24(1), 32-54.
3. Ayub, n., & Iqbal, S. (2011). Student Satisfaction with e-Learning achieved in Pakistan. *Asian Journal of Distance Education*, 9( 2), 26 – 3.
4. Berge, Z.L. (1999). Post-secondary Web-based learning. *EDUCATIONAL TECHNOLOGY*, 39(1), 5-11.
5. Chang, V., & Fisher, D. (2001). *The validation and application of a new learning environment instrument to evaluate online learning in higher education*: School of Information Systems, Curtin University of Technology.
6. Dewhurst, D.G., Macleod, H.A., & Norris, T.A.M. (2000). Independent student
7. learning aided by computers: An acceptable alternative to lectures? *Computers & Education*, 35, 223-41.
8. Drennan, J., Denedy, J., & Pisarski, A. (2005). Factors affecting student attitudes toward flexible online learning in management education. *THE JOURNAL OF EDUCATIONAL RESEARCH*, 98(6), 331-338.
9. Garrison, D. R. (2005). *Blended learning policy and leadership*. Sloan Invitational Blended Learning Workshop, Chicago.
10. Ehlers, U. D. (2004). Quality in e-learning from a learner's perspective. *European Journal of Vocational Training*.
11. Field, A. P. (2009). *Discovering statistics using SPSS*: SAGE publications Ltd.
12. Gulati, S. (2008). Technology-enhanced learning in developing nations: A review. *The International Review of Research in Open and Distance Learning*, 9(1), Article 9.1. 4.
13. Hussain, I. (2007). A study of student's attitude towards virtual education in Pakistan. *TURKISH JOURNAL OF DISTANCE LEARNING*, 8(2). Retrieved June 1, 2007 from: <http://tojde.anadolu.edu.tr/>
14. James, T. & Miller J., 2005. Developing a Monitoring and Evaluation Plan for ICT in Education. In Wagner, D., et. al. 2005. *Monitoring and Evaluation of ICT in Education Projects – A Handbook for Developing Countries*, InfoDev. 57-77
15. Johnston, J., Killion, J., & Oomen, J. (2005). Student satisfaction in the virtual classroom. *The Internet Journal of Allied Health Sciences and Practice*, 3(2), 1-7.

16. Keegan, D. (1995). Distance education technology for the new millennium: compressed video teaching. ZIFF Papiere. Hagen, Germany: Institute for Research into Distance Education. (Eric Document Reproduction Service No. ED 389 931).
17. Kamsin, A., & Is, E. (2005). Is e-learning the solution and substitute for conventional learning? *International Journal of the Computer, the Internet and Management*, 13(3), 79-89.
18. Malik, m. W., & mubeen, g. (2009). Student satisfaction towards e-learning: influential role of key factors. *Proceedings 2nd CBRC, Lahore, Pakistan*.
19. Mantyla, K., and Woods, J. A. (2001). *The 2001/2002 ASTD Distance Learning Yearbook*. New York: McGraw-Hill.
20. McGorry, S. Y. (2003). Measuring quality in online programs. *The Internet and Higher Education*, 6(2), 159-177.
21. Moore, D.R., & Lockee, B.B. (1998). *A taxonomy of bandwidth: considerations and principles to guide practice in the design and delivery of distance education*. Unpublished manuscript: Portland State University.
22. Oubenaissa, L., Giardina, M., & Bhattacharya, M. (2002). Designing a framework for the implementation of situated online, collaborative, problem-based activity: Operating within a local and multi-cultural learning context. *International Journal on E-Learning*, 1(3).
23. Passmore, D.L. (2000). Impediments to adoption of web-based course delivery among university faculty. *ALN Magazine*, 4 (2).
24. Pituch, K. A., & Lee, Y. (2006). The influence of system characteristics on e-learning use. *Computers & Education*, 47(2), 222-244.
25. Saunders, G., & Weible, R. (1999). Electronic courses: Old wine in new bottles? *INTERNET RESEARCH*, 9(5), 339-347.
26. Schmidt, E. K., & Gallegos, A. (2001). Distance learning: Issues and concerns of distance learners, *Journal of Industrial Technology*, 17 (3), 2-5.
27. Sher, A. (2008). Assessing and comparing interaction dynamics, student learning, and satisfaction within Web-based online learning programs. *MERLOT Journal of Online Learning and Teaching*, 4(4), 446-458.
28. Soon, K., Sook, K., Jung, C., & Im, K. (2000). The effects of internet-based distance learning in nursing. *Computers in Nursing*, 18(1), 19.
29. Sorebo. M., and oystein Sorebo. (2009). Understanding E-Learning Satisfaction in the Context of University Teachers, *International Journal of Humanities and Social Sciences*
30. Sun, P. C., Tsai, R. J., Finger, G., Chen, Y. Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education*, 50(4), 1183-1202.
31. Tweddle, S., James, C., Daniels, H., Davies, D., Harvey, P., James, N.N., Mossman, J., & Woofg, E. (2000). Use of a Web site for learning about cancer. *Computers & Education*, 35 (2), 309-25.

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32. UNESCO (2004). METASURVEY ON THE USE OF TECHNOLOGIES IN EDUCATION IN ASIA AND THE PACIFIC ON THE UNESCO WEBSITE. Retrieved August 03, 2012 from: [http://www.unescobkk.org/fileadmin/user\\_upload/ict/Metasurvey/introduction.pdf](http://www.unescobkk.org/fileadmin/user_upload/ict/Metasurvey/introduction.pdf)
33. Volery, T., & Lord, D. (2000). Critical success factors in online education. *International Journal of Educational Management*, 14(5), 216-223.
34. Wu, J. H., & Wang, S. C. (2005). What drives mobile commerce?: An empirical evaluation of the revised technology acceptance model. *Information & Management*, 42(5), 719-729.
35. Wu, J. H., Tennyson, R. D., Hsia, T. L., & Liao, Y. W. (2008). Analysis of E-learning innovation and core capability using a hypercube model. *Computers in Human Behavior*, 24(5), 1851-1866.
36. Wu, J. H., Tennyson, R. D., & Hsia, T. L. (2010). A study of student satisfaction in a blended e-learning system environment. *Computers & Education*, 55(1), 155-164.



## Appendix

Student's satisfaction from e-learning system: A case study of Virtual University of

Dear Students!

In the process of conducting a research on the topic mentioned above, I require your participation. Please spare some time and share your experience of studying at VU by answering the questions below;

Name: \_\_\_\_\_ Study Program: \_\_\_\_\_  
Campus Name: \_\_\_\_\_

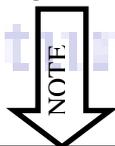
**Q: Why did you choose VU for higher studies?**

- It is affordable. Priority No. \_\_\_\_\_
- Its degree is HEC recognized. Priority No. \_\_\_\_\_
- Its teaching standards are high. Priority No. \_\_\_\_\_
- It suits me with my business or job. Priority No. \_\_\_\_\_
- It is convenient to interact from anywhere. Priority No. \_\_\_\_\_

**Note:** Put your preferences in priority order.

Give 1<sup>st</sup> position to most important option, 2<sup>nd</sup> position to 2<sup>nd</sup> important and so on up to 5<sup>th</sup> position to least

**Q: Do you know that the professors in the video lectures are not those to whom you interact through VULMS?** Yes No



Indicate the extent to which you agree with each of the following statements by **ENCIRCLING** one option on the given scale.  
1= Strongly Disagree (SD); 2 = Disagree (D); 3 =Neutral (N); 4 =Agree (A); 5= Strongly Agree (SA).

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Sr.	Dimension	S	D	D	N	A	S	A
<b>(1) E-LEARNING OPPORTUNITIES</b>								
1	Education with the help of new educational technologies makes the learning easier.	1	2	3	4	5		
2	E-learning enables learning at any time possible.	1	2	3	4	5		
3	E-learning enables learning at any place possible.	1	2	3	4	5		
4	E-learning lacks the element of face to face communication (interactivity).	1	2	3	4	5		
5	VU has taken enough measures to minimize distance between students & teachers.	1	2	3	4	5		
<b>(2) SATISFACTION WITH SYSTEM</b>								
6	E-learning has established students' independence towards learning and education.	1	2	3	4	5		
7	Learning Management System (LMS) is satisfying the needs of interaction between students and teachers.	1	2	3	4	5		
8	Instructors are fully experienced and give you satisfactory reply on MDB.	1	2	3	4	5		
9	Learning Materials and Contents provided in online learning system are satisfactory.	1	2	3	4	5		
10	Guidance (mentoring behavior) of your course instructors is satisfactory.	1	2	3	4	5		
11	Answers to your e-mails queries given by your respective instructors are satisfactory.	1	2	3	4	5		
12	The announced knowledge tests such as assignments, projects & on-line quizzes are satisfactory.	1	2	3	4	5		
<b>(3) SATISFACTION WITH LEARNING PROVISIONS</b>								
13	The quality of video lectures is satisfactory and they are understandable.	1	2	3	4	5		
14	Overall quality of the courses enhances your learning capacity.	1	2	3	4	5		
15	E-learning serves your educational needs.	1	2	3	4	5		
16	Your individuality is maintained by the instructors.	1	2	3	4	5		
17	Instructors inform you about your progress analysis regularly.	1	2	3	4	5		
18	You receive clear directions about the requirements for assignments, quizzes & GMDBS (due dates, evaluation criteria, etc.).	1	2	3	4	5		
19	E-learning system enables you to share learning experiences with other students.	1	2	3	4	5		
<b>(4) CONVENTIONAL Vs. E-LEARNING</b>								
20	VU has provided an opportunity of getting higher education to thousands of people who otherwise were unable to take admission in conventional	1	2	3	4	5		

	education institutions.					
21	VU has provided you quality education at your door step.	1	2	3	4	5
22	VU has provided you affordable education.	1	2	3	4	5
23	VU's current self-date sheet signup facility is convenient.	1	2	3	4	5
24	VU's current on-LAN examination system i.e. giving distinct question papers is commendable.	1	2	3	4	5
25	E-learning is a better mode of teaching as compared to conventional system.	1	2	3	4	5

What possible solution(s) you can recommend to VU to enhance satisfaction with e-learning mode? Give your own views.

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## **Customer's Voice in eHealth Evaluation**

Marjo RISSANEN

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**Abstract:** *Kano model is one of the choices for requirement evaluations. This study declares what kind of insights this specific approach could offer for evaluation in the area of eHealth. The Kano model is widely used in customer satisfaction analyses. However, it is poorly known in the health sector and in the area of eHealth. This article discusses how the Kano theoretical thinking could serve consideration of evaluative aspects in the area of eHealth and thus gives enlightening new insights to this discussion. Questions of evaluation of user experience are analyzed and considered in relation to the Kano theoretical aspects. Multifaceted literature review supports the questioning and connected contemplations. The connected empirical case deals with issues of user evaluation which is carried out at the early design phase of the application. Kano frame offers inspirational ideas also in situations when the data is not collected and processed in a way which is typical for this toolkit use (e.g. QFD, Kano categorization, Kano modifications). While typically requirement lists may seem endless, it is useful to identify and concentrate first on the so called "must-be quality" constraints in each evaluation category. "Must-be attributes" represent such features which absence can result customer dissatisfaction. The Kano based identification work may help designer to catch and capture the design challenges in a more streamlined manner when it helps designers to think about more precisely which areas should be conquered first; which areas represent so called must-be factors and form the threshold for success if these would not actualize. This forces designers to prioritize product features and requirements and perhaps may improve the quality level of design when the designer has to concentrate on the essentials properly at the first stage. It is beneficial to reach and identify first the "must-be quality" level in each evaluation category even though the final target is and should be high-quality product which delights customers and offers more competitive value. In genuine development such strategy is needed especially in all demanding development areas which also eHealth represents. "Indifference attributes" represent attributes which are rarely needed by users and do not typically result in either customer satisfaction or customer dissatisfaction. Therefore, it is also important to avoid so called "indifference attributes" at the starting phase of the development when the customer is familiarizing with all the aspects of a new product. In case the amount of such features is remarkable the clarity and manageability of the offered new application will suffer and may in this way at least discourage its potential users.*

**Keywords:** eHealth, evaluation, Kano model

### **Introduction**

Current technology development in eHealth needs continuous evaluation. User satisfaction is one of the primary targets in eHealth evaluation and patient experience is considered as an important part of a "meaningful use" criteria. The concept of eHealth includes use of the Internet or other electronic media by the public, health workers, and others to disseminate health related information, connective products and services. In eHealth consumer targeted domains offer e.g., information but also support users' self-

management in their health affairs. An efficient evaluation makes iterative development possible. Evaluative aspects should have direct connection to the development and design. Therefore, the aim of evaluation is to mature and enhance the quality level of design. Many customer targeted eHealth applications have nowadays such features which attract customers because these bring within totally new kinds of functioning models to health care and improve therefore consumers' possibilities to better self-management in their health issues. However, the developmental challenges in this area are still remarkable. It is useful to understand Kano theoretical thinking when designing new innovations. The Kano model based identification work may help designers to catch and capture the design challenges in a more streamlined manner. While typically requirement lists may seem endless, it is meaningful to reach and identify first the "must-be quality" level in each evaluation category even though the final target is and should be a high-quality product which delights customers and offers more competitive value. "Must-be attributes" represent such features which absence can result customer dissatisfaction. It is equally important to avoid so called "indifference" requirements at the starting phase of the development when the customer is familiarizing with all the aspects of the new product. "Indifference attributes" represent attributes which are rarely needed by users and do not typically result in either customer satisfaction or customer dissatisfaction. However, it is assumable that in case the amount of such features is remarkable the clarity and the manageability of the offered new product will suffer and may in this way at least discourage new users. To gather these signals it is important that applications in eHealth contain flexible feedback channels which collect user experience and data for product improvement. This study declares what kind of insights Kano approach could offer for evaluation in the area of eHealth. This study considers the following questions: In which way in the Kano frame presented categorization and especially issues concerning must-be category would inspire design in eHealth area? And further, how this sub-topic inspired considerations in the presented empirical case?

## **Methods**

This research touches the area of design research and especially questions connected to the iterative development in digital design through user evaluation. While evaluative aspects are connected to developmental iterations of products the approach is pragmatic. Questions of evaluation of user experience are analyzed and considered in relation to the Kano theoretical aspects and especially, from view of the “must-be attributes”. Multifaceted literature review supports the questioning and connected contemplations. The connected empirical case deals with evaluation of the so called reaction level of training. This case is connected to occupational eHealth training which is carried out as a class intervention supported with an application designed for this context. Kano approach offers a framing tool for these considerations.

## **Identification of the must-be level**

*Must-be attributes* in eHealth form one of the choices for requirement evaluation. Kano et al (1984) have distinguished three types of product requirements which cause customer satisfaction in the following ways: the “must-be” requirements form the basic criteria of an offered product. “Must-be attributes” represent such features which absence can result customer dissatisfaction. Must-be requirements represent a decisive competitive factor, and if these are not in order, the customer will not be interested in the product at all (Matzler & Hinterhuber, 1998). When the must-be requirements are in order the situation represents the level of “not dissatisfied”. If we want to develop attractive products, it is reasonable to try to catch first the “must-be level”. There is also used a word “threshold attributes” which means that these attributes should always be present. The customer considers must-be requirements as prerequisites, and takes them for granted and hence does not necessarily demand these issues (Kano et al, 1984). Must-be requirements may differ in utility expectations of different customer groups and thus customer-tailored solutions can guarantee an optimal level for the different customer groups. Yang (2005) divides must-be attributes as necessary (necessary with low importance) and as critical (high importance for users) quality requirements; critical

attributes with high importance are essential to customers and necessary attributes are such which should be guaranteed when trying to avoid dissatisfaction of customers. Even though most of the must-be attributes are of high importance, it is possible that some attributes are to be required without high importance to consumers and hence, such a distinction produces more precise categories (Yang, 2005). High-level requirements are actually not requirements but moreover goals or capabilities and these should be contained in the mission statement of the system or the product (Bahill & Dean, 2009). Some requirements are changing with time and therefore e.g., evolutionary development and identification of those issues which are likely to change is of high importance (Bahill & Botta, 2008). When so called “basic-musts” are in order this means that customers do not experience too much frustration when trying to make acquaintance with new information sources or with new kinds of products. The identification work enhances overall product evaluation and smoothes the way when trying to reach the final target: a product that provides customer satisfaction with attractive quality elements. Identification of the “must-be quality” level in each evaluation category is valuable even though the final target is and should be high-quality product which delights customers and offers more competitive value.

*Attributes of indifference* form a special area in the Kano frame. This element will not result in satisfaction or not, whether it is sufficient or no and therefore, customers do not care whether they are fulfilled or not. “Indifference attributes” represent attributes which are also rarely needed by users and also therefore, do not typically result in either customer satisfaction or customer dissatisfaction (Rejeb & Guimares, 2008). However, “*users with different degrees of experiences evaluate features differently and therefore experienced users might expect a different set of features from users with less experience.*” (Lee et al, 2008). Experienced users may consider such attributes as indifferent which novice users may especially expect and therefore, customizations are needed to fulfill the needs for different user groups (Lee et al, 2008). However, it is important that the clarity of the application is optimal and hence

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additional features (which are only seldom used or asked) may produce too much such “noise” to the application which disturbs its clarity value and prevents users from finding the essentials in an application. This is important especially when the user is familiarizing with a new product.

### **Must-be level in eHealth**

Digital eHealth sector represents a service concept which is a part of the total service system in health care. E.g., in a hospital environment such features, as safe environment and high-quality medical care can be considered as priority attributes (must-be attributes) (Yeh, 2010). eHealth products form a critical part in a whole health service concept and therefore, this area forms a part of customers’ service experience. It is sometimes thought that the must-be level is already acquired in eHealth sector and that the direction in development is towards attractive attributes of production. This is however the truth only partially. The American Healthcare commission found that even though users have a high interest in getting health related information online, they also have a low trust towards these pages (D’Andrea, 2002). If the must-be level is not in order this causes risks which in the health related area may mean besides negative cost-effects but also more serious outcomes. Also even though Internet is a popular source of health related information, solutions targeted for disease management, health promotion, and health behavior are not as successful and widely adopted for active use (Evers, 2006). Moreover, there is also evidence that new kinds of health technologies are adopted of younger users with better health and less of those groups which really would need those (Weingart et al, 2006). While consumers find typically online health information useful when managing with their health issues (e.g., Murray et al, 2003) one problem in health related information is the amount of the offered information. Some patients feel overwhelmed by online information and have difficulties in managing with it (e.g., Hart et al, 2004). The use of new eHealth technologies is also time-consuming for those involved (van Gemert-Pijnen et al, 2011). It is proposed that in medical field and health sector greater attention should be given to the question: “*how can internet-*

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*based learning be effectively implemented and when internet-based learning should be used* “(Cook et al, 2008). There is a need for rethinking how eHealth technologies in generally should be used to innovate health care services (van Gemert-Pijnen et al, 2011).

Some must-be attributes are self-evident. It is clear that e.g., health related information should be easy to understand, relevant, and up-to-date. Also, it is clear that usability and accessibility issues must be in order. Somehow, it is also clear that provided products must be contextual and customized for a certain, specific user group (elderly people, teenagers etc.). All these issues represent so called must-be attributes. But how we can identify so called neglected issues that may need more attention. It is important to identify “the hidden needs and problems”; if customers are only asked about their desires the results are easily already known (Sauerwein et al, 1996). E.g., consumers are most satisfied with such health related online information that offers options, not simply facts and insights and which helps them to use the information in terms of treatment, options, and support groups (Goetzinger et al, 2007). This means that tools and applications must give for customers more real and contextual value to serve their everyday life and connected health related decisions.

### **Customers’ voice and value insights - what else?**

Before we can offer at least “must-be quality” we must be aware of customers’ needs in every specific area. Users’ needs can be expressed as a set of specified requirements (Bevan, 1995). Besides, “*the quality of use is determined not only by the product, but also by the context in which it is used: the particular users, tasks, and environments.*” (Bevan, 1995). Need identification can be achieved with many different methods. This kind of information gathering in health sector is not however straightforward. E.g., information that is gathered through surveys raises a question: “*how many customers should be asked to make a reliable conclusion*” (Rashid et al, 2010). In many cases it is essential to make evaluation using different user groups carrying out different tasks (Bevan, 1995). Besides, even though customer interviews are useful for registering

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visible product requirements and customer problems, they are insufficient when investigating potential new and latent product requirements and especially attractive ones (Matzler & Hinterhuber, 1998). Besides, understanding only customers' values and desires innovative design has an ability to look into the future (e.g. Flint et al, 2005). Also features which are attractive today may represent must-be level tomorrow. This requires so called design readiness and design intelligence. At a certain degree, designers must be able to forecast customers' reactions and needs and even create these if necessary and this concerns especially areas with novelty value. Otherwise, product design tends to flow at a certain degree in a state of stagnation. Bevan (1995) recommends adoption of a user-centered approach to design and additionally to engage continuous user-based evaluation. Such approach is necessary if we want to produce really user-centered products.

An organization's measurement method of learning satisfaction can cover the following levels: reaction level, learning level, behavior level, and results level (Kirkpatrick, 1959). According to Chien (2005), the information related to "reaction level" can be collected by questionnaire surveys, the level of learning through tests, the level of behavior through evaluative methods and observations, and the level of results through a comprehensive evaluation. The product dictates how the profile of evaluation should be formed. What kind of combination of methods gives such a scope which is continuous and complete enough, and offers appropriate feedback? Which is then a successful way to integrate user participation in a development process? In user-centered design needs analysis, usability testing, and user participation in a design process are some of the methods used (Abrams et al, 2004). Van Velsen et al (2012) propose use of so called personas in holistic design process: These are so called "*hypothetical archetypes of actual users, asset of fictitious persons, each one typical for a group of people, who will, potentially, use a new technology*". The overall assessment of impact of eHealth technology needs advanced methods with broader view (van Gemert-Pijnen et al, 2011, Black et al, 2011). There is still need to develop technologies that take end users better

into account particularly in context of long-term care (van Gemert-Pijnen et al, 2011) and which motivate consumers to self-management in their health affairs (Chatterjee & Price, 2009). As well, it is needed further research to identify the most useful and effective technologies for patients (e.g., Ahern et al, 2011). The need for customization is still one challenge in eHealth sector because the knowledge level and eagerness of users to allocate time for health management with online type information vary. Therefore, understanding also the must-be aspects from the view of individual users, makes digital design in this sector more demanding.

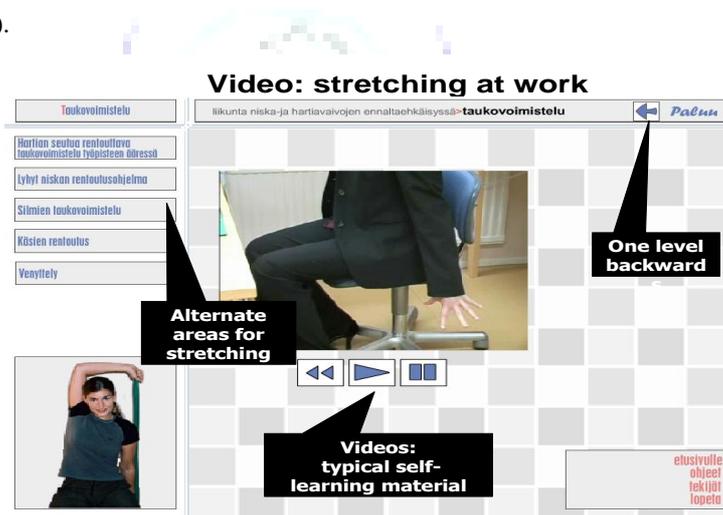
### **Case: Capturing customer feedback during design Training intervention at workplace (occupational health)**

The following case deals with the feedback of the training entity targeted for occupational health. Customers' opinions (reaction level) were gathered after a traditional class lecturing intervention in which the designed application supported the instruction and connected interventions. The application deals with preventable health problems which are typical for office workers, as well as, it gives additional information of the tasks connected to the factors which enhance employees' well-being in their workplace. In this way the purpose of the application is to enhance health promotional activities at the workplace (figure 1). The purpose was to develop a product which design ideology supports also blended learning environments and therefore, this class intervention also represented a plausible way to streamline the product and its featuring. The purpose of this intervention was to get a rough idea how the integrated principles of user-centered design would actualize and how the models and content related aspects integrated to this application would benefit its users. At a certain degree, the purpose was to identify the must-be elements which would form the threshold for the usability of the planned application. The training day (one eight-hour working day) consisted of six instructionally emphasized parts, of two exercise parts, and of an applicative part. After the instruction, the users were asked to rank the value of this consultation day using two categories: they ranked the situation as an instructional experience and thereafter, they

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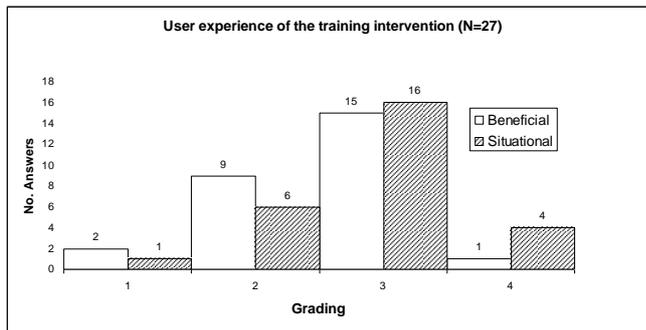
also asked to evaluate the beneficialness of this training entity. They ranked each type of instruction/consultation using the same category (1-4) and the ranking category varied from one (1=no beneficial) to four (4=very beneficial). So, this questionnaire measured employees' satisfaction with the training (the reaction level). Additionally, they encouraged to mark their further comments concerning the training entity. The questionnaire form consisted of these quantitative and qualitative parts (space for comments).



**Figure 1:** Part: training tips for stretching

### **Results of the feedback**

Results showed that in this small sample (N=27) in the experienced value of this training entity there was some variation clearly to be seen among employees (figure 2). However, most of the employees found the training entity as beneficial (grade 3; 15 answers/persons). The results revealed that customizable areas or options are needed e.g., in the area of given exercises. Feedback connected to instructionally emphasized detailed parts showed that the users mainly experienced the instruction to be beneficial.

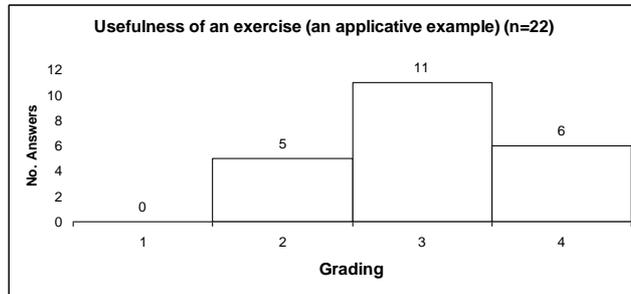


**Figure 2:** User experience concerning the whole training intervention

Actually, the qualitative part of the feedback gave more precisely information about the factors which needed enhancement. Most claims connected to the timing problems during the day and difficulties in managing with too much topics in a limited time (too short time for exercises, too exhaustive speed in instructional parts, too much information, many unfamiliar terms, too short time for conversations etc.) (table 1). The results revealed that when offering health related information and instruction typically, “less is more“. However, the differences between individuals are remarkable and this day also confirmed that “one size does not fit all“. Therefore, we can say that in this sample also the must-be level was different among the employees. Also, quite a plain application may have needs for options and customizations. This day did not actually measure the meaning of all kinds of additional (indifference level). However, also too much information or given details may mean for listeners such a burden of “indifferences“. Therefore, such a “noise” should be minimized at least at the beginning when the user tries to get acquainted with the topic and connected themes. This finding is in consensus with the evidence concerning eHealth related informative web-pages (e.g., Hart et al, 2004). Finally, it is difficult to define which areas or topics represent the level of “too much or too detailed“. This knowledge requires feedback which is collected from different sources, from different time periods, and maturation levels of the products. Therefore, it is also important that the knowledge (information) intensity level

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is easily adjusted by the user in this area. This feedback revealed also the fact that users are interested of such knowledge which is applicable or gives to the issues at hand practical insights.



**Figure 3:** User feedback concerning applicative exercise

The exercise which dealt with the applicative procedures was considered most favorable among the employees. No one gave the lowest grade (1= no beneficial) (figure 3). Also this finding is common from literature concerning the experienced benefits of health related practically emphasized information (e.g., Goetzinger et al, 2007).

**Table 1:** Opinions concerning the training entity (the qualitative part)

Topic	Opinions (Feedback)
<b>Instruction</b>	<ul style="list-style-type: none"> <li>- too many unfamiliar terms</li> <li>- interesting presentations</li> <li>- good topics</li> <li>- need for company specific instruction (local problems, issues)</li> <li>- “boring” lecturers</li> </ul>
<b>Exercises</b>	<ul style="list-style-type: none"> <li>- some exercises can be modified for listeners</li> </ul>
<b>Situation</b>	<ul style="list-style-type: none"> <li>- too many topics</li> <li>- too hurried a schedule</li> <li>- timing problems</li> <li>- too formal presentation style</li> </ul>

## **Discussion**

User satisfaction is one of the primary targets in eHealth evaluation and patient experience is considered as an important part of a “meaningful use” criteria. Kano theoretical thinking may bring to these evaluative proceedings new insights in health related area. Usability means e.g., that the user can achieve one’s goal when using the product (Bevan, 1995) and this naturally improves product’s diffusion process. Kano frame may be beneficial also in situations when the data is not collected and processed in such a way which is typical for this toolkit use (e.g. QFD, Kano categorization, Kano modifications). Kano categorization as such is beneficial because it helps designers to think about more precisely which areas should be conquered first; which areas represent so called must-be factors and form the threshold for success when are not present.

A real contact with a focus group in design phase helps designers to find out which ideas might work and as well, it gives a rough idea of the critical “*must-be level*”. In genuine development such strategy is needed especially in all demanding development areas which also eHealth represents. This forces designers to prioritize product features and requirements and perhaps improves quality level when designer has to concentrate on the essentials properly at the first stage. Competitive product means that the product contains features that can be called as “surprise and delight attributes”. However, if so called “basic-musts” are in order at the very beginning this means that customers do not experience too much frustration when trying to make acquaintance with new information sources or with new kinds of products. The identification work enhances overall product evaluation and smoothes the way when trying to reach the final target: a product that provides customer satisfaction with attractive quality elements.

It is equally important to avoid so called “*indifference*” requirements at the starting phase of the development when the customer is familiarizing with all the aspects of the new product. If the amount of such features is remarkable the clarity and the manageability of the offered new product will suffer and may in this way at least discourage new users. To gather these signals it is important that applications in eHealth contain flexible feedback channels which collect user experience in a way which is

comprehensive enough. Continuous evaluation ensures the maturation of such aspects which as requirements will change with time. Following checklist may give inspirational insights in the eHealth sector when trying to identify the barriers in the targeting of the “basic-musts”:

- Identify the mission of the product and the critical “must-be” level
- Are there additional features (indifference category) which might disturb concentration on the essentials?
- Is the product’s use too time-consuming?
- Are there enough options for different user groups (individual differences)?
- Does the application represent enough amount of straightforwardness?
- Is the knowledge intensity level easily controlled and selected by the user?
- Does the application support connected practices intensively enough (applicative functions)?

## **Conclusions**

Continuous evaluation and product development form an iterative cycle. While requirement lists are typically wide, it is useful to identify and list the so called “must-be” requirements in new innovation areas in each evaluation category. This type of an approach enhances the way within design efforts when trying to target the level of “attraction” in product design. To gather these signals it is important that applications in eHealth contain flexible feedback channels which collect user experience in an enough multidimensional way. The Kano model is widely used in customer satisfaction analyses and also at a certain degree, in web analysis context. However, it is poorly known in health sector and in the area of eHealth. The Kano model based identification work may help designers to catch and capture the design challenges in a more streamlined manner. This article discusses how the Kano theoretical thinking could serve consideration of evaluative aspects in the area of eHealth and thus gives enlightening new insights to this discussion.

## **References**

1. Abras, C., Maloney-Kricmar, D., & Preece, J. (2004). User-Centered Design. In W. Bainbridge (Ed.), *Encyclopedia of Human-Computer Interaction*. Berkshire Encyclopedia of Human-Computer Interaction (pp.463-468).Great Barrington, MA: Berkshire Publishing Group.
2. Ahern, D., Woods, S., Lightowler, M., Finley, S., & Houston, T. (2011). Promise of and potential –Facing technologies to enable meaningful use. *American Journal of Preventive Medicine*. 40(5S2), S162-S172.
3. Bahill, A., & Dean, F. (2009). Discovering system requirements, Chapter 4. In , A. P. Sage & W. B. Rouse (Eds.), *Handbook of Systems Engineering and Management*, 2<sup>nd</sup> edition (pp. 205-266). Hoboken, NJ: John Wiley & Sons.
4. Bahill, A., & Botta, R. (2008). Fundamental principles of good system design. *Engineering Management Journal* 20(4), 44 - 52.
5. Black, A., Car, J., Pagliari, C., Anandan, C., Cresswell, K., Bokun, T., McKinstry, B., ... Sheikh, A. (2011). The impact of eHealth on the quality and safety of health care: A systematic overview. *PLoS Medicine*, 8(1).
6. Bevan, N. (1995). Usability is quality of use. In Anzai & Ogawa (Eds.), *Proceedings of the 6th International Conference on Human Computer Interaction*, Yokohama: Elsevier.
7. Chatterjee, S. & Price, A. (2009). Healthy living with persuasive technologies: Framework, issues, and challenges. *Journal of American Medical Information Association*, 16(2), 171-178.
8. Chien, T. (2005). Using a satisfaction decision model to enhance e-learning performance: A case study. *International Journal of Electronic Business Management*, (3)3, 214-224.
9. Cook, D., Levinson, A., Garside S., Dupras, D., Erwin, P., & Montori, V. (2008). Internet-based learning in the health professions; A meta-analysis. *Journal of the American Medical Association*, 300(10), 1181-1196.
10. D’Andrea, G. (2002). Health web site accreditation: Opportunities and challenges. *Journal of Healthcare Information Management*, 16(3), 9-11.
11. Evers, K. (2006). eHealth Promotion: The use of the internet for health promotion. *American Journal of Health Promotion*, 20(4), s. 1-7.
12. Flint, D., Larsson, E., Gammelgaard, B., & Mentzer, J. (2005) Logistics, innovation: A customer value –oriented social process. *Journal of Business Logistics*, 26(1), 113–147.
13. van Gemert-Pijnen, J., Nijland, N., van Limburg, M., Ossebaard, H., Kelders, S., Eysenbach, G., & Seydel, E.(2011). A Holistic framework to improve the uptake of eHealth technologies. *Journal of Medical Internet Research*, 13(4), e.111.
14. Goetzinger, L., Park, J. Lee, Y., & Widdows, R. (2007). Value-driven consumer e-health information search behavior. *International Journal of Pharmaceutical and Healthcare Marketing*, 1(2), 128-142.

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15. Hart, A., Henwood, F., & Wyatt, S. (2004). The role of the internet in patient-practitioner relationship: Findings from a qualitative research study. *Journal of Medical Internet Research*, 4(6):e. 36.
16. Lee, C., Wu, LL., Lin, YC., Lu, HP., & Chou, SC. (2008). Dynamic evaluations of blog search engines. In *Proceedings of BAI 2008 International Conference on Business and Information*, Academy of Taiwan Information Systems Research.
17. Kano, N., Seraku, N., Takahashi, F., & Tsuji, S. (1984). Attractive quality and must-be quality. *Journal of Japanese Society of Quality Control*, 14(2), 39–48.
18. Kirkpatrick, C. (1959). Techniques for evaluating training program. *Training and Developing Journal*, (13)11, 3-9.
19. Matzler, K., & Hinterhuber, H. (1998). How to make product development projects more successful by integrating Kano's model of customer satisfaction into quality function deployment. *Technovation*, 18(1), 25-38.
20. Murray, E., Lo, B., Pollack L., Donelan K., Catania J., White, M., Zapert K., & Turner R. (2003). The impact of health information on the internet on the physician-patient relationship: Patient perceptions. *Archives of Internet Medicine*, 163(14), 1727-1734.
21. Rashid, M., Ullah, A., Tamaki, J., & Kubo, A. (2010). A Kano model based computer system for respondents' determination: Customer needs analysis for product development aspects. *Management Science and Engineering*, 4(4),70-74.
22. Rejeb, H. & Guimares, L.(2008). A new methodology based on Kano model for needs evaluation and innovative concepts comparison during the front-end phases. In *Proceedings of EUROMOT 2008*.
23. Sauerwein, E., Bailom, F., Matzler, K., Hinterhuber, H. (1996). The Kano model: How to delight your customers. In *International Seminar on Production Economics* (pp.313 – 327). Innsbruck.
24. Van Velsen, L., Van Gemert-Pijnen, L., Nijland, N, et al (2012). Personas: The linking pin in holistic design for eHealth. In L. Van Gemert-Pijnen, H. Ossebaard, A. Smedberg, S. Wynchank, & P. Giacomelli, (Eds.), *eTELEMED 2012 The Fourth International Conference on eHealth, Telemedicine, and Social Medicine 30.1-4.2. 2012*, Valencia, Spain.
25. Weingart. S., Rind, D., Tofias, Z., & Sands, D. (2006). Who uses patient internet. *Community Health*, 56, 808-812.
26. Yang, CC. (2005). The refined Kano's Model and its application. *Total Quality Management* 16portal? The PatientSite experience. *Journal of American Medical Informatics Association*, 13(1), 91-95.
27. Yeh, TM. (2010). Determining medical service improvement priority by integrating the refined Kano model, Quality function deployment and fuzzy integrals. *African Journal of Business Management*, 4(12), 2534–2545.

## Distance Learning System And Students' Characteristics in University of Mersin Higher Vocational School of Mersin

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***Abstract:** The recent developments in technology, computers and communication have caused variations in instruction comprehension and have brought with them the use of modern techniques and methods nowadays. Today, the amount of information that needs to be learned increases day by day, making it compulsory for an individual to renew and develop her/himself continuously. The "Life-time learning" concept does not only get prevalent professionally but it also gets widespread for the personal development purposes and thus the demand on "distance learning" and "continuous training" increases. In this concept, thousands of people – in addition to their formal educations – among the world go through a "training activities process" like the vocational schools, certificate programs as well as programs that helps particular people get better prepared for particular professions such as the industry, the agriculture, the service sector act. And keep a better track of innovations thereof. Correspondingly, people get the opportunity to acquire new information, skills, attitudes and values.*

*The aim of this study is to examine of University of Mersin, Higher Vocational School of Mersin students' characteristic. For this purpose, questionnaire was applied to 287 students attending Higher Vocational School of Mersin in 2011-2012 academic years. The research population of Mersin University, Mersin 2011-2012 academic year, department of Computer Programming, 1st class students studying Vocational School Database Management Systems-I and Chart-Animation consists of students taking the course. The sample, part of Computer Programming, continuing college students in 1st class and the Graphics-Animation Database Management Systems-I UEYS students taking the course, students participated in the survey are defined between the dates indicated on the system. The survey is mandatory for all students through the system was applied UEYS. Date of implementation of the survey period, the students have high levels of the system, the date the application range of the survey respondents participating in the system is long and failing to do anything else that is not possible, led to more participation in the survey.*

*In this study, 287 college students in the classes out of 287 respondents who participated in the course registration. Participation rate is 100% of the survey. Consisting of 20 questions as a means of data collection, "Two Different Teaching Methods with Different Learning Area Distance Education Quality Standards for Quality Assessment and Student Expectation Survey" questions applied. This survey of students by gender, age, what lessons / classes and their methods of presentation of both views on the different courses given for the course, expectations and opinions, and the like, there are questions about the consequences. The data were analyzed by using SPSS 15.0 package program. Issues related to the results and proposals have been interpreted.*

**Keywords:** Distance Learning, Web Based Learning, Online Education, synchronous training

## **Distance Education**

New media tools such as Internet has brought about new understandings referred to as "fourth generation distance education" [B.Atıcı, M.Gürol, 2001].

Rapid advances and improvement in computer networks, increases in personal computer's processing speed, with the size of the advancements of magnetic information storage technology; in parallel with these innovations development in software technologies have led academia and academician to use the Internet as an effective and an efficient tool in the field of distance education [Frank Mayadas, 2001]. Distance Learning is a particular method of teaching, in cases where classroom activities are not available and in the absence of performing that kind of activities due to the limitations of traditional teaching-learning methods, makes communication and interaction possible among educational planners and practitioners and learners through teaching units designed specially and supplied from a specific media center via various tools.

Again, we can define distance education as is a corporate training activity that has brought together students, teachers and teaching materials are in different places through communication technologies. [Online: <http://www.yok10.com/uzaktan-egitim-uzaktan-egitim-nedir/>]. Education can be defined as an organization of knowledge and the environment for the realization of learning. The media is not mentioned only for the place of teaching, is meant the knowledge transfer and methods, equipment, and materials that will be used to guide individuals (learning). (Demirel ve diğ., 2002: 13-14).

Online courses can be done simultaneously (synchronous) and asynchronous methods. Sometimes it could be the mixture of both. The most up-to-date asynchronous presentation method is web based one. Web is an education environment that is easy and quick to reach and enables to develop different applications and present and is easy to update. Çiğdem Koçoğlu, Emre Sezgin,2000]. Course materials are presented online at web based asynchronous courses. Course, students' support services, communication, interaction and assessment and evaluation activities are realized online. Auxiliary

materials such as cd-roms, books and videocassettes can also be used to support the education,

Educational technology is an authentic discipline relate to learning and teaching process. (Alkan ve diğ., 1995). How important is to set up a platform for distance education in a distance learning system of education, it is also so important to prepare the content of it. Make a instructional design and produce multimedia contents necessitate experience and require a specific expertise. Design of a well designed web based educational web page and its structure, its content, its visual images and the internet services contain within such as chat, search, e—mail and forum play a fundamental role. Another important issue that needs to be taken into consideration is the page view. Organizing the structural view of the web page design, controlling and maintaining it require expertise of design theory and application and web technology experts. The most difficult part in Web based education is the preparing a page content in terms of both technical and educational. Here the most important thing is the copyrights and the protection of well prepared materials and the content of web courses that prepared meticulously.

### **Distance education at Mersin University**

Mersin University started its distance education studies in 1998. In our university there is mba (master of business administration) program and higher vocational school (two-year graduate school) which has only distance education program. In this study, Mersin distance education higher vocational school and its students have only been scrutinized.

Mersin higher vocational school has started giving education in four different programs within the body of higher vocational school technical programs department since 2002. After then, formal education students and evening education students sent to another body of higher vocational school and our higher vocational school has become a distance education higher vocational school since then.

Our vocational school gives education in the following fields and programs:

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**Departments of technical programs**

Computer Technologies and programming

Electronic technology

Automation and control technology

Electronic communication technology

**Departments of Economic and administrative programs**

Business administration

**Departments of health services Programs**

Pharmacy services

Medical sales and marketing

Health facilities administration

**Departments of public relations**

Public relations

Within the 2012-2013 academic year there will be 3 different departments and their programs.

Education in our vocational school has been done asynchronously on web page. Some parts of the some courses have been realized synonymously (synchronous). Moreover, methods such as cyber chat hours, projects, assignments forums etc are also used. Midterm exams are done online and their percentage from overall grade is 20%. This %20 percentile consists of 25% of assignment, Project or final grade. Final exams are done at weekends on Saturdays and Sundays at central campus' classes under supervision. Exams done in the form and structure of open faculty exams, freshmen students take exams in the morning and sophomore take exams in the afternoon on Saturday and Sunday. Percentage of the final exams is 80%.

All teaching and learning and student affairs are carried out online by specific education software. This system that enables educators, students and staff to do all teaching and learning process online is called UEYS Web based distance education management system. All process at university is done via distance education

management program software. At vocational school assignments, ftp, survey, statistics, search, messaging, chat, course content tracking, visual contents, and simultaneous lectures are realized online via Web based distance education management system. In UEYS Web based distance education management system every user has his own user name and password and everyone has the right to surf on pages and transact within the rights provided by the system administrator. At the same time system keep records of both instructors and students personnel information. Lecture notes, web lecture contents, studio recordings of lectures, visual lectures and exams questions are included that lecturers prepared meticulously need to be protected by copyrights.

### **Method (Survey study)**

Population and sample: The research population consists of students taking the course at Mersin University, Mersin 2011-2012 academic year, department of Computer Programming, 1st class students studying Vocational School Database Management Systems-I and Chart-Animation. The sample, part of Computer Programming, continuing college students in 1st class and the Graphics-Animation Database Management Systems-I UEYS students taking the course, students participated in the survey are defined between the dates indicated on the system. The survey is mandatory for all students through the system applied UEYS. Date of implementation of the survey period, the students have high levels of the system, the date the application range of the survey respondents participating in the system is long and failing to do anything else that is not possible, led to more participation in the survey. In this study, out of 287 college students in the classes 287 responded who participated in the course registration. Participation rate is 100% of the survey.

Consisting of 20 questions as a means of data collection, "Two Different courses; Different Teaching Methods with Different Learning Area Distance Education Quality Standards for Quality Assessment and Student Expectation Survey" questions are applied. In this survey there are questions on students' gender, age, what lessons / classes they take and their opinions about different presentation methods of both courses,

their expectations and their opinions about the consequences and similar questions. Because of the structure of the survey students cannot leave the answer blank.

This survey conducted on students studying Computer Programming department taking Database Management Systems-I and Chart-Animation courses.

**Auxiliary methods were used in addition to lecture methods at vocational school in Database Management Systems course;**

1. Course was recorded in the studio and carried out with about 10 students; lesson taught interactively by sometimes in the form of Q/A. This recorded lecture was given to the students as lecture notes on UEYS. Students were able to watch it as many as they like and whenever they want. For that kind of lectures theoretical and representational topics were generally preferred. From the students' feedbacks it has been stated that these lectures were forwarded to different media tools such as cell phones, mp3 players and computers and listened on all occasions. And consequently it has been considered that we diversify the learning environment and period.
2. Database Management Systems' course's all practical part were lectured by applying one-to-one practice by using screen capture programs. These hands-on trainings' topics lectured in audiovisual method were also handled to students via Web based distance education management system UEYS system as lecture notes.
3. Sample questions were prepared with quizz maker. Sample questions presented with this method are in the form of exam. Here, students have the ability to test themselves, are able to see exam results and can manage the questions of his right and wrong answers.
4. Every week classic chat realized at the classic chat hour.

**Auxiliary methods were used in addition to lecture methods at vocational school in  
Chart-Animation course**

1. Lectures were given live on subject basis prepared by using power point and adobe connect program.
2. With the help of screen capture programs, audiovisuals lectures were applied. This method realized by using Flash CS4 program in order to give sample animations' visual expression of lecture notes. These issues are described in the same time of weekly live course
3. Sample questions were presented in the form of word document.
4. Every week classic chat did not realize at the classic chat hour.

Data obtained from survey application were described and interpreted as percentage % and frequency (f). The obtained data were analyzed by using SPSS 15.0 package program and results were listed in tables. In this study, 2 questions out of 20 questions were used with the aim of learning the general condition of the students. While interpreting the results in the table the important ones of the result were indicated.

In this study, the results with regard to presentation methods of both courses in the spring semester of 2012-2013 academic-year were interpreted and some results were tried to be obtained.

**Facts (findings)**

**Question 1:** Your age

**Table 1:** evaluation of question 1

Your age	f	%
17-20	52	18,1
21-24	159	55,4
25-29	51	17,8
Over 30	25	8,7
	287	100

%55,4 of the students are between 21-24 age, %18,1 of them are between 17-20 age, %17,8 of the students are between 25-29 age and the other %8,7 are over 30 .

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**Question 2:** the method of catechism classical lecture was more efficient to me to understand the subject better in studio for database management system course I.

**Table 2:** evaluation of question 2

Answer	f	%
strongly agree	96	33,4
Agree	127	44,3
Disagree	41	14,3
strongly disagree	23	8,0
	287	100

%44,3 of the students are agree, %33,4 of them are strongly agree. Total %67,7 of the students stated that the method of catechism classical lecture more efficient to understand better.

**Question 3:** weekly live lecture with the help of Adobe Connect software used in Graphics-Animation course has been more effective in understanding.

**Table 3:** evaluation of question 3

Answer	F	%
strongly agree	90	31,4
Agree	142	49,4
Disagree	38	13,2
strongly disagree	17	6,0
	287	100

49.4% of our students are agree, 31,4% are strongly agree. 80.8% of the total stated that weekly live lecture with the help of Adobe Connect software Graphics-Animation course has been effective in understanding.

**Question 4:** the presentation of the application part of both course in the form of video recording help me to understand more efficiently.

**Table 4:** evaluation of question 4

Answer	f	%
strongly agree	97	33,8
Agree	143	49,8
Disagree	30	10,5
strongly disagree	17	5,9
	287	100

49.8% of our students are agree, 33.8% of them are strongly agree. 81.6% of the total stated that presentation in the form of video recording of each course application part was more effective in understanding of the course notes.

**Question 5:** there were not any differences to understand the lecture between live lecture at Graphics-Animation course and video lecture at database management system course.

**Table 5:** evaluation of question 5

Answer	f	%
strongly agree	85	29,6
Agree	122	42,5
Disagree	59	20,6
strongly disagree	21	7,3
	287	100

42.5% of our students are agree, and 29,6% of them are strongly agree. 72.1% of the total indicated that there were no differences between live course and video lectures to understand both of the courses.

**Question 6:** because lectures notes and the weekly live lecture with the help of Adobe Connect software used in Graphics-Animation course were the same that would not efficient for me to understand the course.

**Table 6:** evaluation of question 6

Answer	F	%
strongly agree	85	29,6
Agree	129	45,0
Disagree	54	18,8
strongly disagree	19	6,6
	287	100

45.0% of our students are agree, and 29,6% of them are strongly agree. 74.6% of the total confirmed although the notes and the weekly live lectures realized with the help of Adobe Connect software were the same it was more effective in understanding the course.

**Question 7:** It is important for the Graphic animation course's visual lecture given by lecturer live.

**Table 7:** evaluation of question 7

answer	F	%
strongly agree	113	39,4
agree	138	48,1
disagree	20	7,0
strongly disagree	16	5,5
	287	100

Students 48.1% are agree, 39.4% of them are strongly agree. A total of 87.5% expressed the importance of the Graphic animation course's visual lecture given by a lecturer live.

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**Question 8:** while lecturing live by using adobe connect software at graphic animation course and presenting all lecture notes in the form of power point slides help me to understand better.

**Table 8:** evaluation of question 8

answer	F	%
strongly agree	89	31,0
agree	143	49,9
disagree	34	11,8
strongly disagree	21	7,3
	287	100

%49,9 of the students agree, %31,0 of them are strongly agree. A total of %81,9 underlined that lecturing live by using adobe connect software at graphic animation course and presenting all lecture notes in the form of power point slides help them to understand better.

**Question 9:** It is more efficient for me to understand the graphic animation course better on lecturing and presenting the important part of the subject by preparing power point slides via adobe connect software and stressing on the important parts.

**Table 9:** evaluation of question 9

answer	F	%
strongly agree	99	34,5
agree	140	48,8
disagree	32	11,1
strongly disagree	16	5,6
	287	100

%48,8 of our students agree, %34,5 of them strongly agree. A total of %83,3 stated while lecturing live with adobe connect software and presenting power point slides stressed the most important part of the course enable them to understand the subject better.

**Question 10:** It is very beneficial that there is chat hours apart from lectures with adobe connect software.

**Table 10:** evaluation of question 10

answer	F	%
strongly agree	96	33,4
agree	152	53,0
disagree	25	8,7
strongly disagree	14	4,9
	287	100

%53, 0 of the students agree, %33, 4 strongly agree. A total of %86,4 agreed with the benefit of having chat hours apart from lectures with adobe connect software.

**Question 11:** that would be better if weekly visual lectures take place as it is in graphic animation course out of working hours

**Table 11:** evaluation of question 11

answer	f	%
strongly agree	110	38,3
agree	142	49,4
disagree	19	6,6
strongly disagree	16	5,7
	287	100

%49, 4 of them agree, %38,3 of them strongly agree. A total of %87,7 indicated that would be better if weekly visual lectures take place as it is in graphic animation course out of working hours.

**Question 12:** there are not any differences between the weekly live visual lectures in graphic animation course and video recording lectures in database management system course.

**Table 12:** evaluation of question 12

answer	f	%
strongly agree	88	30,7
agree	134	46,7
disagree	50	17,4
strongly disagree	15	5,2
	287	100

%46, 7 of the students agree %30,7 strongly agree. A total of %77,4 thought that there are not any differences between the weekly live visual lectures in graphic animation course and video recording lectures in database management system course.

**Question 13:** there is no difference between weekly live adobe connect software lectures and visual video lectures.

**Table 13:** evaluation of question 13

answer	f	%
strongly agree	88	30,7
agree	124	43,2
disagree	55	19,2
strongly disagree	20	6,9
	287	100

%43,2 agree, %30,7 strongly agree. A total of %74,4 underlined that there is no difference between weekly live adobe connect software lectures and visual video lectures.

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**Question 14:** sample questions presented visually in database management system course were more efficient than the sample questions presented in word format in graphic animation course.

**Table 14:** evaluation of question 14

answer	f	%
strongly agree	93	32,4
Agree	142	49,5
disagree	35	12,2
strongly disagree	17	5,9
	287	100

%49,5 of the students agree, %32,4 of them strongly agree. A total of %81,9 stated that instead of presenting in the form of word, presenting the sample questions in a visual media in a special exam form like in the course of database management system would be more efficient.

**Question 15:** methods presented in graphic animation course help me understand better.

**Table 15:** evaluation of question 15

Answer	f	%
strongly agree	94	32,8
Agree	150	52,3
disagree	25	8,7
strongly disagree	18	6,2
	287	100

%52,3 of them agree, %32,8 strongly agree. A total of %85,1 indicated that methods used in graphic animation course lectures were more efficient to understand the topics than lectures presented on the classical internet environment.

**Question 16:** methods presented in database management system course were more efficient to understand better.

**Table 16:** evaluation of question 16

Answer	f	%
strongly agree	88	30,7
agree	146	50,9
disagree	34	11,8
strongly disagree	19	6,6
	287	100

%50,9 of the students agree, %30,7 strongly agree. A total of %81,6 indicated that methods used in database management system I course lectures were more efficient to understand the topics than lectures presented on the classical internet environment.

### **Survey results**

Following results were obtained according to the answers that the students gave about distance education.

Age distribution of our students is between 21 and 24. While lectures are given simultaneously or prepared in visual video forms comprehension of the topics are much more efficient up to 80-90 %. When lecture notes only distributed online in the classical form understanding the topic would get more difficult. All here are up to the students. That means that students have to study much more in order to succeed.

There is no difference between visual lectures and video recording lectures while lecturing. However, there need to have separate chat hour in order students to learn better for both methods.

Courses for both lectures methods have been kept records on the system. Students have the opportunity to watch the lectures as many as they want and they have the access whenever they want. Although there is not any difference between understanding the both lectures methods as lectures prepared in the form of video lectures and video formatted lectures can be used by transforming into other media tools it could be the reason for preference for the students.

for sample questions rather than be in only text format It is more efficient to present sample questions2 answers are found in the form of visual animation when necessitate in an exam environment

### **Result and suggestions**

Nowadays, individuals meet their needs through technology. Society and individuals have reached today's level of living with the help of technology. Countries that have advanced level of technology have more advanced level of living. (Doğan, 1983: 33)

Both methods were approximately effective at the same level. Institutions will decide which method to apply. Opportunities that institutions have, advantages and disadvantages of lecture methods would affect this decision. It is also important on this

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decision that lecturers' technology competence, protection of the works of lecturers, protection of lecture notes and copyrights.

### **References**

1. Alkan, C., Deryakulu, D., Şimşek, N. (1995) Eğitim Teknolojisine Giriş : Disiplin, süreç, Ürün: Önder matbaacılık Ltd.Şti, Ankara
2. B.Atıcı, M.Gürol, Nesnelci Öğretim Yaklaşımlarından Oluşturmacı Öğrenme Yaklaşımlarına Doğru İnternet Tabanlı Uzaktan Eğitime Yönelik Bilimsel Bir Model Önerisi, Bilişim Teknolojileri Işığında Eğitim Konferansı ve Sergisi Bildiriler Kitabı, 2001, s.177.
3. Çiğdem Koçoğlu, Emre Sezgin, “www İçin Etkili Öğretim Materyali Tasarım Önerileri”, inet-tr 2000
4. Demirel, Ö., Seferoğlu, S., Yağcı, E. (2002). Öğretim Teknolojileri ve Materyal Geliştirme, PegemA Yayıncılık, Ankara
5. Doğan, H. (1983), Teknoloji Eğitimi, A.Ü.Eğitim Bilimleri Fakültesi, Ankara
6. Frank Mayadas, Asynchronous Learning Networks, (Çevrimiçi) <http://www.aln.org/alnweb/aln.htm>, 17.02.2001
7. Online: <http://www.yok10.com/uzaktan-egitim-uzaktan-egitim-nedir/>, 10.04.2010



## **Distance Learning in Lithuania and Turkey: A Comparative Study**

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**Abstract:** *This paper presents the questionnaire-based analysis of the results of distance learning studies at Vilnius Gediminas Technical University (Lithuania) and Istanbul University (Turkey). Eleven years of practical experience of distance learning under two study programs at the Department of Construction Economics and Property Management at Vilnius Gediminas Technical University (VGTU) is presented. The analysis of social and economical aspects, moral issues of studies was made on the basis of questionnaire results. The survey was fulfilled in 2011 year, the number of respondents took part in a survey was 73. The questionnaire-based results were received by using Moodle and additional scripts, programmed and applied to the Moodle learning space.*

*The same research have been fulfilled at Istanbul University (Turkey). The survey was based on a questionnaire. Practical experience of distance learning at the Master of Science, Undergraduate, Pre-undergraduate (2 years) at Istanbul University (IU) is presented. The analysis of social and economical aspects, moral issues of studies was made on the basis of questionnaire results. The survey was fulfilled in 2011 year, the number of respondents took part in a survey was 1127. Departments are Law106, Turkish Language and Literature 125, Banking and Insurance 65, Computer and Instructional Technologies Education 54, Labour Economics and Industrial Relations 60, Foreign Trade 75, Econometrics 18, Journalism 64, Public Relations 93, Cinema-Radio-TV 91, Economics 88, Business Administration 63, Finance 46 and 179 person did not notice department. The questionnaire-based results were received by using Moodle and additional scripts, programmed and applied to the Moodle learning space.*

*The respondents were asked to answer the questionnaire which contained the following three main parts: information about the respondent, information about the studies, social and economic aspects of studies.*

*After completion of the research, the following conclusions have been made: 1. The number of students enrolled in e-learning courses as in Lithuania as well in Turkey have been increasing; 2. These are the main advantages of distance learning: convenient form of studies; an opportunity to get acquainted with new information technologies; saving of time; fast communication; flexible choice of academic subjects; good professional training.*

**Keywords:** Distance learning, Questionnaire, E-Learning systems

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## **Introduction**

Due to fast advances in ICT, the past decade has seen an increasing number of online education programs and software applications developed at every level of business life as well as in academia. Leading technology companies such as IBM and HP utilize online tools not only to facilitate communication among their employees, but also to train them in various respects of their work life (Yucelen, Kuzulugil, 2008). E-learning is a popular mode of delivering educational materials in higher education by universities throughout the world (Bhuasiri et al., 2012) and at the same time E-learning is an important tool for delivery, interaction, and facilitation of both teaching and learning processes (Cohen, Nycz, 2005; Jamlan, 2004). The integration of technology in learning, needs to address the very important issue of enhancing the teaching and learning process, rather than just being seen as a new flexible delivery medium (Nichols, 2003).

While information technology has created both opportunities and challenges for education, E-learning in the broader context of using technology meets society's needs for learning for lifelong and rapid learning. According to Watkins (2009), for most online students, development of effective study habits and learning skills is also critical to their academic achievement and retention. It also requires understanding that adult learners have psychological needs and demands that e-learning must address (Cercone, 2008; Cohen, Nycz, 2005; Omar et al., 2011). It is therefore important to choose the best teaching strategy and actively involve students in problem solving.

Parallel to the world, there is a growing interest in online education in Lithuania, as well. In 1993, Lithuania joined the PHARE Multi-country program for Distance Education. Currently, Lithuania uses the Academic and Research Network LITNET (<http://www.litnet.lt/index.php/apie-litnet>), which opens a door to the state-of-the-art world of IT and information repositories. Creation and development of the portal "Lithuanian Virtual University" (<http://www.lvu.lt/cms/liedm/app>) is part of the program of the Ministry of Education and Science of the Republic of Lithuania "Lithuanian

Virtual University 2007–2012”, which carries on and expands activities of the previous programmes and attracts new institutions to such activities (Lithuanian Virtual University, n.d.).

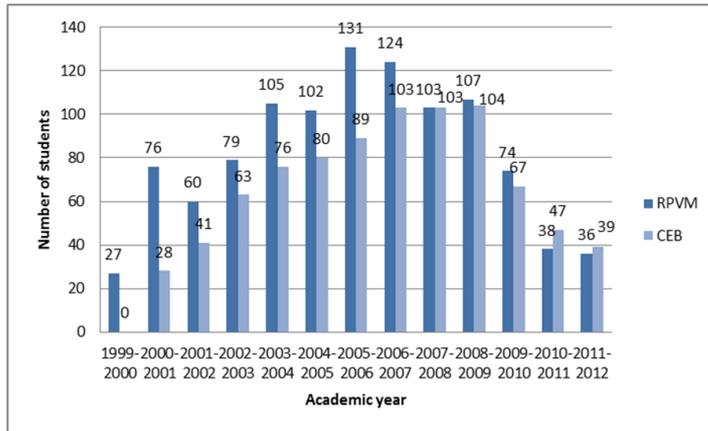
In this research the distance learning at the Department of Construction Economics and Property Management of the Faculty of Civil Engineering of VGTU and Departments of Law, Turkish Language and Literature, Banking and Insurance, Computer and Instructional Technologies Education, Labour Economics and Industrial Relations, Foreign Trade, Econometrics, Journalism, Public Relations, Cinema-Radio-TV, Economics, Business Administration, Finance of IU are analysed.

E-learning courses at the Department of Construction Economics and Property Management of the Faculty of Civil Engineering of VGTU were introduced in September of year 1999. Twenty seven (27) students from all over Lithuania were accepted into the Real Estate Valuation program. Since 2000 students can enrol in Construction Management e-learning course selecting Construction Economics and Management as a major subject (Rimkuvienė, Lepkova, 2004; Rimkuvienė et al., 2010).

The variations in the number of students in e-learning programs (Real Estate Valuation and Management (RPVM) and Construction Economics and Business (CEB)) are shown in Figure 1.

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**Figure 1:** Variation in the number of students in e-learning programs

As shown in Figure 1, the total number of students enrolled in distance learning courses have been increasing before economic recession. On that time (2007-2009 year) the increment of the student's number is equal in two programmes. It was related to the increased employment opportunities in Construction and Real Estate sector. After economic crisis, the number of students rapidly decreased. The main reasons were economic recession, demographic situation, emigration, and high unemployment rate.

In Turkey, distance education has been applied for years. In 1970's distance education methods and components were given by television (TV) at the Eskişehir Economical and Commercial Sciences Academy (EECSA). In 1981 Anadolu University started first distance education applications in higher education. Then some universities in Turkey applied different distance education methods, for example Middle East Technical University (Ankara), Bilkent University (Ankara), Fırat University (Elazığ), Kahraman Maraş Sütçü İmam University (Kahraman Maraş), Sakarya University (Adapazarı), Selçuk University (Konya), Bilgi University (İstanbul), İstanbul University (İstanbul), Harran University (Şanlıurfa) and İstanbul Technical University (İstanbul).

Distance education at Istanbul University started in 2000. Since 2000, it has been applied between Istanbul University and Harran University by means of videoconferencing and broadcasting. Later in the academic year of 2009-2010, Istanbul University Distance Education Center (ISUZEM) has been established and has started its activities. Distance education programs under the supervision of ISUZEM are shown in Table 1. In addition to these programs there are two certificate programs. Also, Faculty of Open and Distance Education has been established in 2010 (April). In the 2010-2011 education year, approximately 3.500 students have been enrolled in ISUZEM.

**Table 1:** ISUZEM Distance Education Programs at Istanbul University.

<b>Institute/Faculty</b>	<b>Name of Program</b>	<b>Academic Year of Start</b>	<b>Program Degree</b>
<b>Institute of Science</b>	Informatics	2010-2011	Master of Science
<b>Institute of Social Sciences</b>	Capital Markets Specialist	2010-2011	Master of Science
	Financial Econometrics	2010-2011	Master of Science
	Department of Museum Management	2012-2013	Master of Science
	Department of Cultural Heritage Areas Management	2012-2013	Master of Science
	International Business	Coming soon	Master of Science
<b>Faculty of Letters</b>	Turkish Language and Literature	2009-2010	Undergraduate
	History	Coming soon	Undergraduate
	Information and Records Management	Coming soon	Undergraduate
<b>Faculty of Communication</b>	Journalism	2009-2010	Undergraduate
	Public Relations	2009-2010	Undergraduate
	Cinema-Radio-TV	2009-2010	Undergraduate
<b>Faculty of Economics</b>	Economics	2009-2010	Undergraduate
	Business Administration	2009-2010	Undergraduate
	Finance	2010-2011	Undergraduate
	Econometrics	2010-2011	Undergraduate

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	Labour Economics and Industrial Relations	2010-2011	Undergraduate
<b>Hasan Ali Yücel Education Faculty</b>	Computer and Instructional Technologies Education	2010-2011	Undergraduate
<b>Faculty of Divinity</b>	Divinity Completed Undergraduate	2010-2011	Undergraduate
<b>Vocational School of Law</b>	Law	2009-2010	Pre-graduate (2 years)
<b>Vocational School of Social Sciences</b>	Foreign Trade	2010-2011	Pre-graduate (2 years)
	Banking and Insurance	2010-2011	(2 years)

### **Analysis of questionnaire-based survey results**

This paper presents the questionnaire-based analysis of the results of distance learning studies at Vilnius Gediminas Technical University (Lithuania) and Istanbul University (Turkey). Eleven years of practical experience of distance learning under two study programmes at the Department of Construction Economics and Property Management at Vilnius Gediminas Technical University (VGTU) is presented. The analysis of social and economical aspects, moral issues of studies was made on the basis of questionnaire results.

73 respondents took part in a survey conducted in 2011. The respondents were asked to answer the questionnaire which contained the following three main parts (see Appendix A):

- Information about the respondent;
- Information about the studies;
- Analysis of the study materials;
- Social aspects of studies.

The following is an analysis of the data obtained through questionnaire-based survey. First of all we conducted the analysis of the information about the respondents (age, occupation). Distribution of respondents by age is shown in Figure 2. The age of

respondents ranged between 21 and 55 years.

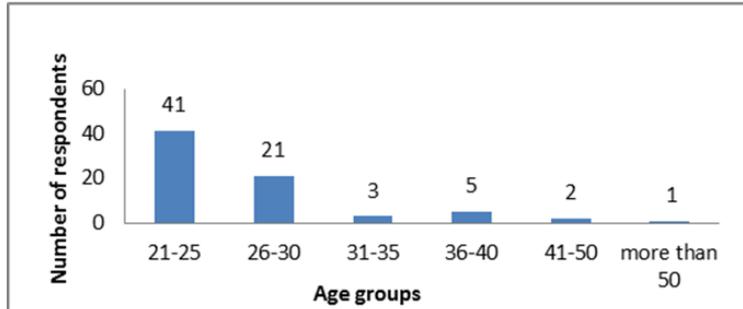


Figure 2: Respondents age groups.

As can be seen from Figure 2, the majority of students are young people. Figure 3 shows the distribution of respondents by type of employment.

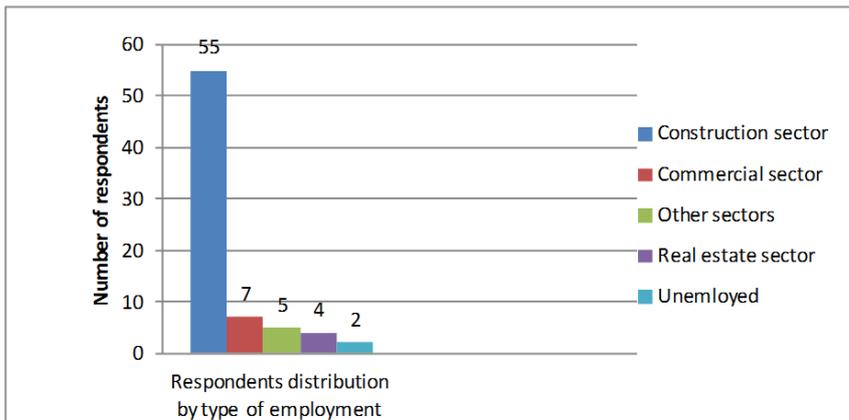
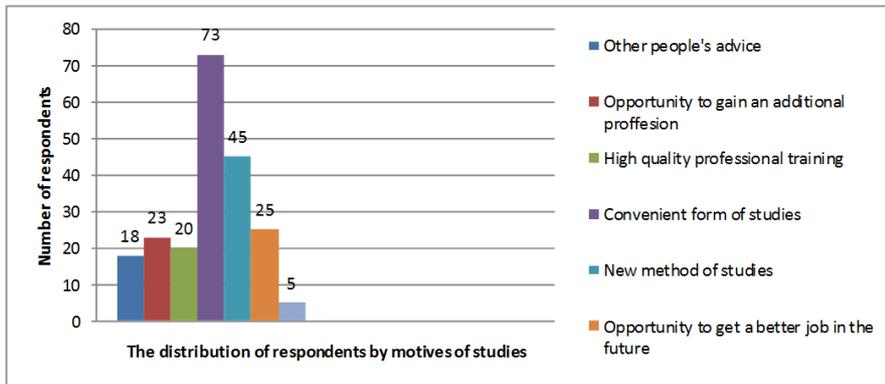


Figure 3: The distribution of respondents by type of employment.

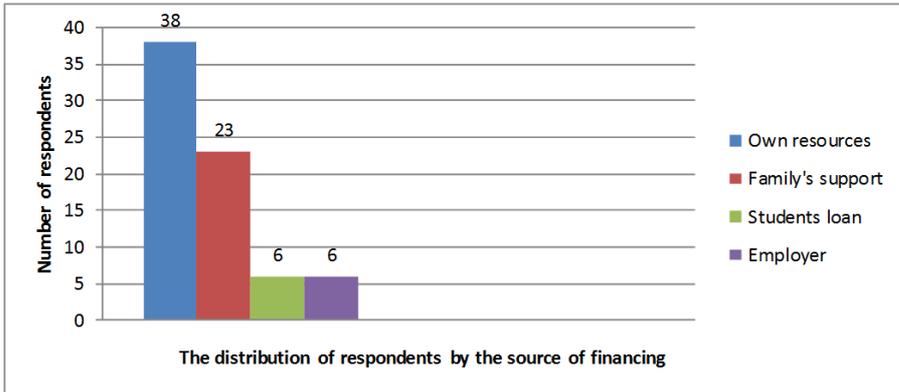
Figure 3 shows that the majority of respondents are employed in the construction sector. The distribution of respondents by motives of studies is shown in Figure 4.



**Figure 4:** The distribution of respondents by motives of studies.

As illustrated in Figure 4, the number of respondents who selected the answer “convenient form of studies” is one of the major factors. Mature respondents focused of this motive, because all of them are working people and it is relevant for them to combine work and studies. For young generation the new method of studies is more attractive in case of application of new technologies. Students had the opportunity to choose more than one motive of studies.

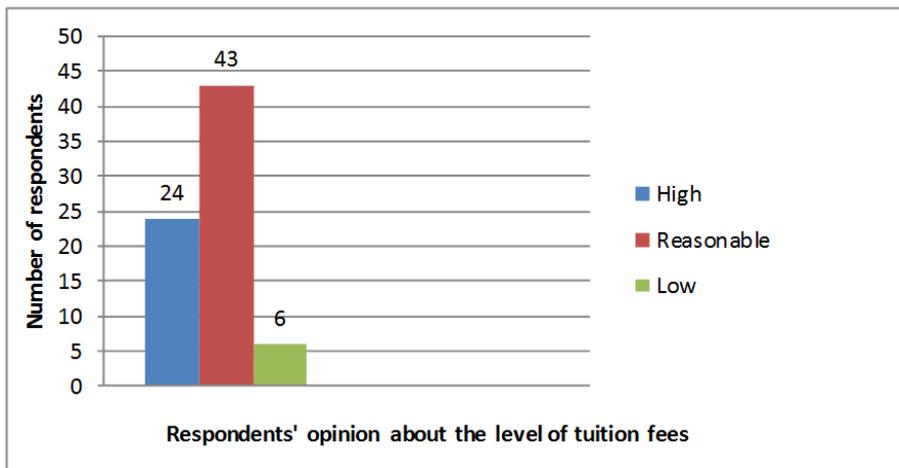
The distance learning studies are paid, therefore students were asked to specify the source of financing, and to evaluate the size of tuition fee and the cost of studies. The distribution of respondents by the source of financing is presented in Figure 5.



**Figure 5:** Distribution of respondents by the source of financing.

As illustrated in Figure 5, the first place takes own resources, and 23 respondents were supported by families. Only 6 respondents took a students' loan and only 6 respondents supported by employer.

It was useful to know the respondents' opinion about level of tuition fees, is it too high or reasonable. The respondents' opinion about level of tuition fees is shown in Figure 6.

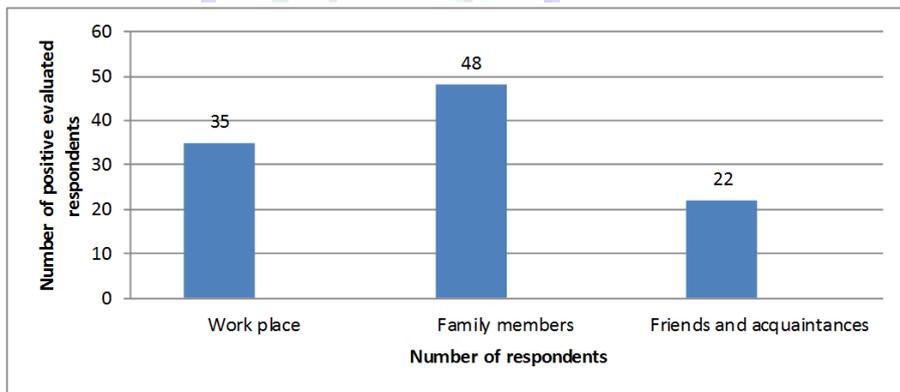


**Figure 6:** Respondents' opinion about the level of tuition fees.

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As can be seen from Figure 6, for majority of respondents the level of tuition fees is reasonable and it is understandable, because they have jobs and pay for their studies themselves.

The respondents were asked about social aspects of studies. The questionnaire contains questions as to the reaction of the students' social environment to the fact that they have decided to study. Respondents were asked to comment on the reaction of their employer, family members, friends and acquaintances to their intention to renew their studies (see Figure 7).



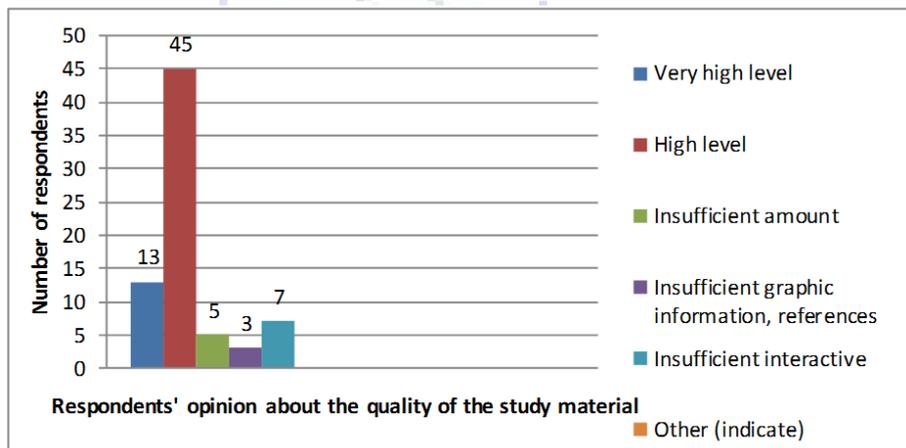
**Figure 7:** Reaction of social environment about respondents with respect to their studies.

As can be seen in Figure 7, the problems most often occur at young respondents' workplace—employers' attitude towards their studies was negative. 35 respondents were supported by work place, also they were supported by family members, but the reaction of friends was more negative (because of lack of time for friends and so on). Older respondents encountered mostly negative attitude in their families (they were spending time for studies), but they were evaluated positively by the work place. Students had the opportunity to choose more than one reaction of social environment.

Students' backgrounds are very diverse, so they have different experiences and expertise in different fields, also in numeracy and IT, and varying communication skills.

It is not uncommon for complaints to come from those who do not understand the need for IT on their courses (Williams, 2002).

The questionnaire also contained questions about the quality of study materials. The distribution of respondents' opinions as to the quality of the study materials is shown in Figure 8. The respondents had to indicate the advantages and disadvantages of study materials.



**Figure 8:** Respondents' opinions as to the quality of the study materials.

As can be seen from Figure 8, 7 respondents think that there is a lack of interactivity in electronic textbooks. Some other shortcomings have also been mentioned by the respondents, one of them being the lack of links and graphic information. On the whole, however, the level of electronic textbooks is considered quite high.

Most of the problems were found in the video and audio materials. The considerable part of respondents think that this material is not comprehensive enough and video image are sometimes of poor quality.

The tests received the highest score. With very few exceptions, they contained no faults.

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The same research has been fulfilled at Istanbul University and the distance education at Istanbul University (Turkey) have been analysed.

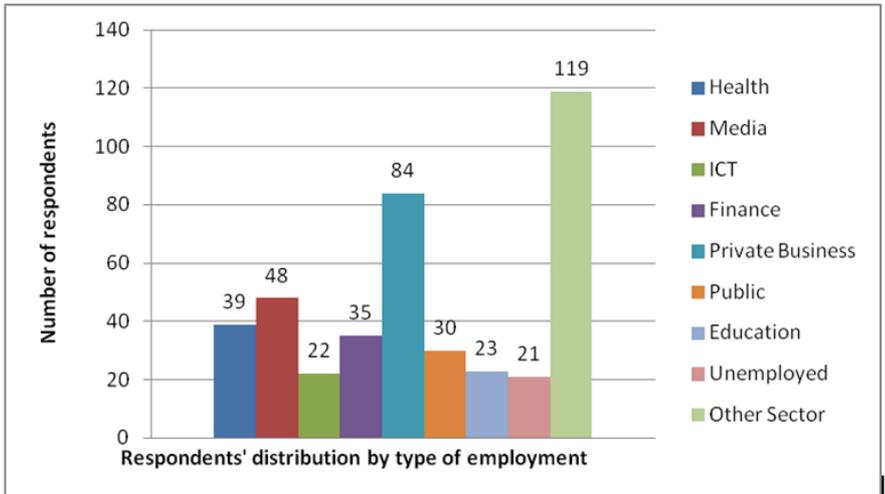
In this study, an online questionnaire was applied to 1127 ISUZEM's students from different departments (Table 2).

**Table 2: ISUZEM's Departments and Numbers of Students**

<b>ISUZEM Program Name</b>	<b>Number of Students</b>
Law	106
Turkish Language and Literature	125
Banking and Insurance	65
Computer and Instructional Technologies Education	54
Labour Economics and Industrial Relations	60
Foreign Trade	75
Econometrics	18
Journalism	64
Public Relations	93
Cinema-Radio-TV	91
Economics	88
Business Administration	63
Finance	46
Unknown	179
<b>Total</b>	<b>1127</b>

1127 respondents took part in a survey conducted in 2011. The survey was based on a questionnaire. The respondents were asked to answer the questionnaire which contained the following three main parts: information about the respondent, information about the studies, social and economic aspects of studies.

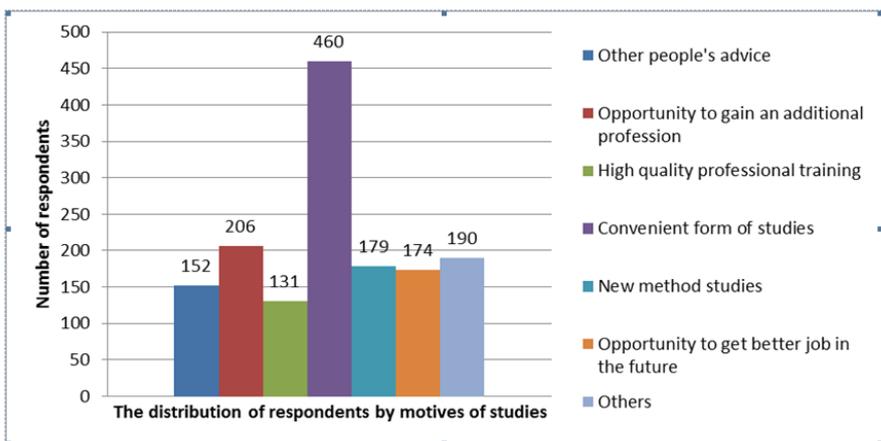
First of all we conducted the analysis of the information about the respondents (age, occupation). The results shows that the students are citizens of cities/regions all over Turkey and three of them are living in Azerbaijan. While the city with the biggest number of distance education students is Istanbul, following cities are Ankara and Bursa. The average of 1075 respondent's age is 39.



**Figure 9:** The distribution of respondents by type of employment.

Figure 9 the distribution of respondents by type of employment and shows that the majority of respondents are employed in the private business and other sector.

The distribution of respondents by motives of studies is shown in Figure 10.



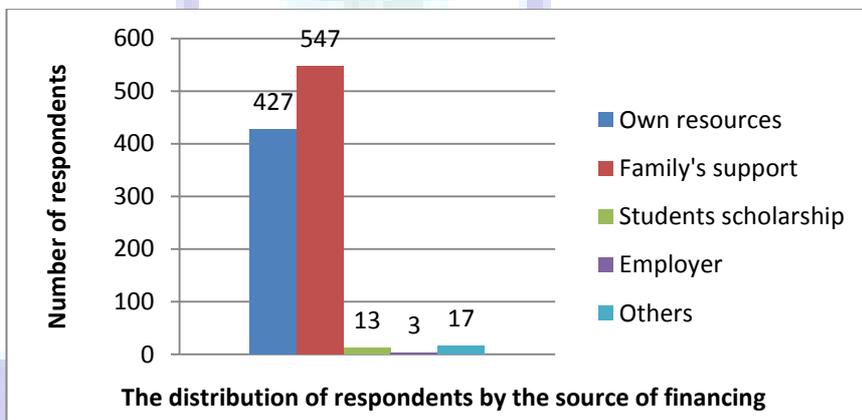
**Figure10:** The distribution of respondents by motives of studies

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As illustrated in Figure 10, the number of respondents who selected the answer “convenient form of studies” is one of the major factors as VGTU in Lithuania (Figure 4). Mature respondents focused of this motive, because all of them are working people and it is relevant for them to combine work and studies. For young generation the new method of studies is more attractive in case of application of new technologies. Students had the opportunity to choose more than one motive of studies.

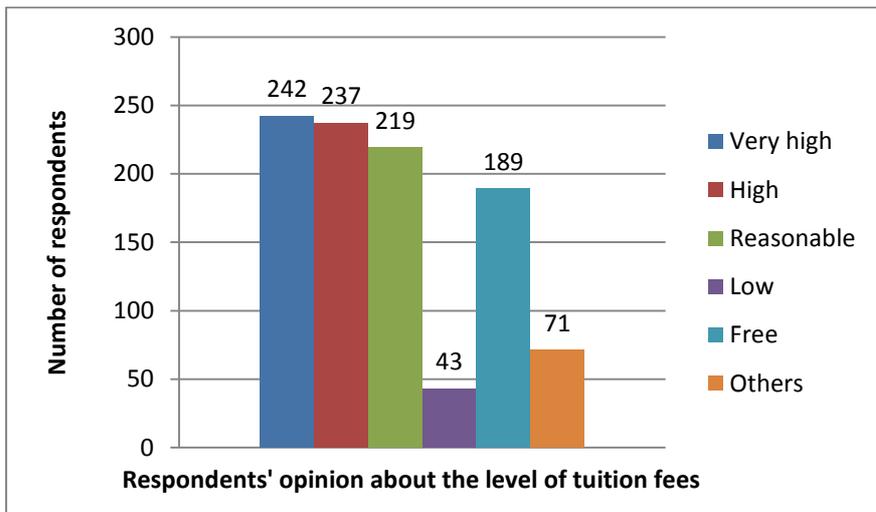
The distance learning studies are paid, therefore students were asked to specify the source of financing, and to evaluate the size of the tuition fee and the cost of studies. The distribution of respondents by the source of financing is presented in Figure 11.



**Figure 11:** Distribution of respondents by the source of financing.

As illustrated in Figure 11, opposite to VGTU the first place takes answer supported by “families and then answer own resources” (Figure 5). Only 13 respondents took a students’ scholarship and only 3 respondents supported by employer similar to VGTU.

It was useful to know the respondents’ opinion about level of tuition fees, is it too high or reasonable. The respondents’ opinion about level of tuition fees is shown in Figure 12.



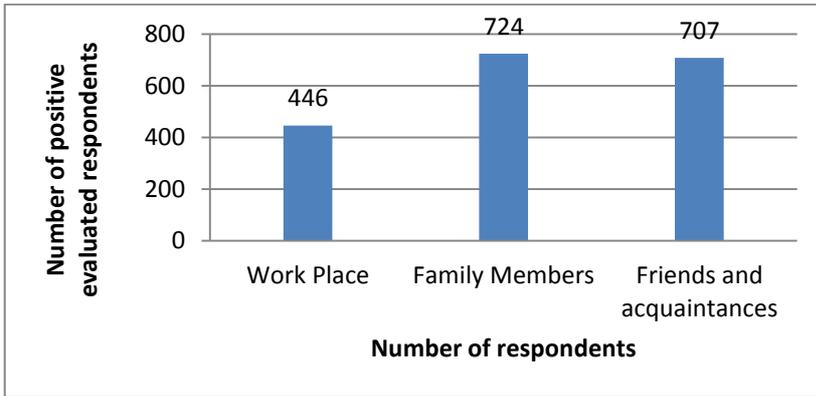
**Figure 12:** Respondents' opinion about the level of tuition fees

As can be seen from Figure 12, for majority of respondents the level of tuition fees is high or very high opposite to VGTU (Figure 6).

The respondents were asked about social aspects of studies. The questionnaire contains questions as to the reaction of the students' social environment to the fact that they have decided to study. Respondents were asked to comment on the reaction of their employer, family members, friends and acquaintances to their intention to renew their studies (Figure14).

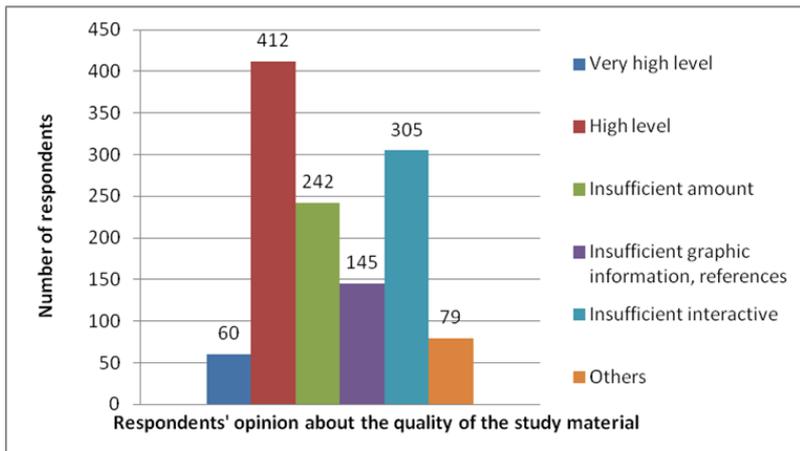
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**Figure 13:** Reaction of social environment about respondents with respect to their studies.

As can be seen in Figure 13, the opinion of family members, friends and acquaintances is positive than employer. Even, e-Learning can be seen as wasting of time or escaping from the job or losing the job by the employer. Family members, friends and acquaintances are supporters of e-learning to be a good opportunity. Comparing with Lithuanian case, we can say that the opinions of friends and acquaintances are more positive in Turkish case (Figure 7).



**Figure 14:** Respondents' opinions as to the quality of the study materials.

The questionnaire also contained questions about the quality of study materials. The distribution of respondents' opinions as to the quality of the study materials is shown in Figure 14. The respondents had to indicate the advantages and disadvantages of study materials.

As can be seen from Figure 14, most of respondent's opinion of the quality of the study material is high level. The figure 8 graphic has got same pattern as VGTU.

## **Conclusions**

After the completion of the research, the following conclusions have been made:

1. The main advantages of distance learning are: Convenient form of studies; An opportunity to get acquainted with new information technologies; Saving of time; Fast communication; Flexible choice of academic subjects; Good professional training.
2. When compared Distance Learning in Lithuania and Turkey, in conclusion some of results similar like motives of studies and opinions as to the quality of the study materials. Some of them is different "Source of financing", "opinion about the level of tuition fees" and "Reaction of social environment about respondents with respect to their studies". This difference may be due to the difference in culture.

## **References**

8. Bhuasiri, W.; Xaymoungkhoun, O.; Zo, H.; Rho, J.J.; Ciganek, A.P. (2012). Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty, *Computers & Education*, 58(2), 843-855.
9. Cercone, K. (2008). Characteristics of adult learners with implications for online learning design, *AACE Journal*, 16(2), 137-159.
10. Cohen, E.B.; NYCZ, M. (2005). Learning objects and e-learning: An informing science perspective, *Interdisciplinary Journal of Knowledge and Learning Objects*, 2, 23-34. Retrieved January 8, 2012 from: <http://ijklo.org/Volume2/v2p023-034Cohen32.pdf>.
11. Jamlan, M. (2004). Faculty opinions towards introducing e-learning at the University of Bahrain, *THE INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING*, 5(2). Retrieved December 20, 2011 from: <http://www.irrodl.org/index.php/irrodl/article/view/185/267>.

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12. Lithuanian Virtual University. (n.d.). About LVU programme, Lithuanian Virtual University. Retrieved January 6, 2012 from: <http://www.lvlu.lt/cms/liedm/app?service=external/index&sp=1705>
13. Litnet. 2012. Lithuanian Academic and Research Network (in Lithuanian). Retrieved January 8, 2012 from: <http://www.litnet.lt/index.php/apie-litnet>.
14. Nichols, M. (2003). A theory for eLearning, *Educational Technology & Society*, 6(2), 1-10. Retrieved January 8, 2012 from: [www.ifets.info/journals/6\\_2/ets-6-2.pdf](http://www.ifets.info/journals/6_2/ets-6-2.pdf).
15. Omar, A.; Kalulu, D.; Alijani, G.S. (2011). Management of innovative e-learning environments, *Academy of Educational Leadership Journal*, 15(3), 37-64.
16. Rimkuvienė, S.; Lepkova, N. (2004). Analysis of experience and efficiency of e-learning Master's degree programme in construction economics and property management, *Journal of Civil Engineering and Management*, X(1), 51-60.
17. Rimkuvienė, S.; Lepkova, N.; Krutinis, M. (2010). Results of Three Research Works on E-Learning with a Special Emphasis on the Change of Economic Conditions. In Proceedings of 10th International Conference "Modern Building Materials, Structures and Techniques", May 19-21, 2010, Vilnius, Lithuania. VGTU (pp. 506-511). Vilnius: Technika.
18. Vilnius Gediminas Technical University, Civil Engineering Faculty. (2012). *Students opinion survey* (in Lithuanian). Retrieved December 21, 2011 from: [http://odl.vgtu.lt/index.php?lang=lt&menuitem=tr\\_apklausa](http://odl.vgtu.lt/index.php?lang=lt&menuitem=tr_apklausa).
19. Watkins, R. (2009). Creating positive e-learning experiences for online students. In: Rogers, P.L. et al. (Eds.). *Encyclopedia of Distance Learning* (2nd ed.) (pp. 517-524). Hershey: Information Science Reference.
20. Yucelen, M., Kuzulugil, S. (2008). A comparison of motivational value orientations in traditional classroom setting and e-learning courses. In *Proceeding of Second International Conference on Innovations in Learning for the Future 2008 e-Learning*. March 27-29, 2008, İstanbul, Turkey, 386-398.
21. Williams, P. (2002). The learning Web. The development, implementation and evaluation of Internet-based undergraduate materials for the teaching of key skills. *Active learning in higher education*. Vol 3 (1). p. 40-52.

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## **Appendix A**

### **QUESTIONNAIRE**

#### **Analysis of Experience and Efficiency of Distance Learning**

This questionnaire is aimed at the determination of the advantages and disadvantages of distance learning as well as wishes of students. The tutors and the lecturers are going to take these remarks into their consideration.

**Please, specify:**

Name, surname

Age

Your education

Name of place of work

Position (scope of work)

Home address (town is compulsory)

Contact information (telephone/fax, e-mail, mobile phone)

The specialisation of distance learning studies:

#### **I. INFORMATION ON STUDIES**

**1.1. Why have you chosen this particular form of studies?** (Please, indicate all suitable variants)

- other people recommended
- convenient form of studies with no distraction from work
- good work opportunity in the future occupation
- possibility to acquire a parallel occupation
- new method of studies
- good professional training
- other (indicate).....

**1.2. In what respect, in your opinion, is distance learning better than other forms of studies?**

**(Please, evaluate every study advantage in points form 1 to 10)**

- better study quality
- flexible option of subjects
- time saving
- advanced IT
- better lecturers
- latest information
- fast connection
- other (indicate).....

**1.3. From what sources of information did you find out about distance learning Master's studies at your university? (Please, mark all suitable variants)**

- advertisement in a newspaper
- during an exhibition
- during conferences
- information on university internet website
- promotional leaflets
- other people recommended
- other (indicate).....

**1.4. Evaluate the efficiency of information sources on distance learning Master studies at your university in points (10 most efficient):**

- 1 point
- 2 points
- 3 points
- 4 points
- 5 points
- 6 points
- 7 points
- 8 points
- 9 points
- 10 points

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1.5. What are your study goals? (Please, mark all suitable variants)

- to improve knowledge                       to obtain a diploma of a new speciality  
 to improve current working skills         to acquire new knowledge  
 opportunities to get a good job             other (indicate).....

1.6. What way of distance communication with lecturers is more acceptable and convenient for You? (Please, mark all suitable variants)

- e-mail             intended contact meetings             video conference

virtual environment

- telephone             fax                                               other (indicate).....

1.7. What way of distance communication with tutors is more acceptable and convenient for You?

- e-mail             fax                                               video conference  
 telephone         intended contact meetings             other (indicate).....

1.10. Are you satisfied with the study fee? Or the study free of charge?

- high             low             satisfactory             free of charge  
 other (indicate).....

1.11. Who covers Your distance studies?

- place of work                               family support             other  
(indicate).....

- own funds                                   study loan                       free of charge

1.12. Is the study fee a hard financial burden for You?

- very hard             normal             not substantial             free of charge  
 hard                       not noticeable             other (indicate).....

## II. ANALYSIS OF STUDY MATERIAL

2.1. How do you evaluate the quality of distance learning material?

2.1.1. Electronic notes: (Please, mark all suitable variants)

- very high level                               insufficient amount  
 high level                                       insufficient graphic

information, references

- insufficiently interactive                       other  
(indicate).....

2.1.2. Evaluate the quality of electronic notes in points:

- 1 point             3 points             5 points             7 points             9 points  
 2 points             4 points             6 points             8 points             10 points

2.1.3. Video and audio material (Please, mark all suitable variants if it is developed)

- very high level                               insufficient amount  
 high level                                       other (please,  
indicate).....

2.1.4. Evaluate the quality of video and audio material in points:

- 1 point             3 points             5 points             7 points             9 points  
 2 points             4 points             6 points             8 points             10 points



## **Examination of LMS Logs in Academic Education Platforms: A Case Study**

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**Abstract:** *In recent years, with the popularization of the LMS software's usage, the importance of analyzing these logs of LM systems were discovered both by LMS developers and the academics, and the number of researches and studies on this field increased greatly.*

*In this study, web server logs of LMS provided to Okan University by Enocta Akademik Eğitim Platformu (EAEP – Enocta Academic Education Platform), which is the biggest LMS platform and education content provider of Turkey were examined. Various data appear in these logs. These data were subjected to examination through log analyzer tools and evaluations were made concerning the learning forms of students through trying to reveal what would be the benefits it will provide, such as the profile, behaviors, learning activity and system usage preferences of the students. On this study, since a university's all distance education students' LMS log recordings have been examined it has a unique significance both in point of content and its being the first study made in this field in Turkey.*

*In the study, the LMS data were processed through log analyzer tools. The evaluation of log analysis results of the LMS system through taking the learning form and usage preferences of the student into consideration may help in increasing the learning speed and level of the users. Aside from that, as to improve content facilitative elements may be developed according to students' learning styles.*

**Keywords:** Educational data mining, distance education, learning management system, data mining, analysis of lms logs

### **Introduction**

Undoubtedly, the most effective factor in titling our age as “Information Age” has been internet technology's being widespread. Since 1960s, the development of internet technology and its being widespread especially for the last 20 years have had a great many reflections to daily life. Internet does not only take place in every field of our lives but also it has changed our habits. For instance, an important part of trade has been done via internet; e-mail and webcast have replaced classical communication devices. Also in education sector, computer and internet have had a living space and they have even started to change classical education understanding with the education models named “distance education” and “online learning”. The skills like reaching masses fast and drawing attention with different features have taken the role of internet into a more different place. While it was being thought that internet would make web based learning

environments as main means to present better education programs to more students with a lower cost (Peled and Rashty, 1999), it has become a significant learning means like classic learning with current developments. A great many educational institutions have supported learning processes of traditional education by using Learning Management Systems (LMS) (Masip et al., 2010).

With common usage of LMS, measurement of fertility and successes in learning process of these systems and habits of users and determining of their profiles have become an important issue. Therefore, especially in recent years educational data mining studies have started to increase and researchers have increased their studies in this field. With data mining, it is provided to be shown up covered and interesting patterns among huge data collections (Romero et al., 2008). The main purpose of educational data mining is its usage to provide the improvement of the system and the information that has been discovered from learning management systems in a constant betterment circle (Masip et al., 2010). In this sense, Sheard (2010), has stated that the ultimate goal of educational analysis is to create practical and useful learning environments for students. On the other hand, data analysis methods and tools have also been used for observing the behaviors of the students and helping instructors in determining possible missing and mistakes (Romero et al., 2008).

### **Literature Overview**

As for online and computer based learning systems, there is an interaction between the student and the system (Hershkovitz and Nachmias, 2011). Interaction has a significant effect on learning success (Pahl, 2004). However, in classic education model, there is only an interaction in class environment between the instructor and the student, the student and his or her friends, the student and the teaching material. While in classic education model, the teacher can measure the learning condition of the students by means of eye contact which is one-to-one interaction, and the students can learn the subjects by asking that he or she has not understood, in online learning it is not so

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possible (Zorrilla et al., 2005).

Therefore the measurement of success provided by LMS software has become an important problem. To carry out this measurement, it is supposed to be analysed every operation and activity which the students do who use this system and these operations and activities should be saved. Student interactions, preserved online learning logs can be proved about learning condition (Yang et al., 2010). Various analyses and evaluations can be done with the observing of the log files. By this means, the learning process is provided to be understood and improved better (Hershkovitz and Nachmias, 2011). The analyses made also enable us to understand discovering the unknown facts about the system itself and user behaviors (Masip et al., 2010). At the same time, data mining studies that have been done on student data will help supporting the decisions that will be made while e-learning base investments are done (Monk, 2005). Saving and evaluating e-learning log records effectively can be used in LMS systems' learning and teaching functions making easier and improving (Lam et al., 2011). By this means the fertility in learning process has been increased. E-learning log analyses, in this respect, can help education planners, instructors and software engineers who develop e-learning portal in terms of the methods that would be developed in teaching methodology (Güneş et al., 2010). Furthermore log analyses bring a different dimension for the evaluation of educations and may affect the selections in learning material presentation.

In e-learning there are three main sources of access records. These are recorded text, server logs, and LMS logs (Black et al., 2008). In this study, server logs and student habits will be analysed.

#### **Server Log Files**

Server logs are the files in which the activities of the server made are kept (Yang et al., 2010). Log files are usually created by the server automatically. Log files can be kept in one file or in different files day by day to make it convenient for examining it later. In log files, various data that belongs to the client is kept (Monk, 2005). And which of this data will be kept can be adjusted. Among log files this data takes place: The accessed

date and time, accessing client's IP address, the page that he or she requests, the answer that the server gives to the access, the success level of the request or error code, the client browser, the operating system that the client uses.

Only access data takes place in server logs because it includes low level information in terms of structure (Pahl, 2004; Black et al., 2008). For instance, with the analysis of server logs high level information such as, the success level of the students in the tests that they solve, the number of lessons they follow and the ratio of their attendance to the lessons cannot be obtained. However server logs give statistical information about the student's access. Web server logs also provide to discover useful information about the system (Zaïane, 2001).

## **Study**

The purpose of the study is to gain information about the general usage of LMS system by analysing the access logs that an LMS server produces, to determine the client habits and to observe how the interaction between the student and the system. During the time of analysis, by determining what the changing client habits are, to increase fertility in learning in according with these trends, making suggestions of improvement for LMS systems have been aimed.

In the study, distance education server access logs between beginning of June, 2011 and end of June, 2012 have been analysed in Okan University which uses the Enocta Company's Enocta Academic Education Platform (EAEP) that provides e-learning platform and education content to various educational institutions and corporate firms.

In the study, all the LMS logs that a university has used without a few classes or department limit have been analysed. Also a period more than a year has been examined. Therefore this study has the characteristics of the most extensive study ever made in this field in Turkey.

The logs that are examined have primarily been subjected to a filtration preprocessing. Because of LMS harbouring that are provided to more than one

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institution on Enocta server, with the filtration made with the records in the log files that are out of Okan University Academic Teaching Management System (URL5, 2012) are not considered.

Every line takes place in server logs does not mean a page that is shown. Servers save all the files such as, css, javascript, image, icon, etc in an access made to the page (Carbo et al., 2005). For instance, in an asp page more than a picture and javascript file can take place. In this situation, each of the files that have been requested to access is kept in a different line one piece in server logs. The differences between the number of clicks and the number of pages shown therefore have been created.

In accordance with the data that has been analysed the information such as, visitor, traffic, the information of the system that gains access have been examined in daily, monthly and yearly periods and the data that is observed has been evaluated in Evaluation and Result part. In the study, some statistical analyses of EAEP that Okan University uses have been made which will determine which day and which hours it has been used most, daily average page display and the number of visitors, the usage level in the year, average visit time, the systems by which the students gain access to the system, the number of mobile tablets usage and its changing in time and what are the browser information.

#### **Log Time Period**

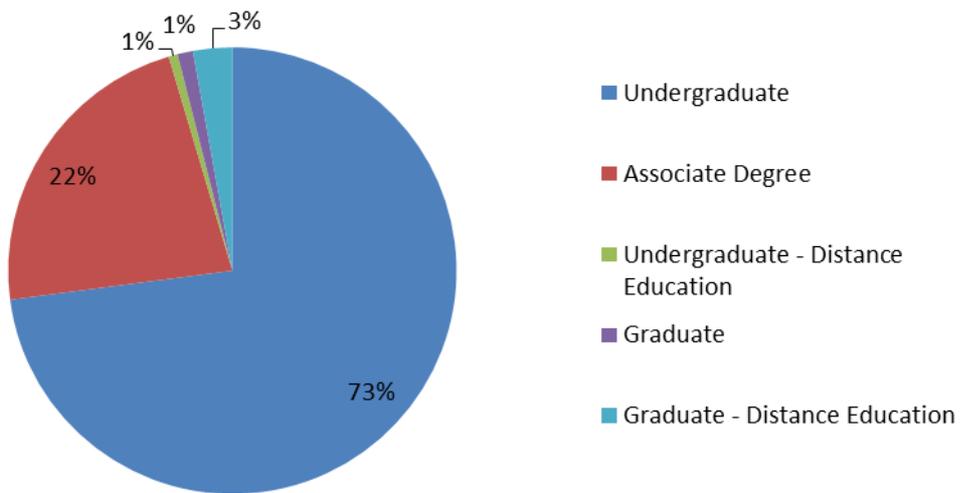
The log files observed between 01 June 2011 and 26 June.2012 includes 13 months/392 days period.

#### **Participants**

During the time that the study made 2011 academic year ended and 2012 academic year started. Therefore in the beginning and end of the study, to give the numbers of the students respectively having distance education who are registered in Okan University Academic Teaching Management System will provide to have a better evaluation about the data analysed. After one month later of the log records that have been analysed in the study, at the date of 01 July 2011, there are 1219 registered people in Okan University

Academic Teaching Management System. And at the end of the time analysed at the date of 01 July 2012, the number of people registered on the system is 2943. During this time there has been an increase of 141% in client numbers.

662 people are associate degree students, 2146 people are undergraduate students and 83 people are graduate students registered in the system. In the departments which give distance education the number of registered undergraduate students are 19 and undergraduate students are 33. And students' dispersion according to gender is 64% male (1871 people) and 36% female (1072 people).



**Figure 2:** The ratio of the participants according to their education levels

#### **Log Files Physical Size**

The physical size of 392-day log files observed is 741.8 GB. Log files daily average size is 1.9 GB.

#### **Log File Content**

The examined logs are the logs that are in W3C Extended format that are daily produced by Internet Information Services (IIS) 7.5 web server. These log files are the

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files that are only open access to authorized system administrators not opened access to normal client (Yang et al., 2010). IIS server that produces the analysed logs in the study has created a different log file for every day and all the requests belong to the client have been kept in these log files.

According to W3C Extended format that has been the examined log format the data belong to the fields below take place (Giuseppini and Burnett, 2004; Robichaux et al., 2005): date, time, s-ip, cs-method, cs-uri-stem, cs-uri-query, s-port, cs-username, c-ip, cs(User-Agent), sc-status, sc-substatus, sc-win32-status, time-taken. The explanations about prefixes that take place in the fields are like that (Microsoft, 2012): s action for the server, c action for the client, cs action from client to the server, sc action from server to the client.

The explanations of the fields in log file are given in Table 1 (Microsoft, 2012):

**Table 1:** Access fields summary info

<b>Field</b>	<b>Appears As</b>	<b>Description</b>
Date	date	The date on which the activity occurred.
Time	time	The time, in coordinated universal time (UTC), at which the activity occurred.
Service Name and Instance Number	s-sitename	The Internet service name and instance number that was running on the client.
Server Name	s-computername	The name of the server on which the log file entry was generated.
Server IP Address	s-ip	The IP address of the server on which the log file entry was generated.
Method	cs-method	The requested verb, for example, a GET method.
URI Stem	cs-uri-stem	The target of the verb, for example, Default.htm.
URI Query	cs-uri-query	The query, if any, that the client was trying to perform. A Universal Resource Identifier (URI) query is necessary only for dynamic pages.
Server	s-port	The server port number that is configured for the

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Port		service.
User Name	cs-username	The name of the authenticated user that accessed the server. Anonymous users are indicated by a hyphen.
Client IP Address	c-ip	The IP address of the client that made the request.
Protocol Version	cs-version	The HTTP protocol version that the client used.
User Agent	cs(User-Agent)	The browser type that the client used.
Cookie Referrer	cs(Cookie) cs(Referrer)	The content of the cookie sent or received, if any. The site that the user last visited. This site provided a link to the current site.
Host	cs-host	The host header name, if any.
HTTP Status	sc-status	The HTTP status code.
Protocol Substatus	sc-substatus	The substatus error code.
Win32 Status	sc-win32-status	The Windows status code.
Bytes Sent	sc-bytes	The number of bytes sent by the server.
Bytes Received	cs-bytes	The number of bytes received and processed by the server.
Time Taken	time-taken	The length of time that the action took, in milliseconds.

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### **Tools that are used in the analysis of log files**

Various log analysis tools have been used to report and to get the necessary statistical information from the questions whose answers are researched in the study. In the study, Microsoft LogParser 2.2 (URL1, 2012) software has been benefited greatly to analyse the log files that are huge-sized whose size sometimes may be 5.4 GB. Since Microsoft LogParser 2.2 software permits flexible SQL inquiries, it has enabled to make the requested analyses on log files. Also WebLog Expert Enterprise Edition v7.7 (trial edition) (URL2, 2012), Nihuo Web Log Analyzer Enterprise Edition v4.16 (trial edition)

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(URL3, 2012) and Log Parser Lizard v2.5 (URL4, 2012) software have been used as they give especially graphical reporting and filtration opportunity.

## Findings

The summary info about the analysed logs in the study given in Table 2.

**Table 2: Access statistics summary info**

<b>Hits</b>	
Total Hits	21.969.995
Average Hits per Day	56.045
Average Hits per Visit	227,71
Cached Requests	4.678.867
Failed Requests	2.543.822

<b>Page Views</b>	
Total Page Views	7.287.035
Average Page Views per Day	18.589
Average Page Views per Visit	75,53

<b>Visitors</b>	
Total Visitors	96.482
Average Visitors per Day	246
Total Unique Visitors	42.917
Total Visitor Stay Length	44.929:02:36
Average Visitor Stay Length	30:40

As it can be seen from Table 2, during the time analysed, 7.287.035 pages display have been made. The page has been visited in total 42.917 different IP addresses and the number of average visitors has been 246 daily. In a visit, approximately 30 minutes have spent on the system and approximately 75 pages have been shown. The other important information about statistical data is given in Table 3.

According to Table 3 data the operability of the system on week days (272 visits) is 36% more intense compared with weekends (201 visits). LMS that Okan University uses has been used most intensely between the hours 17:00-18:00. Monthly click and page display numbers of LMS are given in Table 4 and the graphic belongs to

this data is shown in Figure 2.

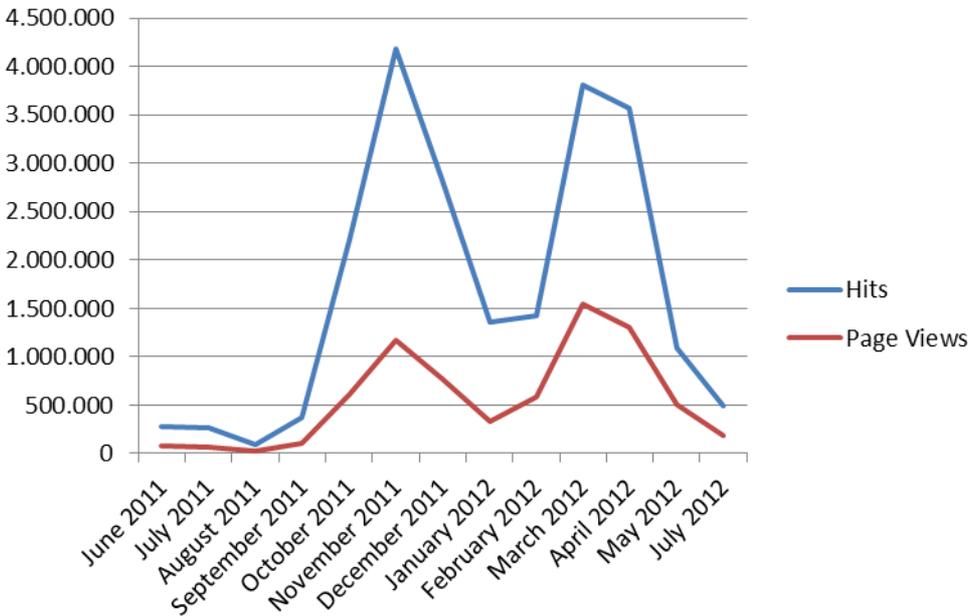
**Table 3:** Summary of activity

<b>Summary of Activity</b>	
Average Number of Visits per Day on Weekdays	272
Average Number of Visits per Weekend	201
Most Active Day of the Week	Thursday
Least Active Day of the Week	Sunday
Most Active Date	Thursday, 05 April, 2012
Number of Hits on Most Active Date	1.193.008
Number of Visits on Most Active Date	2.046
Least Active Date	Tuesday, 30 August, 2011
Most Active Hour of the Day	17:00 - 17:59
Least Active Hour of the Day	03:00 - 03:59

**Table 4:** Monthly click, page display, number of visitors and the time spent on the system

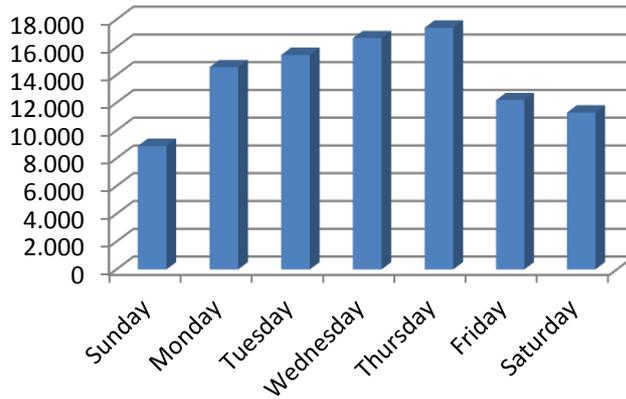
<b>Month</b>	<b>Hits</b>	<b>Page Views</b>	<b>Visitors</b>	<b>Stay Length per Visit By Month</b>
June 2011	280.040	79.366	1.990	23:01
July 2011	267.111	65.851	1.563	26:49
August 2011	87.846	23.732	933	17:56
September 2011	368.288	104.225	2.200	17:52
October 2011	2.209.340	606.164	10.110	32:44
November 2011	4.178.568	1.169.111	17.252	40:19
December 2011	2.823.714	776.692	18.625	31:20
January 2012	1.363.891	326.885	10.203	19:31
February 2012	1.429.072	582.027	5.812	22:45
March 2012	3.803.909	1.550.977	13.923	27:33
April 2012	3.564.596	1.305.428	8.854	39:34
May 2012	1.097.866	510.489	2.346	41:47
June 2012	495.754	186.088	2.671	12:57
<b>Total</b>	<b>21.969.995</b>	<b>7.287.035</b>	<b>96.482</b>	
<b>Average</b>	<b>1.690.000</b>	<b>560.541</b>	<b>7.422</b>	<b>30:40</b>

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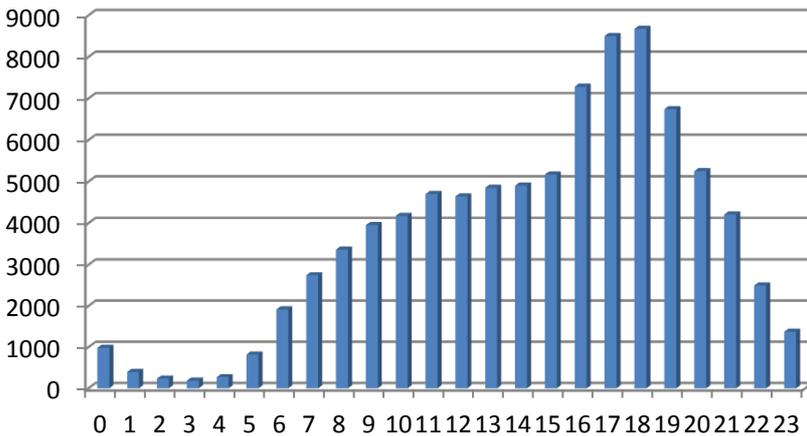
**Figure 3: Hits and page views by month**

At the dates 16-23 November, 28 March-9 April and 19-26 April, Okan University distance education exams (midterm, final, make-up) have been made. As it can be seen from Figure 2, the number of visitors has hit the top during the exam periods and during the academic holiday terms the number of visitors has fallen down of the average. Another point is that there has been an increase in the number of visitors at the rate of 34% in June, 2012 when compared with the previous year's June. In the study, which day LMS is used more has been examined as well. It has been observed that Thursday is the day in which the system is used more, the usage of system has an increase from the beginning of the week until Thursday and that the usage is decreased beginning from Friday (Figure 3).



**Figure 4:** Visits by day of week

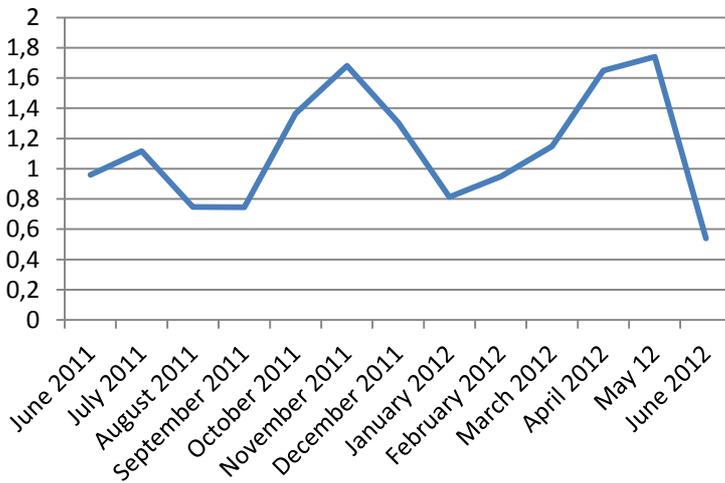
At which hours LMS is used more is given in Figure 4. When the figure is examined, it has been observed that the system is more intense especially between the hours 16:00-19:00. These hours are the hours when students are freer and they have no face to face lessons.



**Figure 5:** Visits by hour of day

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In LMS the changing graphic of visitors' monthly time spent on the system is given in Figure 5. As it can be seen from the graphic, the time spent on the system has decreased in the academic holiday terms but it has increased during the middle of the term.



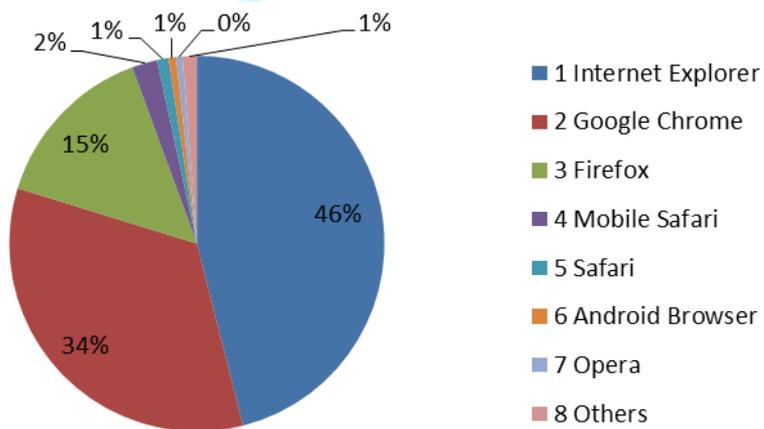
**Figure 6:** Stay length per visit by month

When the evaluation of the visitors in all over the country is made, it has been determined that naturally the most visit is in Turkey (98,18%) and secondly England (0,68%) and thirdly the USA (0,44%). Here especially the foreigner visits bring the minds follow of some of the graduate students from abroad. The data about LMS usage for cities in Turkey is given in Table 5. İstanbul is the city where the access to system is made most at the rate of 70%. Respectively İzmir, Bursa, İzmit and Ankara follow it.

**Table 5:** Most active cities

	City	Visitors	% of Visitors
1	Istanbul	65.411	69,7%
2	İzmir	5.220	5,5%
3	Bursa	4.611	4,9%
4	İzmit	3.593	3,8%
5	Ankara	2.484	2,6%
6	Other	7.815	13,2%
	<b>Total</b>	93.743	100%

In the study, what the browsers are when used to access LMS and in which rates they are used have been researched as well. It is seen that the access is gained mostly via Internet Explorer (Figure 6). The browser usage rate first found during the whole study and then the rates of browsers usage are given in June, 2011 when the study started and the date when it finished June, 2012 (Table 6). As it can be seen from the table, the usage rate of Google Chrome has increased in half and Firefox has decreased in half and browser usage in Android platforms has increased ten times.



**Figure 7:** Most used browsers

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**Table 6:** Most used browsers

<b>Browser</b>	<b>Total Usage % of Visitors</b>	<b>2011 June Usage % of Visitors</b>	<b>2012 June Usage % of Visitors</b>
1 Internet Explorer	46,03%	62,47%	55,71%
2 Google Chrome	33,73%	15,43%	28,01%
3 Firefox	14,64%	16,79%	8,00%
4 Mobile Safari	2,19%	1,91%	3,30%
5 Safari	0,98%	2,16%	1,15%
6 Android Browser	0,66%	0,19%	1,95%
7 Opera	0,54%	0,19%	0,44%
8 Others	1,23%	1,05%	1,88%

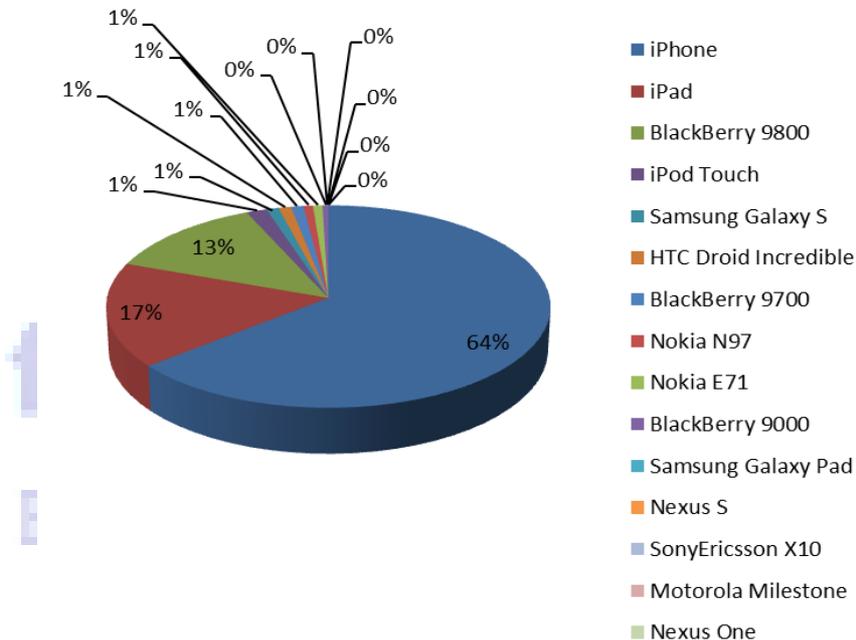
In the study, it has also been researched what the operating systems of the students who use the system (Table 7). Generally Windows platform has been used; respectively iPhone and Android follow it. When the table examined carefully, the Android operating system which is in the tenth in the beginning of the study has risen fourth place, iPhone and Windows 7 has risen one place each.

**Table 7:** Most used operating systems

<b>Total</b>		<b>2011 June</b>		<b>2012 June</b>	
<b>Platform</b>	<b>% of Visitors</b>	<b>Platform</b>	<b>% of Visitors</b>	<b>Platform</b>	<b>% of Visitors</b>
1 Windows 7	56,67%	Windows XP	44,01%	Windows 7	58,95%
2 Windows XP	29,40%	Windows 7	37,92%	Windows XP	30,12%
3 Windows Vista	8,73%	Windows Vista	11,54%	Windows Vista	3,03%
4 iPhone	1,18%	Mac OS	2,28%	Android OS	2,20%
5 Mac OS	1,02%	Windows	1,59%	iPhone	2,20%

6	BlackBerry	0,75%	2000		
7	Android OS	0,65%	iPhone	0,70%	Mac OS
8	Others	0,63%	BlackBerry	0,63%	BlackBerry
9	iPad	0,31%	iPad	0,44%	iPad
10	Windows	0,27%	Others	0,44%	Others
	2000		Android OS	0,19%	Linux
					0,08%

In the study, it has also been researched what the mobile tools that access to LMS. The access is mostly gained via iPhone and iPad, the tools in BlackBerry and Android platforms have followed them (Figure 7).



**Figure 8:** Most used mobile device

## Discussion and Conclusion

With being widespread of LMS usage, the teaching success of these systems

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and the measurement of the students' learning process have started to become a new and important research field. In educational data mining studies, the server logs of e-learning platforms or LMS's own logs have been used. While LMS logs have included higher level information like the measurement of student success, server logs have reserved information about the access of students. With server logs student habits can be determined and e-learning systems can be improved according to students' choices. By this means, both the students' interaction with the system is easier and more useful and it will create a positive effect on their learning success.

In the study, according to the analysed server logs findings, students mostly use Windows operating system and Internet Explorer browser. While LMS is developed that is web based e-learning platforms, they should be developed as they will work more unproblematic and in appropriate definition on these platforms and browsers.

In the study, it has been determined that the system is mostly used on Thursdays and in the middle of academic terms and at the end of the shift between the hours 17:00-19:00. The institutions developing LMS, should consider the permission conditions and else of their technical personals who especially serve at the hours and time periods to commercial and academic institutions that are their customers. Especially in exam periods, necessary infrastructure works are suggested to be done so as to prevent slowdown in the system because of the increased intensity.

In the study, one of the remarkable findings is the increase in the usage of smart mobile devices and tablet platforms in the last year. With being cheaper and widespread of smart mobile devices day by day, the students can follow their lessons from everywhere they wish and access to the education materials. That is why e-learning suppliers should develop their systems in a way as they will work on these devices and should adjust the screen definitions on these devices in a way that will provide to be read easily. iPhone and iPad, having iOS operating system, take place in access statistics at a very significant rate. On the other hand, this should be understood as a sign for future prediction that devices with Android operating system will dominate over old system as it has increased ten times; from 0,19% to 2,20%. Institutions, also, should make

compatible investments and developments to these devices in their e-learning platform for meeting customers' needs, having success in competition and complying with the technology. Therefore, digital platform should be transformed into mobile learning platforms (Yamamoto, 2009; Yamamoto, 2011).

Educational data mining has educational centered benefits, too. Educators should consider statistical data in their education planning. The daily life has been turning into mobile center and the statistical data gained in the study has confirmed this situation. As it can be understood from the study, in LMS systems the education is not made and finished in certain hours of the day. Instead, in every hour of the day there is access to the system. Educators should consider this situation, too and they should adapt themselves into mobile life. Thus it will be possible for them to answer every question and request in every moment of the day.

Saving server log records, provides an opportunity to make historical based comparison. For instance, one of the findings in the study is that Google Chrome browser has replaced Firefox browser which is the second in browser arrangement. This situation is because of the fact that the clients cannot get efficiency from browsers and institutionally their addressing to other browsers. So as to notice this alteration and else, logs are supposed to be saved regularly and the analyses made are supposed to be evaluated carefully. By this means, it will be possible to make more reasonable decisions in correction and developments that will be made for the system and that the investments, time and efforts will be taken advantage of.

## **References**

1. black, E.W. Et al., 2008, "Data for free: Using LMS activity logs to measure community in online courses", *In: The Internet and Higher Education*, 11 (2), pp: 65–70, doi: 10.1016/j.iheduc.2008.03.002.
2. Carbo, J.M. et al., 2005, "User navigational behavior in e-learning virtual environments", *In: The 2005 IEEE/WIC/ACM International Conference on Web Intelligence, 2005. Proceedings*, pp: 243 – 249, doi: 10.1109/WI.2005.155.
3. Giuseppini, G., Burnett, M., 2004, "Microsoft Log Parser Toolkit", Rockland, MA, Syngress Pub., ISBN: 9781932266528.

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Innovations in Learning for the Future 2012: e-Learning  
Future-Learning 2012, Nov. 14-16, İstanbul**

4. Güneş, İ. et al., 2010, "Log analyzer programs for distance education systems", *In: Procedia - Social and Behavioral Sciences*, pp: 1208–1213, doi: 10.1016/j.sbspro.2010.12.308.
5. Hershkovitz, A., Nachmias, R., 2011, "Log-Based Assessment of Motivation in Online Learning", *In: Romero, C. et al. (Eds.), Handbook of Educational Data Mining*, Boca Raton, FL, CRC Press, pp: 287–297, ISBN: 9781439804575.
6. Lam, P. et al., 2011, "Evaluations of online learning activities based on LMS logs", *In: Babo, R., Azevedo, A. (Eds.), Higher Education Institutions and Learning Management Systems:: Adoption and Standardization*, Hershey PA, USA, IGI Global, pp: 75–93, ISBN: 9781609608842.
7. Masip, D. et al., 2010, "Capturing and Analyzing Student Behavior in a Virtual Learning Environment", *In: Romero, C. et al. (Eds.), Handbook of Educational Data Mining*, Boca Raton, FL, CRC Press, pp: 339–351, ISBN: 9781439804575.
8. Microsoft, 2012, "W3C Logging", [online]: [http://msdn.microsoft.com/en-us/library/windows/desktop/aa814385\(v=vs.85\).aspx](http://msdn.microsoft.com/en-us/library/windows/desktop/aa814385(v=vs.85).aspx), [Access date: 20.10.2012].
9. Monk, D., 2005, "Using Data Mining for e-Learning Decision Making", *In: Electronic Journal of e-Learning*, 3 (1), pp: 41–54.
10. Pahl, C., 2004, "Data mining technology for the evaluation of learning content interaction", *In: International Journal on ELearning*, 3 (4), pp: 47–55.
11. Peled, A., Rashty, D., 1999, "Logging for Success: Advancing the Use of WWW Logs To Improve Computer Mediated Distance Learning", *In: Journal of Educational Computing Research*, 21 (4), pp: 413–31.
12. Robichaux, P. et al., 2005, "Exchange Server Cookbook: For Exchange Server 2003 and Exchange 2000 Server", Beijing; Cambridge, O'Reilly Media Inc., ISBN: 9780596007171.
13. Romero, C. et al., 2008, "Data mining in course management systems: Moodle case study and tutorial", *In: Computers & Education*, 51 (1), pp: 368–384, doi: 10.1016/j.compedu.2007.05.016.
14. Sheard, J., 2010, "Analysis of Log Data from a Web-Based Learning Environment", *In: Romero, C. et al. (Eds.), Handbook of Educational Data Mining*, Boca Raton, FL, CRC Press, pp: 311–322, ISBN: 9781439804575.
15. URL1, 2012, "Log Parser 2.2", [online]: <http://technet.microsoft.com/en-us/scriptcenter/dd919274.aspx>, [Access date: 20.10.2012].
16. URL2, 2012, "WebLog Expert - Powerful log analyzer", [online]: <http://www.weblogexpert.com/>, [Access date: 20.10.2012].
17. URL3, 2012, "Web Log Analysis", [online]: <http://www.nihuo.com/web-log-analyzer.html>, [Access date: 20.10.2012].
18. URL4, 2012, "Log Parser Lizard GUI - FREE Query Software - Lizard Labs", [online]: [http://www.lizard-labs.net/log\\_parser\\_lizard.aspx](http://www.lizard-labs.net/log_parser_lizard.aspx), [Access date: 20.10.2012].
19. URL5, 2012, "Okan Üniversitesi Eğitim Platformu", [online]: <http://www.myenoceta.com/okanuniversitesi/>, [Access date: 25.10.2012].

20. Yang, H.-H. et al., 2010, "A study of generating teaching portfolio from LMS logs", *In: WSEAS Trans. Info. Sci. and App.*, 7 (4), pp: 573–586.
21. Yamamoto, G.T., 2009, "M-Öğrenme", [online]: [http://www.mdevlet.org/wp-content/uploads/2009/06/gonca\\_telli\\_mobil\\_ogrenme5mb.pdf](http://www.mdevlet.org/wp-content/uploads/2009/06/gonca_telli_mobil_ogrenme5mb.pdf), [Access date: 20.10.2012].
22. Yamamoto, G. T., 2011, M-Learning: New Concept, New Rules, New Implementations in Marketing in Cases on Challenges Facing E-Learning and National Development: Institutional Studies and Frameworks, *In: Demiray, U., Sever S., (Eds.), Marketing Online Education Programs: Frameworks for Promotion and Communication*, pp: 140-158, Hershey, PA: Information Science Reference, doi:10.4018/978-1-60960-074-7.ch010.
23. Zaïane, O.R., 2001, "Web Usage Mining for a Better Web-Based Learning Environment", *In: Proceedings of the 4th IASTED International Conference on Advanced Technology for Education (CATE'01)*, Banff, Canada.
24. Zorrilla, M.E. et al., 2005, "Web usage mining project for improving web-based learning sites", *In: Proceedings of the 10th international conference on Computer Aided Systems Theory*, Berlin, Heidelberg, Springer-Verlag, (EUROCAST'05), pp: 205–210, doi: 10.1007/11556985\_26, ISBN: 3-540-29002-8, 978-3-540-29002-5.



## **The Examination of User Habits through the Google Analytic Data of Academic Education Platforms**

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**Abstract:** *A web-based LMS can have hundreds, or even thousands users, with various powers, such as student, teacher, manager and normal user. The increase in the Web traffic of the LMS system, in parallel with the increasing number of users, brings with it the problem of hardware and infrastructure capable to host this traffic, and therefore solutions suitable to developing technology are required. Along with this, another of the common problems of all systems with a busy visitor traffic, like LMS, is that the website management and evaluation becomes more challenging, and it is difficult to ensure that users, each of which have a different usage habit, different levels of knowledge and learning, and different style of learning, benefit from the system in an optimum level and to ensure their satisfaction. Due to this reason, it is very important for website administrators and system developers to use web mining tools ensuring the analysis and evaluation of user behaviors. To ensure this, it is necessary to monitor all the incoming traffic of the website and the in-site traffic, to log the visitor information and to analyze these. Using the logs of the web server to analyze the website traffic, developing special systems which log and analyze the in-site interaction/activity information of the visitors, and/or using services such as Google Analytics, are few of the methods used addressed towards the abovementioned purpose.*

*In the present study, it is tried to provide information on the behavior forms of the distance education students, the user habits and the student profile, through analyzing the Google Analytics data pertaining to 2011 year of the Enocta Akademik Eğitim Platformu (EAEP – Enocta Academic Education Platform), which provides web-based learning environment to many universities and corporate enterprises in Turkey. The analysis and evaluation of LMS user data may be used while carrying out a detailed analysis of LMS and in the efforts to develop and improve LMS. The increase of student satisfaction and learning success may be ensured through making changes on LMS according to student behaviors.*

**Keywords:** Learning analytics, distance education, learning management system, web mining, analysis of lms usage

### **Introduction**

Societies have firstly experienced the agriculture and industry process in the name of different social needs and being able to compensate them, nowadays started to live a new process called information society with the increasing value. The effort of gaining accurate information quickly has provided to come out different technologies in this process. Undoubtedly, it can be stated that internet technologies have taken place as the

first when considering the other developing technologies used widely to access the quickest information.

Internet technologies have put a new view to the individual's lifestyles by having quite active role in their life especially provided innovations which would economize the time. Just as, different applications such as health, municipality and commerce have been put into service in the field of health, community commerce, communication, education and the others. It is probably stated that the classical configuration has a big and quite important transition with the developments of internet technologies in education among these fields.

In the last circumstance approached, learning has started to become widespread in every field of life in the name of life – long learning not only limited in the school. Life – long learning is known as learning activities being fulfilled in the whole life in term of improving skill individually or socially even if it has a formal feature or not (Ersoy, 2009). The importance of process of unlimited location and time learning has increased gradually, with the support of classical education perception and also internet technology, education concepts have occurred such as distance education, web based education. Also, learning management systems have started to be used widely with these new education concepts as the trigger of each other. It has been a concern to determine the user's habits and the performance of these systems with the increase of LMS usage.

Within the context of this work, it is aimed to determine this LMS user's habits by analyzing Google Analytics data belongs to LMS and define the changes of these habits and occurring in profiles in time.

### **Literature Overview**

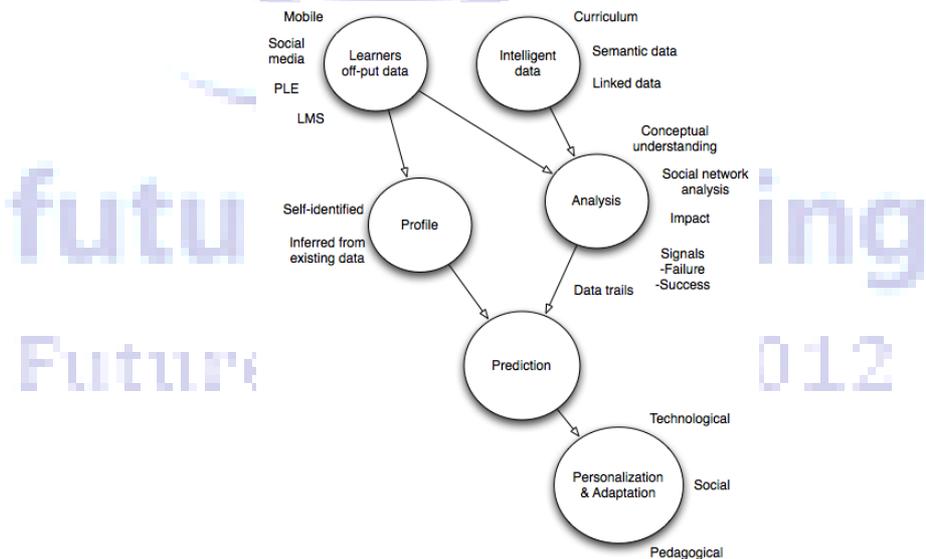
LMS is software which can be fulfilled a lot of activities such as adjusting sharing, arguing, lesson registration, having exam, student teacher and system enrollment (URL1, 2012). This software is simply addressed platforms providing education activities to be able to do on a web. As stated before, even if LMS is a technology which has occurred in

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the process of electronic education, a lot of institutions in the world use LMS to improve and support education activities (Dalsgaard, 2006).

A lot of high - education institutions have improve a lot of different LMS by basing their experiences. Increasing LMS usage and variety arise the question how the usage evaluation belongs to these systems is (Abazi-Bexheti et al., 2010). In this context, commenting logs efficiently by keeping the records might provide to have important information in the issue of how LMS can be used in the education and teaching (Lam et al., 2012).

For a long time, data analogizes which provide to determine online habits by using web analytic instrument thanks to be reported and saved such as being counted the number of click of links, determined the number of visits which is done to the web sites, the detection of visits through which country or domain (Bienkowski et al., 2012). Thanks to this, the process of learning might be provided to be understood and developed better (Hershkovitz and Nachmias, 2011).



**Figure 9:** Learning analytic process (URL2, 2010)

Learning analytics is the use of intelligent data, learner-produced data, and

analysis models to discover information and social connections, and to predict and advise on learning. The learning analytic process starts with to be brought the intelligent data, learner data, profile information in some form of analysis models. Then obtained data trails and profiles are used for prediction, personalization and adaptation (URL2, 2010). Figure 1 shows the learning analytic process.

LMS industry has taken place two different field as technology and education. The expectations from LMS industry has become more sophisticate for the future investments and performance support solution (Davis et al., 2009). Consequently, it is very important that the following analyzes influence the future investments.

Black et al. (2008) say that access records have three main recourses in e-learning: These are recorded text, server logs and LMS logs. In addition to these, Google Analytics or web statistic services which work like server logs can be used. Google Analytics is a strong and simple report platform which provides to count the number of clicks of web pages and how many times this pages have been visited, the durations of these visits and access to much more results (URL3, 2012). Google Analytics, which is required Google account to use, observes the pages, after the procedure of locate a code to the pages which need to be observed. Google Analytics instrument provides statistic information deriving from web server logs. Google Analytics were used for the analyze of data in the context of work.

The data which is provided by Google Analytics service gives statistical data about demography data of visitors (location and language), the visit times, durations and the data of visit frequency, technology data which visitors use in the accession (operating system, screen resolution, scanner data, Flash and Java assistance etc.) and mobile devices which is used in the accession. Also, it can make the data which it provides visual and report with different chart style.

## **Study**

In this study, in the period of January 1, 2011 - January 1, 2012 the usage statistics of universities that use web-based Enocta Academic Education Platform were studied. This

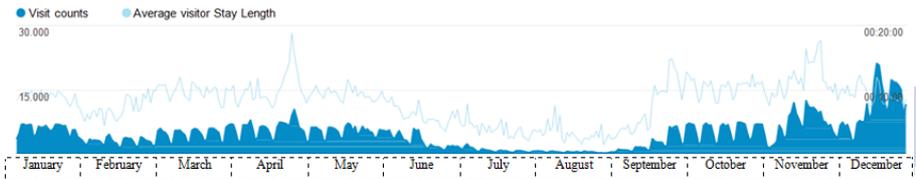
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study includes data from the following universities: Ahmet Yesevi University, Amasya University, Atılım University, Beykent University, Brussel Capital University, Cumhuriyet University, Çukurova University, Dumlupınar University, Ege University, Erciyes University, Gazi University, İstanbul Arel University, İstanbul Commerce University, İstanbul Aydın University, Mersin University, Okan University, Örav (Öğretmen Akademisi Vakfı), Süleyman Demirel University, Trakya University.

In a year period of time the system has been visited approximately 1 million 650 thousand times, 363.744 different people have visited. An average of time spent on the site was 10 minutes; about 15 pages were viewed per visit. Table 1 presents data on usage statistics, Fig 2 shows annual graphic of visit counts.

**Table 8:** General data on the use of the system

Visits	Unique visitors	Pages/visit	Average visit duration	Page views	% New visits	Bounce rate
1.651.008	363.744	14,92	00:09:44	24.640.447	21,57%	3,53%



**Figure 2:** Visit counts and average visit stay lounge graph of Enocta Academic Education Platform (2011)

Figure 2 shows that the use of the LMS platform by universities decreased much in academic holiday periods, on the other hand average of visit durations increased in exam periods. Another result of the graph is to be issued, LMS platform are used heavily in the fall when compared in the spring semester.

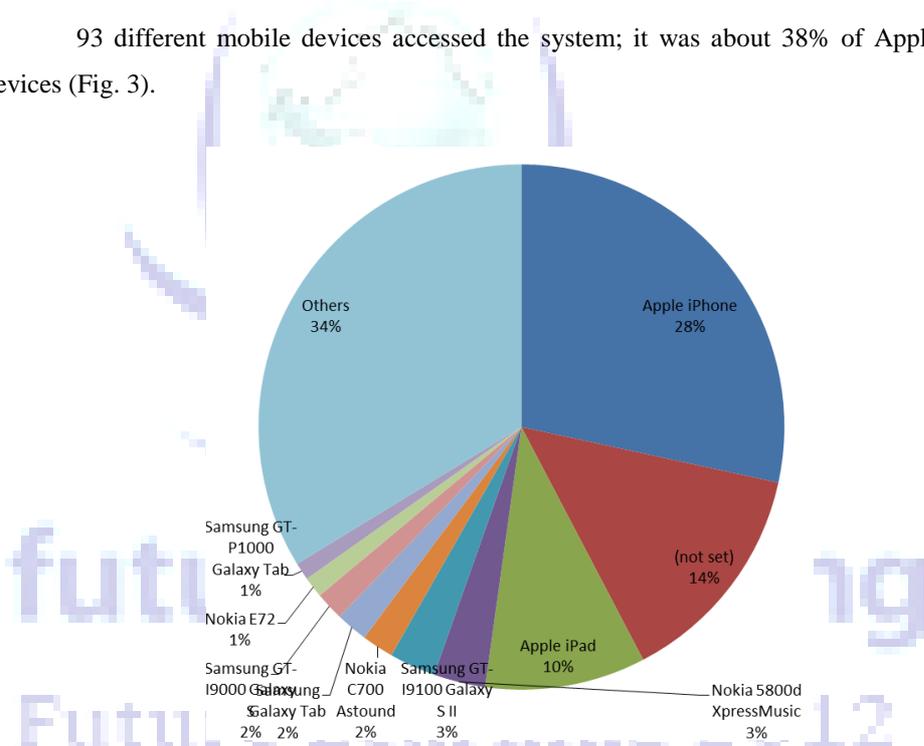
Table 2 presents general data on the use of LMS platform with mobile devices

(mobile phones and tablets). The average duration of visits made by mobile devices, is approximately 50% less than the overall average visit stay lounge.

**Table 9:** General information on Mobile use of the system

Visit count	Pages/visit	Average visit duration	% New visits	Bounce rate
9.687	9,91	00:04:46	46,77%	3,25%

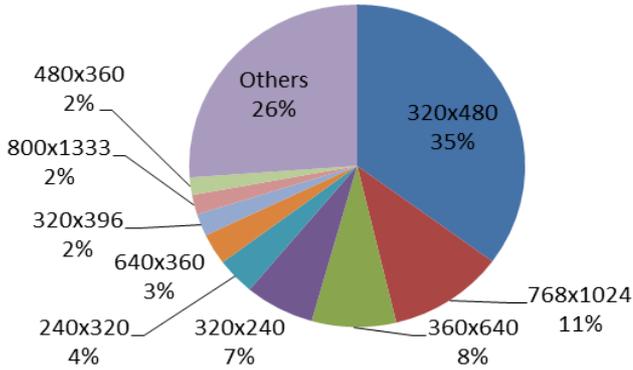
93 different mobile devices accessed the system; it was about 38% of Apple devices (Fig. 3).



**Figure 3:** LMS platform mobile access rates

The display resolutions of mobile devices that access the system are shown in Figure 4. Besides there are 162 different mobile screen resolutions, devices are generally small and 320 pixels wide.

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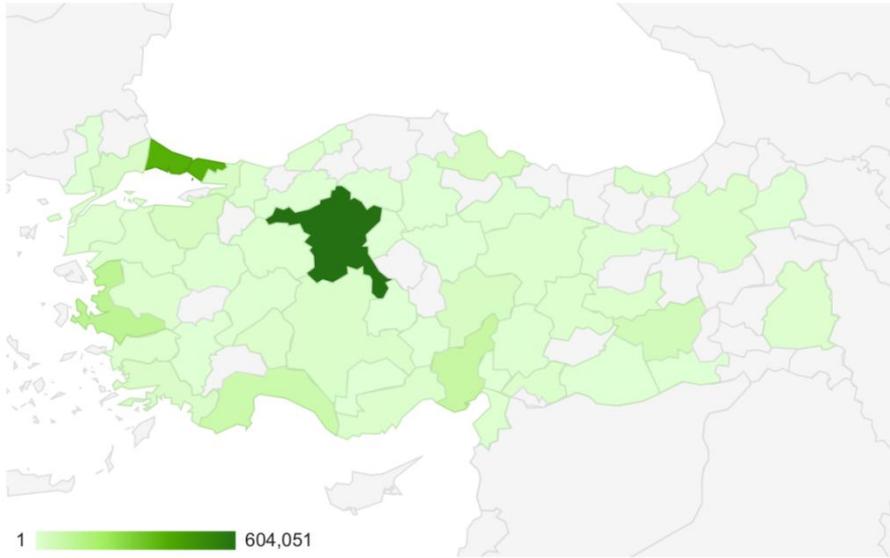
**Figure 4:** Screen resolution distribution of mobile devices

In this study, languages of operating systems used by visitors were also analyzed. 94,07% of the visitors use Turkish system, while 5,76% use the English language, 0,12% use the German language.

Table 3 and Figure 5 show general information on visits by cities. When looking at the table, especially big cities are at the forefront.

**Table 10:** Cities' visit rate

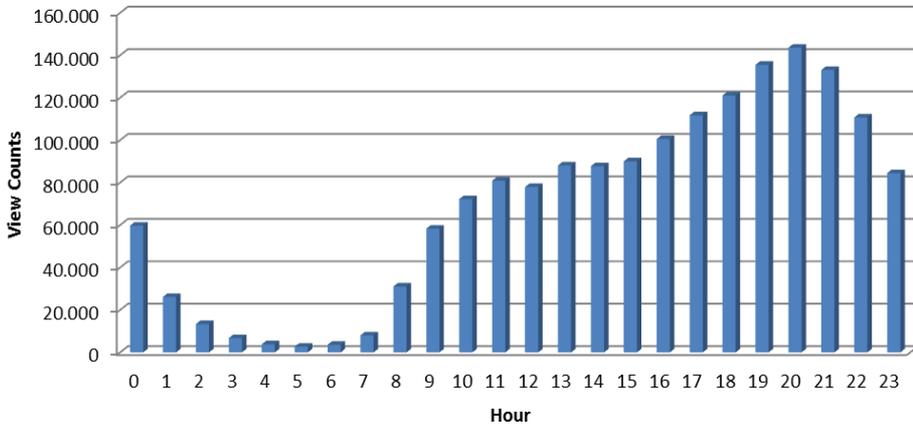
City	Visits	Rate to overall visit	Pages/visit	Average visit duration
1. Ankara	604.051	36,92%	14,10	00:09:46
2. İstanbul	386.023	23,60%	15,72	00:09:47
3. İzmir	112.790	6,89%	13,87	00:08:47
4. Adana	86.497	5,29%	18,17	00:11:26
5. Antalya	67.816	4,15%	14,21	00:08:48
6. Diyarbakır	42.766	2,61%	14,59	00:09:36
7. Samsun	29.634	1,81%	14,58	00:09:54
8. Kayseri	28.608	1,75%	14,81	00:10:04
9. Bursa	28.512	1,74%	14,36	00:15:02
10. Kocaeli	26.185	1,60%	14,76	00:10:44



**Figure 5:** Visit graph by cities

In the study, use of Enocta Academic Education Platform by hour of day is examined. With the greatest access to the Enocta Academic Education Platform at 20:00, while the system is used extensively between the hours of 17:00 to 22:00 according to report (2011) of 1.651.008 visit count (Fig. 6). As can be seen from the graph, the number of visits between the hours of 6:00 to 8:00 p.m. increases and decreases between the hours of 20:00 to 6:00.

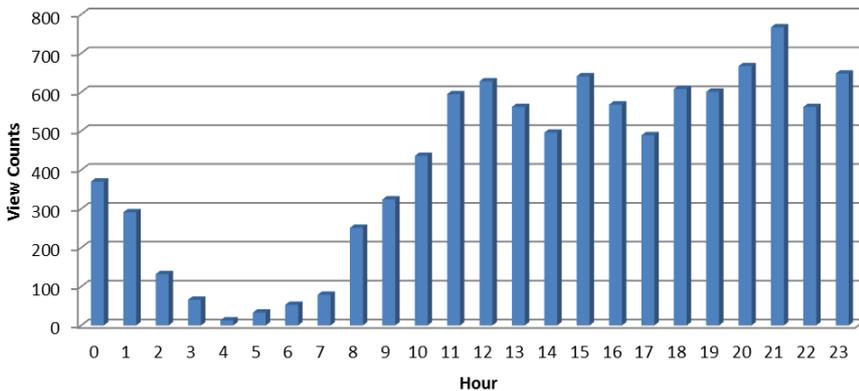
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**Figure 6:** Visits by hour of day

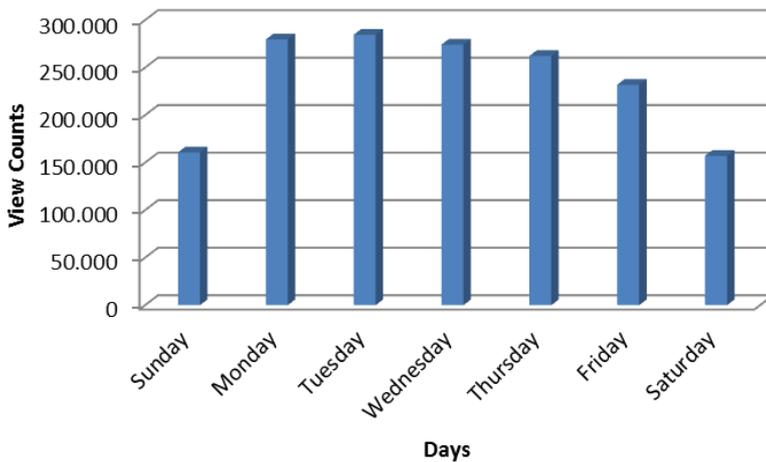
The graph of mobile devices to access the system on an hourly basis is as follows (Fig. 7).

Graphic analysis shows that visits have been increasing, especially in the midday and evening hours. The graphic shows there is not a tendency to increase or decrease in contrast to Figure 6.



**Figure 7:** Mobile visits by hour of day

The study has also investigated the use of Enocta Academic Education Platform on the basis of days of the week. System is least visited in Tuesday and most visited on Saturday according to the report by Google Analytics Custom Reports (Fig. 8). Visit counts reduce since the mid-day of week.

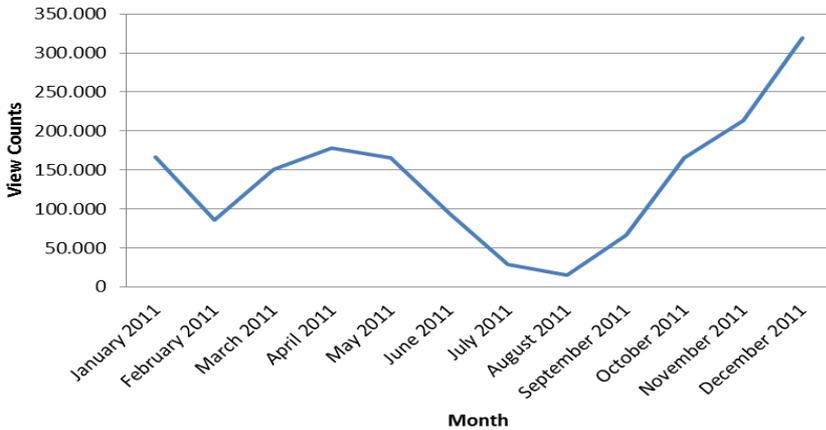


**Figure 8:** Visits by day of week

Visit count by month to Enocta Academic Education Platform is also investigated in the study. Use of the system falls below average in academic holidays as can be seen on the graph (Fig. 9). With the beginning of the new academic year, considering the number of students there is seen an increase on visit counts.

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**Figure 9: Visit by month**

**Table 11: Most used browsers**

	Browser	Total		January 2011		December 2011	
		Visits	Visits Rate	Visits	Visits Rate	Visits	Visits Rate
1	Internet Explorer	1.134.531	68,72%	122.992	73,78%	202.594	63,50%
2	Chrome	267.492	16,20%	16.860	10,11%	72.761	22,81%
3	Firefox	219.719	13,31%	24.319	14,59%	37.539	11,77%
4	Safari	12.416	0,75%	1.346	0,81%	2.645	0,83%
5	Opera	11.022	0,67%	919	0,55%	2.021	0,63%
6.	Android Browser	2.303	0,14%	-	-	831	0,26%

Browsers used in accessing Enocta Academic Education Platform are analyzed too (Table 4). There is 10% decrease on utilization of Internet Explorer that is the most widely used browser when table is examined. Another important point, Android browser not on the list in January, has risen to sixth place in December with the spread of Android devices. On the other hand, use of Firefox on second place at the beginning of the year, has decreased day by day and left its place to Chrome browser. Browser use graphic is shown on Figure 10.

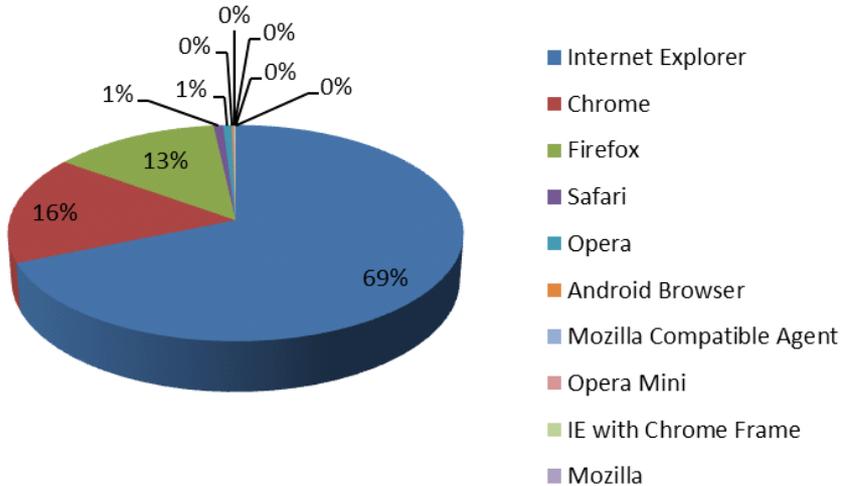


Figure 10: Most used browsers

Operating systems used for accessing the system are also handled in the study. As seen on Table 5, Windows is the most preferred operating system. It can be seen that use of mobile operating systems has tend to increase more and more when looked at Table 5. In mobile operating systems, Android one has the biggest jump. That has 0,03% usage rate in January, Android has reached o 0,29% in December with tenfold increase. iPhone utilization has reached from 0,17% to 0,30% with twofold increase.

Table 12: Most used operating systems

	Operating System	Total		January 2011		December 2011	
		Visits	Visits Rate	Visits	Visits Rate	Visits	Visits Rate
1.	Windows	1.625.691	98,47%	163.950	98,35%	313.756	98,34%
2.	Macintosh	8.106	0,49%	888	0,53%	1.539	0,48%
3.	Linux	5.872	0,36%	1.159	0,70%	849	0,27%
4.	iPhone	3.544	0,21%	282	0,17%	952	0,30%
5.	Android	2.958	0,18%	52	0,03%	924	0,29%
6.	SymbianOS	1.744	0,11%	168	0,10%	398	0,12%

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7.	(not set)	1.733	0,10%	144	0,09%	208	0,07%
8.	iPad	851	0,05%	22	0,01%	267	0,08%
9.	BlackBerry	180	0,01%	5	0,00%	91	0,03%
10.	Samsung	114	0,01%	18	0,01%	23	0,01%

In the study, distribution of mobile operating systems to visit counts in a year has been handled (Table 6). Android what is on third place on the list in January has placed on second at the end of the year. Furthermore, the system has been visited 585 times by mobile devices in the beginning of the year; the number of visit has reached to 2864 with fivefold increase at the end of the year.

**Table 13: Most used mobile operating systems**

	Mobile Operating System	Total		January 2011		December 2011	
		Visits	Visits Rate	Visits	Visits Rate	Visits	Visits Rate
1.	iPhone	3.544	36,59%	282	48,21%	952	35,47%
2.	Android	2.958	30,54%	52	8,89%	924	34,43%
3.	SymbianOS	1.744	18,00%	168	28,72%	398	14,83%
4.	iPad	851	8,78%	22	3,76%	267	9,95%
5.	BlackBerry	180	1,86%	5	0,85%	91	3,39%
6.	Samsung	114	1,18%	18	3,08%	23	0,86%
7.	Windows	96	0,99%	19	3,25%	3	0,11%
8.	iPod	95	0,98%	7	1,20%	10	0,37%
9.	Nokia	84	0,87%	11	1,88%	7	0,26%
10.	Sony	12	0,12%	1	0,17%	4	0,15%
11.	Other	9	0,09%	0	0%	5	0,18%
<b>Total</b>		<b>9.687</b>	<b>100%</b>	<b>585</b>	<b>100%</b>	<b>2.684</b>	<b>100%</b>

The study has also examined the users screen resolutions (Table 7). Graphic shows the screens used for accessing have resolution above than average. The percent of screen that has HD resolution is 2,21%.

**Table 14:** Most used screen resolution

	Screen Resolution	% Visit
1.	1366x768	21,80%
2.	1024x768	21,75%
3.	1280x800	16,02%
4.	1280x1024	8,59%
5.	1440x900	6,34%
6.	1024x600	2,62%
7.	1152x864	2,51%
8.	1920x1080	2,21%
9.	1680x1050	2,21%
10.	1360x768	1,77%

Java support to the system used for accessing is also examined (Table 8). 95% of systems supports Java.

**Table 15:** Java support rate

	Java Support	% Visit
1.	Yes	94.94%
2.	No	5.06%

## Discussion and Conclusion

Interaction, which is an important factor in learning, affects the learning process by occurring in LMS systems between student and teacher (Pahl, 2004). Student's interaction with the system needs to be evaluated for the evaluation of learning success. So student's interaction with the LMS system needs to be analyzed. Nowadays, this interaction is recorded by different ways. One of the most common used systems is server logs and LMS.

The analysis of log records, which are recorded student's interaction data, might provide usable and beneficial data. User habits might be analyzed with these data analysis, informed about user habits (Masip et al., 2010), used to make the functions

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learning and teaching of LMS systems easy and better (Lam et al., 2011). In this way, the learning process might be understood better (Hershkovitz and Nachmias, 2011). At the same time, data mining studies will help to support decisions while doing e-learning investment (Monk, 2005).

Variable data belong to the client are recorded in the server log (Monk, 2005). These are different data such as accession date, IP data, scanner, location and the knowledge of language.

Enocta Academic Education Platform Google Analytics service which fulfills the function of web server log commented the data. Google analytic presents the data which gets from web server log or data mining instruments. Also, it can represent accessions which are done mutually and make comparisons in different times. It can visualize different diagram kinds and provide alternative filtering supports. In this aspect, Google Analytics can represent statistical data whose analysis takes place a few days in a short time.

Some statistical data which is used Google Analytics service in the study, take place. In the study, changing user habits drew attention some data by addressing changing habits. For instance, visits which is done with android operating system have developed about 10 times in 2011, the usage of other mobile devices have increase when compared with the beginning of the year. Tablets have been used since the last period of 2011, mobile access has more increased. Based on this analysis, it is important to provide a competitive advantage in the sector and increase user satisfaction that LMS provider and content provider companies should develop their investments and systems to work compatible with mobile devices and support them, and should consider users' changing habits in investments.

In this study it is tried to find an answer to question of at what time of a day, on which day of a week, in which month Enocta Academic Education Platform is used. With the interpretation of the analyzes made in, rush hours has been found to be the most widely used ones. The intensity of usage of the system increases in examination periods and the mid of academic year. Universities should adjust daily work of staff that

provides the necessary technical support to LMS systems, to avoid a glitch in the system and not to make students leave from the education place by taking into account that hours and periods of usage.

It must be decided where to improve and develop in LMS system considering changing user habits in this study. It is provided not to waste the investments.

### **Acknowledgement**

Thank you Enocta for sharing with us their Google Analytics data.

### **References**

1. Abazi-Bexheti, L., Kadriu, A., Ahmedi, L., 2010, "Measurement and Assessment of Learning Management System Usage", *In: Proceedings of the 6th WSEAS/IASME International Conference on Educational Technologies (EDUTE'10)*, Kantaoui, Sousse, Tunisia, 2010.
2. Black, E.W. et al., 2008, "Data for free: Using LMS activity logs to measure community in online courses", *In: The Internet and Higher Education*, 11 (2), pp: 65–70, doi: 10.1016/j.iheduc.2008.03.002.
3. Bienkowski, M., Feng, M., Means, B., 2012, "Enhancing Teaching and Learning Through Educational Data Mining and Learning Analytics: An Issue Brief, U.S. Department of Education Office of Educational Technology", Department of Education's, Office of Educational Technology, [online]: [http://ctl2.sri.com/eiframe/wp-content/uploads/2012/04/EDM-LA-Brief-Draft\\_4\\_10\\_12c.pdf](http://ctl2.sri.com/eiframe/wp-content/uploads/2012/04/EDM-LA-Brief-Draft_4_10_12c.pdf), [Access date: 29.10.2012].
4. Dalsgaard, C., 2006, "Social Software: E-Learning Beyond Learning Management Systems", *In: European Journal of Open, Distance and E-Learning (EURODL)*, 2006(2).
5. Davis, B., Carmean, C., Wagner, E.D., 2009, "The Evolution of LMS: From Management to Learning: Deep Analysis of Trends Shaping the Future of e-Learning, The eLearning Guild Research", [online]: <http://www.blackboard.com/resources/proed/Guild-LMSreport.pdf>, [Access date: 29.10.2012].
6. Ersoy, A., 2009, "Yaşam Boyu Öğrenme ve Türkiye’de Halk Kütüphaneleri", Master Dissertation, Hacettepe University.
7. Hershkovitz, A., Nachmias, R., 2011, "Log-Based Assessment of Motivation in Online Learning", *In: Romero, C. et al. (Eds.), Handbook of Educational Data Mining*, Boca Raton, FL, CRC Press, pp: 287–297, ISBN: 9781439804575.

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Innovations in Learning for the Future 2012: e-Learning  
Future-Learning 2012, Nov. 14-16, İstanbul**

8. Lam, P., Lo, J., Lee, J., Mcnaught, C., 2011, Evaluations Of Online Learning Activities Based On LMS Logs, *In: Babo, R., Azevedo, A. (ed.) Higher Education Institutions and Learning Management Systems: Adoption and Standardization*, Hershey PA, USA, IGI Global, pp: 75–93, ISBN: 9781609608842.
9. Masip, D. et al., 2010, "Capturing and Analyzing Student Behavior in a Virtual Learning Environment", *In: Romero, C. et al. (Eds.), Handbook of Educational Data Mining*, Boca Raton, FL, CRC Press, pp: 339–351, ISBN: 9781439804575.
10. Monk, D., 2005, "Using Data Mining for e-Learning Decision Making", *In: Electronic Journal of e-Learning*, 3 (1), pp: 41–54.
11. Pahl, C., 2004, "Data mining technology for the evaluation of learning content interaction.", *In: International Journal on ELearning*, 3 (4), pp: 47–55.
12. URL1, 2012, "Eğitim Yönetim Sistemi Nedir ve Niçin Önemlidir?", [online]: <http://www.enocta.com/web2/ContentShowOne.asp?CType=2&ContentID=182&T=5>, [Access date: 29.10.2012].
13. URL2, 2010, What are Learning Analytics?, [online]: <http://www.elearnspace.org/blog/2010/08/25/what-are-learning-analytics/>, [Access date: 30.10.2012].
14. URL3, 2012, Google Analytics, [online]: <http://www.google.com/analytics/>, [Access date: 29.10.2012].
15. Yang, H.-H. et al., 2010, "A study of generating teaching portfolio from LMS logs", *In: WSEAS Trans. Info. Sci. and App.*, 7 (4), pp: 573–586.



## Intention to Use the e-learning System in Teaching: An Empirical Study with Tunisian Faculties Using SEM

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***Abstract:** The introduction of new technologies in education is subject of intense controversy especially in emerging markets where people are known to be very attached to social interactions and human contact. If resistance to these technologies is effective, these projects will not succeed in spite of their high costs. Here, we are interested in teacher's intention to use the e-learning system. Technology Acceptance Model (TAM) is extended to incorporate personal and cultural variables as well as perceived value of higher education teaching. Items used to establish the questionnaire are derived from measurement scales that were proven reliable and valid in foreign countries. Therefore, a contextualization effort was judged necessary to make them comprehensible in the right direction by the population studied. Data was collected with 150 Tunisian teachers. The method of data analysis used is Structural Equation Modeling (SEM). In general, results support the proposed model.*

**Keywords:** TAM, perceived value, culture, personality, SEM

### Introduction

Implementing an e-learning system in emergent countries was proposed as a solution to the temporary increase of the number of students and the lack of infrastructure required for the adjustment to this change. However, culture and individual traits in these countries may be barriers to the adoption of new technologies. If people show resistance to the use of e-learning, this system may fail (Rosen, 2004). Many studies have focused on students' intention to adopt e-learning; in this research the focus will be on faculties. We are interested in teacher's intention to use the e-learning system in the technology acceptance model context. Our research questions will be: what are the determinants of faculties' intention to use the e-learning system to teach? What is the influence of perceived value of higher-education teaching, culture, individual traits and demographic characteristics?

The individual trait that will be studied is innovativeness. It is proposed as a moderator. We also conceive personality according to the big five taxonomy and we propose it as an antecedent to perceived ease of use. Culture is proposed as an antecedent

to perceived ease of use. Perceived value is a concept frequently studied in explaining individual's behavior. Therefore, we explore its role as an antecedent to perceived usefulness. The demographic variable chosen is age. It is suggested as a moderator.

Data collection was made with faculties using paper-pencil questionnaire. We have obtained 150 usable questionnaires. Data was analyzed with SPSS and AMOS using structural equation modeling. This research is pertinent for many purposes. Theoretically, we extend the TAM in order to make it applicable to emergent countries. For managers, it is still useful to know factors that increase individual's acceptance of new programs that use technology.

## **Theoretical background**

In the following section, we are going to expose a theoretical review about the following concepts: (1) the technology acceptance model, (2) the perceived value, (3) the personality, (4) the culture, (5) the innovativeness and (6) the age. The relationships between the different concepts are also given to shape the hypotheses.

### **Technology Acceptance Model**

The Technology Acceptance Model (TAM) was developed by Davis (1989) in the information system domain but was applied in many other contexts dealing with the use of new technologies (Keen et al., 2004). TAM is grounded in Fishbein and Ajzen's (1975) theory of reasoned action (TRA) and Ajzen's (1991) Theory of Planned Behavior (TPB).

According to the TRA, attitude and subjective norms determine behavioral intentions and the latter is antecedent to behavior. Subjective norms reflect perceived social pressure. TRA is classically represented by the Cognition-Attitude-Intention path. TPB (Ajzen, 1991) was "designed to predict and explain human behavior in specific contexts". TPB asserts that behavioral intention is a function of attitude and subjective norms, similar to TRA, but with the addition of perceived behavioral control. Ajzen

(1991) defines perceived behavioral control as the “perception of the ease or difficulty of performing the behavior of interest”.

TAM introduced perceived usefulness (PU) and perceived ease of use (PEOU) to explain behavioral intentions. “The goal of TAM is to provide an explanation of the determinants of computer acceptance that in general is capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified” (Davis et al., 1989). TAM was preferred for its simplicity. “TAM is very intuitive, is easy to test, and has been applied to many forms of technology” (Rosen, 2004).

**Usefulness** is “the degree to which an individual believes that using a particular system would enhance his or her job performance” (Davis, 1993). **Ease of use** is “the degree to which an individual believes that using a particular system will be free of physical and mental effort” (Davis, 1993). **Behavioral intention** is “a person’s location on a subjective probability dimension involving a relation between himself and some action” (Fishbein and Ajzen, 1975). Behavioral intentions represent “an individual’s consciously-formulated plan to perform a specific behavior” (Venkatesh et al., 2006). Ajzen (1991) propose that behavioral intentions represent “how hard people are willing to try, or of how much of an effort they are planning to exert, in order to perform the behavior”. Fishbein and Ajzen (1975) define behavioral intention as “a person’s subjective probability that he will perform some behavior”. Behavioral intention is also defined as “a measure of the strength of one’s willingness to try and exert while performing certain behavior” (Wu and Chen, 2005). It is a conative component that has a probabilistic characteristic.

In TAM, usefulness is supposed to have a direct effect on intention; it is also linked with ease of use. The latter is a determinant of behavioral intentions. These links were supported in many studies (Liu et al., 2011; Bourgonjon et al., 2010; Roca and Gagné, 2007; Saadé and Bahli, 2005). Therefore, we propose the following hypotheses:

H1: PEOU positively influences PU.

H2: PEOU positively influences intention to use.

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H3: PEOU usefulness positively influences intention to use.

However, for the particular context of emergent countries, we can't confine our study to the verification of an established model in developed states. Therefore, we extend the TAM by introducing variables that are specific to the particularities of these societies and these individuals.

### **Perceived value**

Perceived value of higher education teaching is chosen for the importance of the value concept in the comprehension of individual's behavior. For instance, Gallarza and Saura (2006) consider that "consumer behavior is better understood when analyzed through perceived value". Bolton and Drew (1991) also pointed that perceived value is a "richer measure of customers' overall evaluation of a service than perceived service quality".

Three approaches explain the perceived value concept: (1) the tradeoff approach, (2) the means-end approach and (3) the relational approach. Most of researches that use the tradeoff approach are based on Zeithaml's work (1988) that defines perceived value as: "the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given". The means-end approach is based on the means-end chain theory. It states that the product is perceived by consumers according to three levels: attribute, consequences, and final desired state (Woodruff and Gardial, 1996). In keeping with this, Woodruff and Gardial (1996) point out that perceived value is more related to the use of product than an objective perception. Therefore, they define perceived value as "the customer perception of what they want to have happen (i.e., the consequences) in a specific use situation, with the help of a product or service offering, in order to accomplish a desired purpose or goal".

Finally, the relational approach defines perceived value as the result of the experience with the product. It is situated in a middle position in the debate between the subjective and the objective conceptualization of perceived value. The judgment of value depends on the subject, the object to be judged and the situation or the context. The most important difference between the relational approach and the other approaches is that it

is concentrated on the experience rather than the final result. Accordingly, Holbrook (1999) defines the perceived value as “an interactive relativistic preference experience”.

Sheth et al.’s (1991) typology of perceived value was adopted by LeBlanc and Nguyen (1991) and Sweeney and Soutar (2001) in their scale development. Table 1 represents Sheth et al.’s (1991) categorization of perceived value.

**Table 1:** Sheth et al.’s (1991) typology of perceived value

<b>Social value</b>	<i>“The perceived utility acquired from an alternative’s association with one or more specific social groups”.</i>
<b>Emotional value</b>	<i>“The perceived utility acquired from an alternative’s capacity to arouse feelings or affective states”.</i>
<b>Functional value</b>	<i>“The perceived utility acquired from an alternative’s capacity for functional, utilitarian, or physical performance”.</i>
<b>Epistemic value</b>	<i>“The perceived utility acquired from an alternative’s capacity to arouse curiosity, provide novelty, and/or satisfy a desire for knowledge”.</i>
<b>Conditional value</b>	<i>“The perceived utility acquired by an alternative as the result of the specific situation or set of circumstances facing the choice maker”.</i>

Source: Sheth, Newman and Gross (1991)

In the particular context of higher-education, Sheth et al.’s (1999) approach was applied by Brown and Mazzarol (2009), Ledden et al. (2007) and LeBlanc and Ngyen (1999). Here, we suppose that perceived value plays a role in TAM. In fact, if one perceives a high value of an activity (higher-education teaching), he or she is willing to warrant maximum effort for the practice of this activity, to overcome expected problems and to be more eager to make improvements in this domain. The perception of high value of education leads to the perception of usefulness of e-learning system to improve the methods of education. Therefore, we advance the following hypothesis:

H4: Perceived value of higher-education teaching positively influences perceived usefulness of the e-learning system.

### **Personality**

Research on personality is characterized by the multiplication of theoretical works and then the divergence of perspectives. However, a consensus emerged about the big five

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personality dimensions. “The Big Five taxonomy serves an integrative function because it can represent the various and diverse systems of personality description in a common framework” (John and Srivastava, 1999). This is an abstract representation of personality characteristics. The big five taxonomy was developed within the lexical approach and the hierarchical approach. “The lexical approach has been adopted as an exhaustive enumeration of traits, and has proven to be the most fruitful guide to a comprehensive model of personality” (Costa and McCrae, 1995). According to the hierarchical approach, the personality is concentrated on factors that summarize several characteristics. It is organized in bipolar structures. Each of these factors is divided into other factors or facets. These ones are also divided into several characteristics that are distinct and called personality traits (Ambroise et al, 2003).

**Table 2:** The "Big Five" Personality Dimensions

<b>Dimension</b>	<b>Meaning</b>
Extraversion	Activity and energy level traits, sociability and emotional expressiveness.
Agreeableness	Altruism, trust, modesty, prosocial attitudes.
Conscientiousness	Impulse control, goal directed behavior.
Neuroticism	Emotional stability, anxiety, sadness, and irritability
Openness	Breadth, Complexity, and depth of an individual’s life.

Source: Goldberg (1981, 1993)

The adoption of the big five taxonomy as a main theory of personality is confronted to the criterion of universality. Hence, many authors studied the replication of the big five into many languages and cultures (Hendriks et al, 2003; Barrett and Eysenck, 1984; Barrett et al., 1998; Lynn and Martin, 1995; McCrae et al, 2004; Saucier et al, 2000). At the same time, for some authors the big five does not prove its universality, such as John and Srivastava (1999). They state that “strong conclusions about the linguistic universality of the lexically derived Big Five would be premature” (John and Srivastava, 1999).

In this research, we propose to test the influence of personality on perceived value. Matzler et al. (2006) explored the role of two dimensions of personality in

determining perceived value. They found positive relationships between extraversion and hedonic product value on one hand and openness and hedonic product value on the other hand. We think that personality shapes the way with which people view the world and evaluate objects. Therefore, we propose the following hypotheses:

H5: Personality dimensions influence perceived value

H6: Personality dimensions influence perceived ease of use

### **Culture**

Kroeber and Kluckhohn (1952) define culture as “patterns, explicit and implicit, of and for behaviour acquired and transmitted by symbols, constituting the distinctive achievement of human groups, including their embodiment in artefacts”. They further precise that “the essential core of culture consists of traditional (i.e. historically derived and selected) ideas and especially their attached values; culture systems may, on the one hand, be considered as products of action, on the other, as conditioning elements of future action” (Kroeber and Kluckhohn, 1952).

Hofstede et al. (1990) define culture as “the collective programming of the mind”. But this is judged as a simplistic definition (Dickson et al., 1999). Hofstede et al. (1990) distinguish between national culture and organizational culture. Culture is defined in terms of values and organizational culture as practices. Although there is no consensus about the conceptualization of culture, it is commonly acknowledged that it is “deeply embedded at multiple levels of a society” (Dickson et al., 1999). Therefore, it may influence individual’s concepts.

Straub et al. (1997) have proven that TAM differs across cultures. Evers and Day (1997) found that culturally specific design preferences influence perceived ease of use. In Tunisia, the usage of new technologies is encouraged by the government as well as individuals. Teachers are very familiar with them. Therefore, we propose the following hypothesis:

H7: Culture positively influences PEOU.

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### **Innovativeness**

Many definitions were given to innovativeness. These definitions can be categorized into 4 groups (Touzani and Allagui, 2003). The first one represents innovativeness as an individual trait independent from other's influence. In this vein, Midgley and Dowling (1978) define innovativeness as "the degree to which an individual is receptive to new ideas and makes innovation decisions independently of the communicated experience of others". For Hirschman, the origin of innovativeness is consumer novelty seeking which is defined as "the desire to seek out new product information" (Hirschman, 1980). The third trend initiated by Roehrich (1994) proposes two categories of innovativeness which are hedonic and social. Fourth, Goldsmith and Hofacker (1991) relate innovativeness to specific domains of products.

In this research, we adopt the first perspective and we consider innovativeness as an individual trait to seek for novel products in a broad range of product categories. This variable may be influential in the adoption of e-learning in teaching. In fact, Dabholkar and Bagozzi (2002) advance that: "it is accepted that some aspect of innovativeness would influence attitudes toward technological products". Furthermore, Ndubisi and Richardson (2002) have proven the moderator effect of innovativeness on the relationship between perceived ease of use and usage. Therefore, we propose innovativeness as a moderator of the relationship between perceived ease of use and intention to use.

H8: Innovativeness moderates the relationship between perceived ease of use and intention to use.

### **Age**

The demographic variable to be considered in this study is: age. Age was proposed as an external variable that influences PU and PEOU. But its effect was not stable and significant across studies. "Overall, findings on the impact of demographics on using new technologies and innovations have not been consistent" (Ranaweera et al., 2005). Therefore, in this study we propose age as a moderator in TAM. In Venkatesh et al.

(2003), age has proven its moderator role in user acceptance of technology. Here, we advance that younger teachers develop more favorable attitudes toward technology than older teachers because aged persons may not be motivated to make investments (effort, time...) to change the way they teach.

H9: The relationship between perceived value and perceived usefulness is stronger for young teachers than for old teachers.

H10: The relationship between perceived usefulness and intention to use is stronger for young teachers than for old teachers.

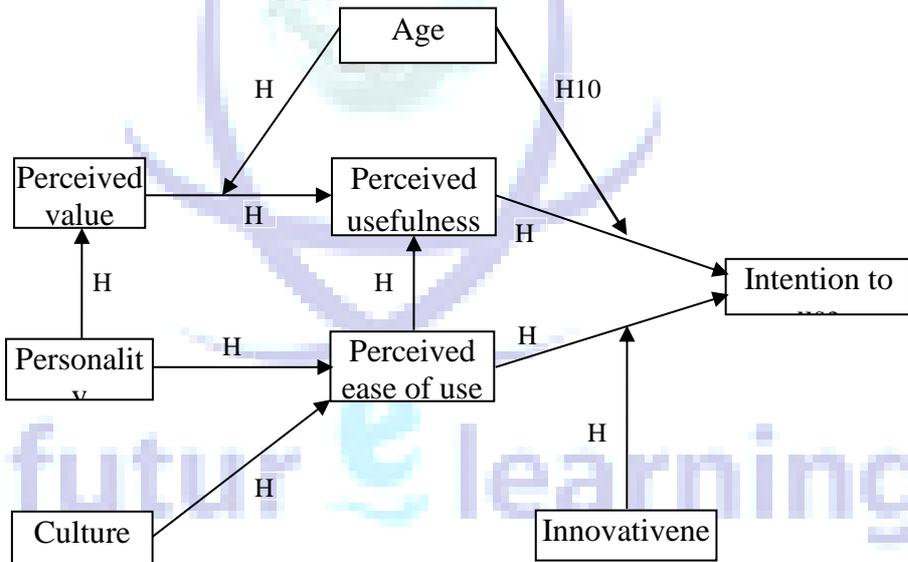


Figure1. Conceptual model to be tested

## Research methodology

In this section the different scales used to measure the variables of this study will be given, in addition to that the way to data collection will be dealt with.

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### **Measurement scales**

Measurement scales used are valid and reliable scales derived from previous studies. All items were measured using five-point Likert scale anchored at “strongly disagree” to “strongly agree”. Items of culture are adapted from O’Reilly et al. (1991). Items for perceived usefulness, perceived ease of use and intention to use were derived from works of Davis (1989). To measure personality we used the five dimensions proposed by Goldberg (1981, 1993). Innovativeness is considered as unidimensional and we used Agarwal and Prasad’s (1998) measurement scale. Perceived value scale is adopted from Sweeney and Soutar’s (2001) scale.

Original scales used in this study are in English language and developed in foreign countries. Therefore, an effort of contextualization is necessary according to Rossiter’s (2002) recommendations. First, items were translated from English to French using double-blind procedure. After that, two teachers of marketing reviewed the questionnaire. They judged understandability of items and their convenience to the Tunisian context. Finally, a pilot study was realized with 19 subjects. The purpose of the pilot study is to gain additional feed-back about the questionnaire instrument. After filling-in the questionnaire, respondents were asked to interpret some items and judge the clarity of questionnaire wording. The questionnaire was revised at each step.

### **Data collection**

Data was collected using self-administered paper-pencil questionnaires with faculties from different Tunisian universities. Teachers are contacted in teachers’ rooms of different universities. These are places where they usually meet, talk, drink coffee... Table 3 shows different places where data was collected. We explain that we are undertaking an academic study in order to investigate methods of teaching. Convenience sampling was adopted because we want to test theoretical links.

**Table 3:** Places of data collection

<b>University</b>	<b>Number of responses</b>
Faculty of Juridical, Economic Sciences and Management of Jendouba	52
Higher Institute of Management of Tunis	45
Faculty of Arts and Humanities of Manouba	23
Higher School of Sciences and Techniques of Tunis	18
Higher School of Sciences and Techniques of Tunis	12

Teachers filled-in the questionnaire and returned it or took it and returned it later. Characteristics of the sample are summarized in table 4. Answers were controlled and respondents were invited to complete missing values. Nevertheless, in some cases, respondents returned the questionnaire and could not wait because they were too busy. Therefore, we had some missing values that were treated later.

**Table 4:** Demographic characteristics of the sample

<b>Gender</b>	
Female	81 (54%)
Male	66 (44%)
<b>Age</b>	
20-25	5 (3.37%)
26-30	56 (37.83%)
31-35	29 (19.59%)
36-40	18 (12.16%)
More than 40	14 (9.3%)
<b>Owning personal computer</b>	
Yes	140 (93.33%)
No	3 (2%)
<b>Internet connection at home</b>	
Yes	121 (80.66%)
No	19 (12.66%)
<b>Internet connection at work</b>	
Yes	135 (90%)
No	10 (6.66%)

From among the 210 distributed questionnaires, 150 were completed and returned. Those who took the questionnaire are reminded to return it each time they came to the teachers' room. Therefore, we compute the response rate according to

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Bethlehem (2009). Response rate=  $n_R/(n_R+n_{NR})^1$ . In our case, response rate is  $150/210=0,714$ . This is a good rate given that no incentive was given (Malhotra, 2008). On the other hand, there is no correlation between non-returned answers and place of data collection or discipline. We think that this was only due to time pressure. Many teachers had courses and were not available to answer. In fact, they never refused but they promised to give it back later.

This sample size is adequate to the requirements of structural equation modeling. In fact, Roussel et al. (2002) recommend a sample size of at least 100 to 150 observations. On the other hand, Westland (2010) established rules for the determination of the minimum sample size. First, minimum sample size is determined using the ratio of indicators to latent variables. This gives us a minimum sample size of 122. Second, the minimum effect to detect is integrated to set the lower bound. A correlation of .3 is considered as a medium level of correlation in social sciences (Cohen, 1992). This gives us a minimum sample size of 197. However, data collection with faculties is a difficult task. We limit our sample size to 150 and we verify by exploratory and confirmatory factor analysis that our dimensions are supported by data.

We rely on Stevens (1996) recommendations to determine the appropriate number of factors: eigenvalue greater than one, scree plot elbow and total variance explained by the factor. For Stevens (1996), to assure reliable factor determination, for a minimum sample size of 150, minimum item factor loading of 0.4 (representing at least 15% of the variance) is required for at least 10 items.

## **Results and discussion**

In the following section we are going to test the hypothesis and do an interpretation of the results.

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<sup>1</sup>  $n_R$  : number of responses  
 $n_{NR}$  : number of non-responses

### **Quality of measurement scales**

For missing values, we used estimation with multiple regressions which is programmed in SPSS. After that, the psychometric quality of measurement scales was verified through exploratory factor analysis using SPSS package. The dimensionality of the set of items was initially explored through calculating item-total correlations and using principal components analysis with Varimax rotation. At this step, we delete problematic items and we determine the emergent factorial structure. Factors extracted had an eigenvalue exceeding 1.0. Items highly correlated to two factors are deleted. We excluded factors composed of only one item. From the scree plot, we extracted components on the steep slope. The components of the shallow slope contribute little to the solution. When the drop ceases and the curve makes an elbow toward less steep decline, Cattell's scree test recommends the drop of all further components after the elbow. The decision rule we adopt here is to consider the number of factors just before the last elbow (Cattell, 1966). After determining the number of factors of our constructs, we calculated Cronbach's alpha for each dimension. Table 5 shows quality of measurement scales. All retained dimensions after exploratory factor analyses had Cronbach's alpha surpassing 0.6 with factor loadings surpassing 0.4 (Robinson et al., 1991; Murphy and Davidshofer, 1988). The cumulative percent of information retrieved was satisfying.

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**Table 5:** Quality of measurement scales

Concept	Dimensions	Number of retained items	Alpha	Cumulative % of information retrieved	AVE	Joreskog Rho
<b>Perceived value</b>	Functional (performance/quality)	6	0.847	30.407	0.516	0.845
	Social	4	0.814	40.710	0.464	0.812
	Fairness	3	0.722	47.202	0.514	0.680
	Facility	3	0.659	52.957	0.473	0.722
<b>Perceived usefulness</b>	Perceived usefulness	3	0.877	81.385	0.729	0.889
<b>Perceived ease of use</b>	Perceived ease of use	3	0.858	78.038	0.720	0.885
<b>Personality</b>	Neuroticism	4	0.084	39.127	0.606	0.859
	Conscientiousness & agreeableness	4	0.868	55.303	0.631	0.872
	Openness	3	0.827	62.784	0.601	0.857
	Extraversion	4	0.754	70.207	0.456	0.768
<b>Culture</b>	People respect	4	0.722	21.422	0.445	0.752
	Outcome oriented	4	0.679	29.373	0.418	0.732
	Detail oriented	3	0.652	36.604	0.531	0.685
	Team oriented	2	0.685	42.881	0.530	0.692
<b>Intention to use</b>	Intention to use	2	0.839	86.634	0.711	0.832
<b>Innovativeness</b>	Innovativeness	4	0.868	71.846	0.639	0.875

Second, we performed confirmatory factor analysis using AMOS software. Maximum likelihood estimation was used in confirmatory factor analysis. We judge reliability with Joreskog rho. A construct has a good reliability if Jöreskog rho is superior or equal to .70. Then, Average Variance Extracted (AVE) has to be superior to .50 (Fornell and Larker, 1981). But values from .4 and .5 are still accepted. We found Jorekog rho superior to 0.7 except for two dimensions of culture (detail oriented and team oriented) where Joreskog rho is close to this commonly accepted threshold. Convergent validity is verified.

For perceived value, the emotional dimension was dropped because it is not reliable (Cronbach's alpha of .514). The functional dimension (price/value for money) was divided into two factors (fairness and facility). Factors of perceived value have quite important correlations (from 0.459 to 0.639) and sustain a second-order structure of perceived value which is justified theoretically. Conceiving perceived value as a second-order construct is in harmony with means-end chain theory (Woodruff, 1997; Zeithaml, 1988). It also supports the adoption of more consequence-level value drivers in consumer behavior. Model fit of first-order structure of perceived value and second-order structure are close with a slight improvement of normed chi-square for the second-order model (from 1.459 to 1.456). We retain the second-order structure.

On the other hand, dimensions of personality are weakly correlated and we think that it is more useful to know the differential effect of each dimension of personality rather than considering a higher-order construct. For culture, conscientiousness items were melting with agreeableness items to form only one factor. This is in line with Eysenck's (1992) three-factor model where conscientiousness and agreeableness are considered as aspects of psychoticism, not as independent dimensions. We have also found that dimensions of culture have correlations varying from 0.44 to 0.64 and we adopt a second-order structure that has the advantage to simplify the model.

#### **Model fit**

A two-step approach is used. We have considered measurement models in confirmatory factor analysis to detect problematic sub-models. After that, we use the whole model to determine model fit (table 6). Chi-square is significant but this is common in marketing studies (Roussel et al., 2002). Therefore, we examine normed chi-square. We remark that it's less than 2 which is a very good value (Hair et al., 1998). GFI value belongs to 0.8-0.9 interval which is at marginal acceptance (Hair et al., 1998). RMSEA is close to zero as recommended. Therefore, model fit is acceptable.

**Table 6:** Model fit

Chi <sup>2</sup>	df	p	Normed chi <sup>2</sup>	GFI	RMSEA
2130.842	1405	0.000	1.517	0.852	0.064

## Test of hypotheses

### 1. Test of TAM

**Table 7:** Test of TAM

Hypotheses	Non-standardized regression weight	CR	Results	Standardized regression weight
PU ← PEOU	.349	3.502	Accepted	0.327
Intention ← PEOU	.140	1.713	Accepted	0.150
Intention ← PU	.494	6.199	Accepted	0.565

Our results sustain the TAM. This model was tested in many countries. Contrary to claims that perceived usefulness is not plausible in emergent countries because people are not utilitarian (Brown and Town, 2002), our research verifies its applicability in an emergent country to test teacher's intention to use e-learning system in higher-education. Perceived usefulness has a stronger effect on intention to use than perceived ease of use. This can be explained by the utilitarian orientation of teaching and therefore the importance of the perceived utility of this system to induce teacher's tendency to adopt it.

## 2. Antecedents of TAM

### 2.1. Predictors of PEOU

We have tested the effects of personality dimensions and culture on perceived ease of use. Culture is a second-order construct. Table 8 shows the results of test of hypotheses.

**Table 8:** The effect of predictors of PEOU

Hypotheses	Non-standardized regression weight	CR	Results	Standardized regression weight
PEOU ← neuroticism	-.098	1.501	Refuted	-0.189
PEOU ← consciousness & agreeableness	.083	.806	Refuted	0.140
PEOU ← openness	-.017	-.205	Refuted	-0.031
PEOU ← extraversion	.116	2.142	Accepted	0.268
PEOU ← Culture	.642	3.723	Accepted	0.415

From among all the dimensions of personality, only extraversion had a significant negative effect on PEOU. Extraversion is defined as “Activity and energy level traits, sociability and emotional expressiveness” (Goldberg, 1993, 1981). Therefore, people scoring high in extraversion claim that things are easier to do than those who score low given that they are aiming to give a more socially accepted image. Culture has also a significant positive effect on PEOU. In fact, in Tunisia new information technologies are perceived positively as well as people who adopt it. Accordingly, culture encourages learning about technology and has a positive relationship with perception of ease of use.

## 2.2. Predictors of PU

**Table 9:** The effect of predictors of PU

Hypotheses	Non-standardized regression weight	CR	Results	Standardized regression weight
PU ← PVE	.415	2.535	Accepted	0.268

Perceived value has a significant positive effect on PU. In fact, an important perceived value of higher-education teaching leads to perception of utility of investments in improving methods and ways of teaching. In this vein, Seligman (2001) has proven that PV has a significant positive effect on PU. Yunjie and Shun (2004) also relate

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utilitarian shopping value to usefulness. Therefore thinking of perceived value of the activity is necessary before implementing an e-learning system. Perceived value has to be understood at many levels (social, functional...).

**2.3. Predictors of perceived value**

We try to explore the influence of teacher’s personality on perceived value of higher education. Perceived value is considered as a second order construct. The emergent structure of personality is composed of four dimensions.

**Table 10:** The effect of predictors of perceived value

Hypotheses	Non-standardized regression weight	CR	Results	Standardized regression weight
PVE ← neuroticism	-.053	-1.096	Refuted	-0.150
PVE ← conscientiousness & agreeableness	.147	1.793	Accepted	0.360
PVE ← openness	.160	2.296	Accepted	0.420
PVE ← extraversion	.024	.608	Refuted	0.079

Our results show that only two personality traits have an influence on perceived value. The first one is conscientiousness & agreeableness and the second one is openness. Persons scoring high on conscientiousness are goal-directed, responsible and respectful. Therefore, their perception of perceived value of higher-education is relatively high. Likewise, persons scoring high on agreeableness are altruist, trustful and modest. Therefore, teaching for them is a valued activity given that teaching is a humanistic activity requiring great implication and communication skills. On the other hand, “people high in openness made more extreme self- and ideal-judgments on risky dilemmas” (Olson and Suls, 2000). Furthermore, “more openness leads to more willingness to embrace new concepts and being more careless with respect to new situations and experiences” (Walczuch and Lundgren, 2004).

### 3. Test of the moderator effect

#### 3.1. Test of the moderator effect of innovativeness

To test the moderator role of innovativeness, we split the sample into low and high innovativeness according to the median of responses. We performed multi-group analyses.

**Table 11:** Test of the moderator role of innovativeness

	$\Delta\text{chi}^2$ (df ; p)	Non-standardized regression weight (cr)	
		Low innovativeness (cr)	High innovativeness (cr)
<b>PEOU-intention</b>	2.923 (1 ; 0.087)	-0.023 (-0.185)	0.248 (2.549)

The results show that there is a significant difference between the two groups. In fact, the PEOU-intention link is not significant with low innovativeness group. However, for high innovativeness, the link is positive and significant. When we have tested the second hypothesis (PEOU-intention), we have found a weak standardized regression weight (0.150). This result is hidden by the existence of different groups in the sample. The test of the moderator role of innovativeness shows in fact that this relationship is only pertinent for individuals characterized by high innovativeness. We think that this can be explained by the existence of many innovations that are complicated. People who are interested in these new objects are aware about this fact and relate the ease of use to the intention of adoption in their work. This relationship may be different for hedonic objects.

#### 3.2. Test of the moderator effect of age

Respondents are divided into two groups of age according to the median (more than 30 years and less than 30 years).

**Table 12:** Test of the moderator role of age

	$\Delta\text{chi}^2$ (df ; p)	Non-standardized regression weight (cr)	
		Young	Old
<b>PV-PU</b>	3.299 (1 ; 0.069)	.164 (1.132)	.144 (1.224)
<b>PU-intention</b>	1.095 (1 ; 0.295)	.614 (4.801)	.448 (4.553)

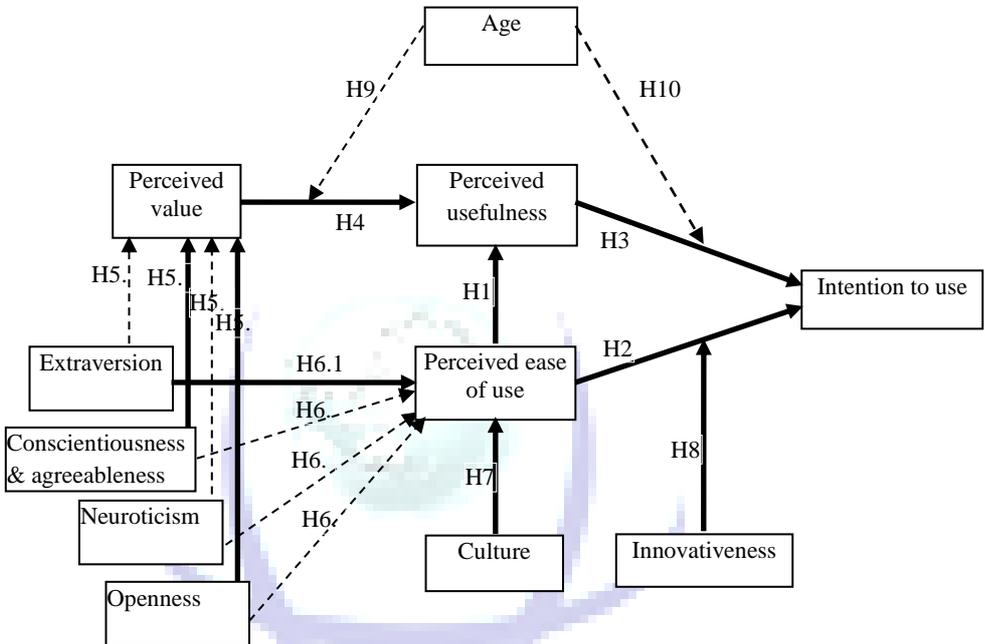
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The moderator role of age is not proven for the relationship between perceived value and perceived usefulness. Age has also no impact on the relationship between perceived usefulness and intention to use. The impact of demographic factors is not object of agreement among researchers. Many studies have refuted this role. Here, age did not have any moderator impact.

### **Conclusion**

TAM was conceived in a developed country. Our results sustain the model in a developing country but we extended the model to incorporate personal and cultural factors which make the difference between people's perceptions across countries. We have also tested the role of perceived value. Straub et al. (1997) have proven that relationships in TAM are different across countries however we have proven that main relationships are sustained and influenced by the moderator role of innovativeness. Perceived ease of use is determined by extraversion and culture. Perceived usefulness is determined by perceived value. Findings are summarized in figure 2.

Therefore, in Tunisia, culture is not a barrier to the adoption of new technologies in teaching. On the contrary, it has a positive impact on perceived ease of use. We think that the categorization developed/developing country does not suffice to determine differences in people's intention to use technology. More interesting are the place of technology and the perception of technological adopters in a society.



**Figure 2:** Summary of findings

Even though perceived value is not usually studied within TAM, we think that it has great potential as an external variable. Some of the dimensions of big five have proven a positive impact on perceived ease of use and perceived value. The innovativeness trait moderates the relationship between perceived ease of use and intention to use but in the opposite direction. In fact, we have found that this relationship is stronger for teachers characterized by high innovativeness. We have explained this surprising result by the utilitarian orientation of the teaching activity. Age did not have any moderator impact.

It is obvious to recommend to conceivers of e-learning platforms to increase the perception of usefulness and ease of use in order to influence intention to use. Teachers who have high perceived value of higher-education and who are more innovative are more likely to adopt the e-learning system. Even though, it is very difficult to influence personality, it is a factor to consider before choosing the educational staff.

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This study has some limitations relevant to the place of data collection. Tunisia may not be representative of all emergent markets. Future researches may duplicate this study to other emergent countries. Furthermore, we have selected a set of variables to extend TAM. These variables are chosen because they can integrate the particularities of the Tunisian sample. However, other variables can be important (technology anxiety, field of specialization of the teacher, motivation...). Rather than studying intention to use, it is possible to study the effective use. This can be the object of future studies.

## References

1. Agarwal, R., & Prasad, J. A. (1998). Conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research*, 9(2), 204-215.
2. Ajzen, I. (1991). The theory of planned behavior. *Organizational Behaviour and Human Decision Processes*, 50(2), 179-211.
3. Ambroise, L., Valette, F. P., Ferrandi, J. M., & Merunka, D. (2003). La construction d'un baromètre de mesure de la personnalité de la marque adapté au contexte français: premiers résultats. In *proceedings of AFM (French Association of Marketing)*, 395-412.
4. Barrett, P. T., Petrides, K. V., Eysenck, S. B. G., & Eysenck, H. J. (1998). The Eysenck personality questionnaire: an examination of the factorial similarity of P, E, N, and L across 34 countries. *Personality and Individual Differences*, 25, 805-881.
5. Barrett, P., & Eysenck, S. (1984). The assessment of personality factors across 25 countries. *Personality and Individual Differences*, 5(6), 615-632.
6. Bethlehem, J. G. (2009). *Applied survey methods: a statistical perspective*. New Jersey :John Wiley & sons, Hoboken..
7. Bolton, R. N., & Drew, J. H. (1991). A multistage model of customers' assessments of service quality and value. *Journal of Consumer Research*, 17(4), 375-384.
8. Bourgonjon, J., Valcke, M., Soetaert, R., & Schellens, T. (2010). Students' perceptions about the use of video games in the classroom, *Computers & Education*, 54, 1145-1156.
9. Brennan, R. (2004). Value in marketing: confusion or illumination?
10. [http://mubs.mdx.ac.uk/Research/Discussion\\_Papers/Marketing/dpap%20marketing%20no25.pdf](http://mubs.mdx.ac.uk/Research/Discussion_Papers/Marketing/dpap%20marketing%20no25.pdf)
11. Brown, R.M., & Mazarrol, T.W. (2009). The importance of institutional image to student satisfaction and loyalty within higher education. *Journal of Higher Education*, 57(1), 81-89.
12. Brown, I. T. J., & Town, C. (2002). Individual and technological factors affecting perceived ease of use of Web-based learning technologies in a developing country. *The Electronic Journal of Information Systems in Developing Countries*, 9(2) 1-15.

13. Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research*, 1, April, 245-276.
14. Cohen, J. A. (1992). Power primer. *Psychological Bulletin*, 112, 155–159.
15. Costa, P. T., & McCrae, R. R. (1995). Domains and facets: hierarchical personality assessment using the revised NEO personality inventory. *Journal of Personality Assessment*, 64(1), 21-50.
16. Dabholkar, P. A., & Bagozzi, R. P. (2002). An attitudinal model of technology-based self-service: Moderating effects of consumer traits and situational factors, *Journal of the Academy of Marketing Science*, 30(3), 184-201.
17. Davis, F. D. (1993). User acceptance of information technology: System characteristics, user perceptions and behavioral impacts. *International Journal of Man-Machine Studies*, 38,475-487.
18. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
19. Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982-1003.
20. Dickson, M. W., Aditya, R. M., & Chhokar, J. S. (2000). Definition and interpretation in cross-cultural organizational culture research: Some pointers from the GLOBE research program. In N. Ashkanasy, C. Wilderom, & M. Petersen (Eds.), *Handbook of Organizational Culture and Climate*, (pp. 447-464). Thousand Oaks, CA: Sage.
21. Evers, V., & Day, D. (1997). The role of culture in interface acceptance. In S. Howard, J. Hammond and G. Lindegaard (Ed), *Human Computer Interaction, Interact'97*. London : Chapman and Hall.
22. Eysenck, H. J. (1992). Four ways five factors are not basic. *Personality and Individual Differences*, 13, 667–673.
23. Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intentions and behavior: an introduction to theory and research*. Boston: Addison-Wesley.
24. Gallarza, M. G., & Saura, I. G. (2006). Value dimensions, perceived value, satisfaction and loyalty: an investigation of university students' travel behavior. *Tourism Management*, 27, 437-452.
25. Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist*, 48, 26-34.
26. Goldberg, L. R. (1981). Language and individual differences: The search for universals in personality lexicons. In L. Wheeler (Ed.), *Review of personality and social psychology*, (Vol. 2, pp. 141-165). Beverly Hills, CA: Sage.
27. Goldsmith, R., & Hofacker, C. (1991). Measuring consumer innovativeness. *Journal of the Academy of Marketing Science*, 19, 209-221.
28. Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis*. 5<sup>th</sup> edition, Upper Saddle River, New Jersey: Prentice Hall.
29. Hendriks, A. J. J. (2003). The five-factor personality inventory: cross-cultural generalizability across 13 countries. *European Journal of Personality*, 17, 347–373.

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30. Hirschman, E. (1980). Innovativeness, novelty seeking and consumer creativity. *Journal of Consumer Research*, 7, 283-295.
31. Hofstede, G. et al. (1990). Measuring organizational cultures: a qualitative and quantitative study across twenty cases. *Administrative Science Quarterly*, 286-316.
32. Holbrook, M. B. (1999). Introduction to consumer value. In Holbrook M.B., *Consumer value: A Framework for Analysis and Research*, London: Routledge, 1-28.
33. John, O. P., & Srivastava. S. (1999). The Big-Five Trait Taxonomy: History, Measurement, and Theoretical Perspectives. In L. Pervin and O.P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed.). New York: Guilford.
34. Keen, C., Wetzels, M., de Ruyter, K., & Feinberg, R. (2004). E-tailers versus retailers: Which factors determine consumer preferences. *Journal of Business Research*, 57, 685–695.
35. Kroeber, A. L., & Kluckhohn, C. (1952). *Culture: A critical review of concepts and definitions*. New York, NY: Vintage Books.
36. LeBlanc, G., & Nguyen, N. (1999). Listening to the customer's voice: Examining perceived service value among business college students. *International Journal of Education*, 13(4), 187-198.
37. Ledden, L., Kalafatis, S. P., & Samouel, P. (2007). The relationship between personal values and perceived value of education. *Journal of Business Research*, 60, 965-997.
38. Liu, I. F., Chen, M. C., Sun, Y. S., Wible, D., & Kuo, C. H., 2010, Extending the TAM model to explore the factors that affect Intention to use an online learning community. *Computers & Education*, 54, 600–610.
39. Lynn, R., & Martin, T. (1995). National differences for thirty-seven nations in extraversion, neuroticism, psychoticism and economic, demographic and other correlates. *Personality and Individual Differences*, 19, 403-406.
40. Malhotra, N. K. (2008). Completion time and response order effects in web surveys. *Public Opinion Quarterly*, 72(5), 914-934.
41. Markus, M. L. (1983). Power, politics, and MIS implementation. *Communications of the ACM*, 26, 6, May, 430-444.
42. Matzler, K., Bidmon, S., & Grabner-Kräuter, S. (2006). Individual determinants of brand affect: the role of the personality traits of extraversion and openness to experience. *Journal of Product & Brand Management*, 15(7), 427-443.
43. McCrae, R. R et al. (2004). Consensual validation of personality traits across cultures. *Journal of Research in Personality*, 38, 179–201.
44. Midgley, D. F, & Dowling, G. R. (1978). Innovativeness: the concept and its measurement, *Journal of Consumer Research*, 4, March, 229-242.
45. Murphy, K. R., & Davidshofer, C. O. (1988). *Psychological testing: Principles and applications*. Englewood Cliffs, NJ: Prentice Hall.
46. Ndubisi, N. O., & Richardson, S. (2002), The entrepreneurs' technology acceptance model. *Academy of Entrepreneurship Journal*. 8(2), 95-114.

47. Olson, B. D., & Suls, J. (2000). Self-, other-, and ideal-judgments of risk and caution as a function of the five-factor model of personality. *Personality and Individual Differences*, 28(3), 425-436.
48. O'Reilly, C. A. et al. (1991). People and organizational culture: a profile comparison approach to assessing person-organization fit. *Academy of Management Journal*, 34(3), 487-516.
49. Ranaweera, C., McDougall, G., & Bansal, H. (2005). A model of online customer behavior during the initial transaction: Moderating effects of customer characteristics. *Marketing Theory*, 5(1), 51-74.
50. Robinson, J. P., Shaver, P. R., & Wrightsman, L. S. (1991). Criteria for scale selection and evaluation. In J.P. Robinson, P.R. Shaver & L.S. Wrightsman (Eds.), *Measures of social psychological attitudes*. (pp.1-16). New York Academic Press.
51. Roca, J. C., & Gagné, M. (2008). Understanding e-learning continuance intention in the workplace: A self-determination theory perspective. *Computers in Human Behavior*, 24, 1585-1604.
52. Roehrich, G. (1994). Innovativités hédoniste et sociale: Proposition d'une échelle de mesure. *Recherche et Application en Marketing*, 10(2), 19-42.
53. Rosen, P. A. (2004). The effect of personal innovativeness in the domain of information technology on the acceptance and use of technology: a working paper. In Proceedings of the 35<sup>th</sup> annual meeting of the decision sciences institute (pp. 6421-6426).
54. Rossiter, J. R. (2002). The C-OAR-SE procedure for scale development in marketing. *International Journal of Research in Marketing*, 19, (4), 305-335.
55. Roussel, P., Durrieu, F., Campoy, E., & El Akremi, A. (2002). *Méthodes d'équations structurelles: Recherche et applications en gestion*. Paris: Economica edition.
56. Saadé, R., & Bahli, B. (2005). The impact of cognitive absorption on perceived usefulness and perceived ease of use in on-line learning: An extension of the technology acceptance model. *Information & Management*, 42(2) 317-327.
57. Saucier, G., Hampson, S. E., & Goldberg, L. R. (2000). Cross-language studies of lexical personality factors. In S.E. Hampson (Ed.), *Advances in personality psychology*, 1(1)-36. Philadelphia: Taylor & Francis.
58. Seligman, L. S. (2001). Perceived value impact as an antecedent of perceived usefulness, perceived ease of use, and attitude: A perspective on the influence of values on technology acceptance. Doctoral dissertation. University of Texas at Austin.
59. Sheth, J. N., Newman, B. I., & Gross, B. L. (1991). Why we buy what we buy: a theory of consumption values. *Journal of Business Research*, 22(2), 159-170.
60. Stevens, J. (1996). *Applied multivariate statistics for the social sciences*. 3<sup>rd</sup> ed., Mahwah, NJ: Erlbaum.

**4th International Future-Learning Conference on  
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62. Straub, D., Keil, M., & Brenner, W. (1997). Testing the technology acceptance model across cultures: A three country study. *Information & Management*, 33(1), 1-11.
63. Sweeney J. C., & Soutar G. N. (2001). Consumer perceived value: The development of a multiple item scale. *Journal of Retailing*, 77, 203–222.
64. Touzani, M., & Allagui, A. (2003) : Comparaison des propriétés psychométriques de trois échelles de mesure de l'innovativité. In Proceedings of ATSG (Tunisian Association of Sciences of Management), Tunis, February 20-23.
65. Venkatesh, V., Maruping, L. M., & Brown, S. A. (2006), Role of time in self-prediction of behavior. *Organizational Behavior and Human Decision Processes*, 100(2), 160-76.
66. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.
67. Walczuch, R., & Lundgren, H. (2004). Psychological antecedents of institution-based consumer trust in e-retailing. *Information & Management*, 42, 159–177.
68. Westland, J. C. (2010). Lower bounds on sample size in structural equation modeling. *Electronic Commerce Research and Applications*, 9(6), 476-487.
69. Woodruff, R. B. (1997). Customer value: The next source for competitive advantage, *Journal of the Academy of Marketing Science*, 25(2), 139-53.
70. Woodruff, R. B., & Gardial S. F. (1996). *Know your customer: New approaches to understanding customer value and satisfaction*, Cambridge, MA: Blackwell Publishers.
71. Wu, I. L., & Chen, J. L. (2005). An extension of trust and TAM model with TPB in the initial adoption of on-line tax: An empirical study. *International Journal of Human-Computer Studies*, 62, 784-808.
72. Yunjie, X., & Shun, C. A conceptual model of customer value in e-commerce.
73. <http://is2.lse.ac.uk/asp/aspecis/20040178.pdf>
74. Zeithaml, V. A. (1988). Consumer perceptions of price, quality and value: A means-end model and synthesis of evidence. *Journal of Marketing*, 52, 2-22.

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## **Discussion of e-Learning Strategies for Moderation and Assessment**

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***Abstract:** Together with the evolution of information and communication technologies, there are many synchronised and asynchronised moderation approaches together with e-assessment strategies that are already being used by many institutions. Since the e-learning environment is the learning management system based on web technologies and Internet connection, the design of a learning environment in harmony with suitable tools and methods, is one of the important aspects of e-Learning. Selection of both teaching and assessment techniques may directly have effect on the success of the process and the product. Being aware of the importance of combination of teaching and evaluation activities for effective learning, this paper tries to reveal the preferences of instructors and students in terms of moderation and assessment approaches. In order to reveal possible outcomes of the applied strategies and their possible impact on learning outcomes, a case study is conducted based on a survey approach to gather e-tutors and e-learners' points of view. Based on the emerging themes after qualitative data analysis in line with the literature, it is obvious that the integration of existing theoretical approaches, instructional methods and techniques is in its infancy and a new era is just starting.*

**Keywords:** e-Learning strategies, e-assessment, effectiveness of e-learning

### **Introduction**

Together with the evolution of information and communication technologies, there are many synchronised and asynchronised moderation approaches together with e-assessment strategies that are already being used by many institutions. By e-moderation approaches we are referring to a learning management system which consists of many ICT options like virtual classroom applications, forums, chats, blogs, wikis, social networks, together with many kinds of learning environments and materials. On the other hand, there are also many e-assessment approaches that can be integrated into teaching-learning processes for evaluation purposes, such as; using e-portfolios, projects, homework, quizzes, discussion processes, tests, presentations, and collaborative work.

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However, the pros and cons of these technologies, coupled with the decisions of where, when and why to choose each medium are still unanswered questions. Since the learning environment is the learning management system based on web technologies and Internet connection, the design of a learning environment in harmony with suitable tools and methods, is one of the important aspects of e-Learning. Selection of both teaching and assessment techniques may directly have effect on the success of the process and the product. Thus, instructional design can play an important role on the achievement levels of learners. Being aware of the importance of the combination of teaching and evaluation activities for effective learning, this paper tried to reveal the preferences of instructors and students in terms of moderation and assessment approaches.

### **e-Teaching and e-Assessment Strategies**

The concept of “e-learning” has been defined in many different ways by many researchers. However, it can simply be described as a learning process occurring in web-based environments, connected to the Internet, where learners can access learning resources online, and interact and communicate with their instructors and peers through online tools (Oakley, 2000).

Universities need to make sure that their students acquire the necessary skills for themselves and their future users, and these universities should also focus on pedagogies and learning designs based on technology and social media (Dumont, 2002). Durham University (2012) in its e-learning strategy work emphasizes potential benefits of e-Learning as a means to (1) achieve a more student centred and personalized approach to learning and (2) help students gain greater levels of control in the management of their own learning. According to Wang (2007), the main advantage of e-Learning is that it overcomes the limits of time and space and provides learners opportunities to perform self-directed learning. However, it also lacks the teacher supervision of traditional teaching and makes learners feel isolated and disconnected. Thus, learners in an e-Learning environment must be highly self-regulated and independent, otherwise their e-Learning effectiveness may be low (Kauffman, 2004). If

an e-Learning environment offers strategies to encourage learners to become highly self-regulated, it will help them enjoy better learning effectiveness (Wang, 2011, p. 1081).

These potential benefits will have more meaning within a well-designed e-learning programme or course if; it is learner centric, it includes shared responsibility between trainers and learners, it is in the form of blended instruction, it is flexible and interactive, it is easy to use, it contains various relevant content and supportive materials, and it provides feedback and assessment (Childs, Blenkinsopp, Hall & Walton, 2005; Kenneth & Page, 2009; Purvis, 2011).

Previous researches have noticed the role of learning strategies in Internet-based learning. It has been observed that student learning strategy is one of the factors impacting student online learning achievement (Shih, Ingevritsen, Pleasants, Flickinger & Brown, 1998). Wallace (2000) and his colleagues indicate that online information seeking is a complex and difficult process for students and developing students' understanding of content through use of the Internet is a challenge for students and teachers. Tsai and Tsai (2003) further report that student Internet self-efficacy and metacognitive strategies play important roles in student online inquiry learning. Ligorio (2001) considers that the various communication styles integrated into online learning activities are valued only when students are aware of the technologies and tools associated with each communication style. For example, Frank and his colleagues (2003) examined the process of online learning via e-mail for elementary students and concluded that students encountered technological problems and social problems. Technological problems included anxiety regarding using computers for learning, difficulties in using email and the Internet to complete homework, and the difficulty of solving problems when computer systems are down. Regarding social problems, the most significant social problems related to feelings of isolation resulting from online learning. Most elementary students still needed parental help to finish their homework. Lee (2001) examined the styles of learners accustomed to online learning environments and further found that students who recognized online learning may have poor online learning achievement. These literatures imply that online learners are challenged by new

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problems which they may have never encountered before in traditional learning environments; for example, how to handle the feelings of isolation and how to solve online technological problems by themselves (Tsai, 2009, p. 34).

In any learning process one of the three attributes or their combination is/are imparted to the learners. They are; (1) knowledge, (2) skills and (3) attitude. Knowledge is the psychological result of perception and reasoning. Skill is an ability that has been acquired by training. Attitude is a mind-set that represents an individual's behavior or belief towards a matter. If designed and delivered correctly, e-learning can impart all these attributes. The real challenge in e-learning is keeping in mind the people for whom it is designed and what attributes are to be delivered. Hence, it is important to adopt different instructional methods and techniques for improving the quality in virtual teaching platforms. Gülbahar & Kalelioğlu (2009) found Socrates method as one that is the effective among others (brain storming, six thinking heads etc.) that fosters critical thinking. There are hundreds of instructional methods and techniques that can be adopted and tested in virtual environments in terms of effectiveness and efficiency.

## **Method**

In order to reveal possible outcomes of the applied strategies and their possible impact on learning outcomes, a case study was conducted based on a survey approach to gather e-tutors and e-learners' points of view.

## **Sample**

A total of 7 e-tutors from various disciplines at a state university, and 14 of their students who volunteered to participate in this research, formed the sample for this research. The e-tutors are experienced in e-Learning and the students are also experienced users in terms of e-Learning tools and techniques.

## **Data Collection Instrument**

A questionnaire consisting of 9 open-ended and check type questions was used to gather data from e-tutors.

In the first part, there were 5 multiple choice questions in which participants could select all the choices that are applicable for them. The scope of the questions was as follows:

1. Possible instructional design theories, methods and techniques that e-tutors are using in e-Learning processes;
2. Possible multimedia applications they are using to deliver their content;
3. Possible software and web standards they prefer;
4. Possible communication tools they are using to create interaction, and;
5. Possible evaluation strategies they use for process and product evaluation.

In addition to multiple choice, there were 4 open-ended questions:

1. Which instructional approaches and techniques do you prefer in your e-Learning courses?
2. Which measurement and evaluation methods do you prefer in your e-Learning courses?
3. Do you have any expectations in terms of content delivery and evaluation aspects in your e-Learning courses? If yes, please explain these in detail?
4. Do you face any obstacles during the management of e-Learning processes? If yes, what are these?

## **Data Analysis**

The gathered data was analysed and discussed under the light of the facts that emerged from recent literature. Quantitative data were analysed inductively based on emerging themes.

## **Findings**

### **Perceptions of e-Tutors**

As an opening question, e-Tutors were asked which instructional approaches, methods and techniques they were using. In terms of instructional approaches, the most preferred were cognitive approaches followed by humanistic approaches. Behaviourist and constructivist approaches were less preferred and none of the instructors used connectivism, a new approach for social network environments (Downes, 2007). It is obvious that although the teaching-learning environment is virtual and definitely different from face-to-face environments, the approaches used are very traditional.

When the instructors were asked which instructional methods they use mostly, it was found that presentation was the leading method used. Then, demonstration, case studies, question and answer was stated as the most used methods, which in fact shows how limited the instructors' perceptions are in terms of the application of different methods into virtual environments. Problem solving and discussion were found to be the most preferred instructional techniques among participants. Simulation, brain-storming and programmed instruction were the other techniques used for teaching purposes in virtual environments. It is not surprising that these techniques were stated when the most preferred instructional approaches were cognitive. Hence, both techniques are quite easy to implement in virtual learning environments with success.

When the instructors were asked about their preference of multimedia applications, text and graphics, presentation, videos and other web-based resources were listed in the order of priority. Although providing text is not the intention of web-based instruction, it is seen that providing text with graphics is the way that instructors deliver their content. In fact, providing text and graphics is not a multimedia application, which means that instructors rarely use multimedia content for delivery of their courses.

In terms of communication tools, the findings revealed that the instructors are mostly using virtual classroom to create interaction. The other preferred communication tools were e-mail and forum. It is seen that social media and audio-video conference and chat-rooms are rarely preferred by instructors. About the instructors' applications, it is

seen that they both try to communicate with synchronous and asynchronous interaction at the same time.

When instructors are asked about their preferences for evaluation performance and success, it is again seen that they prefer traditional methods for virtual environments like homework and face-to-face exams. Discussion forums and online exams are also used by instructors for evaluation purposes. Simulation, demonstration and problem-solving were found to have the potential to be used by instructors. This can be interpreted that the instructors are willing to use more cognitive methods when delivering their instruction.

Instructors stated online exams and project development as their intended approaches for evaluating the achievement of students. This result reveals the fact that instructors want to evaluate student success mostly by using virtual environments, which in fact is consistent with the aims of e-Learning. The analysis of the answers regarding the future expectation of instructors showed that they mostly expect more interactive learning environments. Process evaluation, more collaborative work and enrichment of the delivered content in terms of multimedia applications were also listed among the expectations.

As a last question, instructors were asked about the obstacles they faced. They mostly pointed out the inefficiency of the virtual classroom in terms of technical deficits and inefficiency of interaction. Low attendances in virtual classrooms were also reported to be a problem by some instructors.

### **Perceptions of e-Students**

Students were also asked 4 open-ended questions to explore the phenomenon from a different point of view. First, their opinions about expectations of instructional methods and techniques were solicited. The findings were quite surprising in that the students would be happiest to eradicate technical problems, but this situation stopped them from considering the different possibilities of accessing instruction. Only 3 students stated that

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they prefer hands-on experience and face-to-face instruction during the process. Moreover, 3 students stated their wish about accessing e-content offline.

Measurement and evaluation preferences of students showed convergence on the use of electronic assessment. The students declared that they want homework and online exams for evaluation purposes besides alternative assessments like forum, survey and self-evaluation tests after each unit. Most of them stated that they prefer all the assessment processes to be online. One of the students also wanted to have a one week face-to-face instruction before the final exam.

Student's expectations about accessibility of e-content were mainly focused on the technological aspects that they face during virtual classroom hours. They stated technical problems as being the most important influence on their learning outcomes. In fact, the 14 students whose perceptions are summarised here are the ones who frequently visit the system and try to attend the virtual classrooms regularly. Due to various reasons, others showed a tendency to lean toward individual learning and self-study. While interpreting the findings, this fact should be kept in mind.

## **Discussion and Conclusion**

In order to facilitate the continued and effective integration of e-Learning and increasing the quality of e-Learning processes, educational institutions should explore potential ways to promote and encourage innovation in online learning, assessment, support and feedback mechanisms. Based on the implementations and outcomes from these innovations and interventions, new ways of effective teaching and learning, together with good practices should be explored and disseminated for enhancing the quality of online instruction. These new and emerging approaches will form the knowledge base for a theoretical framework in this new virtual learning environment.

Based on the emerging themes after qualitative data analysis in line with the literature, it is obvious that the integration of existing theoretical approaches, instructional methods and techniques are in its infancy and a new era is just starting. Although this study is a very small-scale case study, it showed us the fact that the e-

moderation and e-assessment strategies used are the same as for traditional learning environments, which in fact contradicts with the philosophy of online instruction. The analysis of the findings showed that instructors are using very limited approaches and very limited types of e-content. Results also showed that students have diverse expectations but the important point is to overcome technical problems. E-Learning approaches should be designed in a way to handle different student expectations otherwise the learning expectations will not be met and this fact puts a huge responsibility on the instructors. Keeping in mind these facts, students should be provided with more rich applications and instructors should devote more time to evaluating the learning process and learning outcomes, as well as student achievement.

Knowing that there is no one true recipe for any course given via any method, some tools, strategies and approaches should be used in harmony for effective teaching and some dimensions should be made clear to e-tutors from various aspects. As a result, developing a roadmap for reaching the right decision before implementation might be useful for instructors. To reach that goal, research should continue in order to reveal the most effective implementations in e-Learning platforms.

## **References**

1. Purvis, A.J., Aspden, L.J., Bannister, P.W., & Helm, P.A. (2011). Assessment strategies to support higher level learning in blended delivery. *Innovations in Education and Teaching International*, 48( 1), 91–100.
2. Childs, S., Blenkinsopp, E., Hall, A., Walton, G. (2005). Effective e-learning for health professionals and students—barriers and their solutions. A systematic review of the literature—findings from the HeXL Project. *Health Information & Libraries Journal*, 22(2), 20–32.
3. Downes, S. 2007. What connectivism is. [Weblog entry, February 3.] Half an Hour. URL: <http://halfanhour.blogspot.com/2007/02/what-connectivism-is.html>.
4. DuMont, R. R. (2002). Distance learning: A systems view (an assessment and review of the
5. Durham University. (2012). e-Learning Strategies, Learning and Teaching Handbook. URL: <http://www.dur.ac.uk/learningandteaching.handbook/7/3/1/>
6. Frank, M., Reich, N., & Humphreys, K. (2003). Respecting the human needs of students in the development of elearning. *Computers & Education*, 40 (1), 57-70.

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Innovations in Learning for the Future 2012: e-Learning  
Future-Learning 2012, Nov. 14-16, İstanbul**

7. Gülbahar, Y. & Kalelioğlu, F. (2009). Tartışmaya Dayalı Öğretim Yöntem ve Tekniklerinin Çevrimiçi Öğrenme Ortamlarına Uyarlanması. 9th International Educational Technology Conference, Ankara, Turkey, p. 203-209.
8. Kauffman, D.F. (2004). Self-regulated learning in web-based environments: instructional tools designed to facilitate cognitive strategy use, metacognitive processing, and motivational beliefs. *Journal of Educational Computing Research*, 30 (1&2), 139–161
9. Kenneth, F., Page, K.(2009). *Delivering E-learning : A Complete Strategy for Design, Application and Assessment*. eBook.
10. Lee, M. G. (2001). Profiling students' adaptation styles in Web-based learning. *Computers & Education*, 36 (2), 121- 132.
11. Ligorio, M. B. (2001). Integrating communication formats: Synchronous versus asynchronous and text-based versus visual. *Computers & Education*, 37 (2), 103-125.
12. literature). Kent, OH: Kent State University. Accessed from October 22, 2012, from <http://www.lib.montana.edu/~alivy/dist.html#Evaluation>.
13. Oakley, B. (2000). "Learning Effectiveness: An Introduction". In J. Bourne, (ed.), *On-line Education: Learning Effectiveness and Faculty Satisfaction*. Proceedings of the 1999 Sloan Summer Workshop. Nashville: ALN Center, Vanderbilt University.
14. Shih, C. C., Ingebritsen, T., Pleasants, J., Flickinger, K., & Brown, G. (1998). The Role of Live, Online Collaboration in Distance Learning. ERIC, ED422876.
15. Sugaraj S.R., Subhashini, A. (2011). E-learning, the next big name in education. *Indian Journal of Science & Technology*. 4 (3), 173-176.
16. Tsai, M.-J. (2009). The Model of Strategic e-Learning: Understanding and Evaluating Student e-Learning from Metacognitive Perspectives. *Educational Technology & Society*, 12 (1), 34–48.
17. Wallace, R. M., Kupperman, J., Krajcik, J., & Soloway, E. (2000). Science on the web: students online in a sixthgrade classroom. *The Journal of the Learning Sciences*, 9 (1), 75–104.
18. Wang, T.H. (2011). Developing Web-based assessment strategies for facilitating junior high school students to perform self-regulated learning in an e-Learning environment. *57(2)*, 1801–1812.
19. Wang, T.H. (2007). Web-based quiz-game-like formative assessment: Development and evaluation. *Computers & Education*, 51 (3), 1247–1263.

## Forming a Virtual Material Lab

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**Abstract:** *Theoretical knowledge taught to students in Faculties of Engineering and Technical Education in chapter lectures needs to be reinforced by applying them in the laboratory or supporting them by simulations. In the formation of a laboratory; restrictions such as appropriate physical environment, time, expensive equipment supply and security are encountered. These restrictions bring out the need to search for appropriate alternatives. It is possible to design experiments independent to space, time and high costs as virtual lab simulations, being an alternative to conventional laboratories. Although the use of virtual laboratories in education does not replace the traditional laboratories, they can be considered as supportive to education. Material laboratory is needed to study science of materials effectively. But most of the universities do not have laboratories or enough materials to be used. Students have difficulties in such cases. Even if there is not any lack of equipment in laboratories, students have a hard time learning the application. Students will have a previous knowledge before going to laboratory by using multimedia techniques (showing pictures, playing videos, sounds etc...). Passing the subjects of science of materials to students by showing pictures and animations will make the education easier, more understandable and permanent, and therefore it will contribute to students' success. The purpose of this study is to improve the quality of Materials Science course using the multimedia features in the face-to-face education. In recent years, multimedia is becoming a whole new way of educational environment. Its role in education is giving more importance to active participation learning rather than passive rote learning. In classes where multimedia methods are used, with the combination of audio-visual aids and animated video games, communication is functioning as entertainment. Therefore, applications being informative as well as fun, offers students an enjoyable learning environment. Within the scope of the study, an education material was created using animations, pictures, graphics and course content. By the help of this material, we can teach the basic subjects and the experiments of the materials science lesson and make them more memorable. And we can support students to get previous research of the subject before going to class at the faculties where they haven't got labs. At the first stage of the study, local and foreign literature was scanned, the information were gathered together and the notes of materials science lesson that students can use have been collected. Later, animations were prepared using the programs "Macromedia Flash, Swish and Java" to use in teaching, according to subjects of the lesson. The animations which have been taken from the local or foreign websites were also used for this purpose. A comprehensive educational material including the material science subjects was prepared using the notes, animations, pictures, graphics and documents such as animated .gif. These were brought together using Dreamweaver and Frontpage programs with the HTML code. The shapes and graphics of materials science subjects are difficult and complex to draw on the board. Using the virtual laboratory, no time is wasted by drawing the figures and graphics on the board and topics are presented to students more quickly, more understandably and in a fun learning environment. With this study, students will intensify the virtual laboratory simulations of the experiment and will be more able to adapt in real laboratory environment that has time limitations, and will be able to remake the experiments that they did not understand so it will help them make the experiments more memorable. Even after the completion of training period, this study will serve as an instrument for the students in their personal learning environments. Presentation of the experiments and different material properties enables the students to learn by seeing and understanding. This developed material supports the improvement of education quality both in face to face education and distance education.*

**Keywords:** Virtual lab, materials science, animation, computer assisted instruction.

## **Introduction**

Traditional teaching-learning environments, crowded classes and the limitation of time and education environment affect the participation of students to the learning process negatively. Usage of computers in education is an effective method to overcome these problems [10]. Computers can provide new materials to students based on one-on-one basis and prepare exercises regarding these materials. Computers can correct the answers the students give to these exercises, they also can help follow up the materials to eliminate inadequacies observed in students and correct the misunderstandings caused by the exercises [12]. Computers, beyond comparison, have more speed, feedback and versatility than other teaching methods [15]. Computers help use educational time in an efficient way. Students spend their limited time by doing efficient activities. The students are rewarded automatically for every learning activity they are engaged in [7]. Transfer of educational contents or activities via computers is called computer assisted instruction. Computer assisted instruction both increases the success and helps improve the high level thinking skills of the students. Thus, students learn by comprehending rather than memorizing [4]. Computer assisted instruction provides easy access to information with internet and education packages, explanatory information, examples and skill practice opportunity [17]. When the teachers giving computer assisted instruction are asked about the advantages of this education model compared to the traditional education, these are the answers: ‘‘there is more time to discuss the subject with students, it is possible to analyze the subject more profoundly and complicated subjects are taught more easily’’ [5]. With the development of technology, virtual lab applications in the field of computer assisted instruction are becoming more widespread today.

A virtual lab can be defined as a computer environment providing interactive learning in experiments needed to be conducted to gain application experience in education. Virtual lab usage tends to be increasing rapidly in the engineering departments of higher education institutions. Ögüt et. al. (2004), created a source made up of animations to support ‘‘Agricultural Tractors’’ course taught in their study, called

‘‘E-Education with Computer Assisted, Web- enabled, Interactive Education CD’’. With this source, the subjects are made memorable by supporting the visual learning methods, which are used in order to prevent subjects remain a theory, with animations. Thus, it was aimed that the students can repeat this course in a computer environment, independent to space [16]. In his research called An Integrated Virtual Learning System for the Development of Motor Drive System, Keyhani (2002) conducted the power electronics laboratory experiments, which the engineering students have difficulties in, in a web-based, real-time virtual lab environment. It was observed that the application at the end of the study made it easier for students to comprehend complicated concepts [9]. In their study Akin et. al. (2003) managed to run a machine with a driver by using LabView program and made it possible to analyze every detail of the system. This will help working with a much more comprehensive structure of instruments which otherwise would remain a closed box in a real laboratory. For that reason, a virtual lab built by creating simulations of all electric machinery will not only be a help in terms of cost, but it will also help make the experiments more comprehensible for students [1].

Kantar (2002) conducted a research about the effects of multimedia usage in 8-Grade Science lesson on the success and attitudes of the students. In this study, a Science lesson subject was planned using a systematic teaching method different from traditional teaching planning and multimedia was included in the learning environment. While lessons were taught traditionally with a plain expression and laboratory studies in the control group, lessons were taught in a computer assisted electronic classroom where appropriate software programs could be used in the experimental group. Later, tests were done in both groups. An increase in favor of the experimental group was observed when the averages of both groups were compared [8]. A virtual lab was developed for the virtual creation and configuration of computer networks, which is of great importance in Computer Engineering. All kinds of configurations can be made with such a network structure consisting of computers, keys and routers as if working on a real network on a computer. Besides being beneficial in terms of cost, this structure provides an easier understanding of the whole structure visually. Moreover, as there is no harm of doing

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wrong configurations, such an application would help students with comprehension and gaining experience [3]. Computer-based tools give the students a chance to start the experiment, follow the procedure, complete the experiment, collect analysis data and evaluate findings. This educational tool decreases the dependence of the students to the teachers and forces the teacher to make the learning process more meaningful. It makes the students decide and there may be right or wrong outcomes of the observation of results. But in the end of the experiment, the students may have made a good observation [6]. Students can bring the learning process out of the campus. They wouldn't be dependent on just school and classes [13]. Being one of the basic science lessons, Material Science is extremely important in training technical personnel [1]. There are some difficulties in teaching material science. It is possible to list these difficulties as follows;

- Most of the students are not familiar with the Material Science terminology
- Most of the subjects in Material Science lessons, should be demonstrated with three-dimensional presentations rather than drawings. For example subjects such as crystal lattice, atomic structure, phase diagram etc. are hard to explain with drawings on boards and it is also hard for the students to envision these subjects.
- The infrastructure required for Material science application classes is impotent. [2]  
[11]

For the reasons mentioned above and some other similar reasons, the students usually leave classes without fully comprehending the subjects explained in lessons.

This study aims that the 'Material Science' lesson in bachelor degree level schools are taught by using computer assisted animation and web technique and it aims to increase student success rates by using these techniques in the visual introduction of expensive, unavailable equipment and materials and in the application of experiments. In the study, a visual lab education package is created, consisting of two-dimensional animations made by using lecture notes on the basic Material Science subjects, pictures, application programs, graphics, animated GIFs and Adobe Flash program. It is aimed that with this package, the basic subjects and experiments of 'Material Science' class can

be taught in bachelor degree level units that don't have a laboratory or in the schools with laboratories this can give the students a chance to make a preliminary research on the subjects before class. Besides, it is anticipated that student success will increase by creating an opportunity to repeat this class outside the campus. An extensive literature review was made for this study.

Lecture notes and animations from the web-sites of different universities from especially U.S.A. and England were analyzed. Some problems such as disarrangement and limited range of subjects were detected in the sources found. This improved study covers the basic subjects of Material Science extensively. William D. Callister's "Fundamentals of Materials Science and Engineering" and "Materials Science and Engineering", Mehmet ERDOĞAN's Material Science and Engineering Materials Volume 1-2, Temel SAVAŞKAN's Material Science and Examination, Eyüp Sabri KAYALI's Mechanical Experiments of Metallic Materials and Emel GENÇKİNLİ's Metallography were made use of. Material Science lesson lecture notes and animations from Universities of Tennessee, Ohio State, Budapest, British Columbia, Florida, Texas, Kansas, Pennsylvania, North Carolina State, Notre Dame, Oxford, Cambridge, Monash, National Chung Hsing etc. were obtained through online research. Moreover, lecture notes and animations relevant to the subject obtained from the e-education web-site of Afyon Kocatepe University, Technical Education School [17] and a thesis titled as "Multimedia Usage in Materials Science Education" from Süleyman Demirel University Library, were used in this study [2].

The virtual labs created, will significantly decrease costs, increase the quality of education and will easily be updated. Real lab environments are, without a doubt, essential in gaining experience and supporting knowledge. However, when the reasons and benefits of the utilization of these virtual labs are taken into consideration, it is anticipated that they will support education.

## **Virtual Lab**

### **Virtual Lab Education Package Main Page Interface**

Developed virtual lab software main page interface is displayed in Figure 1. When the Subjects button is clicked, a total of 23 subjects including basic subjects of Material Science under the title of 5 laboratories are listed.



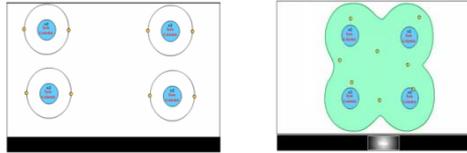
**Figure 1:** Virtual lab education package main page interface [14]

Foreign web-sites utilized are included in the Links section while virtual labs with national and international web sites including Material Science subjects are being formed. Sources used in the preparation of the study are included under the Sources section.

### **Developed Virtual Lab Model Applications**

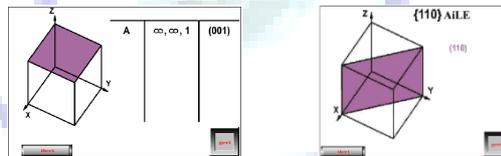
Some examples of animations developed in this study regarding Material Science basic subjects are given in this section. The images and graphics in this study were drawn with the help of programs such as Autocad, Photoshop etc. by using computers. Some images and animations were obtained from different sources and updated before using. Images and graphics were tried to be designed as colorful as possible. Software such as Macromedia Flash, Swish and Java were particularly utilized during the preparation of the animations. Different animations and movies about materials science basic subjects were analyzed on local and foreign web-sites. Features such as taking up less space in the computer memory, watching in full-screen mode, stopping, rewinding and forwarding etc. were improved to enable better control of the existing features. Lecture notes, graphics, images, animated GIFs and two-dimensional animations were combined with Dreamweaver program using html codes and the virtual lab education package was

created.



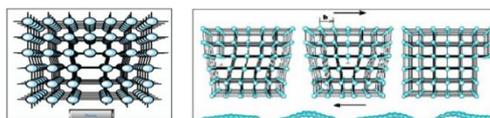
**Figure 2:** Magnesium covalent bound animation [14].

In the animation displayed in Figure 2, magnesium covalent bound formation is displayed. As there are not enough number of electrons on the valance shell, four Mg atoms share two electrons each to become stable.



**Figure 3:** a) Six different planes in cubic crystal lattice b)  $\{110\}$  Plane family and its members [14].

In figure 3.a, six different planes are designed and these planes come one after another by pushing the buttons. Besides, when these planes are displayed on the screen, the length of the line segments separated by these planes (x, y, and z) and miller indices can be seen in the tables on the right side. Thus, numerous planes can be reflected visually. There is an equivalent planes family in symmetrical crystals. Especially in highly symmetrical cubic systems, there are many equivalent planes. In the animation in Figure 3.b,  $\{110\}$  plane family and its members are displayed separately on the same center line as an example to the plane families, by clicking on the forward button.

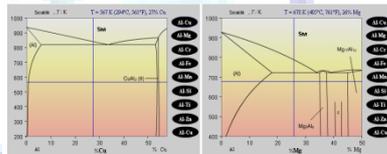


**Figure 4:** Schematic display of linear errors [14]

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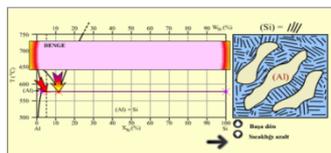
Edge dislocation is shaped like the edge of a lacking plane between atomic planes in crystal lattice. It can also be formed by removing one or two lines of atomic layers from a perfect crystal. Different positions of the animation showing edge dislocation is displayed in Figure 4. Besides, the similarity between the movement of a creature (worm) and the movement of the atoms in the material due to the edge dislocation is shown.

In binary alloy systems which can dissolve each other to a limited scale, in a constant temperature, liquid phase turns into two separate solid phases. This transformation is called eutectoid reaction.



**Figure 5:** Binary equilibrium diagram [14]

In the animation shown in Figure 5, binary equilibrium diagrams of Al-Cu, Al-Mg, Al-Cr, Al-Fe, Al-Mn, Al-Si, Al-Ti, Al-Zn alloys are demonstrated. As shown in the figures, these nine different alloys are loaded to the buttons located in the same window. Whenever these buttons are clicked, the binary equilibrium diagram of the alloy, whose name is on the button, is displayed. By moving the mouse over the equilibrium diagrams, depending on the location of the mouse cursor, temperature (oK, oC, oF) and the percentage rates of the alloys can be seen on the upper-right side of the screen. These rates can sensitively change with even the slightest movement of the mouse. Thus, values regarding these nine alloys can be measured without any need for calculation.



**Figure 6:** Al-Si alloy equilibrium diagram [14].

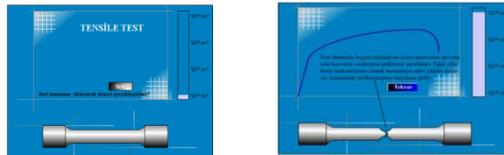
In the animation in Figure 6, Al-Si alloy equilibrium diagram is shown. In this equilibrium diagram temperature range is considered as 750-500 °C by clicking on the lower temperature, return arrows located on the lower-right side of the window, micro structures within this temperature range can be seen on the microstructure window on the right.

Tensile tests are widely conducted in order to determine the basic design information of the material strength and to be able to classify materials according to their properties.



**Figure 7:** Tensile test device [14].

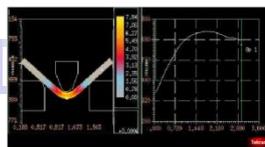
Animation in Figure 7 explains the structure of tensile test device and user control panel and how the tensile test is conducted in general terms. First of all, the tensile test device is prepared for application in this animation. Test sample is placed on the holder part of the device and then the control panel is proceeded to. Firstly, the protection button on the control panel is pressed. This button makes sure that the test value is loaded to the sample, the sample is ready for test and that the sample doesn't get damaged. The light on the button indicates whether the product protection program is active or not. After that, sample positioning is done with the help of up and down arrows located on the right-bottom corner. The light indicator next to the start button shows us whether the mobile mechanism is going up or down. The test is ended by pressing the stop button, when the sample breakdown takes place. Finally return button is pressed and the device is returned to the starting position again. Besides, it is possible to see what the buttons on the panel are used for with their explanations by moving the mouse over the control panel in the animation.



**Figure 8:** Tensile test sample deformation animation [14].

The animation in Figure 8 is created in order to see the deformation on the tensile test sample in details and simultaneously explain the deformation and tension- strain graphics. When the ‘next’ button is pressed, a specific deformation occurs in the sample and this deformation curve is formed in the tension- strain graphic. This curve represents the elastic behavior. Elongation is directly proportioned to strength. When the ‘next’ button is hit again, the sample elongates some more and it is indicated in the graphic that the yield point is exceeded and plastic deformation started. In the fourth phase, the instability condition occurs and constriction appears in any part of the sample. This incident is called waisting. The strength is needed to be decreased for the continuation of elongation after the waisting. If constant load is hung on the sample as loading mechanism, sudden breakdown occurs.

Bending is defined as the deformation occurring after force is applied to a circular or rectangular sectioned sample placed independently on two supports. In the bending tests, rectangular or circular section bars and beams supported from both ends are used (Figure 9).



**Figure 9:** Bending test animation [14].

Here, load is applied slowly on a rectangular section sample placed between two supports based on the center of gravity. The deformation occurring in the sample proceeds gradually and the intensity of the deformation is indicated with blue, red and

yellow respectively. Also, tension- strain graphic moves along with the deformation in the sample simultaneously.

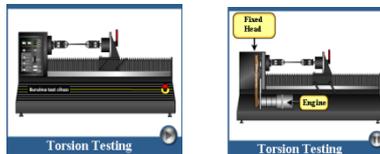


Figure 10: Torsion test animation [14].

In the animation shown in Figure 10, the parts of the torsion test device and the making of the test are explained. First, the sample is placed on the testing device. Then the engine is powered-up by pressing the start button on the control panel. The sample is forced to torsion because of the belt and pulley mechanism and after a certain amount of torsion according to the sample being brittle or ductile, breakdown occurs in the sample.

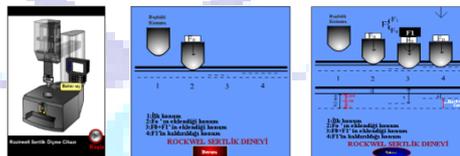
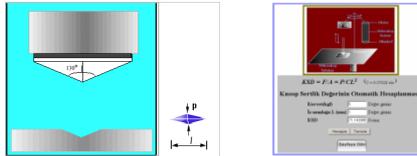


Figure 11: Rockwell hardness test animation [14].

In the animation displayed for the Rockwell hardness test, firstly the preload loading is done with a  $F_0=10\text{kg}$  load. By this means, the stinging pin settles on the sample and keeps it in place. In the second step, the dial of the measuring scale is adjusted to zero and the bigger load is applied. This bigger load is the total load applied and the depth measurement depends on the depth caused by the increase between the smaller load and the bigger one. After the bigger load is applied and removed, the value on the dial with the small load still applied is read according to the standard process.

In the upper part of the program seen in Figure 12, an example of a micro hardness test is displayed schematically. Here, force is applied to a rectangular section

sample with a square-based- pyramid pin and the diagonal line length of the emerging indentation is measured.



**Figure 12:** a) Micro hardness test animation. b) Micro hardness calculation program [14].

As a result, the required formula for calculating the micro hardness value based on the trace obtained is shown in Figure 19.b. Moreover, micro hardness value formula has been turned into a practical program in order to avoid miscalculations and to save time. In this program the knoop hardness value appears automatically in the bottom cell after the strength to be applied on the sample and diagonal line length of the indentation are entered.



**Figure 13:** Jominy test animation [14].

In this simulation (Figure 13), the effect of steel composition to the hardenability is shown with Jominy test. You can choose a sample and place in the austenitization oven. Later you can place the sample in the Jominy device and do quenching. After the quenching and reboring the surface of the Jominy sample, hardness is measured periodically starting from the edge. Obtained data can be recorded and jominy curves of each of the steels can be drawn.

## Conclusion

Utilization of the education package formed under the scope of this study both in traditional and distance education environments for the Material Science classes taught

in some higher education units, is considered to be contributing to increasing the quality of education. When used in the traditional education environment, the subjects of the lessons they couldn't attend to or they want to review are made available to the students in any environment with computer. Thus, it is considered that this situation will contribute to increasing the success and the quality of the students. Research on education shows that the students are able to remember 30% of the things they read, 40-50% of the things they heard, 60-70% of the thing they saw and 90% of the things they both saw and heard. In the animations prepared, the students will be given the opportunity to see and understand the properties and tests of different materials. By giving visuality prominence and adapting the individual participation of the student to teaching process, a teaching environment will be created oriented at long-term memory rather than short-term. The subjects will be more fun by being supported with colorful graphics, pictures and animations. Thus, a teaching environment will be created that will make the students feel as if they were playing a game.

The virtual labs will enable spending the time for education effectively. As the students will have to answer the questions generated by the computer and think about the subject before the next step, they will be constantly active. The experiments that are expensive and dangerous to be conducted in real labs will be done easily with the help of simulation method and this will save time and money. By interacting with the computers, students will be able to ask questions, learn their answers and repeat the subjects whenever they want. They won't have to compete with other students who learn faster than themselves and thus a teaching process at their own pace will be provided to each student. The teachers won't have to slow down others in order to wait for the students who learn at a slower pace or they won't have to keep up with the fast-learners leaving the others behind. Rather than sitting in class and learning passively, the students will have a chance to effectively by active participation and computer interaction. The students will have the opportunity to carry the education process out of the schools and they won't be depending solely on school and class for a better learning.

This education material can be multiplied and given to students. So, the students

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can study wherever or whenever they want to, independent from time and place, without any need for a different computer software or hardware. Moreover, this material can be used by the teachers in class for projection.

## References

1. Akın, E. & Karaköse, M. (2003). Elektrik ve Bilgisayar Mühendisliği Eğitiminde Sanal Laboratuvarların Kullanımı. Homepage. <<http://egitim.emo.org.tr/semp03/tarihce.htm>> (02.06.2005).
2. Aydoğan, H. (2003). Malzeme Bilimi Eğitiminde Çoklu Ortamın Kullanılması, Süleyman Demirel Üniversitesi, Fen Bilimler Enstitüsü. Yüksek Lisans Tezi, 193s. Isparta
3. Cisco Sytems, Homepage. <<http://www.cisco.com>> (21.04.2005)
4. Çekbaş, Y., Yakar, H., Yıldırım, B., & Savran, A. (2003). Bilgisayar Destekli Eğitimin Öğrenciler Üzerine Etkisi. Pamukkale Üniversitesi, Eğitim Fakültesi Dergisi. 3(2), 1-4. Denizli.
5. Erkunt, H., & Akpınar, Y. (2002). İnternet Tabanlı ve İnternet Destekli Eğitim: Kurumsal Yönetim Sistemi Örneği. 3-5 Mayıs, Bilgi Teknolojileri Işığında Eğitim Sempozyumu, ODTÜ, Ankara.
6. Hashemi, J., Austin., & K., Majkowski, A. (1998). Elements of a Realistic Virtual Laboratory Experience in Materials, 1-27, Texas Tech University, Texas
7. İşman, A. (2000). Değişim Semineri Ders Notları. DEÜBEF Dergisi İzmir, (12), 1-32, Sakarya Üniversitesi, Sakarya
8. Kantar, Z., S. (2002). 8. Sınıf Fen Bilgisi Dersinde Çoklu Ortam Kullanımının Öğrencilerin Başarı ve Tutumlarına Etkileri. Homepage. <[www.tedankara.k12.tr/kolej\\_hakkında/egitim2001\\_7.html](http://www.tedankara.k12.tr/kolej_hakkında/egitim2001_7.html)>
9. Keyhani, A. (2002). An Integrated Virtual Learning System for the Development of Motor Drive system, IEEE Trans. On Power Systems, 1-17,
10. Küçükarpacı, N. (1997). Pc World Bilgisayar Dergisi, 1-15. İstanbul .
11. McMahon, C., Weaver., & R. Woods, S. (1998). Multimedia Tutorials for an Introductory Course on the Science of Engineering. Jom-e. 50 (5).
12. Meral, M., Can, B., & Baba, F. (2003). Bilgisayar Öğretimi ve Bilgisayar Destekli Öğretimde Öğrenci Yaklaşımları. Teknik Eğitim Fakültesi, Marmara Üniversitesi, İstanbul .
13. Ong, S., & Mannan, A. (2002). Development of an Interactive Multimedia Teaching Package for a Course on Metalworking. 215-228, National University, Singapore.
14. Oral, O. (2005). Sanal Malzeme Bilimi Laboratuvarı Oluşturulması. Süleyman Demirel Üniversitesi, Fen Bilimler Enstitüsü. Yüksek Lisans Tezi, 128s. Isparta
15. Oral, B., Temel, H., & Güler, E. (2004). Kimya Eğitimi Öğrencilerinin Bilgisayar Destekli Öğretim Uygulamasına İlişkin Alguları. Elektronik Sosyal Bilimler Dergisi, 3(8). 42-51, Eğitim Fakültesi, Eğitim Bilimleri Bölümü, Diyarbakır.

16. Öğüt, H., Altun, A., Sulak, S., & Koçer, H. (2004). Bilgisayar Destekli, İnternet Erişimimli İnteraktif Eğitim CD'si ile E-Eğitim. TOJET, 3(1). ISSN: 1303-6521, Selçuk Üniversitesi, Konya.
17. Taşgetiren, S., & Gökçe, B. (2004). Malzeme Bilimi Eğitiminde E\_ Eğitim desteği ve Bir örnek uygulama. 10. Denizli Malzeme Sempozyumu ve Sergisi, 1048-1058, Afyon Kocatepe Üniversitesi, Teknik Eğitim Fakültesi, Afyon.



## **CAPTCHA Usage in Open Source LMSes**

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**Abstract:** Nowadays, with the increasing usage of Internet and the Web in addition to effects of other factors such as cost and flexibility, many services and applications are transferring to the Web. The opportunities provided by the Internet ensure spreading of e-learning which is recognized as a student-centered teaching method independent of time and place. However, with the rise in the number of such services and the increasing interest of users to these services attract attackers; these services become a target, attacks and misuse increased.

One of the most important aspects of e-learning is web-based Learning Management Systems (LMS) which are used for content submission and management, evaluation, tracking of students and reporting. Learning Management Systems come at the beginning of all other e-learning components that may be a target for attackers.

Such services offered via the Web, including LMS, usernames and passwords are used for both users' authentication and authorization in addition to restricting unauthorized access to protect these services. But, this method does not prevent an attacker to find a valid username and password by applying an attack such as dictionary or brute-force which can try hundreds or even thousands of username/password combinations in a few minute, much faster than a person can do. When attackers obtain a valid user name and password to log into the system, other attacks (attempts to privilege escalation, SQL injection, directory browsing, etc.) will pave the way. If the system administrator account can be captured, all the doors will open and the security will down to zero. To realize these attacks, simple scripts or programs can be used, so low-level attackers called "script kiddie" who is uninformed about attacks and systems can perform such attacks.

To eliminate these types of attacks and to distinguish bots that means non-human intelligent systems, a defense method called "CAPTCHA" has been developed by Luis von Ahn, Manuel Blum, Nicholas J. by Hopper and John Langford at Carnegie Mellon University in 2000. The main objective of this study was to differentiate computer and human behaviors. CAPTCHA, consist of shortening of the words "Completely Automated Public Turing test to tell Computers and Humans Apart" in some sources also referred as "Reverse Turing Test". Since 2000, many different algorithms and alternatives have been developed for this method but basically it is based on the principle of verification of noise added and partially degraded character sequences in an image which are hard to recognize by a bot, but can be perceived by the human.

Attackers try to bypass this verification method and in order to eliminate it; vulnerabilities of used algorithms are targeted. Breaking process consist of applying the Optical Character Recognition (OCR) process after implementation of image processing methods to correct noise and distortion of verification code that is presented to users in an image, and converting characters to text. However, must be said that more complex and different CAPTCHA algorithms and methods are currently in use. For example, CAPTCHAs that ask a simple mathematical operation in an image and wait for the result or CAPTCHAs based on the correct selection of the desired image are also available. Also with a positive perspective, a bypassed CAPTCHA algorithm can be evaluated as getting computer behaviors a little closer to human behavior and a step for the artificial intelligence.

In this study, using CAPTCHA feature to prevent unauthorized access to an open source web-based learning management system and contribute the security of e-learning system is discussed. At the same time solving the

*used algorithm of CAPTCHA by the help of an automated tool Tesseract (A Free Visual CAPTCHA Solving Tool by McAfee) is investigated. Also the common usage and viewpoint for CAPTCHA method in popular and commonly used open source LMSes such as Moodle, ATutor, and Dokeos are discussed.*

**Keywords:** Learning Management System (LMS), CAPTCHA, Solving CAPTCHA, OCR, Image Processing

## **Introduction**

Today many websites on the Internet use CAPTCHAs, or “*Completely Automated Public Turing tests to tell Computers and Humans Apart*” to block automated interactions or connection attempts to their sites (Yampolskiy & Govindaraju, 2008). For example, **Google** improves its mail service by blocking access to automated spammers, **eBay** protect its place in e-commerce by blocking bots from flooding the site with scams, and **Facebook** limits creation of fake profiles used to spam honest users or cheat at games and popular paid download sites protect their investments by using different types of CAPTCHA. (ur Rizwan, 2012)

The most widely used CAPTCHA schemes are consist of combinations of distorted characters and some obfuscation techniques that humans can recognize but that may be difficult for an automated script. Nowadays different types of CAPTCHA implementations can be used alternatively to Character-Based CAPTCHAs. For example Image-Based, Anomaly-Based, Recognition-Based, Sound-Based (Audio CAPTCHA) or Video-Based CAPTCHA implementations can be seen on the web. (Al-abdullatif, 2009)

CAPTCHAs are sometimes called “Reverse Turing Test”, because this method allows to determine if a remote client is human or not by a computer. In spite of their importance at protecting web sites and web services, there are lots of researches to improve Artificial Intelligence technology related with CAPTCHAs. (Ahn, Blum, Hopper, & Langford, 2003)

CAPTCHA has several applications for practical security, including; preventing comment spam in blogs and forums, protecting website registration, protecting e-mail addresses from scrapers, protecting online polls, preventing dictionary and brute-force

attacks to websites, preventing search engine bots, protecting from worms and spam. (Al-abdullatif, 2009)

## **Captcha Background**

People can easily guess that the need for using a CAPTCHA first experienced to keep out the search engines abused by bots. Search engines were one of the most important parts of the web at the beginning of the net. In 1997, **AltaVista** found ways to block and discourage the automatic submissions of URLs into their search engines. Andrei Zary Broder, Chief Scientist of AltaVista, and his colleagues developed a filter. Their method was to generate a randomly printed text that only humans could read and not bots. Their approach was so effective that in a year, spammers were reduced by 95% and this method patented in 2001 (Rusu & Govindaraju, 2004). This was the first application of CAPTCHA and Andrei Zary Broder can be credited with being one of the first people to develop a CAPTCHA.

In November 1999, **slashdot.com** website released a poll to vote for the best College in the US. Students from the Carnegie Mellon University and the Massachusetts Institute of Technology created bots that can repeatedly vote for their own colleges (Ahn, Blum, Hopper, & Langford, 2003; Ahn, Blum, & Langford, 2004). This successful attack showed the need to use CAPTCHAs for such online polls to ensure that only human users are able to take part in the polls.

In September 2000, **Yahoo**'s popular chat service was hit by bots which showed annoying advertising links to human users at chat rooms (Baird & Papat, 2002). Yahoo, developed a CAPTCHA called EZ-GIMPY with Carnegie Mellon University, which chose a dictionary word randomly and distorted it with a wide variety of image manipulation techniques and then asked the user to input the distorted word.



Figure 1: An example for Yahoo's Ez-Gimpy CAPTCHA

The term "CAPTCHA" was coined in 2000 by Luis Von Ahn, Manuel Blum, Nicholas J. Hopper and John Langford from Carnegie Mellon University. (Chandavale & Sapkal, 2010; Hernandez-Castro, Ribagorda, & Saez, 2009)

Today CAPTCHA can be seen at a variety of websites or web services as a regular part of them and number of websites using this solution for automated attacks are rising. Even CAPTCHA itself is given as a service by different providers (reCAPTCHA, Secureimage, WebSpamProtect, Cryptographp, WP Captcha-Free, OpenCaptcha, freeCap, etc). Some web based packet programs such as forums, blogs, e-commerce portals, content management systems and learning management systems come with its own CAPTCHA or bot/spam protection solution.

### **Popular Real World CAPTCHAs**

To observe representative samples of CAPTCHAs on the net, Alexa list of most used websites (Alexa Internet Incorporation, 2012) can be visited. When the top sites which present CAPTCHAs as a part of their account registration, password reset or sometimes login process are visited, different types and algorithms of CAPTCHA implementations can be seen. These CAPTCHAs can be used by a web based Learning Management System one to one without changing anything. Some examples of CAPTCHAs used in most visited websites can be seen below:

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Table 1: Real-world CAPTCHA examples

Text-based CAPTCHA	Website
<p>Robot olmadığınızı kanıtlayın</p> <p><input type="checkbox"/> Bu doğrulamayı atla (telefonla doğrulama gerekebilir)</p>  <p>İki kelimeyi yazın:</p> <input type="text"/> <p>Konum</p> <p>Türkiye</p>	<p>Google CAPTCHA; Google uses its own reCaptcha service for its websites like Gmail, Google search engine, YouTube and others.</p>
<p>Makine olmadığınızı anlamamıza yardımcı olun</p> <p>Gördüğünüz karakterleri girin</p> <p><a href="#">Yeni</a>   <a href="#">Ses</a></p>  <input type="text"/>	<p>Microsoft CAPTCHA in Hotmail service</p>
<p>Görsel kod   Sesli kod   Yardım</p>  <p>Gösterilen kodu yazın <input type="text"/></p> <p><a href="#">Yeni kod deneyin</a></p>	<p>Yahoo mail service CAPTCHA</p>
<p>Otomatik hesap oluşturmaya karşı korumaya yardım etmek için,</p>  <p>Güvenlik Kodu: <input type="text"/></p>	<p>Wikipedia CAPTCHA</p>
<p>Resimdekiler * zorunlu alan</p>  <input type="text"/>	<p>Some web sites use their own CAPTCHA solution but it is possible to say that these are more vulnerable than the well-known implementations (IMKB, 2012).</p>

## **CAPTCHA Security Features**

There are different types of attacks against CAPTCHA; Blind Guessing, AI Attacks, Relay Attacks, Side-Channel Attacks, Bypass attacks, Mechanical Turk attacks, Hybrid attacks, etc. (Hidalgo & Alvarez, 2011; Bell, 2012) In this study CAPTCHAs, so the security consideration of LMSes examined according to AI Attacks.

As listed above according to attack type new features need to be added to the algorithm or logic of CAPTCHA. These requirements, or advices, are frequently proposed by the authors of the attacks. For instance, Yan and Salah El Ahmad suggest a number of precautions to make OCR challenges robust to their pixel-count attack. (Yan & Ahmad, 2007)

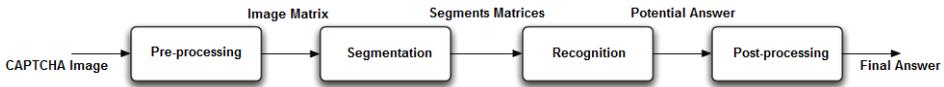
A major problem with these countermeasures is that they affect not only bots but also humans. Again, it is difficult to keep a reasonable trade-off between human and bot recognition rates. A completely secure CAPTCHA is not possible (as they may emerge new attacks that could break it), but it can be easy to make it useless because of human recognition rates are too low. (Hidalgo & Alvarez, 2011)

To defend from attacks targeting CAPTCHA, some factors should be considered. For a secure CAPTCHA implementation the following requirements must be satisfied (Kalra, 2012);

- The client should not have any “influence on” or “knowledge about” the CAPTCHA content.
- The CAPTCHA text must be randomly generated and should have a large sample space.
- The CAPTCHA image should be created so that it deters automated extraction of text by increasing the complexity to perform image preprocessing, segmentation and classification.
- The client should not have direct access to the CAPTCHA solution.
- CAPTCHAs should not be reused.

The Basic CAPTCHA solving methodology can be summarized as the block scheme

shown in Figure 2.



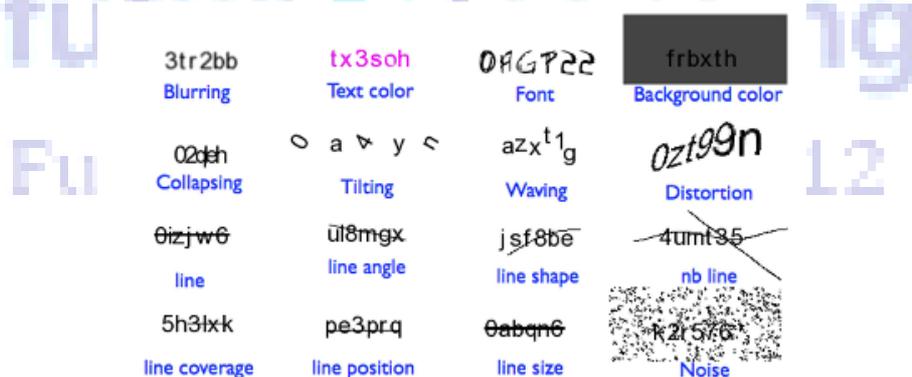
**Figure 2:** Basic CAPTCHA solving pipeline (Bursztein, 2012)

The anti-recognition techniques can be considered as (Bursztein, Martin, & Mitchell, 2011):

1. **Multi-fonts:** Using different fonts or font-faces in a CAPTCHA.
2. **Charset:** Determining which character set is used in the CAPTCHA scheme.
3. **Font size:** Using variable font size in a CAPTCHA.
4. **Distortion:** Distorting the CAPTCHA globally using attractor fields.
5. **Blurring:** Blurring numbers and letters in CAPTCHA.
6. **Tilting:** Rotating numbers and letters with various angles.
7. **Waving:** Rotating the numbers and letters in a wave effect.

The anti-segmentation techniques can be considered as (Bursztein, Martin, & Mitchell, 2011):

1. **Complex background:** Try to hide the text in a complex background or add noise to confuse the solver.
2. **Lines:** Add lines to prevent the solver to know what the real character segments are.
3. **Collapsing:** Try to prevent segmentation by removing the space between characters.



**Figure 3:** Some implementation of anti-recognition and anti-segmentation techniques (Bursztein, 2012)

## **CAPTCHA in Open Source LMSes**

As mentioned above there is no difference between implementation of CAPTCHA in any website or web service and a web based LMS. This is an investigative study to ensure the security of the e-learning system by using CAPTCHA. This research tries to present security approaches of open source LMSes by examining usability of CAPTCHA feature.

In this research 12 most popular open source LMS (Reis, et al., 2012; Hamtini & Fakhouri, 2012; Kusen & Hoic-Bozic, 2012; Al-Ajlan, 2012; ION, 2012) selected and examined in the case of CAPTCHA feature.

Except LON-CAPA, the other LMSes can be installed on different Operating Systems (Microsoft Windows, Linux/\*nix, BSD, Mac OS, etc.) with server software like Apache, PHP/Tomcat, Perl/Ruby and MySQL/PostgreSQL as main requirements. A Linux (different distros are supported) server platform is mandatory for LON-CAPA. Supporting or not-supporting CAPTCHA can't show all the security approach of LMS architecture and LMS developers but it can give an initial idea about it.

It's possible to say that at web applications and services which worry about automated interactions with the website, CAPTCHA usage became an industry standard. Also in some cases to protect websites from Denial of Service attacks CAPTCHA can be used (Mehra, Agarwal, Pawar, & Shah, 2011). So it's a regular expectation to look for CAPTCHA in LMSes when evaluating them in terms of security.

ADA (Ambiente Digitale per l'Apprendimento) is an Italian originated e-learning platform (Penge, Mazzoneschi, & Terraschi, 2005). This LMS doesn't support CAPTCHA for this release and there is no roadmap or future plan to support this feature. After a little experience with ADA LMS, it is possible to say that it's in early development stages. ADA, already not support some base LMS features like collaboration environments, detailed reporting, etc that are supported by other LMSes.

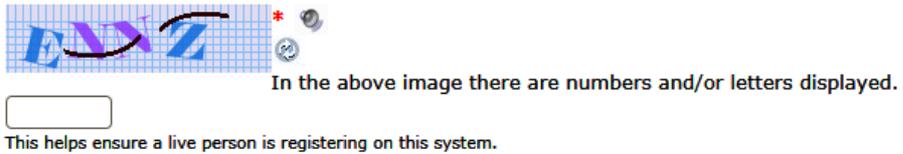
ATutor is a Canadian originated open source web-based e-learning environment developed and supported by University of Toronto. ATutor supports CAPTCHA but it is default disabled. This feature can be enabled from "System Preferences" tab with

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“Allow the use of CAPTCHA” option. When this feature enabled login process doesn’t change, this feature can be used only in registration. ATutor uses Securimage which is an open-source free PHP CAPTCHA script.

**Table 2:** Open source LMSes considered within the scope of this research

#	LMS Name	Homepage	Release	Release Date	License	Platform
1	ADA	<a href="http://ada.lynxlab.com/">http://ada.lynxlab.com/</a>	2.0 r402	Aug. 1, 2012	GNU GPL	PHP, MySQL
2	ATutor	<a href="http://www.atutor.ca/">http://www.atutor.ca/</a>	2.0.3	Sept. 14, 2011	GNU GPL	PHP, MySQL
3	Chamilo	<a href="http://chamilo.org/">http://chamilo.org/</a>	2.1	Jan. 19, 2012	GNU GPL	PHP, MySQL
4	Claroline	<a href="http://www.claroline.net/">http://www.claroline.net/</a>	1.11.0	Jul. 13, 2012	GNU GPL	PHP, MySQL
5	Dokeos	<a href="http://www.dokeos.com/">http://www.dokeos.com/</a>	2.2 beta	Jun. 1, 2012	GNU GPL	PHP, MySQL
6	eFront	<a href="http://www.efrontlearning.net/">http://www.efrontlearning.net/</a>	3.6.11 build15059	Apr. 10, 2012	Common Public Attribution License v1.0	PHP, MySQL
7	Fedena	<a href="http://www.projectfedena.org/">http://www.projectfedena.org/</a>	2.2	Jan. 4, 2012	Apache License v2.0	Ruby, Rails, MySQL
8	ILIAS	<a href="http://www.ilias.de/">http://www.ilias.de/</a>	4.2.5	Jul. 18, 2012	GNU GPL	PHP, MySQL
9	LON-CAPA	<a href="http://www.loncapa.org/">http://www.loncapa.org/</a>	2.10.1	Nov. 30, 2011	GNU GPL	Perl, MySQL
10	Moodle	<a href="http://www.moodle.org/">http://www.moodle.org/</a>	2.3.1+	Aug. 3, 2012	GNU GPL	PHP, MySQL
11	OLAT	<a href="http://www.olat.org/">http://www.olat.org/</a>	7.3.1	Jun. 26, 2012	Apache License v2.0	Java, MySQL
12	Sakai	<a href="http://www.sakaiproject.org/">http://www.sakaiproject.org/</a>	2.8.2	Jun. 10, 2012	Educational Community License v2.0	Java, MySQL



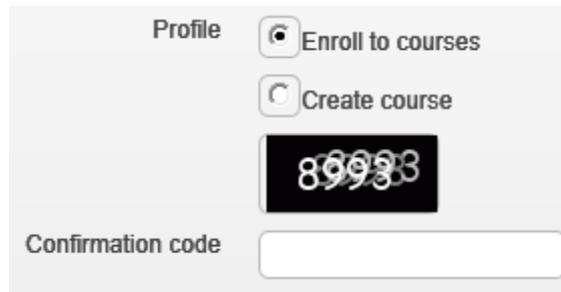
**Figure 4:** ATutor Securimage CAPTCHA example

Chamilo is an open-source e-learning and content management system, developed for improving access to education and knowledge. Chamilo is defended by the Chamilo Association. This LMS doesn't support CAPTCHA but according to its roadmap this feature will be supported with release 1.10. Its priority is degraded from "Normal" to "Low" and target release postponed to a forward one. (Vargas, 2012)

Claroline (**Class Room on Line**) is an open source e-learning and collaboration platform that allows instructors to create effective online courses and to manage learning and collaborative activities. This LMS doesn't support CAPTCHA for this release and there is no roadmap or future plan to support this feature.

Dokeos is a web based e-learning and course management platform whose development is an international, collaborative effort. This LMS supports its own CAPTCHA implementation with php-GD graphic library (`\main\inc\lib\captcha\captcha.php`). The GD Graphics Library is a graphics software library developed by Thomas Boutell for dynamically creating and manipulating images. After the installation CAPTCHA is default disabled. To enable this feature "Administration > Configuration settings (at Portal section) > Plus" path must be visited and "Enable Captcha" option have to select as "Yes". When this feature enabled login page doesn't change, this feature can be used only in user registration page.

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**Figure 5:** Dokeos CAPTCHA example

eFront is described as an open source e-learning platform and it is marketed to both academic organizations and corporations. There are two other commercial editions with different features than open-source edition; these are Enterprise and Educational versions. The open-source solution is experienced in this study. It is written in PHP with AJAX JavaScript. This LMS doesn't support CAPTCHA but according to its roadmap this feature will be supported with release 3.6.12 (eFront, 2012).

Fedena is a powerful, user-friendly and open source school management software developed on Ruby on Rails. It is a web 2.0 application being developed by Foradian Technologies. This LMS doesn't support CAPTCHA for this release and there is no roadmap or future plan to support this feature.

ILIAS (Integriertes Lern, Informations und Arbeitskooperations System [German for "Integrated Learning, Information and Work Cooperation System"]) is a Germany originated open source web-based learning management system which is started in 1997 at the University of Cologne and was released as open source software in 2000. This LMS doesn't support CAPTCHA but according to its roadmap this feature will be scheduled to release 4.3. (ILIAS Open Source e-Learning, 2012)

“LON-CAPA (Learning Online Network with Computer Assisted Personalized Approach) is a comprehensive and full-featured course management system with extraordinary capabilities for automated assessment and interactive learning, devised and controlled by individual instructor-users. The project originates from Michigan State

University (MSU) which has provided the principal development. The LON-CAPA Academic Consortium was formed in 2006 to ensure future funding and direction for the development of the software and to manage institutional memberships in the production network. The initial core members of the Consortium are MSU and the University of Illinois Urbana-Champaign (UIUC).” (Simon Fraser University, 2012)

With “Domain Controller” role follow “Domain Management > Set domain configuration” path, click “check all” button and then “Display” button. From “Log-in page options” section choose “Link to create a user account” as “Yes” and from “User creation” section for “User creates own account” option select “E-mail address”. When “New User?” link opens from login page it can be seen that CAPTCHA is automatically inserted in create new user with e-mail validation page. LON-CAPA release 2.10.1-2011113023 uses Authen-Captcha (a Perl module) for CAPTCHA feature.



The screenshot shows a web form for creating a new user account. At the top, there is a navigation bar with the text "Menu » New username". Below this is a heading: "Create account with an e-mail address as your username". The form itself is divided into two main sections. The first section is labeled "E-mail address:" and contains a text input field. The second section is labeled "Validation:" and contains a text input field with the instruction "Type in the letters/numbers shown below". Below this instruction is a small image showing a CAPTCHA with the characters "v214s". At the bottom of the form is a button labeled "Request LON-CAPA account".

**Figure 6:** reCAPTCHA example in LON-CAPA v2.10.1

As can be seen from Figure 7, release 2.11.0.RC1-2012092606 is using Google’s reCAPTCHA service as a choice according to the old Perl module. This release isn’t published in project’s website yet, for now it’s only available from CVS. (<http://source.lon-capa.org/cgi-bin/cvsweb.cgi/>)

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The screenshot shows a web form for creating a new account. At the top, there is a navigation bar with the text "Menu » New username". Below this, the instruction "Create account with an e-mail address as your username" is displayed. The form is divided into two main sections: "E-mail address:" and "Validation:". The "E-mail address:" section contains an empty text input field. The "Validation:" section contains a reCAPTCHA widget. The widget displays two words: "Istasoo" and "sombre". Below the words, there is a text input field with the prompt "iki kelimeyi yazın:" (write two words). To the right of the input field are two icons: a red 'X' and a red 'O'. Below the input field, there is a small text box with the reCAPTCHA logo and the text "reCAPTCHA™ stop spam, read books". Below the reCAPTCHA widget, there is a line of text: "If either word is hard to read, [icon] will replace them." At the bottom of the form, there is a button labeled "Request LON-CAPA account".

**Figure 7:** reCAPTCHA example in LON-CAPA v2.11.0 RC1 (LON-CAPA, 2012)

MOODLE (Modular Object-Oriented Dynamic Learning Environment) is an open source Course Management System (CMS), also known as a Learning Management System (LMS) or a Virtual Learning Environment (VLE). According to statistics page, more than 65.000 sites use MOODLE on the net. (MOODLE, 2012) MOODLE uses Google's reCaptcha service for CAPTCHA. First to activate this feature "Settings > Site administration > Plugins > Authentication > Manage authentication" patch must be followed and "ReCAPTCHA public key" and "ReCAPTCHA private key" sections must be filled according to reCaptcha registration from Google (<http://www.google.com/recaptcha>). In addition to setting reCAPTCHA keys, e-mail based self-registration should be set as the self registration authentication plugin in the manage authentication common settings and the reCAPTCHA element should be enabled in the E-mail based self-registration settings. Finally CAPTCHA can be seen in the new user registration form.



**Figure 8:** reCAPTCHA example in MOODLE

OLAT (Online Learning And Training) is a Germany originated open source Learning Management System that supports any kind of online learning, teaching, and tutoring. Its development started in 1999 at the University of Zürich. This LMS doesn't support CAPTCHA for this release and there is no roadmap or future plan to support this feature.

Sakai Foundation is a community of academic institutions, commercial organizations and individuals who work together to develop a common Collaboration and Learning Environment (CLE). The Sakai CLE is a free, open source educational software platform. The Sakai CLE which is supported by the foundation is used for teaching, research and collaboration (Sakaiproject, 2012).

In Sakai CLE, CAPTCHA feature default comes disabled and can't open from web user interface. To enable this feature, "sakai.properties" file in "sakai" folder must be edited with a text editor. "user.recaptcha.enabled" key must be set to "true". Then uncomment "user.recaptcha.public-key" and "user.recaptcha.private-key" lines and insert API keys that you obtained from Google (<https://www.google.com/recaptcha/>). This will enable CAPTCHA feature in create new user page.

Yeni Hesap

Kullanıcı oluşturmak için aşağıdaki bilgileri girin

\* Kullanıcı Kodu

Ad

Soyad

Eposta

\* Yeni Şifre Oluştur

\* Yeni Şifreyi Doğrula

Türü

**there thing**

İki kelimeyi yazın:

 stop spam.  
read books.

**Figure 9:** reCAPTCHA example in Sakai

### **Solving CAPTCHAs with Tesseract**

There are lots of automated CAPTCHA breaking tools such as PWNtcha, DeCaptcha, IFS Captcha Solver and aiCaptcha but in this study Tesseract is used. Tesseract is a Windows platform application (requires .Net Framework 4.0) that is developed by Gursev Singh Kalra. It's a visual CAPTCHA solving tool, open for use by Foundstone Inc. (a division of McAfee Inc.)

Tesseract is a Graphical User Interface (GUI) based, point and shoot CAPTCHA analysis tool with the following features (Kalra, 2011):

1. A generic image preprocessing engine that can be configured as per the CAPTCHA type being analyzed.
2. Tesseract-OCR as its OCR engine to retrieve text from preprocessed CAPTCHAs.
3. Web proxy support
4. Support for custom HTTP headers to retrieve CAPTCHAs from websites that

- require cookies or special HTTP headers in requests
5. CAPTCHA statistical analysis support
  6. Character set selection for the OCR Engine

Tesseract operating block scheme can be summarized at five phases as Figure 10. Tesseract has three tabs; Main, Options and Image Processing. “The **main tab** houses controls that are used to start and stop a CAPTCHA test, generate test statistics, perform navigation, and select CAPTCHAs for image preprocessing. The **options tab** houses various configuration controls for Tesseract. These configuration controls allow users to provide an OCR character set, web proxy settings, HTTP redirect configuration settings, image preprocessing selection, and custom HTTP headers. The **image preprocessing tab** houses the various image preprocessing stages along with a verification component. Each image preprocessing stage reflects the changes made on a CAPTCHA to its own picture box and to the picture boxes in the subsequent processing stages.” Image processing stages placed at image processing tab are; 1-Color Inversion, 2-Color Modification, 3-Grey Scaling, 4-Smoothing and Sharpening, 5-Grayscale Buckets, 6-Set Cutoff, 7-Chopping and 8-Border Width Modification. (Kalra, 2011)

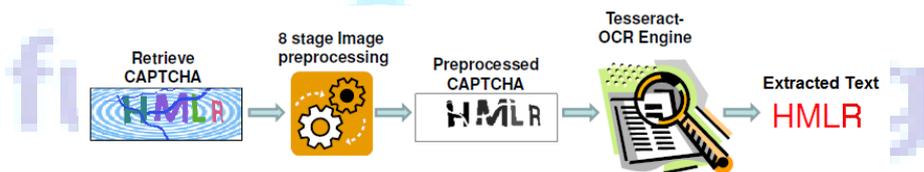
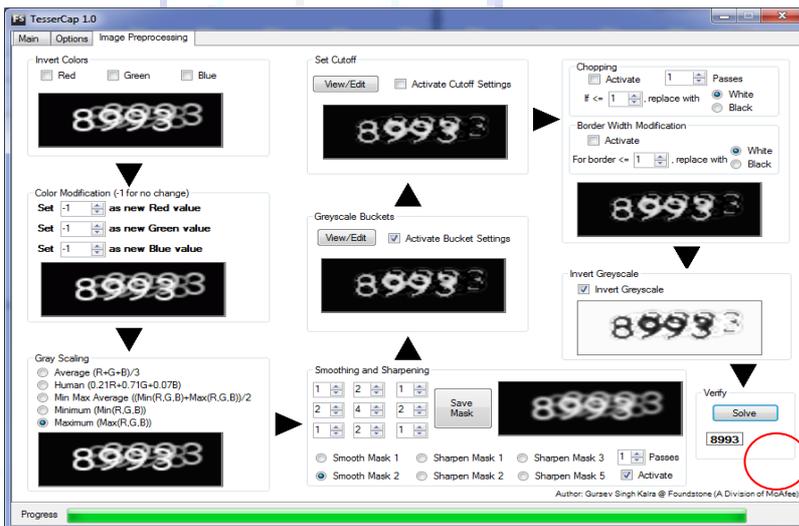


Figure 10: Tesseract operation flow (Kalra, 2012)

In this study there are three different types of CAPTCHA implementation; Securimage phpCaptcha, Dokeos CAPTCHA and reCAPTCHA. reCAPTCHA is the most secure one; the other two implementations can be solved by training the Tesseract (changing the parameters and thresholds at the pre-processing phase). Also %100 successful solving cannot be possible but a significant percentage can be attached. Tesseract has an accuracy of 10-20% for phpCaptcha and 0% for reCAPTCHA (Kalra, 2012).



**Figure 11: Training Tesseract to solve CAPTCHA**

## Conclusion

First of all CAPTCHA is a challenge between developers and attackers -good guys and bad guys-, in an evolution it will be a part of our life in the web at the future. Today it's possible to say that this is a standard on the net to protect websites from bots.

When we look at the 12 LMSes that are the subject of this study, only five of them support CAPTCHA feature. Also it can be said that some of this LMSes have the

CAPTCHA feature but this feature cannot be applicable to the global of LMS, only usable for new user registration for example.

Three LMS solve this issue with Google's reCAPTCHA service and it seems resistant to solving attacks for now. But with a new solving algorithm it can be easily break with a satisfied percentage and possibly a new CAPTCHA born with this security vulnerability. This is a new brick in the Artificial Intelligence wall.

In this study it's possible to say that LMSes focus on usability and learning features and the security features like CAPTCHA are in the second plan. Maybe developers find annoying for users to write CAPTCHA text at every login. This can be affect being a choice and reduce the number of users. At this point users security awareness is the main issue, users must demand this from LMSes.

For developers "usability issues in CAPTCHA implementation" is a serious problem but it can be passed with best practices or try and see. Different types of users must take into consideration before this implementation. The balance between usability and security should be provided. Also when designing a new CAPTCHA, advised security features must be taken into account.

As the other matters of security, CAPTCHA doesn't provide complete security for bots or spammers but it provides a satisfactory percentage validation for human vs. bots until it is break.

CAPTCHA supported LMSes can provide some information to users about this issue and suggest to enable this feature during the installation process.

Tesseract which is used in this study is a basic automated CAPTCHA solving tool but more flexible and successful tools can be develop when the different types of CAPTCHA algorithms thought. It's possible to say that this tool is successful when the CAPTCHA is not so complicated.

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In real world attackers develop their own scripts and use it as a part of their attack. For example after bypassing CAPTCHA and a successful login grabbing valuable information from websites or voting a poll several times, etc. So, for the automated interactions with LMSes and other websites, using other open source web application security tools like PHP-IDS (<https://phpids.org/>), ModSecurity (<http://www.modsecurity.org/>), IronBee (<https://www.ironbee.com/>), etc. can be suggested with CAPTCHA.

## References

1. Ahn, L. v., Blum, M., & Langford, J. (2004). Captcha: Telling humans and computers apart automatically. *Communications of the ACM*, 47 (2), 56-60.
2. Ahn, L. v., Blum, M., Hopper, N. J., & Langford, J. (2003). CAPTCHA: Using Hard AI Problems for Security. *Advances in Cryptology — EUROCRYPT 2003. Volume 2656*, s. 294-311. Warsaw, Poland: IACR.
3. Al-abdullatif, R. A. (2009, February 24). *CAPTCHA: The Security Through Obscurity*. June 10, 2012 tarihinde Scribd: <http://tr.scribd.com/doc/12764153/Captcha> adresinden alındı
4. Al-Ajlan, A. S. (2012, July 02). *A Comparative Study Between E-Learning Features*. July 15, 2012 tarihinde InTechOpen - Open Science Open Minds: [http://cdn.intechopen.com/pdfs/27926/InTech-A\\_comparative\\_study\\_between\\_e\\_learning\\_features.pdf](http://cdn.intechopen.com/pdfs/27926/InTech-A_comparative_study_between_e_learning_features.pdf) adresinden alındı
5. Alexa Internet Incorporation. (2012, June 20). *Alexa Top 500 Global Sites*. June 20, 2012 tarihinde Alexa The Web Information Company: <http://www.alexa.com/topsites> adresinden alındı
6. Baird, H. S., & Popat, K. (2002). Human Interactive Proofs and Document Image Analysis. *Document Analysis Systems V. 2423*, s. 507-518. Princeton, NJ, USA: Springer.
7. Bell, G. B. (2012, February 06). Strengthening CAPTCHA-based Web Security. *First Monday*, 17 (2), s. 1-33.
8. Bursztein, E. (2012, February 27). The art of breaking and designing CAPTCHAs. San Francisco, California, USA.
9. Bursztein, E., Martin, M., & Mitchell, J. C. (2011). Text-based CAPTCHA Strengths and Weaknesses. *ACM Computer and Communication security 2011* (s. 1-14). Chicago, Illinois, USA: ACM.
10. Chandavale, A. A., & Sapkal, A. M. (2010). Algorithm for Secured Online Authentication Using CAPTCHA. *3rd International Emerging Trends in Engineering and Technology Conference (ICETET)* (s. 292-297). Goa, India: Institute of Electrical and Electronics Engineers (IEEE).

11. eFront. (2012, August 23). *Roadmap: eFront Wiki*. July 07, 2012 tarihinde eFront LMS Website: [http://wiki.efrontlearning.net/Roadmap#V\\_3.6.12](http://wiki.efrontlearning.net/Roadmap#V_3.6.12) adresinden alındı
12. Hamtini, T. M., & Fakhouri, H. N. (2012). Evaluation of open-source e-Learning platforms based on the Qualitative Weight and Sum approach and Analytic Hierarchy Process. *10th International Education and Information Systems, Technologies and Applications Conference* (s. 1-7). Orlando, Florida, USA: EISTA.
13. Hernandez-Castro, C. J., Ribagorda, A., & Saez, Y. (2009, August 8). *Side-channel attack on labeling CAPTCHAs*. June 16, 2012 tarihinde Cornell University Library - Cryptography and Security: <http://arxiv.org/pdf/0908.1185v1.pdf> adresinden alındı
14. Hidalgo, J. M., & Alvarez, G. (2011, July 8). CAPTCHAs: An Artificial Intelligence Application to Web Security. *Advances in Computers Vol.83: Security on the Web* , s. 109-173.
15. *ILIAS Open Source e-Learning*. (2012, July 10). July 17, 2012 tarihinde Feature Wiki: [http://www.ilias.de/docu/goto.php?target=wiki\\_1357\\_Captcha](http://www.ilias.de/docu/goto.php?target=wiki_1357_Captcha) adresinden alındı
16. IMKB. (2012, August 05). *Bize Ulaşın: IMKB*. September 10, 2012 tarihinde İstanbul Menkul Kıymetler Borsası Web Sitesi: <http://www.imkb.gov.tr/contactus/contactus.aspx> adresinden alındı
17. ION, A.-M. (2012). Compared Analysis of Representative Learning and Content Management Systems used in Education. *Informatica Economica* , 123-131.
18. Kalra, G. S. (2012). Attacking CAPTCHAs for Fun and Profit. *Application Security Conference (AppSec DC)* (s. 1-37). Washington DC, USA: OWASP.
19. Kalra, G. S. (2011). *Tesseract—A Visual CAPTCHA Solving Tool*. Santa Clara, California, USA: McAfee.
20. Kusen, E., & Hoic-Bozic, N. (2012). In search of an open-source LMS solution for higher education using a criterion-based approach. *International Journal of Learning Technology* , 115-132.
21. LON-CAPA. (2012). *Create New Account*. August 12, 2012 tarihinde LON-CAPA Testdrive Website: <https://testdrive.loncapa.org/adm/createaccount> adresinden alındı
22. Mehra, M., Agarwal, M., Pawar, R., & Shah, D. (2011). Mitigating Denial of Service attack using CAPTCHA Mechanism. *International Conference and Workshop on Emerging Trends in Technology* (s. 284-287). TCET, Mumbai, India: ICWET.
23. MOODLE. (2012). *Moodle Statistics*. July 20, 2012 tarihinde Moodle Website: <https://moodle.org/stats/> adresinden alındı
24. Penge, S., Mazzoneschi, M., & Terraschi, M. (2005, September 26). *How to design an open (source) e-learning platform: The ADA experience*. July 05, 2012 tarihinde Steve's apprendimento digitale e dintorni: [http://www.altrascuola.it/staff/steve/public/elearning/ADA\\_open\\_platform.pdf](http://www.altrascuola.it/staff/steve/public/elearning/ADA_open_platform.pdf) adresinden alındı
25. Reis, Z. A., Baktır, H. Ö., Çelik, B., Erkoç, M. F., Özçakır, F. C., Özdemir, Ş., et al. (2012). Açık Kaynak Kodlu Öğrenme Yönetim Sistemleri Üzerine Bir Karşılaştırma

**4th International Future-Learning Conference on  
Innovations in Learning for the Future 2012: e-Learning  
Future-Learning 2012, Nov. 14-16, İstanbul**

- Çalışması. *3rd International Conference on New Trends in Education and Their Implications* (s. 42-58). Antalya: Journal of Research in Education and Teaching.
26. Rusu, A., & Govindaraju, V. (2004). Handwritten CAPTCHA: using the difference in the abilities of humans and machines in reading handwritten words. *Ninth International Conference on Frontiers in Handwriting Recognition* (s. 226-231). Kokubunji, Tokyo, Japan: IEEE Computer Society.
27. Sakaiproject. (2012). *Recent Sakai News and Events*. August 15, 2012 tarihinde Sakaiproject Website: <http://www.sakaiproject.org/news/sakai-cle-280-released> adresinden alındı
28. Simon Fraser University. (2012). *SFU LON-CAPA*. July 18, 2012 tarihinde Simon Fraser University Website: <http://www.sfu.ca/loncapa/> adresinden alındı
29. ur Rizwan, R. (2012). Survey On CAPTCHA Systems. *Journal of Global Research in Computer Science*, 3(6) (s. 54-58). India: JGRCS.
30. Vargas, C. (2012, August 02). *Feature #343*. July 06, 2012 tarihinde Chamilo LMS: <http://support.chamilo.org/issues/343> adresinden alındı
31. Yampolskiy, R. V., & Govindaraju, V. (2008). Embedded non-interactive continuous bot detection. *ACM Computers in Entertainment*, V (4), 1-11.
32. Yan, J., & Ahmad, A. S. (2007). CAPTCHA security: a case study. *Security & Privacy, IEEE*, 7 (4), 22-28.



## Perceptions of Teachers about Electronic Language Education System

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**Abstract:** *Today, distances has disappeared and people has become to communicate with far end of the world. Learning foreign languages is an important need for not only students but also all people in our era where communication continuously grows. It is a necessity to speak, understand and communicate in English, a global communication language. Learning a foreign language is an ability to be developed. Developing language ability using classical education methods does not meet the expectations. It is a fact that foreign languages can be learned more quickly at younger ages. For this reason, foreign language education taken at younger ages, directly affects their future. However, developments in internet and computer technology, have led to dramatic changes in education (Odabaş, 2003). Internet, becoming an indispensable element of Educational technology, provides solutions to some unsolved educational problems (Duran, vd, 2006). One of these solutions is e-learning. E-learning has an important role in delivering information fast to other people at low costs. (Duran, vd, 2006). The research problem can be defined as to determine the effectiveness of Dyned English language education programme's applicability in public primary schools of Denizli. In this context, it is possible to state the purpose of the study as follows: What are the views of English teachers, working in primary schools, about Electronic language education system(ELES)?*

- *What are the views of teachers regarding features of ELES?*
- *What are the views of teachers regarding software of ELES?*
- *What are the views of teachers regarding technical support and hardware necessary for using ELES?*

*This study prepared in survey model, is considered important in terms of foreign language education because it seeks teachers' views on ELES. "ELES Efficiency Evaluation Form" consists of 25 items, was used as a data collection tool. This form has been developed by examining previous studies in this field and by taking opinions of English teachers. The sample of this study are 128 English teachers (98 female, 30 male) working in Denizli. The obtained data were analyzed using descriptive statistics(frequency & percentage). Findings revealed teachers' views that ELES is beneficial for students but hardware and technical support in schools are inadequate. The obtained results indicate that ELES successfully implements the principles such as immediate feedback-correction or reinforcement in teaching-learning process. It gives students the opportunity to practice as needed without any pressure or criticism. ELES software using color, sound and animations which creates an enjoyable environment, makes it easy to learn. Students can be supported by giving training courses about how to use this software and thus prejudices can be broken. Ministry of National Education can organize in-service training courses for increasing teachers' competencies. To obtain efficiency in this training, volunteer teachers should be selected. In addition to this, student, teacher and system interaction should be continuous. It has been taught that students can make progress in the system with the help of teachers.*

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**Keywords:** Foreign Language Education, Information and Communication Technology, Electronic Language Education System, Computer assisted language learning.

## **Introduction**

The language learning and teaching has become important for the realization of information sharing at the highest level in today's world which distances have disappeared. The field of language education which has a history of nearly 5000 years has been developed under the shadow of traditional grammar, oratory and educational sciences (pedagogy) until the beginning of the 20th century that we had left behind (Kartal,2005: 383).The developments and recent advances in internet and computer technologies has led to radical changes in education as well as in all field (Odabaş, 2003). Internet that has become an indispensable element in education technologies offers solutions to some education problems which haven't been solved up to this point in time (Duran, et al., 2006) One of the solutions is e-learning. E-learning has an important role in transmitting the information to another people in a short time and at low cost when requested (Duran, et al., 2006). In addition, e-learning creates some opportunities such as solving education problems in several fields and disciplines of public and private sector and individual, occupational and academic development for working people or participating in certificate programs (Al and Madran, 2004). The information and communication technologies are implemented to the education field in the last few decades, too. In fact, the traces of education and computer applications can be observed until the early 1970s (Levy, 1997) and governments of many countries began to show an increasing interest in information and communication technologies because of its potential contribution to education due to its versatility and flexibility. The information and communication technologies in education comprise multimedia education, computer-based communication, learning with advanced information and communication technology, learning with advanced computer or technology, computer-aided learning and web-based learning fields, too. (for example: Skinner, 2009; Spencer-Oatey, 2007). As the result of the fast growth in computer industry especially after the

second half of the 1970s, the computer costs are lowered and sizes of them became smaller and their qualifications increased and began to be used in education and teaching field widely (Alyaz, 2003:121). It is transmitted to an interactive dimension in language education and teaching via the developed softwares and websites aimed at teaching of English language. Law No.4306 came into force for to ensure that all students of Turkey to learn at least one foreign language effectively in the changing and developing circumstances. Thus, English Education has become compulsory after 4th class of Primary Education beginning from 1997-1998 academic year with the directive published on the Official Statement No.2481 dated October 1997 by changes (Kaya, 2007). The desired efficiency couldn't be obtained in language education despite of all these efforts and the methods has began to be questioned. It's transitioned to language teaching in electronic environment in 4th, 5th, 6th, 7th and 8th classes in the 2008-2009 academic year in order to increase efficiency in language education. This course provided language education for students not only in the classroom but also at the outside of it.

### **Foreign Language Education**

The society type of our time is named as "Information Society". The individual of 21th century needs to know at least one foreign language for his/her personal development and to be informed about the developments in the world immediately (Çelebi, 2006). It's exposed that it would be beneficial to begin the foreign language education as the results of many empirical and descriptive studies in terms of developmental psychology and learning principles (Durukafa, 2002). The language development of children begin when they are two years old and it continues until the completion of their lateralization during adolescence (Demirezen, 2003). If children begin to learn foreign languages in these periods, they can learn both foreign and their mother language easily without any difficulties (Krashen, 1973). Foreign language education given at early ages develops children's quick-wit and increases the ability of understanding in mother language as well as giving positive results (Anşın, 2006).

### **Use of Computer and Internet in Foreign Language Education**

The attitudes and beliefs of teachers are defined as an important factor affecting the adaptation and integration of teacher that is used in teaching the information and communication technologies. (for example Bliss & Bliss, 2003; Fullan, 2001; L.Hu, 2007) The use of information and communication technologies in education is required the re-evaluation of the teacher's role in the classroom .(Mumtaz, 2000). Teacher's role has become more critical in teaching and learning with information and communication technology and it's a great importance how they will cope with this change in role and how it can be helped them (O'Mahony, 2003). The advantages of this role change are observable and significant that the thing we have to do is to provide opportunity for teachers to experience this role change. We can provide education opportunities in which teachers experience such this kind of education model, in where the education itself is student-centered although communication model is still conducting the education programs from specialists to teachers (Lock, 2006). According to the proposal of Peng and He (2007), if it is needed for teachers to teach by using information and communication technologies, then they have to be trained in the issue that how they will use the education materials assisted by information and communication technologies and pedagogy of information and communication technology. This role change is a long process that teachers need help and time for to change (Meng, 2005). The properties of computer turned it into an important actor in education but internet which is growing and increasing with each passing month and year shares this acting. These two actors has become indispensable tools of education at the end. A point to bear in the mind is the presented content of information. Although the question of 'How best to integrate new communication tools in the foreign language lessons?' comes to the fore, a discussion as 'The content of lesson have to be changed completely due to the integration of new technologies into the lesson' does not take place (Kaptı, 2008). Electronic Language Education System (ELES) is an education tool that allows students to learn English through the computers connected to the main server installed at the Ministry of National Education. The system supports the current curriculum. In addition, it provides students

opportunity of studying their lessons in front of their computers at school or in their homes, tracking the results of their studies by teachers and to monitor and guide them. Electronic Language Education System supports the language education with four skills that are understanding the language, perception, comprehension the grammar structure and using the language in an integrated way. This system has the ability of adjusting the foreign language learning level of a student by following him/her and record what he/she have learned until now.

#### **Benefits of Electronic Language Education System**

- It increases the quality of learning.
- It provides opportunity to progress in accordance with the learning rate.
- It shortens the learning time.
- It increases the quality of teacher.
- It provides opportunity to follow development processes of students.
- It provides opportunity for students to review.
- It allows the difference between the levels of students to be eliminated.
- It provides opportunity to present the subject in a more visual and interactive way.

#### **Limits and Disadvantages of Electronic Language Education System**

- It requires equipment.
- Educators have insufficient knowledge of the software.
- Educational software can have less value for education regardless how good it is prepared if they are not compatible with the education program (Öğüt et al., 2004). If permanently used, it can affect adversely psychosocial development of students.
- Equipment and software can be expensive.
- If teacher doesn't maintain its activities, then the computer can take

the place of teacher.

- The system is interrupted due to internet disconnection and power failure in schools where there is no power source.

### **Research Method**

In this section, research model, population and sample, data collection tools, statistical analysis techniques used in data analysis and relevant parts are included.

### **Purpose and Importance of Research**

Learning, speaking, understanding a language and communicating in this language is a necessity. Learning language is a skill that must be developed and classical education methods are insufficient in this regard. It's a fact that reforms and different approaches on education are required for to gain a place and have a say in this changing world. It is inevitable to use information and communication technologies in education in Turkey where computer usage has become widespread. Teachers who use ELES that is brought about technology play a key role in this process. In this regard, it's tried to be determined system-related views of English teachers who give education to 4th, 5th, 6th, 7th and 8th class students and who are subjected to ELES.

### **Research Question**

What are the views of English teachers who give education in elementary schools about Electronic Language Education System?

- What are the views of teachers about features of Electronic Language Education System?
- What are the views of teachers about software quality of Electronic Language Education System?
- What are the views of teachers about technical support and equipment required for use of Electronic Language Education System?

### **Research Model**

The research uses screening model. In this research, all English teachers take charge in elementary schools in Denizli City Center where there's no English teacher shortage are included. To fulfill the purposes of the research, the following process steps were taken:

- Literature review was made concerning the steps that are demanded to be taken while applying Electronic Language Education System which was put into effect in 2008-2009 school years.
- By arranging meetings with English teachers, the conditions occurred in the application processes of Electronic Language Education System and their views about this education system were asked.
- Previous researches on electronic environment language education were defined and application processes and results of these researches were analyzed.
- The scale to be used in data collection was developed in parallel to literature review and the views of the teachers.
- Suggestions were developed by interpreting the findings obtained upon application of the scale to the teachers included in the sample.

### **Population**

The population of the research is composed of 312 English teachers take charge in formal elementary schools located in Denizli City Center.

### **Sample**

In parallel to the purposes of the research, the basis of this sampling is to purposefully select one or more sub-sections of the population rather than selecting a representative sample. In other words, purposeful sampling means observing the most appropriate section of the population (Sencer, 1989: 386). In this regard, 95 elementary schools located in Denizli City Center were included in the sample. Of 95 elementary schools included in the sample, 74 schools use electronic English language system, and 21

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cannot use due to lack of equipment and installation. 34 scales of the total that were sent to 200 English teachers take charge in elementary schools located in city center were canceled due to false and imperfect filling; and 38 of them were canceled because of the reason that Electronic Language Education System was not used.

### **Demographic Characteristics**

76,6% (n=98) of 128 English teachers in the sample were women and 23,4% (n=30) of them were men.

**Table 1:** Length of Service Information

<b>Length of Service</b>	<b>Number of Teachers (n)</b>	<b>Percentage (%)</b>
1-5 year(s)	44	34.4
6-10 years	44	34.4
11-15 years	27	21.1
16-25 years	9	7
25+ years	4	3.1

When it is looked at the length of service of teachers according to their professions, 34,4% (n=44) of 128 teachers are between 1 and 5 years, 34,4% (n=44) of them are between 6 and 10 years, 21,1% (n=27) of them are between 11 and 15 years, 7% (n=9) of them are between 16 and 25 years, 3,1% (n=4) of them are over 26 years. 96,9% (n=124) of 128 teachers were informed about the use of Electronic Language Education System and 3,1% (n=4) of them are not informed.

### **Data Collection Tool**

This study is prepared for the purpose of taking the teachers' opinions to measure the efficiency of Electronic Language Education System and to determine problem areas. Research data has been collected through the questionnaire prepared by researchers. The following steps have been taken during preparation of the questionnaire:

- First of all, possible 30 questionnaire items have been determined.
- Prepared questionnaire has been conducted on a pilot group of 43 persons.

**Table 2:** Reliability Analysis

<b>Cronbach's Alpha</b>	<b>Cronbach's Alpha Based on Standardized Items</b>	<b>N of Items</b>
,789	,801	25

- Considering pre-application results and expert opinion, 5 items of possible questionnaire form of 30 items have been eliminated. It's seen that eliminated items caused increase in alpha value of the scale. While Cronbach reliability coefficient was 76 at the end of the pre-application, it was calculated as 79 after 5 items had been eliminated.
- Taking expert opinion, 25-item questionnaire form has been prepared.
- To determine problems occurred in using Electronic Language Education System and to learn solution suggestions, open-ended questions have been asked.
- The main questionnaire form has been applied on 200 English teachers who use Electronic Language Education System.
- 5-item likert scale has been used for answering questionnaire: (5) Strongly agree (4) Agree (3) Neutral (2) Disagree (1) Strongly disagree

### **Data Analysis Techniques**

In analysis of the data obtained as the result of questionnaire, frequency and percentage calculations have been used.

### **Findings**

In this section, the findings are included that have been reached as the result of statistical analysis of the data obtained for to answer sub-problems of the research.

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**Table 3:** Frequency and Percentages of Answers given to the questions

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
	1		2		3		4		5	
	F	%	F	%	F	%	F	%	F	%
I look positively to the usage of Electronic English Language Education System in schools.	12	9,4	31	24,2	40	31,3	35	27,3	10	7,8
I have sufficient knowledge of installation of Electronic English Language Education System.	6	4,7	17	13,3	17	13,3	61	47,7	27	21,1
I have sufficient knowledge of usage of Electronic English Language Education System.	4	3,1	14	10,9	13	10,2	68	53,1	29	22,7
Electronic English Language Education System is successful language education/teaching software.	4	3,1	15	11,7	62	48,4	37	28,9	10	7,8
Computer Formatter Teachers fulfill their responsibilities regarding installing ELES on the computer systems in your school and providing them work problem-free.	15	11,7	20	15,6	13	10,2	46	35,9	34	26,6
English language education must be given in electronic environment.	10	11,7	20	15,6	13	10,2	46	35,9	34	26,6
English language education must be given computer-aided.	3	2,3	8	6,3	10	7,8	69	53,9	38	29,7
I take English lessons in IT class by Electronic English Language Education System.	16	12,5	55	43,0	25	19,5	26	20,3	6	4,7
IT class is proper for using Electronic English Language Education System.	42	32,8	37	28,9	9	7,0	23	18,0	17	13,3
Internet connection is sufficient for using Electronic English Language Education System.	45	35,2	39	30,5	11	8,6	24	18,8	9	7,0
Students use Electronic English Language Education System wishfully.	17	13,3	38	29,7	43	33,6	22	17,2	8	6,3
Subjects on Electronic English Language Education System are in accordance with the curriculum.	23	18,0	44	34,4	24	18,8	32	25,0	5	3,9
Electronic English Language Education System accelerates the speed of students to understand a subject.	6	4,7	33	25,8	51	39,8	31	24,2	7	5,5
Students find difficult installation of Electronic English Language Education System.	9	7,0	27	21,1	18	14,1	46	35,9	28	21,9

Students find difficult usage of Electronic English Language Education System.	9	7,0	44	34,4	25	19,5	39	30,5	11	8,6
I motivate my students to use Electronic English Language Education System out of course hours.	4	3,1	13	10,2	11	8,6	73	57,0	27	21,1
Electronic English Language Education System has increased the desire of students to learn English.	10	7,8	29	22,7	53	41,4	31	24,2	5	3,9
Subjects on Electronic English Language Education System are proper for our students' level.	6	4,7	36	28,1	33	25,8	50	39,1	3	2,3
Electronic English Language Education System contributes to students for speaking English.	10	7,8	28	21,9	38	29,7	46	35,9	6	4,7
Electronic English Language Education System contributes to students for understanding English reading texts easily.	8	6,3	39	30,5	43	33,6	35	27,3	3	2,3
Electronic English Language Education System contributes to students for developing their vocabulary.	4	3,1	22	17,2	24	18,8	68	53,1	10	7,8
Students get bored while practicing on Electronic English Language Education System.	10	7,8	26	20,3	21	16,4	55	43,0	16	12,5
Students can carry out their own assessments by using Electronic English Language Education System.	5	3,9	31	24,2	31	24,2	52	40,6	9	7,0
Students can make review out of the school by using Electronic English Language Education System.	12	9,4	35	27,3	29	22,7	48	37,5	4	3,1
Electronic English Language Education System prevents students to become creative.	13	10,2	50	39,1	47	36,7	14	10,9	4	3,1

Questions numbered 1, 2, 3, 6, 7, 8 and 16 are asked for to determine opinion of teachers regarding features of Electronic Language Education System; Questions numbered 4, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24 and 25 are asked for to determine opinion of teachers regarding software quality of Electronic Language Education System; Questions numbered 5, 9 and 10 are asked for to determine opinion of teachers regarding technical support and equipment required for using Electronic Language Education System. When the questions asked to determine the opinions of teachers about the properties of Electronic Language Education System, it is observed

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that teachers gave consistent answers to the questions of the scale which are related to each other. There are some uncertainties which can be explained depending on the use of ELES in a limited framework and experiences of teachers. It can be said that the answers given to the scale items are not always the same but distributed in different options. It can be interpreted that the uncertainties of teachers about the ELES in the most positive scale items is an important result in the context that teachers must see and experience the advantages and disadvantages of the system by widespreading the active use of the ELES in the learning - teaching process. If it is paid regard to the fact that teachers gave positive answers to the scale items about the use and installation of system, it can be concluded that informational meetings held for the purpose of introduction of system achieved their objectives. Even if the system is not corresponding to the curriculum exactly, it may become compatible with the application method of teachers. While teachers who have comprehensive knowledge of system using the system more sensitive and successfully, teachers who prejudice system cannot use system actively. When questions in order to determine the opinions of teachers about the software properties of Electronic Language Education System are examined, it can be said that the answers given to the scale items are not the same but distributed to different options. It's so normal for teachers to remain hesitant because of the reason that they don't have enough knowledge about the system. While the students are very enthusiastic when they first start to use the system, they stuck at certain points in time. At these moments, teachers need to engage and support the student. However, teachers who cannot recognize the necessity and use of the system lead to withdrawal of students by remaining insufficient in meeting the demands of students and students are discouraged. It's required to inform students in the subject how they will study in line with this system and the required support must be provided. The ELES is updated every year and new approaches are adopted. Teachers also have to be integrated in to new system and must contribute to the system by adding points. The study of Alkan and Özgü (1989,26) which says "Computer can be used for the solution of problems in fact. Most of the students prefer to find

solution to their problems with the help of the computer instead of solving a given problem bu hand." and Öztürel's study saying that teaching with computers provides the acquisition of solving problems rather than the ready solutions and develops the creativity have a characteristic that supports the abovementioned finding in the direction that it provides the habit of problem-solving and develops the creativity. It's stated in the ELES that the vocabulary exercises lessons are liked most by the students. The research findings in the direction that prepared lesson softwares supported by programmed teaching, sound, color, graphic and animations easily increase the appeal and pedagogical effectiveness has characteristic that supports the result. Students see a picture about a word or hear the sound of it if exists and learn the word after interpreting clearly. Thus, the world permanence of the word is at upper level. Learning by doing and living is at high level which we start out with the idea that 'we forget what we hear, we remember what we see and we lean what we do'. We can say that the ELES contribute to the development of vocabulary of students. Computer Formatter Teachers fulfill their responsibilities regarding installing Electronic Language Education System on the computer systems in schools and providing them work problem-free for the purpose of determining the opinions of teachers regarding technical support and equipment required for using Electronic Language Education System. However, they have mentioned that Information Technology classes are insufficient for using Electronic Language Education System and that they should be transformed into a more suitable environment for language education. They think that internet speed is sufficient for using Electronic Language Education System in schools where internet connection is independent; while it is insufficient in schools where the number of students is high and where there is only one internet connection. Insufficient equipments in schools disturb the application of ELES.

### **Conclusion and Suggestions**

It's seen that research results and suggestions are still up-to-date. ELES is not a system in which the very communication occurs between student and computer and in which

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there is no interaction between student and student or student and teacher. It's possible to successfully apply the principles such as instant feedback and correction or providing reinforcement within the process of learning-teaching of ELES. It allows students to practice and review in the sufficient number without any suppress or criticism. Although ELES software is not prepared in accordance with teaching methods, techniques and principles, learning environment becomes enjoyable due to colors, voices and animations and it eases the process of learning. If teachers are given ELES education and prejudices are overcome, students can be given sufficient support, too. The Ministry of National Education can offer in-service trainings for to increase the level of competency of teachers in this regard. For getting efficiency as the result of these trainings, voluntary teachers should be selected who will use the system actively. In addition, interaction between students, teachers and the system should be permanent. Students proceeds with the system by receiving help of teachers if necessary. Considering suggestions, there should be high speed internet connection in the laboratories where ELES is installed and these laboratories should be independent of other departments of the school. Support should be given for creating electronic system that can be used actively in language education and is suitable for every level. The system usage should be supported by the Ministry, teachers should be given necessary education, and prejudices should be overcome. Awareness of students should be raised in terms of studying on computer and of using computer for education purposes. Explanatory user manuals should be prepared for teachers and students to use the system; and these manuals should be sent to the schools. Usage of Electronic Language Education Systems shouldn't be limited to schools; they should be used out of schools, too. For teachers and students to contribute to the development of the system and to the corrections of deficiencies of it, suggestions link should be added to the system. Researches should be carried out for preparation and evaluation of Electronic Language Education Systems that are significant opportunities for language education; and improving works should be conducted by means of feedbacks.

## **References**

1. Al, U. ve Madran, O., Web Tabanlı Uzaktan Eğitim Sistemleri: Sahip Olması Gereken Özellikler ve Standartlar, *Bilgi Dünyası*, 2004; 5(2): 259-271
2. Alkan, İ. ve Özgü Ö., Bilgisayarın eğitimdeki yeri ve Türkiye için Durumu, 6.Türkiye Bilgisayar Kongresi, 29-31 Mayıs, Ankara,1989
3. ALYAZ, Y., Yabancı Dil Öğretim Yazılımlarında Yapay Zekaya Dayalı Etkileşim, *Tömer Dil Dergisi*, Ankara, 2003; Sayı 121, 22
4. Anşin, S., Çocuklarda Yabancı Dil Öğretimi, Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi, Diyarbakır, 2006; Sayı 6, 9-20
5. Aslan Ö.,Öğrenmenin yeni yolu: e-öğrenme,Fırat üniversitesi sosyal bilimler dergisi, Cilt: 16, Sayı: 2, 2006, s. 121-131.
6. Balcı, A., Sosyal Bilimlerde Araştırma, Pegem A Yayıncılık, Ankara, 2004
7. Bliss, T.J. and Bliss, L.L.. Attitudinal responses to teacher Professional development for the effective integration of educational technology. *Journal of In Service Education*, 29(1), s. 81-99, 2003.
8. Çelebi M.D., Türkiye’de Anadili Eğitimi ve Yabancı Dil Öğretimi, *Erciyes Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, Kayseri, 2006; 21(2): 285-307
9. Demirezen M., Yabancı dil ve anadil öğreniminde kritik dönemler, *Dil Dergisi*, Ankara, 2003, Sayı:118, 5-15
10. Denizli İl Milli Eğitim Müdürlüğü Dyned Projesi web sayfası <http://dyned20.joomlam.com/> (Erişim Tarihi: 27 Eylül 2011)
11. Duran, N., Önal, A., Kurtuluş, C.. E-öğrenme ve kurumsal eğitimde yeni yaklaşım öğrenim yönetim sistemleri, *Bilgi Teknolojileri Kongresi IV*, Akademik Bilişim, Bildiriler Kitabı, 9-11 Şubat 2006: 97-101
12. Durukafa G., Kiriş S., İlköğretimde yabancı dil öğretimi ve öğretmen yetiştirme programı, *Dokuz Eylül Üniversitesi Buca Eğitim Fakültesi Dergisi*, İzmir, 2002; 14: 93-97
13. Fullan, M.. *The new meaning of educational change.* , 3rd ed., London: RoutledgeFalmer, 2001
14. Hu, L. Teachers’ beliefs and attitudes towards information and communication technology (ICT) and related pedagogy for English for Business Purposes (EBP) education in Chinese higher education (Doctoral thesis), Department of Education and Professional Studies, School of Social Science and Public Policy, King’s College London. 2007.
15. Kaptı, Ü., Alman Dili Eğitiminde Sözcük Öğretimi Amacıyla Web Sayfalarının Kullanımı, VIII. International Educational Technology Conference I.E.T.C., Eskişehir, 2008
16. Kartal, E., Bilişim-iletişim Teknolojileri ve Dil Öğretim Endüstrisi, *Uludağ Üniversitesi Eğitim Fakültesi Dergisi*, Bursa, 2005; 18(2): 383-393
17. Kartal, E., Çoklu-Ortamlı Yazılımların Fransızcanın Yabancı Dil Olarak Öğretimindeki Yeri ve İşlevleri, *Uludağ Üniversitesi Eğitim Fakültesi Dergisi*, Bursa, 2005; 18(2): 231-241

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18. KAYA, Ü.Ü., İlköğretim I.kademede İngilizce Derslerinde Oyun Tekniğinin Erişiyeye Etkisi, Kocatepe Üniversitesi, Sosyal Bilimler Enstitüsü, Yüksek Lisans Tezi, Afyonkarahisar, 2007
19. Krashen, S.D. Lateralization, Language Learning and Critical Period: Some new Evidence. *Language Learning*, 23(1): 63-74, 1973.
20. Levy, M. Computer assisted language learning: Context and conceptualization, Oxford University Press, 1997.
21. Lock, J. A new image: Online communities to facilitate teacher professional development. *Journal of Technology and Teacher Education*, 14: 663-678, 2006.
22. Meng, F. Analysis of CALL: Its new role and strategy of use (in Chinese). *Computer Assisted Foreign Language Education*, 102: 32-35, 2005.
23. Mumtaz, S. Factors affecting teachers' use of Information and Communications Technology: A review of the literature. *Journal of Information Technology for Teacher Education*, 9: 319-341. Taylor&Francis Online, 2000.
24. O'Mahony, C. Getting the Information and Communication Technology formula right: Access + ability = confident use. *Technology, Pedagogy and Education*, 12: 295-311. Taylor&Francis Online, 2003.
25. Odabaş, H., İnternet Tabanlı Uzaktan Eğitim ve Bilgi ve Belge Yönetimi Bölümleri, Türk Kütüphaneciler Derneği, Türk Kütüphaneciliği, 17(1): 22-36, 2003.
26. Ögüt, H., Altun, A.A., Sulak, S.A., Koçer, H.E., Bilgisayar destekli, internet erişimli interaktif eğitim cd'si ile e-egitim, *The Turkish Online Journal of Educational Technology- TOJET*, 3(1): 10, 2004
27. Öztürel, L., Bilgisayarla Öğretimin Matematik Erişimine Etkisi, Hacettepe Üniversitesi, Sosyal Bilimler Enstitüsü, Yüksek Lisans Tezi, Ankara, 1987
28. Peng, W.Q. ve He, J.J. ICT pedagogy integration in teacher training (in Chinese). *Foreign Language World*, 2: 18-25, 2007.
29. Robinson D.J. ve Ikeda T., Is On-Line Education The Future For Universities?, <http://www.cshe.nagoya-u.ac.jp/publications/journal/no2/09.pdf> (Erişim Tarihi: 29.08.2011), 2002.
30. Sencer, M. Toplumbilimlerinde yöntem. Beta Basım Yayıncılık, İstanbul, 1989.
31. Skinner, J. Making Virtual Learning Environments work for us as Teachers. IATEFL Exeter Conference Selections. Pp.139-140. Canterbury, UK, 2008.
32. Spencer-Oatey, H. E-Learning initiatives in China – Pedagogy, policy and culture, Hong Kong: Hong Kong University Press, 2007.
33. Ünsal Haluk, Web destekli eğitim, elektronik öğrenme ve Web destekli öğretim programlarındaki çeşitli ders modelleri, XI. Eğitim bilimleri kongresi, Lefkoşa, 23-26 Ekim 2002.

## So They Think They Are Ready for Distance Learning..? Faculty Members' Attitude Towards and Their Potential Contribution to Distance Learning Initiatives: Muğla Sıtkı Koçman University Case

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**Abstract:** This study is financed as part of a comprehensive Scientific Research Project at Muğla Sıtkı Koçman University, Turkey, in order to ensure a smooth, well-planned and well-received introduction to distance learning. The study aims to determine the attitudes of faculty members towards distance learning and the potential areas that they can and wish to contribute to for the successful implementation of such activities. The study, thus, is sought to respond to the following questions: (1) What are the attitudes of the faculty members of Muğla Sıtkı Koçman University towards distance learning? (2) Do the attitudes of the faculty members of Muğla Sıtkı Koçman University vary by title, by computer ownership/use or by previous distance learning experience? (3) What are the potential areas of contribution that the faculty members of Muğla Sıtkı Koçman University feel they can bring to the distance learning initiatives? This is a two-part descriptive research study with 268 respondents (26%) from the population of 1,024 faculty members currently working within 11 faculties, 3 institutes, 5 polytechnics, 11 vocational polytechnics and 18 research centres of Muğla Sıtkı Koçman University. The first part of the study made use of a "Distance Learning Attitude Scale" developed by Ağır (2007) in order to determine level of faculty members' attitudes towards distance learning. This part examined academic title and previous exposure to distance learning variables that were considered to be possible factors having an influence on the faculty members' attitudes as well. In addition, a second two-dimension standard scale (Süer, Kaya, Bülbül, Karaçanta, Koç, Çetin, 2005) was used to define the areas or processes that the faculty members think they can contribute to. Quantitative data obtained from the surveys were then analysed using statistical software (SPSS), which formed the basis for the findings of the research. The quantitative data was elaborated with the participants' answers to open-ended question regarding their distance learning experience. Findings of this study, the completion of which is anticipated by the end of June 2012, will serve as a foundation for the expansion and further development of distance learning activities at Muğla Sıtkı Koçman University and will play an important role in the strategic planning process at the university regarding the adoption of distance learning technologies and contribute to the efforts in expanding the distance learning initiatives in a well-planned systematic manner.

**Keywords:** Distance learning, e-learning, distance education, faculty attitudes, online learning

### Introduction

Muğla Sıtkı Koçman University, established in South-West Turkey in 1992, started distance (online) learning for the first time in the 2011 autumn semester with the delivery of a compulsory Basic Computer Technologies course to approximately 1,500

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first and second year undergraduate students and an elective course on image processing delivered to approximately 250 students. The university is currently in the process of expanding the scope of online learning activities through its newly established Distance Education Centre. For this aim, the Centre prepared a Scientific Research Project to be supported by the research fund referred to as BAP in Turkey. One of the components of this project has been examining the attitudes of faculty members towards online learning practices as well as their potential contribution to any such initiative. It is highly expected that the findings of this component would be of benefit to the expansion process since full the support of the faculty members is a crucial ingredient when trying to successfully apply innovation within higher education institutions.

In launching an online distance education programme at a higher education establishment, is it safe to assume that faculty members will readily adopt this new medium, and more importantly, are they sufficiently prepared? Simonson defines distance education as an ‘institution-based, formal education where the learning group is separated, and where interactive telecommunications systems are used to connect learners, resources, and instructors’ (Simonson 2003 quoted in Schlosser, 2010). Whilst it is obvious that there are technological requirements of hardware and software, the educational considerations are far more of a challenge, such as the physical preparation of online materials and ensuring that course delivery meets the pedagogical standards and requirements to make the whole venture successful, not to mention the faculty members themselves, upon which any distance education initiative heavily relies upon.

For an institution launching a distance education programme, the importance of having a faculty who are ready to embrace the world of online distance education with a positive attitude, is undoubtedly a key factor in the success of such a programme. We cannot assume that all faculty members will respond to online distance education as early adopters, or that they will be automatically equipped for or even willing to embrace it. Online distance education environment is different from the classic classroom environment (Totaro et al., 2005), and ‘the success of any distance education initiative

relies on a critical and core resource of faculty who provide quality instruction' (Tabata & Johnsrud, 2008), with 'quality instruction' being the imperative, rather than the technological environment.

In addition to their perceptions about their effectiveness in online instruction, there is the fear or unfamiliarity of faculty members with online educational technologies to be considered. 'Although faculty use assorted technologies to facilitate their work they resist using technologies in delivering distance education,' says Tabata & Johnsrud (2008). Bower observes it that 'many (faculty) have simply been disillusioned by previous technologies touted as innovations that would alter the course of education. Faculty are exhibiting healthy scepticism when they resist the call to jump on the latest educational bandwagon before assessing how this technology will help students learn' (Bower, 2002). Babson Survey Research Group's recent survey on 4,564 faculty members in the US reveals that the growth of online education fills almost 60% of the faculty members with fear rather than excitement and the faculty report 'being more pessimistic than optimistic about online learning' (Allen & Seaman, 2012). Nevertheless, the researchers have also indicated that faculty members tend to have a more positive attitude toward online learning if they have been exposed to it previously, which has also been shown in their 2011 survey. Attitudes also align with faculty members' own teaching experiences, Allen and Seaman continues, since faculty members who are either teaching fully online or blended courses have the most sympathetic attitude about online learning (2012).

The roots of the term 'attitude' goes back to 'aptus' in Latin, which means 'being available and ready for action' (Hogg & Vaughan, 2007). There are many definitions of attitude, one of the oldest ones belonging to Allport who defines attitude as 'a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related' (Allport, 1935, p. 810, quoted in Hogg & Vaughan, 2007). A simpler definition is of Pickens describing attitude as 'a mindset or a tendency

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to act in a particular way due to both an individual's experience and temperament' (Borkowski, 2005).

In a study conducted in 2005 to investigate the distance education potential at Gazi University, Turkey, faculty members' attitudes towards distance education were found out to be relatively neutral yet close to being positive (Süer et al., 2005). This study also aimed to find out to what extent the faculty members could contribute to distance education initiatives at the university, the result of which showed that the faculty needed to be provided with advanced technical knowledge and skills in order to be able to contribute.

Elaborating on Gazi University's study, this paper has aimed to examine faculty members' attitudes toward distance (online) education and their perceptions about whether or not they are ready to contribute to the launch of a distance learning initiative at Muğla Sıtkı Koçman University. The aim is to understand where there are potential crises of confidence within the faculty and to consider how the faculty as a whole feels about its' ability to accept, adapt to and start teaching within an online environment. The conclusions from this study will help the management of the distance education centre shape the training provided in the future to faculty members as a prerequisite to online teaching at the university.

### **Significance and Aim of the Research**

Having the full support of faculty members is a crucial part of innovation in higher education. The findings of the first part of the study are particularly vital in the consideration that the enthusiasm of faculty members is a prerequisite for both the success and efficiency of distance learning initiatives, and the attitudes are amongst the most influential factors affecting the use of innovative technologies.

The study responds to the following questions:

1. What are the attitudes of the faculty members of Muğla Sıtkı Koçman University towards distance learning?
2. Do the attitudes of faculty members at Muğla Sıtkı Koçman University vary by

academic title or by previous distance learning experience?

3. What are the potential areas of contribution that the faculty members of Muğla Sıtkı Koçman University feel they can bring to the distance learning initiatives?

This study aims to contribute to the strategic planning process at the university regarding the adoption of distance learning technologies and to contribute to the efforts in expanding the distance learning initiatives in a well-planned systematic manner.

### **Survey Methodology**

This is a descriptive study that has sought to examine faculty members' attitudes towards distance learning as well as their potential contribution in distance learning initiatives.

The population of the study is comprised from faculty members currently working within 11 faculties, 3 institutes, 5 polytechnics, 11 vocational polytechnics and 18 research centres of Muğla Sıtkı Koçman University. The study has aimed to reach the whole population, and 1,024 faculty members in all faculties and polytechnics were contacted via e-mail informing them about the aim of the study and a link to the online data collection tool was provided. A total of 268 faculty members filled in the online survey form for a response rate of 26%.

The first part of the study employed a "Distance Learning Attitude Scale" developed by Ağır et al. (2007) in order to determine the level of faculty members' attitudes towards distance learning. The scale consists of 21 items, 7 of which are negative. Ağır reports that the value of the inner consistency multiple (Cronbach Alpha) is  $\alpha = 0,835$ , and the scale has a valid and a confident structure based on the findings about the studies for the validity and the confidence. This first part of the study has examined academic title and previous distance learning variables that are possible factors having an influence on the faculty members' attitudes as well.

The second two-dimensional standard scale (Süer et al., 2005) was used to define the areas or processes that the faculty members think they can contribute to. This scale consisted of 17 items representing various tasks needed to be fulfilled during the design and delivery of online learning materials. This part of the study tried to reveal

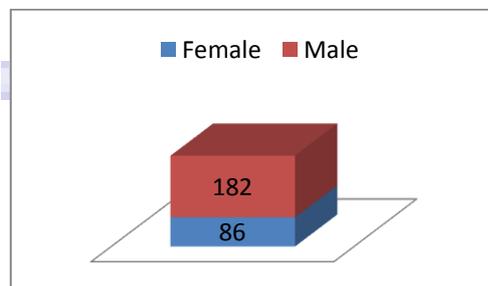
whether faculty members thought they could contribute to the design, development and delivery of distance learning at any stage.

Quantitative data obtained from the surveys was analysed using SPSS (Statistical Package for Social Sciences) software, which formed the basis for the findings of the research. Based on the information provided in the first section of the data collection tool, dissemination of the faculty members who participated in the research as of academic title and previous distance learning experience, if any, was reflected as frequency and percentage. Arithmetic mean and standard deviation calculations were made to find out the attitudes of the faculty members towards distance learning. In addition, t-test and variance analysis (One Way Anova) were used to reveal whether there was a significant relationship between the faculty members' attitudes and such variables as academic title and previous distance learning experience. Again, frequency and percentage calculations were made to obtain findings about the potential contribution the faculty members thought they could make to any distance learning initiative.

## **Findings**

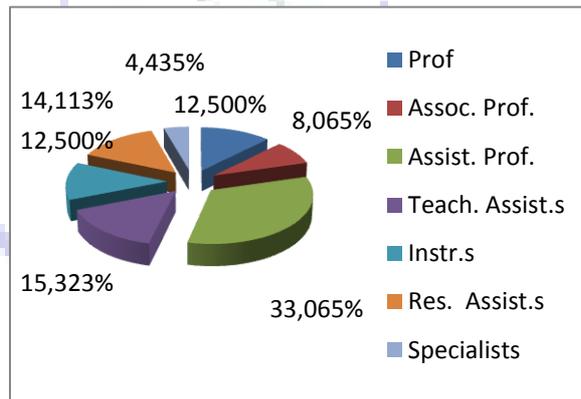
### **Characteristics of the Sample**

A total of 268 faculty members out of 1,024 completed the online form. Gender analysis revealed that total 182 males (67.9%) and 86 females (32.1%) participated in the study.

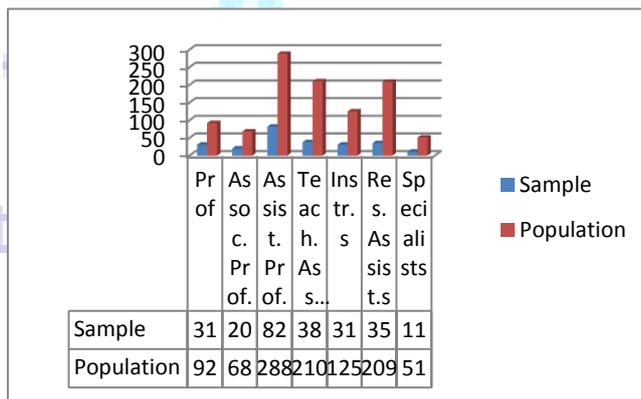


**Figure 1:** Participant Faculty Members by Gender

As Figure 2 shows below, 82 (33.1%) of the respondent faculty members were assistant professors while 31 (12.5%) were professors, 20 (8.1%) were associate professors, 38 (15.3%) were teaching assistants, 31 (12.5%) were instructors, 35 (14.1%) were research assistants, and 11 (4.4%) were specialists. The sample represented 26% of the population overall, and Figure 3 shows the breakdown of representation by academic titles from 17% to 34%.

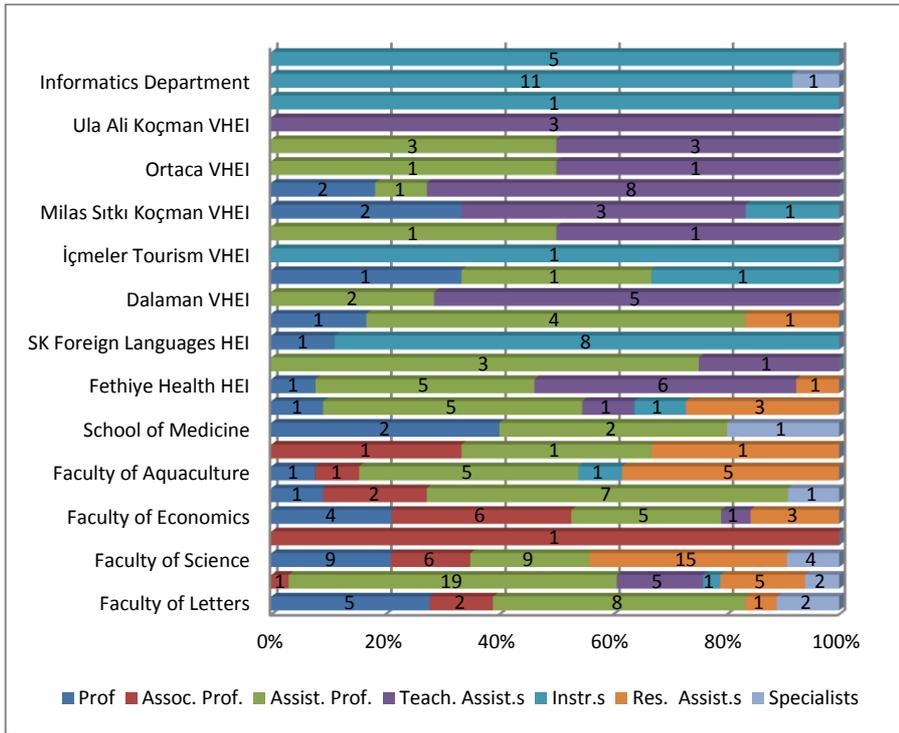


**Figure 2:** Academic Titles of the Participant Faculty Members



**Figure 3:** Academic Titles of the Participant Faculty Members Compared to Population

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**Figure 4:** Academic Titles of the Participant Faculty Members by Institution

The respondents were requested to give information about their computer use. A great majority (98.9%) of the respondents stated that they were regular users of computer and internet technologies, whereas merely 3 faculty members (1.1%) stated that they did not use computer and internet technologies regularly. Similarly merely 3 faculty members (1.1%) indicated that they used computer for the last 1 to 4 years. Almost 70% of the faculty members indicated they have been using computer and internet technologies for more than 12 years (Figure 5).

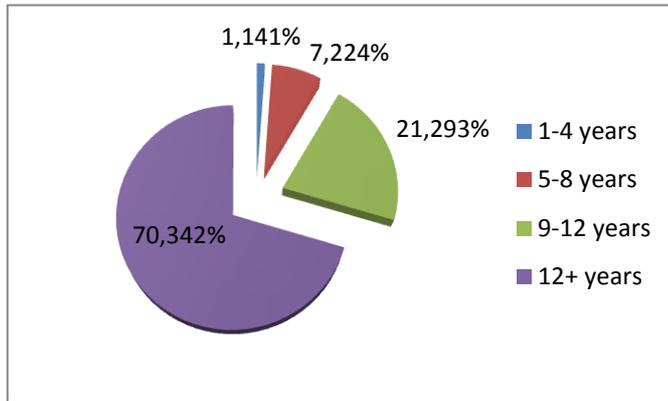


Figure 5: Faculty Members' Computer Use by Years

The respondents were asked whether or not they had any idea or information about what distance learning was. Almost half of the respondents (48%) stated that they had some idea about distance learning, and 46% clearly stated that they knew about distance learning while 7 (2.6%) respondents emphasised that they did not have any idea or information about it. The respondents were also asked if they had any previous distance learning experience. The data showed that big majority of the participants (80.3%) did not have any previous exposure to distance learning. Of the remaining, 17 (6.3%) stated that they had distance learning experience as instructors whereas 35 faculty members (13.4%) were learners in a distance learning system previously.

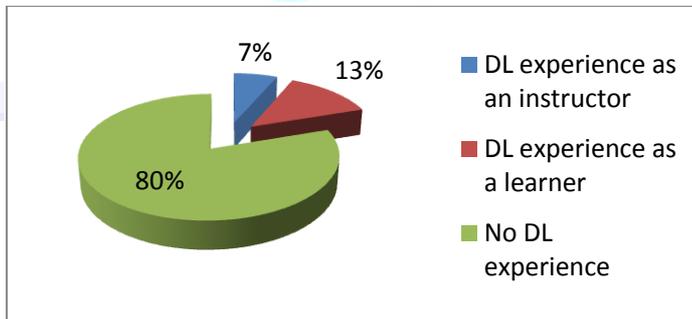


Figure 6: Faculty Members' Previous Distance Learning Experience

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The participants who had some previous distance learning experience were asked to elaborate on their experiences. The results pointed out that the faculty members responded to this question had their distance learning experience from various sources ranging from online language classes to certificate programmes of international organisations. 4 faculty members who elaborated their previous experiences defined distance learning as a “useful and fruitful system” whereas 1 faculty member described distance learning as “unnecessary and useless”. 1 faculty member who used to be a student in open education for two years described it “as a good experience”. The opportunity to meet and interact with many people from various countries or cities and to learn from each other’s experiences was another aspect of distance learning emphasised by those faculty members who experienced distance learning as students. Some of the faculty members who worked as online instructors previously either on a course or programme basis looked at the issue from the perspective of their students, and stated that asynchronous nature of distance learning was particularly welcome by their students since they could follow the classes whenever they wanted to and at their own pace. One negative aspect of distance learning mentioned by some faculty members was the lack of eye contact between instructor and learners.

Faculty members who answered this question also emphasised the importance of time management and a planned, systematic approach to distance learning especially from the students’ perspective. The respondent faculty members also mentioned that distance learning students should be self-disciplined as well as motivated for learning; and it was the responsibility of the faculty members to motivate students. Yet, it was also emphasised that the faculty members should also have been informed about what distance learning was, what its basic principles were, and how the system operated before starting any distance learning initiative. A faculty member referred to a quite uncomfortable experience where s/he needed to teach online without any professional training. Nevertheless, except for one respondent mentioned above, all faculty members responded to this question considered distance learning as a flexible instructional system

for non-traditional students who could not access to formal education for various reasons ranging from physical impairment to business or domestic responsibilities provided that the necessary technical infrastructure, instructional materials and training opportunities were created at the outset. A faculty member said: “against all odds, distance learning is a magnificent learning method forcing learner to be a learner and instructor to be an instructor, to develop himself professionally...”

### **Faculty members’ attitudes towards distance learning**

This section reveals the findings about faculty members’ attitudes towards distance learning. The Likert scale used for the purposes of this study was from 1 to 5, with 1 being ‘Strongly Disagree’ through to 5 being ‘Strongly Agree’. The arithmetic mean of total attitude scores of the faculty members was found to be 3.26, very slightly above ‘neutral’. As a general statement it is possible to say that attitudes of the faculty members in Muğla Sıtkı Koçman University towards distance education tend to be positive yet quite cautious.

Table 1 puts forward the attitudes of the faculty members towards distance learning as per specific items arranged in a descending order based on the arithmetic mean of each item. As can be seen, the most significant finding was regarding Statement 3 *Distance education provides the flexibility to repeat as much as one wants*. The mean value of 4.37 showed that respondents stated as a whole that they ‘Strongly Agree’ with this statement.

There were 5 other statements on which faculty members responded positively with ‘Agree’ (based on a mean value around the 4.00 mark), and those are Statement 1 *Access to knowledge is faster in distance learning since information is shared through Internet* (4.08), Statement 11 *Face-to-face learning is more beneficial than distance learning* (4.04), Statement 2 *Lack of traditional time and space limitation in distance education ensures sustainability of learning* (4.02), Statement 12 *It is necessary to have face-to-face interaction to ensure a better education to take place* (3.97) and Statement 4 *Distance education ensures effective learning through audio-visual designs and*

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technology (3.90). In the middle, so to speak, are 2 statements on which faculty members really could not decide one way, or the other, or were just ‘not very sure’. Those are Statement 20 Distance education is efficient in solving many problems of traditional education (3.00) and Statement 10 Distance education applications produce high quality outcomes (2.97).

**Table 1:** Faculty members’ attitudes towards distance learning by specific items

<b>Attitude</b>	<b>N</b>	<b>X</b>	<b>Sd</b>
3. Distance education provides the flexibility to repeat lectures as much as one wants.	246	4.37	.865
1. Access to knowledge is quicker through distance learning since information is accessed via the Internet.	248	4.08	.942
11. Face-to-face learning is more beneficial than distance learning.	245	4.04	1.035
2. Elimination of traditional time and space limitations in distance education ensures sustainability of learning.	248	4.02	1.043
12. It is necessary to have face-to-face interaction to ensure a better standard of education takes place.	244	3.97	1.010
4. Distance education ensures effective learning through audio-visual designs and technology.	245	3.90	1.064
7. Immediate results in testing and evaluation increases student motivation in distance education.	242	3.64	1.163
6. Distance education ensures equal opportunities.	246	3.46	1.237
13. Learning is anti-social in distance education.	244	3.32	1.282
21. Each individual can be educated at his/her own level with distance education.	244	3.30	1.165
5. It is possible to follow up learners’ achievement processes in distance education.	245	3.23	1.186
19. Distance education has a great power.	246	3.17	1.101
18. Distance education helps learners to develop their self-assessment skills.	242	3.16	1.066
20. Distance education is efficient in solving many problems experienced in traditional education.	245	3.00	1.073
10. Distance education applications produce high quality outcomes.	245	2.97	1.053
16. It is not as possible as it should be to control learning environments in distance education.	245	2.93	1.201
17. Outcomes of distance education practices are not effective.	245	2.56	1.120
15. It is not possible to implement distance education in Turkey	244	2.54	1.235

properly.			
14. I have no interest in distance education.	246	2.32	1.306
8. Learning through distance education is more fun than learning through face-to-face education.	241	2.26	1.108
9. Distance learning is more effective than face-to-face learning.	244	2.15	1.037

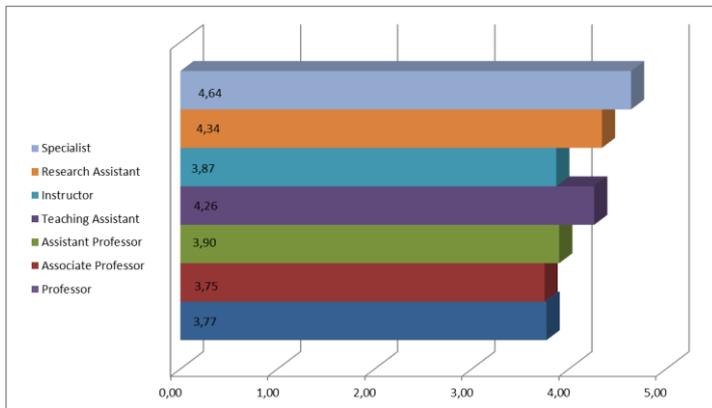
At the negative end of the scale, there are 3 statements with which respondents ‘disagreed’ with, (based on a mean value around the 2.00 mark), and those are Statement 14 *I have no interest in distance education* (2.32), Statement 8 *Learning through distance education is more fun than learning through face-to-face education* (2.26), and Statement 9 *Distance learning is more effective than face-to-face learning* (2.15).

#### **Faculty members’ attitudes towards distance learning by their academic titles and previous Distance Learning (DL) experience**

This part of the study focuses on whether attitudes of the faculty members towards distance learning differ according to, or influenced by their academic titles or their previous experience of distance learning. The faculty members’ attitudes by their academic titles and by previous distance exposure to learning were examined using one-way analysis of variance. Where the ANOVA test results points out a significant difference at 0.05 significance level, this means that the attitudes of faculty members significantly differ by their academic titles or their previous exposure to distance learning, and the test of homogeneity of variances was applied to find out which groups led to this difference. This was followed by the Duncan test if equal variances were assumed or Tamhane if not.

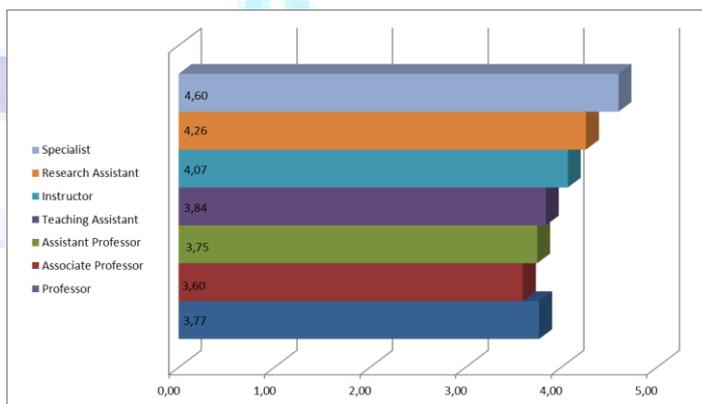
#### **Faculty members’ attitudes by academic titles**

With regard to the faculty members’ attitudes towards distance learning by their academic titles, the examination of the results of the one-way analysis of variance at 0.05 significance level shows that there is no significant difference between groups for faculty attitudes towards distance learning except for the statements No. 2 and No.4.



**Figure 7** – Statement No. 2 Elimination of traditional time and space limitations in distance education ensures sustainability of learning

Figure 7 above gives the arithmetic mean of the participants’ responses to the Statement No.2. The Duncan test showed that the specialists almost strongly agreed (4.64) with the statement no.2, followed by research assistants (4.34) and teaching assistants (4.26) whose responses ranged between ‘Agree’ and ‘Strongly Agree’. The responses of the other faculty members were also positive, yet being not as high as these three groups, ranging from ‘Neutral’ to ‘Agree’.

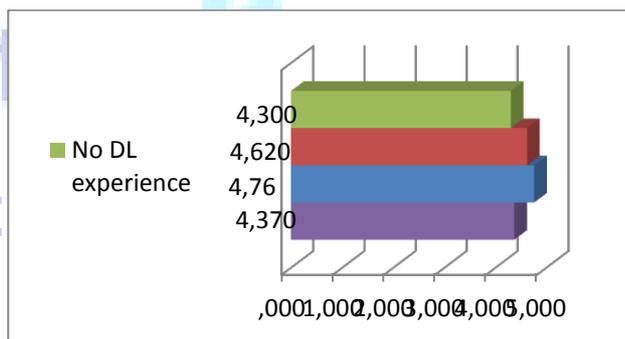


**Figure 8** – Statement No. 4 Distance education ensures effective learning through audio-visual designs and technology

Figure 8 above gives the arithmetic mean of the participants' responses to the Statement No.4, regarding which the results were quite similar to the above with specialists 'Strongly Agree'ing with the statement (4.60) that was followed by research assistants (4.26) and teaching assistants (4.07). Similarly, the responses of the other faculty members were also positive, yet being not as high as these three groups, ranging from 'Neutral' to 'Agree'.

**Faculty members' attitudes by previous exposure to distance learning**

With regard to the faculty members' attitudes towards distance learning by their academic titles, the examination of the results of the one-way analysis of variance at 0.05 significance level shows that there is significant difference between groups for faculty attitudes towards distance learning for 16 of the statements. The following is an item-by-item disclosure of these statements, where there is a significant difference between the groups, based on the Duncan or Tamhane tests applied. It is important to note here once more and refer to the above mentioned data regarding previous exposure to distance learning of the faculty members that 80% of the participant faculty members had not been exposed to any type of distance learning previously either as instructors or learners.

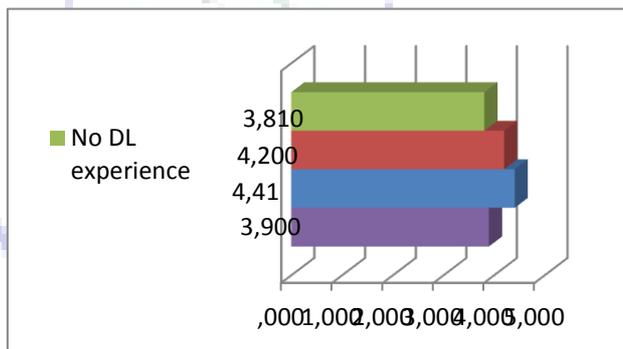


**Figure 9** – Statement No. 3 Distance education provides the flexibility to repeat lectures as much as one wants

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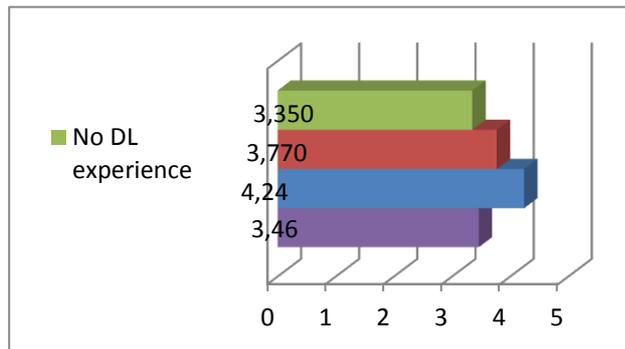
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Figure 9 above gives the arithmetic mean of the participants' responses to the Statement No.3. ANOVA showed a significant difference between groups for the Statement No.3 (.021). Since the test of homogeneity of variances also led to a value below the level of significance, Tamhane test displayed a mean difference of .467 between the faculty members having a prior exposure to distance learning as an instructor (4.76) and those with no distance learning experience (4.30).



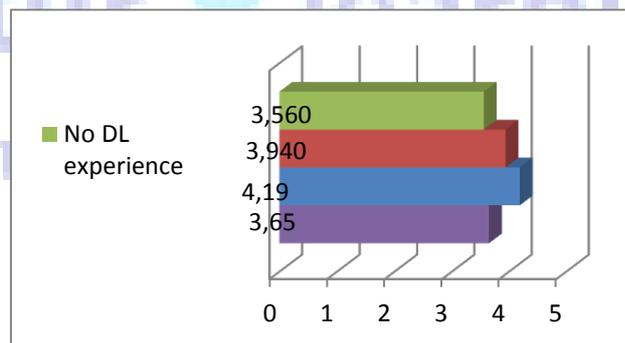
**Figure 10** – Statement No. 4 Distance education ensures effective learning through audio-visual designs and technology

Figure 10 above gives the arithmetic mean of the participants' responses to the Statement No.4. ANOVA presented a significant difference between groups for the Statement No.4 (.016). Equal variances assumed, Duncan test showed that the faculty members with previous distance learning experience displayed a positive attitude towards this statement (4.20 for learners and 4.41 for instructors). Participants with no previous DL experience also showed a cautious but almost positive attitude (3.81).



**Figure 11** – Statement No. 6 Distance education ensures equal opportunities

Figure 11 above gives the arithmetic mean of the participants' responses to the Statement No.6. ANOVA also presented a significant difference between groups for the Statement No.6 (.005). Equal variances assumed, Duncan test showed that the faculty members with previous distance learning experience as an instructor displayed a truly positive attitude towards this statement (4.24) between 'Agree' and 'Strongly Agree'. Participant with previous DL experience as learners also had a cautious but positive attitude (3.77) towards this characteristic of distance learning to provide equal opportunities, yet faculty members with no DL experience displayed an attitude slightly above neutral (3.35).

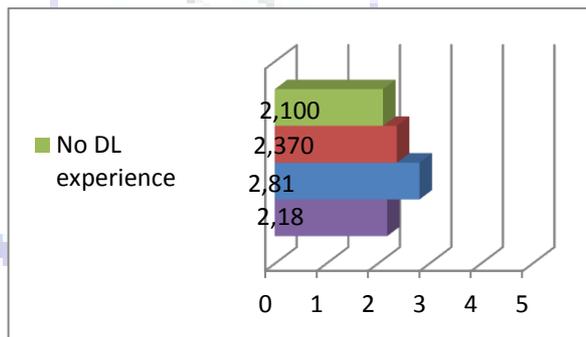


**Figure 12** – Statement No. 7 Immediate results in testing and evaluation increases student motivation in distance education

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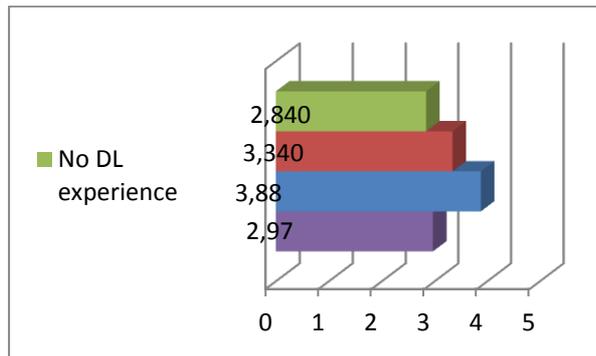
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Figure 12 above gives the arithmetic mean of the participants' responses to the Statement No.7. ANOVA presented a significant difference between groups for the Statement No.7 (.032). Equal variances assumed, Duncan test showed that the faculty members with previous distance learning experience as an instructor (4.19) and as a learner (3.94) agreed with this statement. Participants with no DL experience displayed an attitude just above the neutral (3.56).



**Figure 13** – Statement No. 9 Distance learning is more effective than face-to-face learning

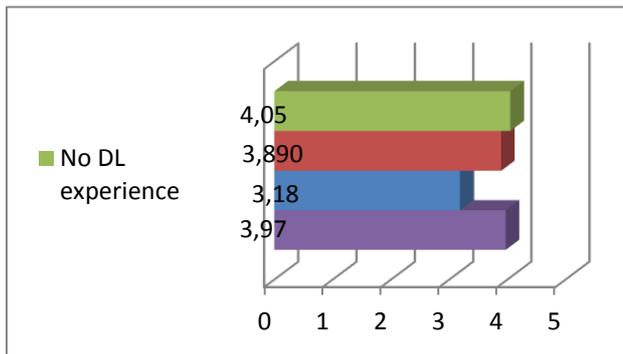
Figure 13 above gives the arithmetic mean of the participants' responses to the Statement No.9. ANOVA presented a significant difference between groups for the Statement No.9 (.014). Equal variances assumed, Duncan test showed that the faculty members with previous distance learning experience as an instructor (2.81) had a relatively neutral attitude for this statement compared to the others since the participants who had distance learning experience as a learner (2.37) and those with no DL experience (2.10) did not agree with this statement. These results pointed out that the faculty members did not believe in the effectiveness of distance learning in comparison to face-to-face learning, although the attitude was more positive if they had been exposed to distance learning as an instructor previously.



**Figure 14** – Statement No. 10 Distance education applications produce high quality outcomes

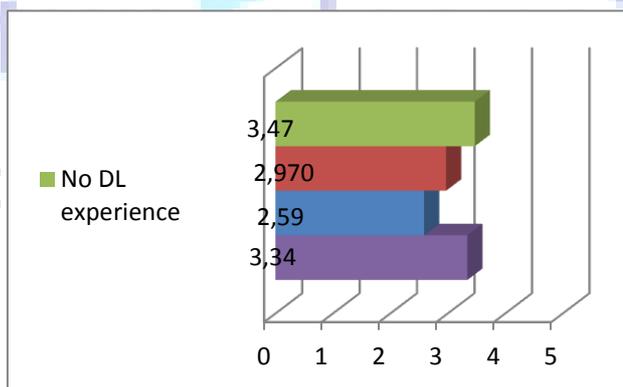
Figure 14 above gives the arithmetic mean of the participants' responses to the Statement No.10. ANOVA presented a significant difference between groups for the Statement No.10 (.000 with an F value of 10.299). Equal variances assumed, Duncan test showed that the faculty members with previous distance learning experience as an instructor (3.88) agreed with this statement compared to the others since the participants who had distance learning experience as a learner (3.34) and those with no DL experience (2.84) had a relatively neutral state. These results pointed out that there was a significant difference between the faculty members who had been exposed to distance learning as instructors and those who did as learners or who did not at all in terms of high quality outcomes of distance learning.

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**Figure 15** – Statement No. 12 It is necessary to have face-to-face interaction to ensure a better standard of education takes place.

Figure 15 above gives the arithmetic mean of the participants' responses to the Statement No.12. ANOVA showed a significant difference between groups for the Statement No.12 (.002). Since the test of homogeneity of variances led to a value below the level of significance, Tamhane test pointed out that the faculty members, who were exposed to distance learning as instructors, had a neutral approach (3.18) to the necessity of having face-to-face interaction for a better education while those with experience as learners (3.89) or those without any distance learning experience (4.05) agreed with the statement.



**Figure 16** – Statement No. 13 Learning is anti-social in distance education

Figure 16 above gives the arithmetic mean of the participants' responses to the Statement No.13. ANOVA presented a significant difference between groups for the Statement No.13 (.005). Equal variances assumed, Duncan test showed that the faculty members with no previous distance learning experience (3.47) significantly differed from those who had been exposed to distance learning as instructors (2.59) or learners (2.97). Those who considered distance learning as 'anti-social' were the faculty members who did not have any distance learning experience previously. The other faculty members' attitudes are more positive due to, probably, the fact that they had been and interacted in the system before.

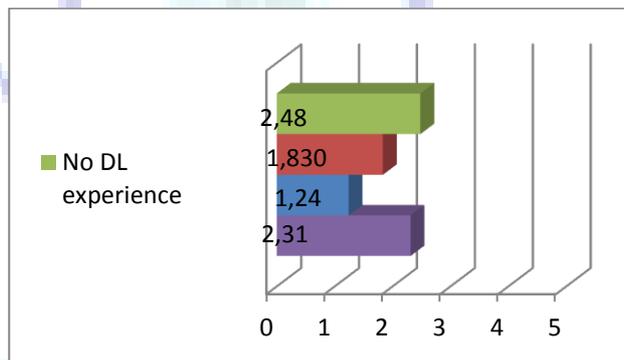
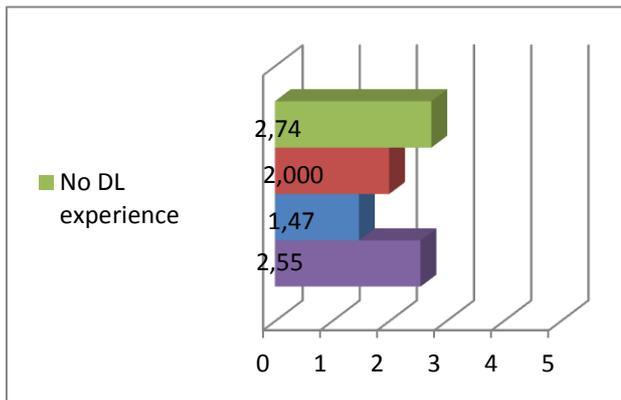


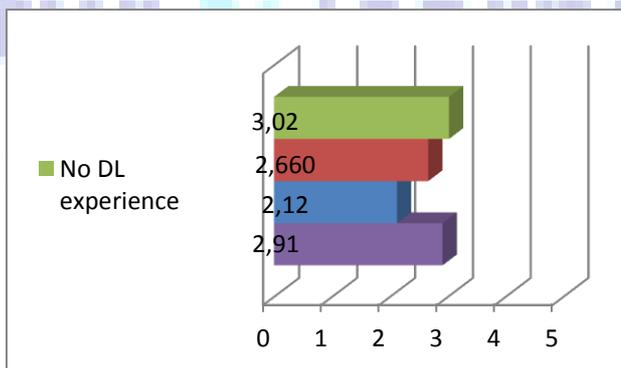
Figure 17 – Statement No. 14 I have no interest in distance education

Figure 17 above gives the arithmetic mean of the participants' responses to the Statement No.14. ANOVA showed a significant difference between groups for the Statement No.14 (.000 with an F value of 10.871). Since the test of homogeneity of variances led to a value below the level of significance, Tamhane test depicted a significant picture where the faculty members with any distance learning experience as an instructor strongly disagreed with this statement (1.24 and 1.83). On the other hand, those who did not have any previous distance learning experience were cautious about it (2.48).



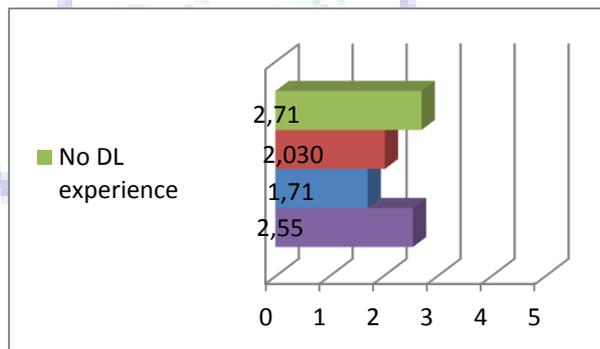
**Figure 18** – Statement No. 15 It is not possible to implement distance education in Turkey properly

Figure 18 above gives the arithmetic mean of the participants' responses to the Statement No.15. ANOVA showed a significant difference between groups for the Statement No.15 (.000 with an F value of 13.239). Since the test of homogeneity of variances led to a value below the level of significance, Tamhane test displayed a similar result as above. The faculty members having a prior exposure to distance learning as an instructor (1.47) and as a learner (2.00) did not agree with this statement, whereas those with no distance learning experience (2.74) were cautious about whether it was possible to implement distance education in the country properly.



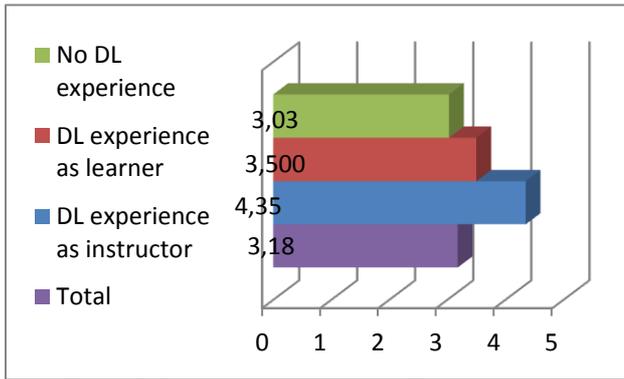
**Figure 19** – Statement No. 16 It is not as possible as it should be to control learning environments in distance education.

Figure 19 above gives the arithmetic mean of the participants' responses to the Statement No.16. ANOVA presented a significant difference between groups for the Statement No.16 (.005). Equal variances assumed, Duncan test showed that the faculty members with previous distance learning experience as instructors disagreed with this statement (2.12) whereas those who had not been exposed to distance learning previously were neutral about it (3.02). The faculty members, who were involved in distance learning before as learners, also did not agree with the account that controlling the learning environment in distance education was not possible (2.66).



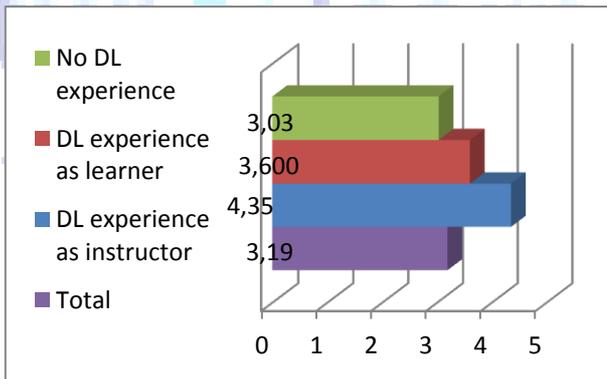
**Figure 20** – Statement No. 17 Outcomes of distance education practices are not effective

Figure 20 above gives the arithmetic mean of the participants' responses to the Statement No.17. ANOVA presented a significant difference between groups for the Statement No.17 (.000 with an F value of 11.513). Equal variances assumed, Duncan test showed that the difference between groups here was quite significant with the faculty members that had previous distance learning experience as instructors having disagreed with this statement (1.71). The faculty members who had not been exposed to distance learning previously did not fully agree yet were almost neutral about it (2.71). The faculty members somehow involved in distance learning before had a relatively more positive attitude about the outcomes of distance education practices.



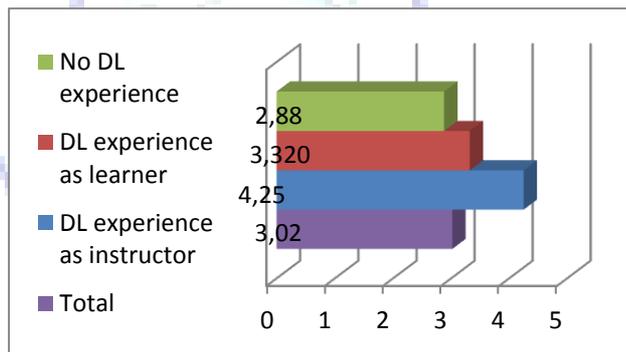
**Figure 21** – Statement No. 18 Distance education helps learners to develop their self-assessment skills

Figure 21 above gives the arithmetic mean of the participants’ responses to the Statement No.18. ANOVA presented a significant difference between groups for the Statement No.18 (.000 with an F value of 15.021). Equal variances assumed, Duncan test showed that the faculty members who had previous distance learning experience as instructors almost strongly agreed with this statement (4.35). The faculty members who had experienced distance learning as learners cautiously approached to this statement (3.50), yet those who had not been exposed to distance learning previously stayed indecisive (3.03).



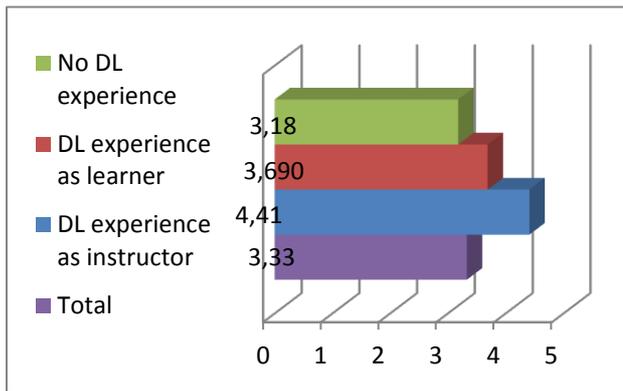
**Figure 22** – Statement No. 19 Distance education has a great power

Figure 22 above gives the arithmetic mean of the participants' responses to the Statement No.19. ANOVA presented a significant difference between groups for the Statement No.19 (.000 with an F value of 15.759). Equal variances assumed, based on the Duncan test, the faculty members who had previous distance learning experience as instructors (4.35) almost strongly agreed that distance education had a great power. Those who experienced distance learning as learners (3.60) were closer to agree with it, yet the faculty members who had not experienced distance learning were cautious and stayed indecisive (3.03).



**Figure 23** – Statement No. 20 Distance education is efficient in solving many problems experienced in traditional education

Figure 23 above gives the arithmetic mean of the participants' responses to the Statement No.20. ANOVA presented a significant difference between groups for the Statement No.20 (.000 with an F value of 14.656). Equal variances assumed, based on the Duncan test, the faculty members who thought that distance education was efficient in solving problems of traditional education were the ones exposed to distance learning as instructors (4.25) or as learners (3.32). Yet, the faculty members who did not have any distance learning experience were cautious and stayed indecisive, almost disagreed, about the efficiency of distance education in this regard (2.88).



**Figure 24** – Statement No. 21 Each individual can be educated at his/her own level with distance education

Figure 24 above gives the arithmetic mean of the participants' responses to the Statement No.21. ANOVA presented a significant difference between groups for the Statement No.21 (.000 with an F value of 11.544). Equal variances assumed, Duncan test showed that the faculty members more than agreed with this statement were the ones exposed to distance learning as instructors (4.41). The faculty members who had experienced distance learning as learners (3.69) almost agreed with this statement; yet, the faculty members who did not have any distance learning experience were cautious and stayed indecisive (3.18).

### **Potential areas of contribution to the distance learning initiatives**

Potential contribution that the faculty members thought they could make to distance learning initiatives started at the university is given in the following table (Table 2).

**Table 2:** Frequency and Percentage Values as to Potential Contribution of the Faculty Members to Distance Learning Practices

	Cannot Contribute		Can Contribute		Total	
	f	%	f	%	f	%
1. Developing content	69	25.9%	197	74.1%	266	100.0%
2. Converting content into course books based on distance education principles	102	38.3%	164	61.7%	266	100.0%
3. Converting content into scenarios based on instructional software procedures	158	59.4%	108	40.6%	266	100.0%
4. Converting scenarios into instructional software	186	69.9%	80	30.1%	266	100.0%
5. Preparing figures, graphics, animations, etc. in the scenarios during their conversion into instructional materials	186	69.9%	80	30.1%	266	100.0%
6. Preparing scenarios for audio presentation (podcasts, audio files, CDs)	165	62.0%	101	38.0%	266	100.0%
7. Transferring audio presentation into audio files and formats	152	57.1%	114	42.9%	266	100.0%
8. Converting content into TV/video scenarios	191	71.8%	75	28.2%	266	100.0%
9. Preparing figures, graphics, animations, etc. for TV/video	207	77.8%	59	22.2%	266	100.0%
10. Transferring scenario into video format as a whole (shooting)	202	75.9%	64	24.1%	266	100.0%
11. Transferring course programme from video format to digital format	161	60.5%	105	39.5%	266	100.0%
12. Using tele-conferencing for lectures in distance education	108	40.6%	158	59.4%	266	100.0%

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	Cannot Contribute		Can Contribute		Total	
	f	%	f	%	f	%
13. Using audio-conferencing for lectures in distance education	96	36.1%	170	63.9%	266	100.0%
14. Holding face-to-face lectures during distance education from time to time	61	22.9%	205	77.1%	266	100.0%
15. Holding classes via Internet during distance education from time to time	87	32.7%	179	67.3%	266	100.0%
16. Providing advisory services during distance education (once a week in the amount of course credit)	104	39.1%	162	60.9%	266	100.0%
17. Providing co-advisory services through Internet during distance education (once a week in the amount of course credit)	104	39.1%	162	60.9%	266	100.0%
<b>TOTAL</b>		49.5%		50.5%		100.00%

It was interesting to note that for the survey as a whole, there was an almost 50/50 split in positive/negative responses, with 50.5% of respondents saying that they could contribute, and 49.5% saying they could not contribute. However, as seen below, the responses were by no means equal across the board. On examination, it can be determined that the academic teaching professionals believe that they can contribute to the ‘educational side’ of distance education, but they are less confident about their ability to contribute on the ‘technical side’.

In the area of preparing educational material for distance education, 74.1% of respondents replied positively, saying that they could contribute to *Developing content*, although whilst still positive, that figure dropped to 61.7% for those who felt they could

contribute in the task of *Converting content into course books based on distance education principles*.

However, when it comes to the actual preparation of online course materials, the respondents' knowledge or experience in the field of eLearning was significantly lower. Although we have shown that a high percentage felt they could contribute to content development, 69.9% said that they could not contribute to *Converting scenarios into instructional software*. In the same vein, an identical percentage, 69.9%, said that they could not contribute to *Preparing figures, graphics, animations, etc. in the scenarios during their conversion into instructional materials*.

In the matter of using video and graphics technology for online content preparation, the respondents were much less confident, with 71.8% saying that they could not contribute to *Converting content into TV/video scenarios*, 77.8% could not contribute to *Preparing figures, graphics, animations, etc. for TV/video* and 75.9% could not contribute to *Transferring scenario into video format as a whole (shooting)*. However, it was interesting to observe that 63.9% of respondents said that they could contribute by *Using audio-conferencing for lectures in distance education*, and similarly, 59.4% could contribute by *Using tele-conferencing for lectures in distance education*, perhaps indicating a familiarity with the use of audio/video conference calling, technologies that have been in play for the past 10 years.

For the actual delivery of online courses, it is clear that the respondents feel that their face-to-face teaching proficiency and basic understanding, albeit perhaps limited, of distance education, could be of much more use within an online programme. When asked about *Holding face-to-face lectures during distance education from time to time*, 77.1% of respondents said that they could contribute, and 67.3% could contribute by *Holding classes via Internet during distance education from time to time*.

A positive response was also seen of respondents when asked about advisory services, with 60.9% saying they could contribute to *Providing advisory services during distance education (once a week in the amount of course credit)*, and again 60.9% could

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contribute to *Providing co-advisory services through Internet during distance education (once a week in the amount of course credit)*.

## **Conclusion**

For an institution launching a distance education programme, the importance of having a faculty who are ready to embrace the world of online distance education with a positive attitude, is undoubtedly a key factor in the success of such a programme. Studies have reported that faculty members tend to use computer and internet technologies for their day-to-day communication, research, reading newspapers or benefitting from online services (e.g. shopping, banking), yet they approach web-based educational technologies with caution such as audio-video conferencing, multimedia material development, discussion forums, and they resist using these technologies to provide online education (Düzakın & Yalçınkaya, 2008; Tabata & Johnstrud, 2008).

Of the 268 faculty members who participated in this study a great majority (98.9%) are regular users of computer and internet technologies, almost 70% of them have been using computer and internet technologies for more than 12 years, and 87.4% know or have a rough idea about distance learning. Yet, 80.3% of them had never been exposed to distance learning before whereas 6.3% had distance learning experience as instructors and 13.4% as learners.

The data analysis has indicated a significant difference in 16 statements related to distance learning in the attitude scale between groups in terms of previous distance learning exposure. Based on the analysis, it is possible to say that the faculty members at Muğla Sıtkı Koçman University, who had previous distance learning experience, have a more positive attitude towards distance learning compared to those who have not been exposed to distance learning. More specifically, the faculty members who had distance learning experience as instructors are more positive than those with experience as learners. The flexibility of distance learning, the effect of audio-visual technologies on learning, provision of equal opportunities by distance learning, immediate results in testing and evaluation and its impact on student motivation, high quality outcomes, helping learners to develop their self-assessment skills, distance learning's efficiency in

solving many problems experienced in traditional education, and learning at one's own pace are specific distance learning characteristics approached more positively by the faculty with prior distance learning experience. The faculty members who instructed online previously strongly believed in the great power of distance education while those with no experience stayed cautious and neutral in this regard.

The faculty members, who had no prior distance learning experience, were neutral and did not seem very interested in distance education either. This finding coincides with the findings of Tuncer & Tanaş (2011) where 59 academicians in their study did not make any individual effort regarding distance education. Another parallel result with this study is that the faculty members with no distance learning experience are quite pessimistic about the learning environment and they believe that learning is not a social activity in distance education. They believe in the necessity of having face-to-face interaction for a better standard of education, and they do not believe in the effectiveness of distance learning compared to face-to-face learning.

This air of pessimism is also depicted by Allen & Seaman (2012) in Babson Group's survey of *Conflicted: Faculty and Online Education*. Allen & Seaman also state that faculty members are critical about the learning outcomes of online education. Nevertheless, Allen & Seaman point out that faculty members who have been exposed to distance learning previously are not as pessimistic as their colleagues who have had no previous experience about distance learning. Faculty members with direct online learning experience as an instructor, though, have the most positive thoughts about distance learning by far, as the researchers have stated. Allen & Seaman's findings certainly match with the findings of this research regarding the impact of previous exposure to distance learning, particularly as an instructor, on the attitudes of faculty members toward it.

Tabata and Johnsrud (2008), on the other hand, refers to the role of technology use and competencies in serving to shape the faculty members' attitudes about distance education, and quotes from Berge et al. (2002) who has found that the faculty members

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with higher levels of expertise in technology are less concerned about the barriers to participation in distance education compared to those with lower levels of expertise. Similarly, the participant academic teaching professionals of this study believe that they can contribute to the 'educational side' of distance education, but they are less confident about their ability to contribute on the 'technical side'. When it comes to the actual preparation of online course materials, the respondents' knowledge or experience in the field of eLearning was significantly lower whereas for the actual delivery of online courses, it is clear that the respondents feel that their face-to-face teaching proficiency and basic understanding of distance education, albeit perhaps limited, could be of much more use within an online programme.

Gold speaks of a positive change in faculty's attitudes toward online instruction, seeing it as more participatory and interactive, after being exposed to a pedagogical in-service training course (2001). Nevertheless, merely provision of training activities for the faculty members to overcome their fears and reshape their attitudes may not be the only solution. As Bates put forwards, teaching by technology may arise legitimate fears, which 'need to be addressed in a constructive and open manner' during the process (2000).

Based on the survey results, as part of an overall planning process regarding the adoption of distance learning technologies, a comprehensive institutional support system should be established for faculty members to include:

- training and orientation activities (ranging from introductory courses for beginners to refreshing courses for the more experienced);
- assistance in development of the course content;
- mentors and assistants particularly for beginner online instructors;
- 24x7 technical support;
- development of a sense of community; and
- strong administrative support and backup.

As stated at the opening, the findings of this study will serve as a foundation for

the expansion and further development of distance learning activities at Muğla Sıtkı Koçman University and will play an important role in the strategic planning process at the university regarding the adoption of distance learning technologies and contribute to the efforts in expanding the distance learning initiatives in a well-planned systematic manner.

## **References**

1. Ağır, F., Gür, H. ve Okçu, A. (2008) Özel okullarda ve devlet okullarında çalışan ilköğretim öğretmenlerinin uzaktan eğitime karşı tutumlarının belirlenmesi. The 8th International Educational Technology Conference, IETC 2008 Proceedings (370-375), May 6th - 9th 2008, at Anadolu University in Eskişehir.
2. Allen, I. E. & Seaman J. (2012). *Conflicted: Faculty and Online Education, 2012*. Survey Report by Inside Higher Ed and Babson Survey Research Group.
3. Bates T. (2000). *Managing technological change: Strategies for college and university leaders*. San Francisco: Jossey-Bass Publishers.
4. Berge, Z.L., Muilenburg L.Y. & Haneghan J.V. (2002). Barriers to distance education in postsecondary education in the United States: An institutional study. *Online Journal of distance Learning Administration*. 1(3).
5. Borkowski, N. (2005). *Organisational behaviour in health care*. USA: Jones and Bartlett Publishers Inc.
6. Bower, B.L. (2002). Instructional issues. In L. Foster, B.L. Bower & L.W. Watson (Eds), *ASHE reader distance education: Teaching and learning in higher education* (pp. 211-213). Boston MA: Pearson Custom Publishing.
7. Donnelly R. (2009). *Applied e-learning and e-teaching in higher education*. London: IGI Global.
8. Düzakın E., Yalçınkaya, S. (2008). Web tabanlı uzaktan eğitim sistemi ve çukurova üniversitesi öğretim elemanlarının yatkınlıkları. *Ç.Ü.Sosyal Bilimler Enstitüsü Dergisi*. 17(1): 225-244.
9. Gold, S. (2001). A constructivist approach to online training for online teachers. *Journal of Asynchronous Learning Environments*. 5(1): 35-57.
10. Hogg, M.A. & Vaughan G.M. (2008). *Social Psychology*. Essex: Pearson/Prentice Hall.
11. Schlosser, L.A., Simonson, M. (2010). *Distance education: Definition and glossary of terms (3<sup>rd</sup> Edition)*. USA: Information Age Publishing Inc.
12. Sürer İ., Kaya Z., Bülbül H.İ., Karaçanta H., Koç Z., Çetin Ş. (2005). Gazi Üniversitesi'nin uzaktan eğitim potansiyeli. *The Turkish Online Journal of Educational Technology*. 4(1): 107-113.
13. Şimşek, A. (2011). Interview with tony Bates on the aspects and prospects of online learning. *Contemporary Educational Technology*. 2(1): 88-94.

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14. Tabata L.N., Johnsrud L.K. (2008). The impact of faculty attitudes towards technology, distance education and innovation. *Res High Educ.* 49: 625-646.
15. Totaro M.W., Tanner, J.R., Noser T., Fitzgerald, J.F., Birch, R. (2005). Faculty perceptions of distance education courses: A Survey. *Journal of College Teaching & Learning.* 7(2): 13-20.
16. Tuncer M., Tanaş, R. (2011). The evaluation of academicians' views on distance education programs (the sample of Frat and Tunceli Universities). *Elementary Education Online.* 10(2): 776-784.



## What Affects Faculty to Start Using a Course Management System

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**Abstract:** *In higher-education institutions, course management systems (CMS) seem to be one of the critical technologies. Today, there are many alternative CMSs, which provide infrastructure to start implementation and to support management of blended or online courses. There are different factors affecting the adoption of technology in both individual and institutional settings. It is obvious that different mechanisms and policies are needed to support individual and institutional adoption of CMSs. These varying aspects related to use of CMS can be discussed from student perspective, course perspective, teaching perspective, departmental perspective or from the university management perspective. From the perspective of the institutional use of CMSs, the position of teachers is believed to be very crucial for the meaningful adoption of CMSs. In order to support the adoption in higher-education institutions, it is important to understand the needs and forces which drive the initial start of CMS use by the teachers. This study aims to investigate the factors affecting the faculty intention to use course management systems (CMS). The study was conducted in a private university to test the provided model which is developed through utilization of the technology acceptance model (TAM). In addition to the core factors of TAM, "computer self-efficacy" as a well-known external variable and two new constructs "availability of training and support" and "perceived personal benefit" constructs were added to the model through a careful selection process. The model developed was tested through 260 responses given to survey study. In order to examine the provided model, these data were analyzed using the structural equation modeling (SEM) technique. The findings indicated that, faculty intention to use CMS is mostly related with seeing a value in use of it, which includes both personal and task/course-related issues. Additionally, the use of a CMS should be perceived as easy, which is directly influenced by the computer self-efficacy of the instructors. In this study, discrimination of perceived personal benefits and task/course-related usefulness is found to be important. The results gathered from the analysis of the collected data show that; (1) the task/course-related perceived usefulness is found to be weak without perceiving them personally beneficial, (2) availability of training and support is found to be weakly related to initial intention; however, it appeared as an important variable for continuing to use CMS. Furthermore, it is important to underline that differences in the teachers profiles, institutional policies or organizational infrastructures may have direct and indirect effects on the examined factors.*

**Keywords:** Course management system, Technology acceptance model, Change management, Higher education, Structural equation modeling

### Introduction

In our rapidly changing globalized world, expectations from higher education institutions are becoming higher and higher in order to fulfill the needs of society. As

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one of future shaping actors of the society, faculty and administrators of universities feel this pressure and try to manage the change at both the individual and institutional levels from different viewpoints such as organizational structure, cultural context or technological aspects. Technology is one of the most critical forces which provide opportunities to increase productivity and the meaningful use of resources.

In higher education, an important aspect of integrating technology to the teaching-learning processes is the integration of course management systems. A course management system (CMS) can be defined as: an internet based software that manages student enrollment, tracks student performance, and creates and distributes course content (Ullman & Rabinowitz, 2004). As a concept, a CMS may have different value in different roles in higher education. Examples of the different roles include: as a pedagogical tool, a performance support system, a communication environment, a web page development tool, or as a change agent. With these roles, the position of CMS and its infrastructure for institutions seems to be very important and CMSs play an increasingly important role in higher education's technology infrastructure (Morgan, 2003a).

To fulfill these needs, today there are lots of alternative software solutions, some of which can also be easily and freely downloaded from the Internet. As a result, we can easily find many higher education faculty who use a CMS for their courses on an individual basis. However, if we consider the use of CMSs, it is important to discriminate individual use from institutional use, since the needs and policies would differ a lot from each other. In contrast to its individual use, the institutional use of a CMS requires that some institutional policies and mechanisms be in place in order to support end-users like instructors and students.

In addition to individual and institutional viewpoints, CMSs could be investigated from student or faculty perspectives. When the topic is course management systems, a variety of research focusing on students, faculty members, administrators, software features or organizations can be found in the literature. Considering the studies

already conducted on the impact of CMSs on students, Harrington, Staffo, and Wright (2006) believe that research that focuses on the faculty side of the equation is in high demand. It is natural to expect that understanding the faculty side and an increased use of CMS by faculty would have positive direct or indirect effects on the diffusion of change both on student related issues and university management related issues.

Focusing on the faculty side still, the integration of CMS technology can be investigated in different contexts. For instance, it can be discussed in the context of its integration into courses and course design, it can be related to factors critical for a sustainable use, or it can be related to instructors' intention to use. While deciding on the context of these investigations, the strategies (top-down or bottom-up) implemented by university administrators would also be necessary to consider. To give an example, for university administrators, learning the factors that affect instructors' intention to use can a CMS be more critical when a voluntary based bottom-up strategy is implemented. On the other hand, knowing how to adapt the courses can be more critical for instructors and managers when a top-down strategy is pursued.

Morgan (2003a) states that "identifying the factors that encourage faculty to start using technology in their teaching is a constant challenge facing university administrators" and she adds "administrators need to identify the factors that cause or contribute to CMS use so that they can better support the technology and educate faculty in its use". In her study, she observed that the practice of relying on faculty to adopt technology at their own speed is not sufficient and strong leadership from top management is required (Morgan, 2003a). This brings university leaders to a point whereby focusing on supporting faculty for their intention to use CMSs in their courses is beneficial and meaningful for their administration processes.

In this study, there were two critical ideas behind the development of the hypothesized model. The first focuses on the individual because of the critical position of the faculty in the successful diffusion of technology. Considering the academic freedom and autonomy expectations in higher education, their individual internalization

and adoption is very critical. The second one is the institutional use. A CMS is a special form of information system and it is generally implemented in an institutional context. So, besides the individual needs it is also important to pay attention to the institutional context which may become a barrier or enabler for a better individual adoption. With these focuses, the aim of this study can be summarized as examining a model having factors which are expected to affect the faculty intention to use CMS in higher education and to understand what drives instructors to start using it.

## **Theoretical Background**

### **Course Management System (CMS)**

Electronic courseware is one of the general terms used for similar technologies in higher education. Minielli and Ferris (2005) state that, electronic courseware, or online course software programs, can be called different names like ‘learning content management system’, ‘learning management system’, ‘virtual learning environments’ or ‘course management systems’. According to them, although these systems share many features, their usage may vary by nation or industry. They define a Course Management System as an instructional technology software created for educational use – primarily as course support, or as vehicles for online learning”. In the course management system strategy document of Indiana University, it is stated that, “A university’s CMS is arguably the largest single service directly used by students and faculty” (Wheeler, 2002, p.16). De Boer (2004) notes that technology, particularly course management systems, is important for dimensions that underlie the change in higher education.

### **Use of CMS in Higher Education**

In higher education different uses of CMSs can be observed. Morgan (2003b) explained that ‘supplementing lecture materials’, ‘increasing transparency and feedback’, and ‘increasing contact with and among students’ are listed as most important goals of faculty for using CMSs. Ullman and Rabinowitz (2004) argue that CMSs could be used

in accordance with two distinct mental models. The first model is “to supplement a conventional course experience” and the second model is “to organize a conventional course experience”. Woods et al. (2004) conducted a large-scale study and reported that course administration and management purposes are the main uses of CMS. They observed that faculty used CMS primarily to post course syllabi, send email, and post grades. More interactive course administrative functions were not used by majority of faculty.

CMSs can be criticized as being focused on managing learners rather than having a focus on promoting rich, interactive learning experiences. (Bonk, Kim, & Zeng, 2006). In addition to such uses, alternative ways of using CMSs are also possible. Using a CMS for collaborative work like project groups, to create virtual communities or using it as departmental communication area or as online material repository can be given as examples.

### **Adoption, Diffusion, Institutionalization**

Faculty intention to use CMSs can be studied from different viewpoints and they may have different scopes. McQuiggan (2006) emphasizes grouping these viewpoints and categorizes them into two major perspectives as micro-level theories and macro-level theories. Micro-level theories focus on the individual adopter, whereas macro-level theories focus on the institution and systemic changes.

When the topic is ‘change’ it is natural to expect resistance of target groups. Over the years many studies were conducted to understand various types of resistance factors as Surry and Ely (2007) said. They also point out the ‘personal’, ‘attitudinal’ and ‘organizational’ categories of barriers to the use of web based learning in higher education. So, in understanding why people use or do not use educational technology, it is important to consider factors or issues in the context of both institutions and individuals.

Interpreting these findings together, it would be meaningful to pay attention to

understanding the factors affecting individual intention without excluding institutional use issues. There are various models explaining the use of technology from the individual's viewpoint; one of the most credible ones is the technology acceptance model.

### **Technology Acceptance Model (TAM)**

The Technology Acceptance Model (TAM) introduced by Davis (1989) is one of the most cited theoretical frameworks, and is used to predict acceptance and use of the technology by focusing on perceived ease of use and perceived usefulness as core motivational factors affecting the behavioral intention to use the new technology. (Compeau, Huff, & Higgins, 1999; Venkatesh, 1999; Lee, Cho, Gay, Davidson & Ingraffea, 2003; Park, Lee & Cheong, 2007; Ong, Lai & Wang, 2004; Wu, Wang & Lin, 2007). Here, perceived usefulness refers to the degree to which a person believes that using the new technology would enhance his/her job related performance. As the second core factor, the perceived ease of use refers to the degree to which a person believes that using the new technology would be easy to use not only in terms of using software but also in handling environmental issues (Davis, 1989).

Davis adapted the theory of reasoned action (TRA) proposed by Fishbein and Ajzen to explain and predict the behaviors of people in a specific situation (Legris et al., 2003; Venkatesh, 1999). He compared the strengths of these variables and reported the relative strength of the usefulness-usage relationship compared to the ease of use-usage relationship as one of the most significant findings. Moreover he added that "usefulness was significantly more strongly linked to usage than was ease of use" (Davis, 1989). The image below shows the original technology acceptance model (Figure 1). As seen from the model, perceived usefulness and perceived ease of use are affected by 'external variables' and they affect 'attitude towards the use', 'behavioral intention to use' and 'actual system use' consequently.

According to Leong (2003), researchers prefer TAM because of its theoretical

bases and its good predictive validity. In their critical review of TAM, Legris, Ingham and Colletette(2003) stated that “TAM has proven to be a useful theoretical model in helping to understand and explain use behavior in IS implementation”. It is easy to find different versions of TAM. Legris et al. (2003) evaluated 22 selected articles and assessed the factors in the model one by one. They found various alternatives as shown below (Figure 2). This model is a modified version of TAM which excludes ‘attitude to use’ and ‘actual system use’ variables and shows the direct effects of perceived usefulness and perceived ease of use on the behavioral intention to use.

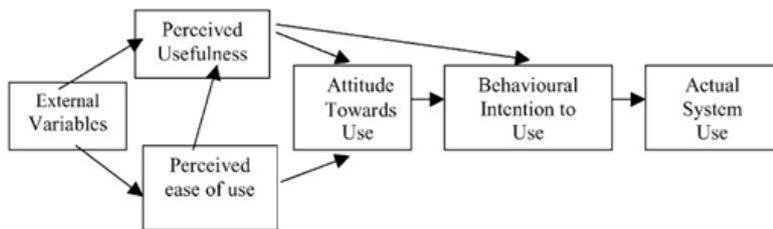


Figure 1: Original Technology Acceptance Model (TAM)

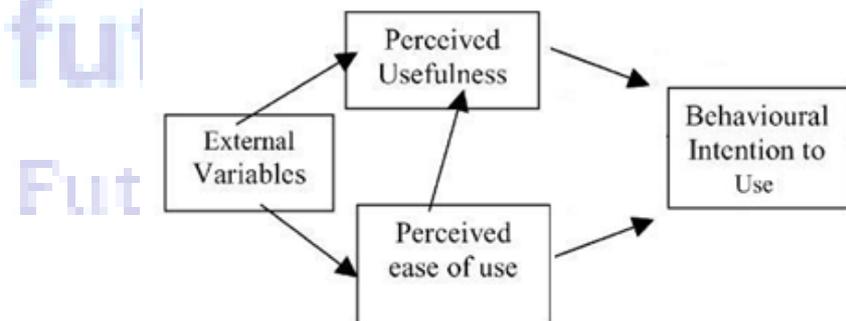


Figure 2. TAM without ‘Attitude to use’ and ‘Actual system use’ variables

## **Computer Self Efficacy**

“Self-efficacy” is an important construct in social psychology and was first defined by Albert Bandura. Compeau and Higgins (1995) explained self-efficacy as the belief that one has the capability to perform a particular behavior. They defined the construct of ‘computer self-efficacy’ as the judgment of one's capability to use a computer.

Numerous studies (Shih, 2006; Ong, Lai & Wang, 2004; Wu et al., 2007), show extended TAM versions including computer self-efficacy as an external factor. However, application specific computer self-efficacy can be more meaningful. Hwang and Yi (2002) categorized CSE as ‘General CSE’ and ‘Application-specific CSE’. CSE is evaluated as a multilevel construct that operates at two distinct levels. The first is the general computing level and the second is the specific application level.

In a model proposing the relation of general CSE and application-specific self-efficacy to ease of use, it is observed that application-specific self-efficacy is a more powerful and direct determinant of ease of use than general CSE (Agarwal, Sambamurthy, & Stair, 2000).

As a result, in the context of using CMS, understanding the “computer self-efficacy” concept as “Users’ individual perception of efficacy in using a CMS” would be more meaningful.

## **Perceived Personal Benefit**

A person may intend to use a technology not because of the perceived usefulness (related to job performance) but because of perceived personal benefits (social, political, organizational), but not job or task related. At the same time a person may believe that using the provided technology will be useful for his/her job performance but he/she may reject using it because of personal reasons.

Compeau et al. (1999) made a similar distinction while testing a model of individual reactions to computing technology in a longitudinal context. They defined ‘outcome expectations as the perceived likely consequences of using computers’ and

distinguished the two dimensions of outcome expectations as:

- “Performance-related outcomes are those associated with improvements in job performance (efficiency and effectiveness) associated with using computers.” (Compeau et al., 1999)
- “Personal outcome expectations relate to expectations of change in image or status or to expectations of rewards, such as promotions, raises, or praise”. (Compeau et al., 1999)

### **Availability of Training and Support**

Training and support are two different constructs that are critical for an effective technology diffusion process. However, it is important to underline that the concept of ‘training and support given to users’ is not same with the ‘availability of the training and support (that can be given to users). Knowing the ‘availability of training and support’ is very similar to ‘perceptions/expectations about training and support’.

Langenberg and Spicer (2001) mentioned support as the most critical, and most difficult component of a campus technology architecture due to the need for staff to ‘design, implement, integrate, and maintain’ all of the components of a modern campus. Similarly, Harrington, Staffo, & Wright (2006) note that for each interviewee the key issue for continued use of a CMS was institutional support and commitment. According to Venkatesh (1999) ease of use perceptions are significantly affected by training during the early stages of learning and use.

### **Research Methodology**

In order to address the main point of this study, the researcher constructed a conceptual model which presents the examined factors and the relationships among them. This model was constructed through utilization of TAM with the use of two new constructs which were carefully selected through literature review. Since the structural equation modeling technique was considered to examine the model, it was important to have

simpler models for better interpretation of the findings. So, having the least number of variables which would provide a level of unity was the aim while developing the model.

### **Constructs and the examined model**

The hypothesized model includes the core concepts of TAM. These are “perceived usefulness”, “perceived ease of use” and “behavioral intention to use”. “Computer self-efficacy” which had been shown to have indirect effects on “behavioral intention to use” through “perceived ease of use” and “perceived usefulness” is also taken as a construct of the examined model. The two new constructs tested in the model are (1) availability of training and support and (2) perceived personal benefit. Here, it is important to underline that “perceived usefulness” generally refers to being useful for increasing the task/job related performance. The distinction between “perceived personal benefit” and “perceived usefulness” is considered to be important for the examined model. From this point of view, “perceived usefulness” refers to task/course related usefulness and does not represent being useful in terms of personal outcomes. Figure 3 shows the developed model which questions ten interrelationships (shown as Q1 to Q10) between these factors. Q1-Q10 represent questions similar to “Is there a relationship between ‘computer self-efficacy’ and ‘perceived usefulness of CMS’”.

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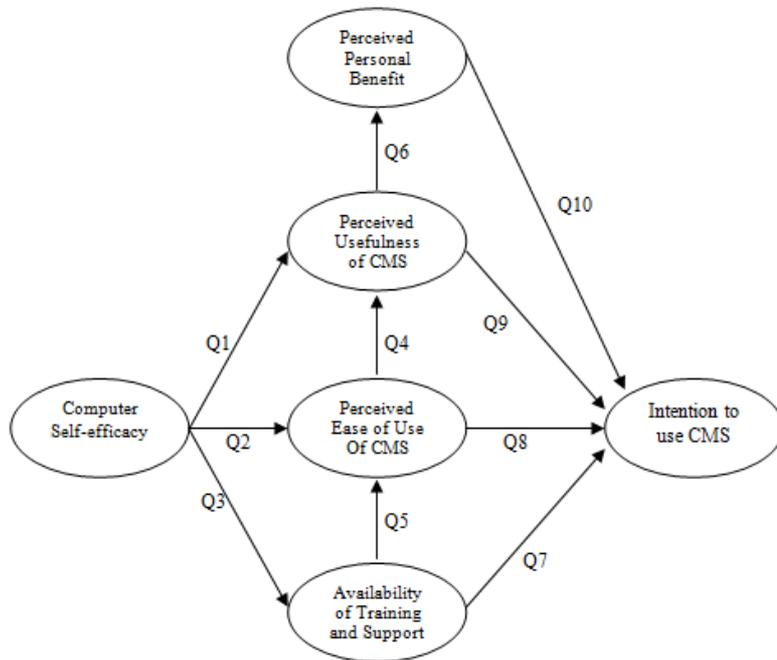


Figure 3: Examined Model

### Questionnaire Development

In order to collect data, a questionnaire with 26 five-point Likert-type items was prepared. Most of the items were adopted from previous studies (Davis, 1989; Legris et al., 2003; Ong, Lai and Wang, 2004). Before the pilot study, the first version of the questionnaire was revised 17 times by 11 experts from 5 disciplines such as educational science, instructional technology, psychology, statistics, and English as second language.

To complete the questionnaire, a pilot study was conducted. In the pilot study, 69 of 92 participants (response rate = 75%) responded. The collected data were analyzed through descriptive statistics and explanatory factor analysis in order to check the working items about the factors and to provide construct validity (Table 1).

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**Table 1:** Cronbach's alpha coefficients of factors (after the pilot study)

	<b>Cronbach's alpha</b>	<b>N of items</b>
Computer Self Efficacy	0.810	3
Perceived Usefulness	0.889	6
Perceived Ease of Use	0.853	6
Availability of training and support	0.740	4
Perceived Personal Benefit	0.812	8

### **Sampling**

Participants are selected using a criteria based sampling methodology from all departments of Bilkent University. The criteria were (1) being an instructor or teaching assistant, (2) using, having been used or at least having tried to use a CMS in their courses. Each faculty member satisfying these criteria in Bilkent University was asked to complete the questionnaire on a voluntary basis.

The number of responses to 470 delivered questionnaires was 266 (response rate is 56.59%) where 6 were neglected due to the empty items. As a result, return rate for valid responses was 55.32%.

### **Demographics of the Participants**

The participants were grouped according to their age, gender, academic position, school, department, academic program and perceived level of CMS expertise.

Except the 5 unanswered gender question, 98 of 260 participants were male and 157 were female. The average age of the participants was 37.83 and their ages range from 22 to 72.

The distribution of the participants according to their academic position, school, department and program was very similar to the distribution of the faculty in the university. The representativeness of the collected data is high in terms of such demographics and there is no doubt that the researcher collected data from a valid group of participants according to the selection criteria.

## **Data Analysis**

The data collected through the scales were analyzed by applying the Structural Equation Model (SEM) technique. The Lisrel 8.3 program was used to complete the analyses. SEM technique was used in order to examine the proposed model and to see whether variables were interrelated through a set of linear relationships or not. The researcher decided to use the two-step approach, comprising a measurement model and a structural model.

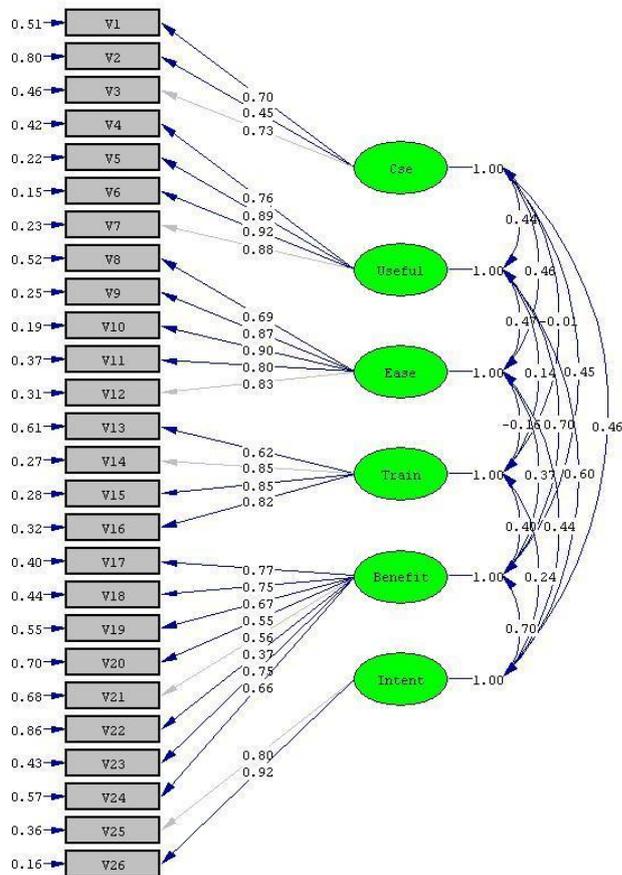
Two confirmatory factor analysis were used to assess the reliability and validity of the measurement model. It was used to test if the empirical data were consistent with the presumed model and to show how well the observed variables served as a measurement instrument.

The structural model was validated through SEM, in order to analyze the relationships between the latent (unobservable) and observable variables.

## **Findings**

Findings of the study are gathered through the outputs of Lisrel 8.3 program which provided chi-square statistics and different goodness of fit statistics such as Comparative Fit Index (CFI), Non-Normed Fit Index (NNFI), Root Mean Square Error Approximation (RMSEA), Standardized Root Mean Square residual (SRMR), Goodness of Fit (GFI), Adjusted Goodness of Fit Index (AGFI) and Parsimony Goodness of Fit Index (PGFI). The path diagram and the standardized coefficients for the initial assessment of the measurement model are given in Figure 4. As seen in Figure 4, the chi-square coefficient was more than twice the degree of freedom, and the RMSEA value was 0.071. These results may be evaluated as mediocre fit, which was not close to the good fit criteria.

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Chi-Square=657.97, df=284, P-value=0.00000, RMSEA=0.071

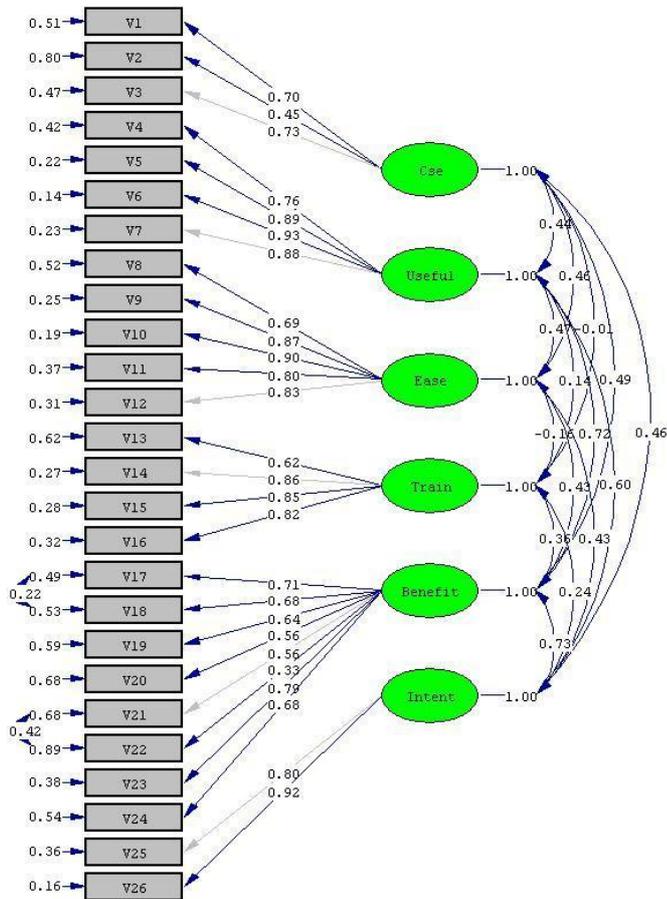
Figure 4: Measurement model (initial state before modifications)

In addition to the goodness of fit statistics, the outputs also include recommended modifications. These modifications caused a decrease in the chi square values and an increase in the goodness of fit values. The researcher evaluated these suggestions and decided to correlate the errors between two pairs of observed variables, since the issues they questioned were related to each other. The first pair of items whose errors had been correlated were; (1) 'I believe that educators should use CMS for their

professional development’ and (2) ‘Using CMS has a potential to change educators professional status in a positive manner’. Justification for the researcher’s decision for error correlation was that professional development and professional status may be interpreted as closely related to each other. Similarly, the second pair of correlated items were; (1) ‘Administrators’ recognition of my use of CMS is valuable to me’ and (2) ‘Incentives would increase my use of CMS’. Justification for this error correlation was that generally administrators give incentives and so they should be related to administrators’ recognition.

The path diagrams and the standardized coefficients for both measurement models are given in the two figures below. Initial model (Figure 4) shows the model and values before error-correlation modifications. Final model (Figure 5) shows model and coefficients after the modification.





Chi-Square=523.46, df=282, P-value=0.00000, RMSEA=0.057

Figure 5: Measurement model- revised (final state after modifications)

Since interpretations using only one model fit index is not recommended, different fit values of the confirmatory factor analysis for the selected fit indices were assessed together (Table 2). As a result of these evaluations, the measurement model can be accepted as a mediocre fitting model.

**Table 2:** Fit indices for the measurement model (CFA results)

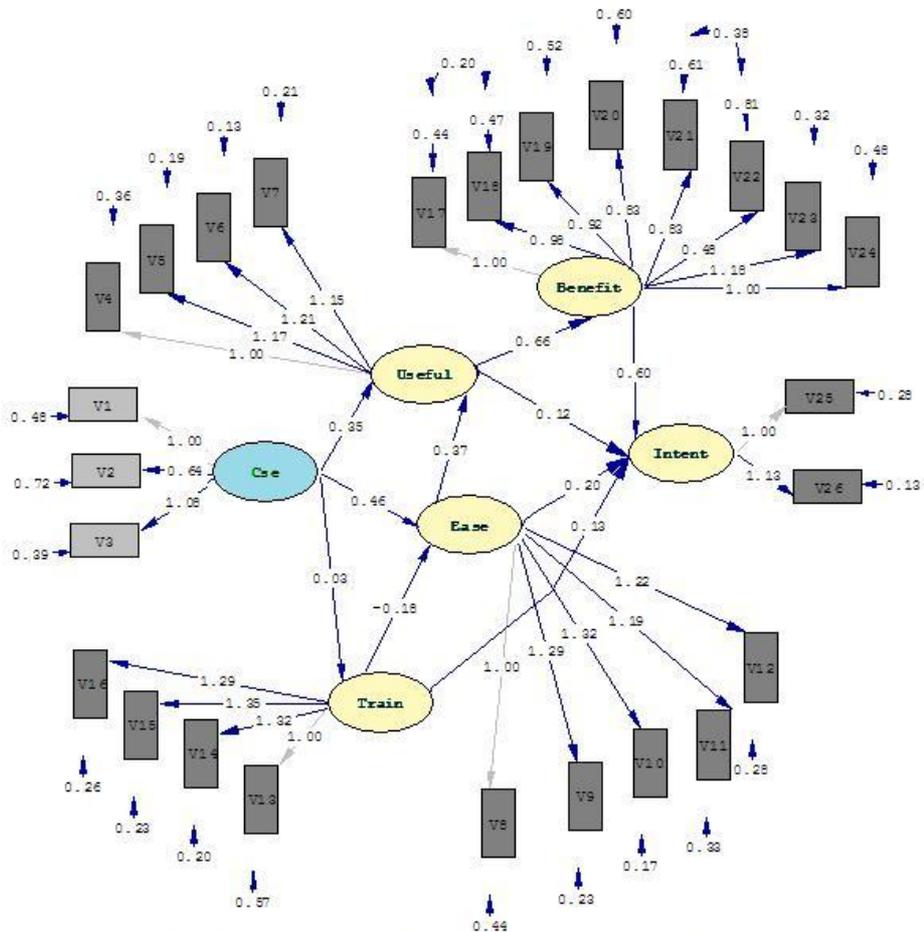
	<b>CFA-1 (before m.)</b>	<b>CFA-2 (after m.)</b>	<b>Evaluation of fit indices (After error-correlation modifications)</b>	
df	284	282		
$\chi^2$	657.97 (P=0.0)	523.46 (P=0.0)		
$\chi^2/df$	2.317	1.856	1.856 < 2	→ Good fit
RMSEA	0.071	0.057	0.057 < 0.06	→ Mediocre fit
SRMR	0.071	0.066	0.066 < 0.10	→ Mediocre fit
CFI	0.91	0.94	0.94 > 0.9	→ Good fit
NNFI	0.90	0.93	0.93 > 0.9	→ Good fit

When the measurement model showed a mediocre fit, the structural model was assessed. Below, the goodness of fit indices for assessing the overall structural model is displayed (Table 3).

**Table 3.** Fit indices for the structural model

	<b>Fit indices for the structural model</b>	<b>Evaluation of fit indices (After error-correlation modifications)</b>	
df	287		
$\chi^2$	577.93 (P=0.0)		
$\chi^2/df$	2.014	2.014 > 2	→ Near limits of mediocre fit
RMSEA	0.063	0.063 > 0.05	→ Mediocre fit
SRMR	0.10	0.10 ≤ 0.10	→ Near limits of mediocre fit
CFI	0.93	0.93 > 0.9	→ Good fit
NNFI	0.92	0.93 > 0.9	→ Good fit

Using a cut-off rule of .05, the RMSEA was high indicating a good fit but it was at a mediocre level. SRMR fit index was found to be at the limits of mediocre fit. Evaluating all fit indices given in Table 3, it could be said that the model represents a mediocre fit. Below, the path diagram that includes the estimation coefficients for the structural model (Figure 6) is given. Following that, direct, indirect and total effects among latent variables are given in Table 4, Table 5 and Table 6. In these tables estimation coefficients were used and the relationships that were not significant are marked with an asterix (\*').



Chi-Square=577.93, df=287, P-value=0.00000, RMSEA=0.063

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Figure 6: Estimate coefficients for structural model

**Table 4:** Direct interrelationships between the latent variables (\*: not significant)

	Useful	Ease	Train	Benefit	Intent
CSE →	0.35	0.46	0.03 *	-	-
Useful →	-	-	-	0.66	0.12 *
Ease →	0.37	-	-	-	0.20
Train →	-	-0.18	-	-	0.13 *
Benefit →	-	-	-	-	0.60

**Table 5:** Indirect interrelationships between the latent variables (\*: not significant)

	Useful	Ease	Train	Benefit	Intent
CSE →	0.17	-0.01 *	-	0.34	0.36
Useful →	-	-	-	-	0.39
Ease →	-	-	-	0.24	0.19
Train →	-0.07	-	-	-0.04	-0.07
Benefit →	-	-	-	-	-

**Table 6:** Total effects on the latent variables (direct & indirect effects) (\*: not significant)

	Useful	Ease	Train	Benefit	Intent
CSE →	0.52	0.46	0.03 *	0.34	0.36
Useful →	-	-	-	0.66	0.52
Ease →	0.37	-	-	0.24	0.39
Train →	-0.07	-0.18	-	-0.04	0.06 *
Benefit →	-	-	-	-	0.60

The factors affecting intention to use CMS can be expressed with a mathematical expression where the 'total effects' on variables are used as coefficients of the equation.

$$\begin{aligned}
 \text{Intention to use CMS} &= 0.60 * \text{Perceived Personal benefit} \\
 &+ 0.52 * \text{Perceived Usefulness (task/job related)} \\
 &+ 0.39 * \text{Perceived Ease of use} \\
 &+ 0.36 * \text{Computer self-efficacy} \\
 &+ 0.06 * \text{Availability of training and support}
 \end{aligned}$$

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Findings presented in Table 7, indicate that three of the ten interrelationships between the determinants of the model were not significant at the 0.05 level. These relationships (between the pairs of latent variables) were Intent-Useful, Intent-Train and Train-Cse relationships.

**Table 7:** T-Values and factor loadings (direct effects) for structural model

Path	T-Values	Factor Loadings
Intent ← Benefit	5.34 **	0.60
Intent ← Useful	1.32	0.12
Intent ← Ease	2.84 **	0.20
Intent ← Train	1.86	0.13
Benefit ← Useful	9.08 **	0.66
Useful ← Ease	4.32 **	0.37
Useful ← Cse	3.73 **	0.35
Ease ← Cse	5.38 **	0.46
Ease ← Train	-2.47*	-0.18
Train ← Cse	0.43	0.03

\* $p < 0.05$     \*\*  $p < 0.01$

On the other hand, the findings showed that there were also significant relationships between the latent variables of the model. These significant findings show that

- Computer self-efficacy is significantly related to perceived usefulness.
- Computer self-efficacy is significantly related to perceived ease of use.
- Perceived ease of use is significantly related to perceived usefulness.
- Availability of training and support is significantly related to perceived ease of use.
- Perceived usefulness is significantly related to perceived personal benefit.
- Behavioral intention to use is significantly related to perceived ease of use
- Behavioral intention to use is significantly related to perceived personal benefit

## **Discussion**

The results briefly indicate that the instructors' intention to use a CMS was directly and indirectly affected by perceived personal benefit, perceived usefulness of CMS, perceived ease of use, and availability of training and support. CMS related computer self-efficacy also has an important indirect effect on CMS use. The assessment of the model showed a mediocre level of fit. This result supports the viewpoint represented through the examined model. According to the results, instructors' intention to use a CMS is mostly related with the perceived personal benefits and perceived usefulness, which then is followed by the ease of use of CMS and instructors' application specific computer self-efficacy. The availability of training and support seems to be slightly related to the intention to use CMS.

It was remarkable that the direct relationship between perceived usefulness and the behavioral intention to use was found to be weak (factor loading = 0.12) when the relevant findings of this study were compared with the technology acceptance model. Davis (1989) reported that "usefulness was significantly more strongly linked to usage than was ease of use". There seem to be a conflict with the literature but this situation can be explained through the discrimination of direct, indirect and total effects with the interpretation of including another variable 'perceived personal benefit'. Although the direct effect of perceived usefulness is weak, there is a strong relationship between perceived usefulness and perceived personal benefit.

Separating task/course related usefulness from personal issues by adding the 'perceived personal benefit' factor seems to be meaningful. On the one hand, it can be thought that personal benefit and usefulness are closely related to each other. On the other hand, a differentiation should be considered since a majority of the influence of perceived usefulness appeared to be indirect (through the 'personal benefit' factor) and its direct influence was relatively low. In interpreting this result, it can be speculated that the task related features that were perceived as useful should also be perceived as personally beneficial to be effective on behavioral intention to use CMS. In other words, without seeing benefits for themselves, instructors may reject to use CMSs, although

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they accept that it may be a necessary instrument for their courses.

In terms of the TAM, other relationships were significant and they explain the relationships similar to the technology acceptance model. As an external variable of TAM, computer self-efficacy was also related with both perceived usefulness and perceived ease of use as expected.

Another factor examined in the model was the perceived availability of training and support, which can also be considered as the level of expectations of training and support. This was considered to be effective in increasing CMS usage, with the idea that many of the instructors might not have relevant skills and enthusiasm for integrating CMS into their courses. Instructors who are brave enough to start using a CMS by themselves are expected to have high CMS specific CSE. But generally the number of such instructors is not expected to be high especially at the early periods of adoption of a new technology. Most instructors may require training and support to continue using or to decide starting to use CMS. Especially in the context of institutional use, when the use of CMSs is encouraged at the management level, getting no support or training may turn into an excuse for not using CMS. Results showed that availability of training and support is significantly related with the perceived ease of use. However, its relationship with the intention to use CMS is weak and it is nearly unrelated with the computer self-efficacy of the instructors. As a speculation, training and support may not be meaningful in terms of deciding to use a CMS but it may be meaningful in terms of continuing to use a CMS or in terms of not giving up using a CMS. Morgan (2003a) explained that 29% of faculty stated that training was effective for their initial adoption of a CMS. Further study can be designed to understand the conditions underlying such different results.

The weak relation between computer self-efficacy and availability of training and support can show that regardless of computer self-efficacy, instructors' values about training and support mechanism are similar. However, the expectations about the level or details of training and support can change according to different instructor profiles.

Another interesting finding is the negative value of the relationship between ‘perceived ease of use’ and ‘availability of training and support’. At the beginning of the study, it was claimed that knowing the possibility of getting support and training would encourage instructors and may have an influence on the decision to use a CMS. Similarly, it would have a positive impact on the perceived ease of use of the system. However, the negative value of this relationship shows a different viewpoint, which states that instructors may perceive the availability of training and support mechanisms as evidence of the difficulty to use CMS.

### **Limitations**

This study has some limitations. First of all the data was collected from one non-profit private University. So, the results cannot be generalized to other type of universities. Another limitation was the general level of the questionnaire items. CMS specific features were excluded since the goal was focusing on faculty intention. The restricted number of factors examined in the model can be seen as another limitation of this study. On the other hand, when using the structural equation modeling it is suggested to have fewer variables. Lastly, it should be mentioned that the validity of this study is limited to the validity and reliability of the instruments used in the study.

### **References**

1. Agarwal, R., Sambamurthy, V., & Stair, R. (2000). Research Report: The evolving relationship between general and specific computer self-efficacy—An empirical assessment. *Information Systems Research*, 11(4), 418-430.
2. Bonk, C., Kim, K. J., & Zeng, T. (2006). Future directions of blended learning in higher education and workplace learning settings. In C. Bonk & C. Graham (Eds.), *The handbook of blended learning: Global perspectives local designs* (pp. 550-567). San Francisco: Pfeiffer.
3. Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 19(2), 189-211.
4. Compeau, D., Higgins, C.A., & Huff, S. (1999), Social Cognitive Theory and Individual Reactions to Computing Technology: A Longitudinal Study, *MIS Quarterly*, 23(2), 145-158.

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Innovations in Learning for the Future 2012: e-Learning  
Future-Learning 2012, Nov. 14-16, İstanbul**

5. Davis, F.D. (1989). Perceived usefulness, perceived ease of use and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
6. De Boer, W. F. (2004). *Flexibility Support for A Changing University*. Doctoral dissertation. Faculty of Educational Science and Technology, University of Twente (Enschede, Twente University Press)
7. Harrington, T., Staffo, M., & Wright, V.H. (2006). Faculty uses of and attitudes toward a course management system in improving instruction. *Journal of Interactive Online Learning*, 5(2), 178-191.
8. Hwang, Y., & Yi, M.Y. (2002). Predicting the use of web-based information systems: intrinsic motivation and self-efficacy. *Eighth Americas Conference on Information Systems*, pp. 1076-1081.
9. Langenberg D. N., & Spicer, D. Z. (2001). The Modern Campus. *New Directions for Higher Education*, 2001(115), 3-15.
10. Lee, J. S., Cho, H., Gay, G., Davidson, B., & Ingraffea, A. (2003). Technology Acceptance and Social Networking in Distance Learning. *Educational Technology & Society*, 6(2), 50-61.
11. Legris, P., Ingham, J., & Collette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management*, 40(3), 191-204.
12. Leong, L., (2003). Theoretical Models in IS Research and the Technology Acceptance Model (TAM). In C. K. Davis (Eds.), *Technologies & methodologies for Evaluating Information Technology in Business*, (pp.1-31). Hershey, PA: Idea Group Publishing.
13. McQuiggan, C. A. (2006). A survey of university faculty innovation concerns and perceptions that influence the adoption and diffusion of a course management system. *Paper presented at the Academy of Human Resource Development International Conference (Columbus, OH, Feb 22-26, 2006)*, 1160-1167. (ERIC Document Reproduction Service No. ED492812)
14. Minielli, M.C., & Ferris, S.P. (2005, Sep. 5). Electronic courseware in higher education. *First Monday*, 10(9). Retrieved from <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1279/1199>
15. Morgan, G. (2003a). Faculty Use of Course Management Systems. *EDUCAUSE Center for Applied Research* Retrieved Sep. 10, 2012, from <http://www.educause.edu/ir/library/pdf/ers0302/rs/ers0302w.pdf>.
16. Morgan, G. (2003b). Key Findings: Faculty Use of Course Management Systems. *EDUCAUSE Center for Applied Research*. Retrieved Sep. 10, 2012, from <http://www.educause.edu/ir/library/pdf/ERS0302/ekf0302.pdf>
17. Ong, C., Lai, J., & Wang, Y. (2004). Factors affecting engineers' acceptance of asynchronous e-learning systems in high-tech companies. *Information & Management*, 41(6), 795-804.
18. Park, N., Lee, K. M., & Cheong, P. H. (2007). University instructors' acceptance of electronic courseware: An application of the technology acceptance model. *Journal*

- of Computer-Mediated Communication*, 13(1), 163-186. Retrieved Sep. 10, 2012 from <http://jcmc.indiana.edu/vol13/issue1/park.html>
19. Shih, Y. (2006). The effect of computer self-efficacy on enterprise resource planning usage. *Behaviour & Information Technology* 25(5), 407-411
  20. Surry, D. W., & Ely, D. P. (2007). Adoption, diffusion, implementation, and institutionalization of instructional innovations. In R. A. Reiser & J. V. Dempsey (Eds.), *Trends and issues in instructional design and technology (2nd ed.)*, (pp. 104-122). Upper Saddle River, NJ: Pearson Education, Inc.
  21. Ullman, C., & Rabinowitz, M. (2004, Oct). Course management systems and the reinvention of instruction. *THE Journal*. Retrieved November 26, 2007, from <http://thejournal.com/articles/17014>
  22. Venkatesh, V., (1999). Creation of Favorable User Perceptions: Exploring the Role of Intrinsic Motivation. *MIS Quarterly*, 23(2), 239-260.
  23. Wheeler, B.C. (2002, May). A Course management system strategy for Indiana University. *Office of the Vice President for Information Technology & CIO*, Indiana University. Retrieved November 5, 2008, from [http://www.uiowa.edu/~provost/elearning/resources/IU\\_CMS\\_Strategy\\_2002\\_Public.pdf](http://www.uiowa.edu/~provost/elearning/resources/IU_CMS_Strategy_2002_Public.pdf)
  24. Woods, R., Baker, J.D., Hopper, D. (2004). Hybrid structures: Faculty use and perception of web-based courseware as a supplement to face-to-face instruction. *Internet and Higher Education* 7 (2004) 281-297
  25. Wu, J.H., Wang, S.C., & Lin, L.M. (2007). Mobile computing acceptance factors in the healthcare industry: A structural equation model. *International Journal of Medical Informatics*, 76(1), 66-77.

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## **A Roadmap to Implement Rapid Transition as a Proposal of e-Learning Model**

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**Abstract:** *Digital age (information / computer age) represents us many opportunities. Many transforms and changes have been made in public and private sectors. Society tries to adopt both new information technologies and new terms such as e-marketing, e-commerce, e-banking etc. day by day. Countries have developed e-governance strategies. The ratio of IT users has increased. Inquisitorial, curious, participating new human profiles have arisen in e-republics on e-world. It is clear to say that education is one of the most important areas that we have been trying to use IT tools, applications, and educational methods to be more successful for years. Especially universities have many contributions for research and development. Advanced ones are innovative, usually follow researches around the world and form their students and themselves at this point of view; however, students should be able to reach education institutions without time and place constraints too. Turkey has more young population when compared with The European Union. On one hand, it means that the number of rivals is increasing to be placed in an institution of higher education. They can be senior class level, graduated but not appointed before, graduated from tertiary education and appointed before. On the other hand, most of students cannot achieve success at Student Selection and Placement System (Higher Education Examination-Undergraduate Placement Examination) so they will not be able to continue their educational career, although they want to. Every year, applicants can be from undergraduate programmes, associate programmes or open education. It should be noted that to educate human is the best investment for the economic growth and human development to catch developed countries. Today e-learning is an important way of remove mentioned drawbacks between students and instructors. In addition, it is best way to make education sustainable in every organization. Not only universities but also many organizations in different sectors can face problems during their e-learning experiments. Having enough knowledge about e-learning is not a must for every organization in every sector. However, if an organization wants to start e-learning, it should consider some facts. In this study, basic aim is providing a rapid transition for organizations that wants to set up an e-learning system.*

*This paper gives some hints related to transition process. Therefore, moreover theoretical framework of an e-learning system, selection of learning management system (LMS) and content management system (CMS), designing of a virtual classroom, online course implementation are explained, future works related to the framework are discussed.*

**Keywords:** Distance Learning, e-Learning System, Future Learning, Education.

## **Introduction**

Distance learning is referenced more as ability, whereas distance education is an activity within the ability [of learning at a distance]; though, both definitions are still limited by the differences in time and place (Volery & Lord, 2000; Moore, Dickson-Deane & Galyen, 2011). The main principles of distance learning are summarized as: interactivity with the learning objects and the other learners involved, learning by doing, dynamism, modularity, flexibility, multimedia, re-use of learning objects, traceability with the learning management system (or platform) allowing to follow the student's interaction and human interaction (Severino, 2008; Severino, Aiello, Cascio, Ficarra & Messina, 2011). Distance education is a field where web-based technology was very quickly adopted and used for course delivery and knowledge sharing, also typical web-based learning environments include course content delivery tools, synchronous and asynchronous conferencing systems, polling and quiz modules, virtual workspaces for sharing resources, white boards, grade reporting systems, logbooks, assignment submission components, etc. (Işık & Güler, 2012). Arising terms of distance learning is based on all these mentioned ideas and as Figure 1 (Harper, Chen & Yen, 2004) shows, distance learning proceed in past years parallel with technological developments. If universities around the world (Oxford University, Berkeley University, Yale University, Harvard University, Stanford University etc.) are examined, we can easily see how they give importance to distance learning. According to Global Academy Online, The University of London is first on The Best and Worst Online Degree Programs's Top 10 List in 2010 (about.com, 2010).

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Years	Characteristics	Milestone
1700–1900	Use of mail to deliver course material	Establishment of US Postal System
1920–1960	Correspondence education Use of radio and television for correspondence education	Use of correspondence education in higher education States pass laws requiring students to attend school Use of correspondence education in the military
1970–1980	Use of pre-recorded video recordings Use of cassette recordings Use of “collections” Limited number of broadcast channels Mainly used in research and sciences to share information	
1980–1990	Teleconferencing  Video conferencing Less expensive video recorders Cable networks start programming for K-12 students More televised programs	Emergence of Arpanet, which became the World Wide Web
1990–Present	Less expensive computers Greater access to technology Internet in classrooms More educational institutions and businesses utilize distance learning Computer based training (CBTs) Synchronous and asynchronous communication	Dominance of World Wide Web Emergency of wireless technology More financing from private industry and universities

**Figure 10:** The history of distance learning (Harper, Chen & Yen, 2004)

Turkey has more young population when compared with The European Union. On one hand, it means that the number of rivals is increasing to be placed in an institution of higher education. Every year, applicants can be from undergraduate programmes, associate programmes or open education. They can be senior class level, graduated but not appointed before, graduated from tertiary education and appointed before. On the other hand, most of students cannot achieve success at Student Selection and Placement System (Higher Education Examination-Undergraduate Placement Examination) so they will not be able to continue their educational career, although they want to. According to Turkish Statistical Institute’s researches, in 2011, total number of applicants is 1.759.403 and unfortunately total number of appointed to tertiary is only 789.112 (TSI, a). From another perspective, graduating from an undergraduate, a master or a doctorate program is a need for some people who want to get a better job (with more

salary) or high payrolls. In Turkey, distance learning has spread with Anadolu University Open Education Faculty and is still at the focus of researchers. Especially people are interested in e-learning programmes in distance learning field. We can clearly say that our higher education system becomes richer with these new associate, undergraduate and graduate e-learning programmes at universities.

In Future Education system, learning methods and students' profile will be changed. According to Kavak (2011), age composition in higher education has been changing and parallel to OECD nations, older student attendance has an upward tendency to grow. In this sense, the share of student group in 23 and above age has increased from 11.3% to 18.5% in the last decade. Parallel to these ideas, the availability of education resources and budget of these investments is very difficult for future learning. There is another fact that 42.1% (TSI, b) of Turkey population is under 25 years old, therefore we have young population who need education for future.

E-learning may be defined as instruction delivered electronically via the Internet, intranets, or multimedia platforms such as CD-ROM or DVD (Smart & Cappel, 2006; Abdelaziz, Kamel, Karam & Abdelrahman, 2011). E-learning has a positive effect not only on universities but also on many organizations in IT, education, health, tourism, marketing, commerce, etc. David, Salleh, and Iahad (2012) emphasized significant economic and social advantages of e-learning such as time reduction, increased payback, flexible access, reinforcement, motivation, community building, monitoring of the learning process. However, if an organization wants to start e-learning, it should consider some facts (learning management systems, content management systems, virtual classroom, online course implementation process etc.) related to this subject.

As a conclusion, this study has prepared to build an efficient e-learning system for the first time in advance at an organization. At first, literature review related to this subject is given, than a proposal for an e-learning model is created, afterwards every step that belongs to the proposal is explained.

## **Literature Review**

Researchers are trying to make e-learning more effective and optimized for students, want to guide organizations in their e-learning process. Sharing different e-learning practices in literature helps researchers to improve this subject, too. Papanikolaou and Mavromoustakos (2008) have presented a design model for e-Learning corporate environments that incorporates the social and collaborative aspect of the knowledge transfer process, the quality peculiarities and the training requirements. Malayeri and Abdollahi (2010) has introduced a new methodology of E-Learning systems entitle “Network Learning” with review of another aspects of E-Learning systems. Ismail (2001) explains e-learning systems framework, e-learning applications, learning design system, learning content management system and learning support system terms. Baylari and Montazer (2009) state a personalized multiagent e-learning system based on item response theory (IRT) and artificial neural network (ANN) which presents adaptive tests (based on IRT) and personalized recommendations (based on ANN), in addition these agents add adaptivity and interactivity to the learning environment and act as a human instructor which guides the learners in a friendly and personalized teaching environment. Ruiz, Díaz, Soler, and Pérez (2008) attempts to provide the answers to some design questions as a starting point to further develop e-learning platforms. Research findings of Sun, Cheng, and Finger (2009) provide practical implications for the design and implementation of successful e-learning systems. Wang and Chiu (2011) develops a theoretical model to assess user satisfaction and loyalty intentions to an e-learning system using communication quality, information quality, system quality, and service quality.

## **A Proposal for an e-Learning Model**

Current era requires quick response from organizations; they should follow every new technology that helps to improve their selves. Distance learning systems have many risks such as weak content quality, lack of technological infrastructure, wrong choice of LMS

and CMS software, incorrect organizational structure, not to have training documents and user manuals, not to allocate enough time for training of users, not to have communication and support units, not to meet the required level of demand and revenue (Balaban, 2012). Therefore, if an organization decides to start e-learning, there are some useful points to consider (Figure 2).

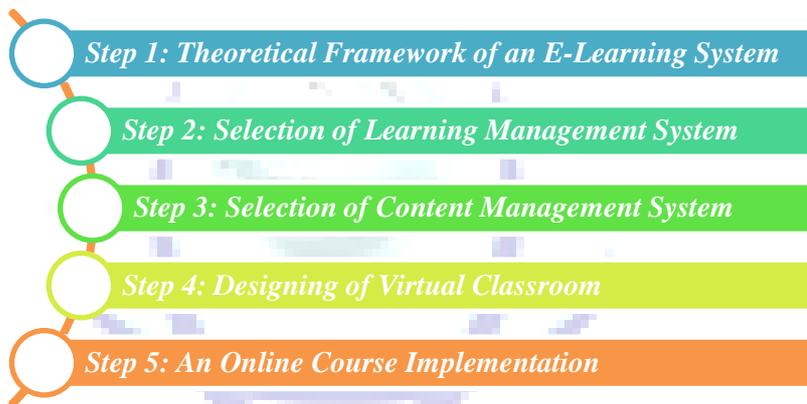


Figure 11: Necessary steps for an e-Learning Model

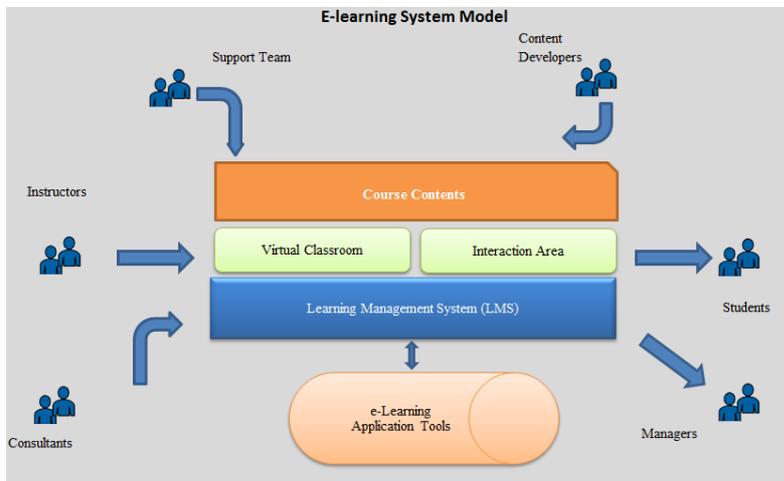
### **Step 1: Theoretical Framework of an E-Learning System**

If an organization wants to make e-learning sustainable, it is important to be careful when selecting of distance learning model, because may vary by education programs. Organizations should decide how they build their e-learning system strategy. There are some choices for this issue such as fully online courses or blended learning. It is important that how much synchronous and asynchronous education service will be used. Not only synchronous learning in live virtual classrooms, or just use of course content which is added to a web environment (asynchronous) make learning effective. While synchronous programmes by virtual classes may be applied at the rate of 1/3, learning should be provided for students by repetitions that they want to do without time constraints at the rate of 2/3. Online courses should be given web supported and

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asynchronous in formal education, if students require, they can consult related instructor face to face.



**Figure 12: Structure of E-Learning Model**

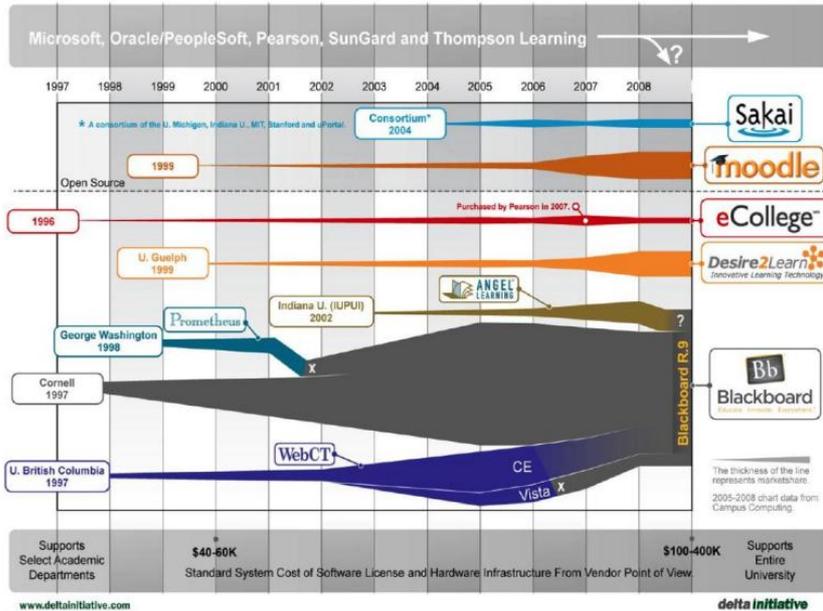
Figure 3 states the elements of e-learning model elements: support team, content developers, instructors, students, consultants, managers, course content, virtual classroom, interaction area, learning management system, e-learning application tools. Course contents, which are created by content developers, are uploaded to system. System includes course content, virtual classroom and learning management system environments. Instructors provide information and knowledge to students. Students interact with e-learning application tools. During the process, consultants and managers support this system. In this structure, all processes should be defined and should be discussed from registration courses or programmes of students, to providing courses and giving system reports to managers. It should be considered that students can benefit from all facilities such as university library, social facilities etc. in system.

## **Step 2: Selection of Learning Management System**

Learning Management System (LMS) is software, which enables selection and registration of courses for students, measurement, and evaluation, following and reporting of users' info. According to Rengarajan (2001)'s definition, an LMS essentially helps manage an organization's learning activities and competencies. Ozan (2008) has explained the basic difference between LMS and other computer terms as follows: LMS includes whole education/training process due to its nature with a systematic approach. LMS is the most important tool that constitutes the distance learning system platform, however is not the aim of educational system. The selection of LMS, which supports virtual class application, is important because a virtual classroom allows learners to attend a class from anywhere in the world and aims to provides a learning experience that is similar to a real classroom (Jadhav). Students want to feel their selves in the classroom and this relates with sense of belonging. Instructor can share his experience from social networks with students; sense of belonging can be gained with social networks. Therefore, selection of LMS, which supports social network applications, comes into prominence. There are many alternatives of LMS such as Sakai, moodle, eCollege, Blackboard, etc. (URL1).

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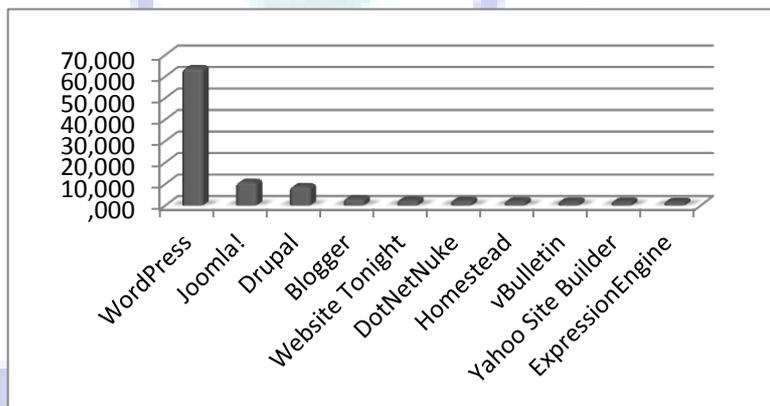
**Figure 13:** The infographic above shows the relative market share of each LMS system (URL1).

Moodle is an open source LMS, is widely used on worldwide an one of e-learning platforms. Top 10 from registered sites in 215 countries: United States, Spain, Brazil, United Kingdom, Germany, Mexico, Portugal, Colombia, Australia and Italy (moodle.org). Support of Moodle's in Turkish as support of multi-language is promoted its usage in Turkey. Starting with Moodle as an LMS is low cost solution for especially opening online web supported courses. Although open source software is free, it will bring implementation and software support costs for organization. When it is compared with commercial software, reduced cost can be seen as a selection factor for it. On one hand, beginning with Moodle will be both reduced investment costs and will provide process of gaining practical experience on the system. However, it is necessary to outsource consultancy service to implement the raw code for organization needs and employ an employee who is responsible of managing the system in the organization. On

the other hand, Blackboard, which is being distributed in Turkey, may be used as an LMS in distance learning models of courses with payment. Related support can be provided by renting this software remotely.

### **Step 3: Selection of Content Management System**

A full-featured content management system “takes content from inception to publication and does so in a way that provides for maximum content accessibility and reuse and easy, timely, accurate maintenance of the content base” (Warren, 2001; Yu, 2005). Nowadays, most web users prefer this technology. Figure 5 (URL2) shows CMS distribution in top million sites.



**Figure 14:** CMS Distribution in Top Million Sites (URL2)

When e-learning is considered, CMS includes all course content and it makes this step more significant. The most important aim of course content design is being easy understandable, learnable, interactive and having a structure which can model behaviors for its users. Qualifications and diversity of course materials are key points of an e-learning programme. Related features which effects quality of the content is given in below:

- being interactive

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- supporting of multi-media such as voice, image, animation, etc.
- animating the course with simulations and to acquire learning activity
- including exercise questions and tests

Another point about content quality is if contents are compatible with content standards. AICC, ADL, SCORM, IEEE, IMS can be given as common standards. Therefore, it is important to search if these standards are used in selection of LMS and CMS. In addition, contents should be prepared appropriate with Bologna Process, National Qualifications Framework for Higher Education in Turkey (NQF-HETR) and student interaction for universities. Easy and fast learning should be provided with contents that teach their selves in distance learning.

This process can be accelerated if instructors use rapid content production tools for their prepared course notes, however if they do not devote time or quality of contents are wanted to increase, this issue will achieved with related content development unit. Personnel requirements can be increased/decreased according the number of learning programmes and courses. Personnel need of content development unit can be constituted as following and implementation of CMS process is given in Figure 6.

- Instructional designer,
- Content specialist,
- Graphic specialist,
- Multi-media producer,
- Programming specialist

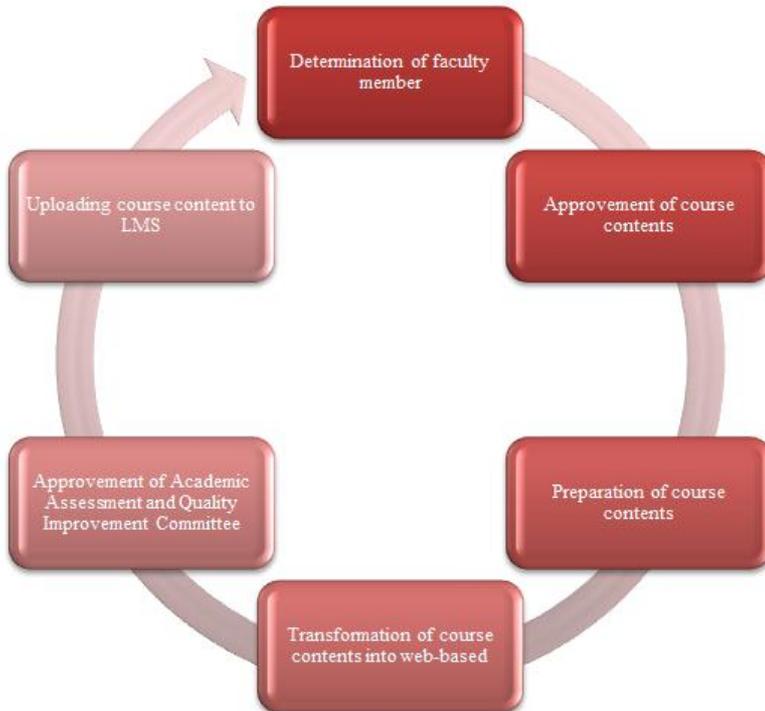


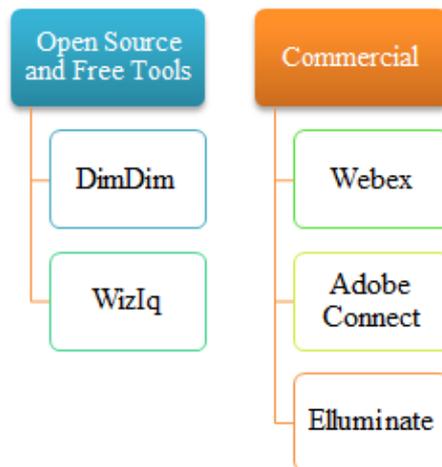
Figure 15: Implementation of CMS process

Employing coordinators who provide communication with faculty members and giving necessary support to them is important for efficiency of this system. A guide should be created to prepare instructors' lecture notes easy and fast. Web interface of Content Management System on organization's web site should include following in below and all these functions should be work together with LMS software.

- Course Materials
- Course Operations
- Exams
- Homework
- Announcements
- Messages
- Discussion Groups
- Chat
- Student Affairs
- Academic Calendar
- Personal Calendar
- Settings

#### **Step 4: Designing of Virtual Classroom**

A virtual classroom is a tool for delivering classroom-like sessions, live over the Internet (Kineo, 2011). According to Yang and Liu (2007), a virtual classroom not only delivers course materials to the learners, but also provides live, contextual and interactive environment for the learners; in addition, teachers can control the learning and teaching process as if they do in the traditional classroom. According to Rayson and Aberdour (2009), top five recommended virtual classrooms are as follows (Figure 7):



**Figure 16:** Top 5 recommended virtual classrooms (Rayson & Aberdour, 2009)

“Adobe Connect” product is widely used as a virtual classroom application in Turkey. This software enables virtual classroom courses through a computer that has an internet connection and camera; also, it has removed need of being physical virtual classroom studio for instructors. Unfortunately, today this technology is not used effectively. Generally if an e-learning programme has a virtual classroom, it is limited with only web camera that shows instructor’s face, however virtual classroom means more than this such as smart camera systems that follows instructor’s body and motion, professional studios. It should be noted that mentioned technologies considered with organization’s e-learning budget.

### Step 5: An Online Course Implementation

Online course implementation process is the last step of the framework. This step includes nine different sub steps: Server supply, Course definition on LMS, Course registration operations, Course content upload, Online practices, Documentation, Training, Establishing solution and support systems, Effort and resources (Figure 7).

**Server Supply:** At first organization should supply a server that hosts e-learning system. LMS and CMS requirements should match up with the server. Organizations can outsource or supply server in-house. **Course Definition on LMS:** After server supply is performed, courses belong to e-learning programme should be defined to LMS. Instructor of the course is determined and user name and password will be given them. **Registering to a Course:** After courses are defined, it is necessary for students to register to courses. This process depends on LMS.

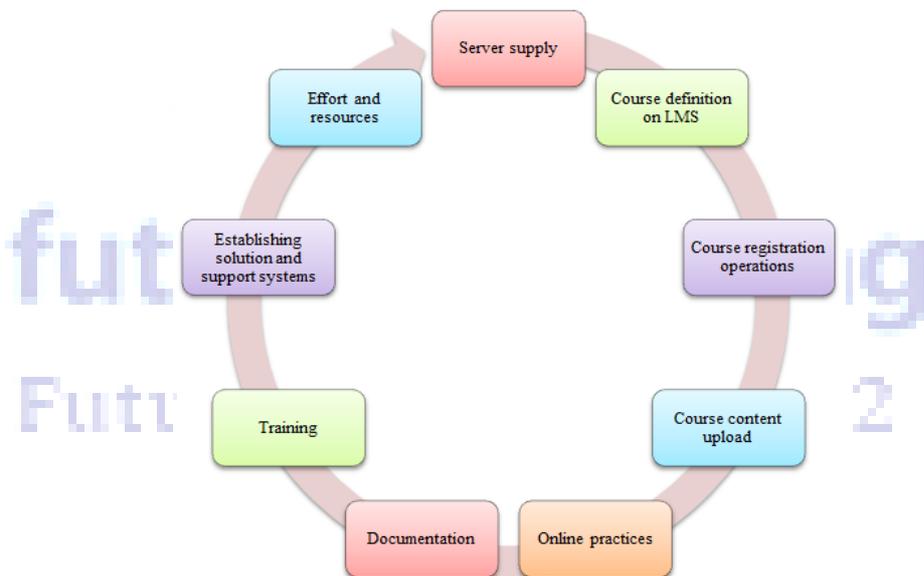


Figure 17: An Online Course Implementation Process: Moodle Example

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**Course Content Upload:** It is advised that content manager uploads course contents. Instructors can also upload contents to system however; the necessity of controlling if contents are compatible with the standards, performing this job with only a person is more suitable. Needs are listed as follows:

- Course materials is asked for instructors with a specific format (related instructor is responsible from plagiarism) ,
- Editors revise course materials and send them to content managers,
- If necessary, content managers prepare scenarios and animations for course contents,
- After instructors' permission and approval are taken, course contents are uploaded to system.

**Online Practices:** If instructor wants, online quizzes can be done. System should enable this. Instructors can upload questions directly or send them to content management unit. System announces exam results to students automatically. All results can be exported as different file formats such as excel, csv, etc. **Documentation:** A guide, which describes usage of the system, is prepared for students, faculty members and content development team. Easy access of this document should be provided. **Training:** Training which is about usage of the system, is given to content management employees and instructors as applied at the computer. **Establishing solution and support systems:** It is important to build an online support system to answer students' or instructors' questions. In addition, system is important because of system takes questions at any time and stores them. Open source software can be used for solution. **Human Resources:** Characteristics of personnel and programmes that will be used by them are listed in below for a solution within the organization:

- System Manager: Experienced in e-learning system environment (chosen LMS, CMS, virtual class etc.).
- Instructional Designer: Graduated from Computer Education and Instructional

Technology Department, knows how to use of “Adobe e Learning Suit”.

- **Illustrator:** Designs visual materials in defiance of copyrights and responsible staff from copyright problems.
- **Programmer:** Can make needed implementation and changes for LMS and similar issues, develops software by using PHP programming language.
- **Technical Staff:** Is needed to answer students’ and faculty members’ questions about LMS.
- **Editor:** Is needed for contents (Adobe eLearning Suite 2.5 which includes Adobe Captivate, Adobe Presenter, Adobe Flash, Adobe Dreamweaver, Adobe Audition, Acrobat X Pro, Adobe® Photoshop, can be used for developing contents), if contents are developed in organization.

If number of the courses is not more than five, number of the personnel can be reduced. System Manager, Programmer and Technical Staff can be same. If necessary, consultancy service and technical support can be outsourced.

## **Conclusion**

If we want to be successful in an e-learning project in an organization, first we should think whole system, then start with pilot applications, afterwards test it and finally implement it to entire organization. If mentioned education project is related to an e-learning system and organization does not have enough knowledge about it, does not have enough experience in this area, or does not know where they should start it, this paper will be useful as a guideline to accelerate the e-learning process as a proposal model. Moreover theoretical framework of an e-learning system, selection of learning management system (LMS) and content management system (CMS), designing of a virtual classroom, online course implementation are explained, future works related to the framework are discussed. Discussed steps are respectively:

- **Step 1:** Theoretical Framework of an E-Learning System,
- **Step 2:** Selection of Learning Management System,

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- **Step 3:** Selection of Content Management System,
- **Step 4:** Designing of Virtual Classroom,
- **Step 5:** An Online Course Implementation

It should be considered that given proposal is a rapid transition guide of an e-learning system, so it has no strict and certain lines. It can be seen as a systematic approach to initialize the process of e-learning system. Each step related to proposal should be expanded, improved and implemented in future works. It is a roadmap to implement rapid transition as an e-learning project in organizations and compare expected and actual results of the study. It is assumed that there is no difficulties and blocks to implement an e-learning model proposed in this study. It is known that the successful of a e-learning implementation depends to organization culture and it can be successful by the top management and academic personal support. As a conclusion, a learning system is not a technological project for future learning. It is an educational project exactly.

## References

1. Abdelaziz, M., Kamel, S. S., Karam, O., Abdelrahman, A., 2011. Evaluation of E-learning program versus traditional lecture instruction for undergraduate nursing students in a faculty of nursing, *Teaching and Learning in Nursing*, 6 (2): 50-58, <http://www.sciencedirect.com/science/article/pii/S1557308710000910>, [Access Date: September 19, 2012].
2. about.com, 2010, The Best and Worst Online Degree Programs, <http://adulthood.about.com/b/2010/06/19/the-best-and-worst-online-degree-programs.htm>, [Access Date: June 5, 2012].
3. Balaban, M. E., 2012. Teknoloji ile Eğitim ve Fatih Projesi (Yüksek Öğretimde Uzaktan Eğitim), 11. Matematik Sempozyumu, 19-21 Eylül 2012, 19 Mayıs Üniversitesi, Samsun.
4. Baylari, A., Montazer, Gh. A., 2009. Design a personalized e-learning system based on item response theory and artificial neural network approach, *Expert Systems with Applications*, 36 (4): 8013-8021, ISSN 0957-4174, 10.1016/j.eswa.2008.10.080, <http://www.sciencedirect.com/science/article/pii/S095741740800777X>, [Access Date: September 21, 2012].
5. Malayeri, A. D. & Abdollahi, J., 2010. New designing of E-Learning systems with using network learning, In *Proceedings of CoRR*,

- <http://arxiv.org/ftp/arxiv/papers/1003/1003.3097.pdf>, [Access Date: September 21, 2012].
6. David, O., Salleh, M. & Iahad, N., 2012. The Impact of E-Learning in Workplace: Focus on Organizations and Healthcare Environments, *International Arab Journal of e-Technology*, 2 (4): 203-209, [http://www.iajet.org/iajet\\_files/vol.2/no.4/The%20Impact%20of%20E-Learning%20in%20Workplace\\_%20Focus%20on%20Organizations%20and%20Healthcare%20Environments.pdf](http://www.iajet.org/iajet_files/vol.2/no.4/The%20Impact%20of%20E-Learning%20in%20Workplace_%20Focus%20on%20Organizations%20and%20Healthcare%20Environments.pdf), [Access Date: September 19, 2012].
  7. Harper, K. C., Chen, K., Yen, D. C., 2004. Distance learning, virtual classrooms, and teaching pedagogy in the Internet environment, *Technology in Society*, 26 (4): 585-598, ISSN 0160-791X, 10.1016/j.techsoc.2004.08.002, <http://www.sciencedirect.com/science/article/pii/S0160791X04000545>, [Access Date: September 19, 2012].
  8. Işık, A. H., Güler, İ., 2012. Comprehensive comparison of traditional and distance learning master programs, *Procedia - Social and Behavioral Sciences*, 31: 120-123, ISSN 1877-0428, 10.1016/j.sbspro.2011.12.027, <http://www.sciencedirect.com/science/article/pii/S1877042811029569>, [Access Date: June 27, 2012].
  9. Ismail, J., 2001. The design of an e-learning system: Beyond the hype, *The Internet and Higher Education*, 4 (3-4): 329-336, ISSN 1096-7516, 10.1016/S1096-7516(01)00069-0, <http://www.sciencedirect.com/science/article/pii/S1096751601000690>, [Access Date: September 21, 2012].
  10. Jadhav, S. K., Project Report on “Virtual Classroom”, CDAC, Mumbai, [http://www.cdacmumbai.in/design/corporate\\_site/override/pdf-doc/virtual-classroom.pdf](http://www.cdacmumbai.in/design/corporate_site/override/pdf-doc/virtual-classroom.pdf), [Access Date: June 27, 2012].
  11. Kavak, Y., 2011. Türkiye’de Yükseköğretimde Büyüme: Yakın Geçmiş Bakış ve Uzun Vadeli (2010-2050) Büyüme Projeksiyonları (Growth Of The Higher Education In Turkey: An Overview To Last Decade And Long-Term (2010-2050) Growth Projections), *Yükseköğretim Dergisi (Higher Education Journal)*, 1 (2): 95-102, [http://www.yuksekogretim.org/Port\\_Doc/YOD\\_2011002/YOD\\_2011002005.pdf](http://www.yuksekogretim.org/Port_Doc/YOD_2011002/YOD_2011002005.pdf), [Access Date: October 09, 2012].
  12. Kineo, 2011. Virtual classrooms: an overview, [http://www.kineo.com/documents/Virtual\\_Classrooms\\_Overview\\_V2.pdf](http://www.kineo.com/documents/Virtual_Classrooms_Overview_V2.pdf), [Access Date: June 27, 2012].
  13. moodle.org, Moodle Statistics, <http://moodle.org/stats/>, [Access Date: June 27, 2012].
  14. Moore, J. L., Dickson-Deane, C., Galyen, K., 2011. e-Learning, online learning, and distance learning environments: Are they the same?, *The Internet and Higher Education*, 14 (2): 129-135, ISSN 1096-7516, 10.1016/j.iheduc.2010.10.001,

**4th International Future-Learning Conference on  
Innovations in Learning for the Future 2012: e-Learning  
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- <http://www.sciencedirect.com/science/article/pii/S1096751610000886>, [Access Date: June 27, 2012].
15. Ozan, Ö., 2008. "Öğrenme Yönetim Sistemlerinin (Learning Management Systems-LMS) Değerlendirilmesi", inet-tr'08 - XIII. Türkiye'de İnternet Konferansı Bildirileri, 22-23 Aralık 2008 Orta Doğu Teknik Üniversitesi, Ankara, [http://inet-tr.org.tr/inetconf13/kitap/ozan\\_inet08.pdf](http://inet-tr.org.tr/inetconf13/kitap/ozan_inet08.pdf), [Access Date: September 22, 2012].
  16. Papanikolaou, K. & Mavroustakos, S., 2008. Web2Train: a Design Model for Corporate e-Learning Systems, In Proceedings of BIS (Workshops), 155-163, <http://ceur-ws.org/Vol-333/learn1.pdf>, [Access Date: September 21, 2012].
  17. Sun, P., Cheng, H. K., Finger, G., 2009. Critical functionalities of a successful e-learning system — An analysis from instructors' cognitive structure toward system usage, *Decision Support Systems*, 48 (1): 293-302, ISSN 0167-9236, 10.1016/j.dss.2009.08.007, <http://www.sciencedirect.com/science/article/pii/S0167923609002036>, [Access Date: September 21, 2012].
  18. Rayson, S., Aberdour, M., 2009. Virtual classrooms: an overview, [http://www.cedma-europe.org/newsletter%20articles/Kineo/Virtual%20Classrooms%20-%20An%20Overview%20\(Feb%2009\).pdf](http://www.cedma-europe.org/newsletter%20articles/Kineo/Virtual%20Classrooms%20-%20An%20Overview%20(Feb%2009).pdf), [Access Date: September 24, 2012].
  19. Rengarajan, R., 2001. LCMS and LMS Taking Advantage of Tight Integration, *click2learn*, [http://www.e-learn.cz/soubory/lcms\\_and\\_lms.pdf](http://www.e-learn.cz/soubory/lcms_and_lms.pdf), [Access Date: June 5, 2012].
  20. Ruiz, M. del P. P., Díaz, M. J. F. F., Soler, O., Pérez, J. R. P., 2008. Adaptation in current e-learning systems, *Computer Standards & Interfaces*, 30 (1–2): 62-70, ISSN 0920-5489, 10.1016/j.csi.2007.07.006, <http://www.sciencedirect.com/science/article/pii/S0920548907000517>, [Access Date: September 21, 2012].
  21. Severino, S., 2008. La comunicazione del sapere a distanza. La Moderna, Enna.
  22. Severino, S., Aiello, F., Cascio, M., Ficarra, L., Messina, R., 2011. Distance education: the role of self-efficacy and locus of control in lifelong learning, *Procedia - Social and Behavioral Sciences*, 28: 705-717, ISSN 1877-0428, 10.1016/j.sbspro.2011.11.132, <http://www.sciencedirect.com/science/article/pii/S1877042811025717>, [Access Date: September 24, 2012].
  23. Turkish Statistical Institute (TSI, a) – Student Selection and Placement Center, Education, Culture & Sport, Statistical Tables, Formal Education, Number Of Applicants And Appointed To Tertiary Education In Year 2006 By School Type And Educational Status, [http://www.tuik.gov.tr/VeriBilgi.do?alt\\_id=14](http://www.tuik.gov.tr/VeriBilgi.do?alt_id=14), [Access Date: June 5, 2012].
  24. Turkish Statistical Institute (TSI, b) – Population, Demography, Housing & Gender, Population Statistics and Projections, Mid-year population projections by

- age groups and sex, [http://www.turkstat.gov.tr/PreIstatistikTablo.do?istab\\_id=244](http://www.turkstat.gov.tr/PreIstatistikTablo.do?istab_id=244), [Access Date: October 9, 2012].
25. URL1, Learning Management System (LMS) Evaluation 2011-2012, <http://blogs.butler.edu/lms/files/2011/08/executive-summary.pdf>, [Access Date: September 23, 2012].
26. URL2, CMS Distribution in Top Million Sites, <http://trends.builtwith.com/cms>, [Access Date: September 23, 2012].
27. Volery, T., & Lord, D., 2000. Critical success factors in online education. *International Journal of Educational Management*, 14 (5): 216–223.
28. Wang, H. C., Chiu, Y. F., 2011. Assessing e-learning 2.0 system success, *Computers & Education*, 57 (2): 1790-1800, ISSN 0360-1315, 10.1016/j.compedu.2011.03.009, <http://www.sciencedirect.com/science/article/pii/S0360131511000704>, [Access Date: July 2, 2012].
29. Warren, R., 2001. Information Architects and their Central Role in Content Management. *Bulletin of the American Society for Information Science and Technology*, 28 (1).
30. Yang, Z., Liu, Q., 2007. Research and development of web-based virtual online classroom, *Computers & Education*, Volume 48, Issue 2, February 2007, Pages 171-184, ISSN 0360-1315, 10.1016/j.compedu.2004.12.007, <http://www.sciencedirect.com/science/article/pii/S0360131505000084>, [Access Date: July 2, 2012].
31. Yu, H., 2005. Content and Workflow Management for Library Websites, Chapter 1 – Library Web Content Management: Needs and Challenges, [http://ece.ut.ac.ir/dbrg/seminars/advanceddb/2006/mahdikhani\\_kianrad/second%20report/References/09.pdf](http://ece.ut.ac.ir/dbrg/seminars/advanceddb/2006/mahdikhani_kianrad/second%20report/References/09.pdf), [Access Date: September 23, 2012].

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## **Online Scenario Simulation Exercises: Benefits for Adult Learning in Security Studies**

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**Abstract:** *University of Maryland University College (UMUC) utilizes computerized scenario simulation tools in delivering their online graduate and undergraduate classes. This is especially true in delivering complex scenarios that involve criminal justice, emergency management and public security courses. There is a need for utilizing these tools and making them available in as many courses as possible, as the described survey indicates that there are tangible benefits in student learning. Course evaluations and teaching experience show that (1) students want dynamic, hands-on exercises that simulate real-world environments and real world thinking; (2) textbook reading and classroom/conference participations need further stimulating tools to enhance student understanding of the material; (3) students want to take an active part in the decision making processes as crisis events unfold; (4) students want to learn what are good and bad decisions, and why, by actively seeing consequences of their decisions as events unfold; and lastly the fact that case studies that look backward are not so interesting for them as the events and their consequences are already known. Textbooks and lectures do not capture the dynamic, time-sensitive, context-dependent, multi-disciplinary nature of emergency and crisis scenarios. Understanding the need, this researcher attempted to capture the real benefit of online exercise simulation tools. Due to time and resource limitations, she surveyed only the existing UMUC courses that currently use some sort of online simulation exercises that help students engage more with the material they learn. The researcher looked both at undergraduate and graduate programs related to the discipline. She identified 4 courses that used online (computerized) simulation-based exercises, 3 of them in undergraduate Criminal Justice program and 1 exercise offered in the graduate Homeland Security Management/Biosecurity and Biodefense program specialization. A total of 100 (out of the total sample of 319) students responded to the survey. The results were overwhelmingly favorable in the areas of helping students understand the material, simulating real-world experience, helping in visualizing and conceptualizing, improving decision making skills, and improving communication and consensus gathering skills. Extensive correlation analyses were conducted with the quantitative data generated from this research. There are interesting findings that correlate the degree of satisfaction about individual features of the exercises and student demographics. These findings warrant further testing in future researches in larger scales. The statistics generated through this research can lay a foundation for further detailed studies that assess the effectiveness of online scenario-based simulation tools. The tools assessed in this research were mainly low budget, rudimentary tools. With more sophisticated online tools that use state-of-the art gaming technologies, more effective results may be obtained in terms of student learning.*

**Keywords:** Adult Education; Distance Education; Online Education; Simulation; Scenario-Based Learning; Security

### **Introduction**

Today, many higher education institutions are faced with the challenge of effectively teaching the core concepts and underlying theories that constitute the backbone of

Emergency Management, Criminal Justice, and other security related practical disciplines/professions. Some of the core concepts, particularly the response aspects to large scale crises and emergencies that threaten communities necessitate the use of a scenario-based teaching approach, most suitably web-based scenario simulation exercises. With the growing trend of the online delivery of these curricula, the use of computerized and online scenario simulation approaches are especially sought.

University of Maryland University College (UMUC) located in Maryland, Unites States of America, offers graduate and undergraduate level studies in these fields in mostly online (roughly 90% online, and 10% on-site) and face to face settings to the members of the military and busy working adults. UMUC as one of 11 degree-granting institutions in the University System of Maryland, is arguably the largest public university with online presence with close to 90,000 registered students at any given time.

In introducing new concepts especially in these challenging and continuously evolving fields, students are assigned a heavy reading load from textbooks as well as case studies and other material such as government policy documents. Comprehending these reading assignments represent an added challenge to the existing hurdles of the adult learners whose lives are busy with full-time jobs, family responsibilities, and military or job deployment issues. Understanding the link between the policies and their actual applications presents a challenge in and of itself through textbook reading assignments, lecture notes and class discussions.

Recent course evaluation surveys revealed the fact that there is a growing interest among these students in the potential use of computerized simulation tools to augment textbook reading assignments and virtual class discussions.

In emergency management profession, it is particularly important that students learn how to make the correct decisions under specific crisis situations by applying the learned theories into practice. In face to face, synchronous environments, crisis management situations are simulated through tabletop exercises where key players

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involved are present at the same time for at least a few hours. However, simulating a table top exercise in an asynchronous, online environment presents special challenges. These challenges are outside the scope of this paper.

The literature review conducted earlier by Renda-Tanali and Abdul-Hamid (2011) revealed a variety of teaching experiments that utilize web-based scenario simulation exercises. For example, enhancing classroom learning (online or face-to-face) with the use of multi-media technology (video, audio, web pages, and lately web 2.0 tools: blogs, wikis, social networking sites, podcasts, vodcasts, etc.) has been employed widely for training and education in social sciences (Agostinho et al., 2005; Seabury, 2005; Charsky et al., 2009) as well as physical or computational sciences (Tao et al., 2006; Limson, et al, 2007; Monahan et al., 2008; n.d. 2009; and Bojanova & Pang, 2010). One earlier example is Spinello and Fishbach's (2004) web-based scenario simulation developed for teaching public health courses to undergraduate students. Their online scenario simulation tool generated relatively favorable results in terms of contributing to student learning with challenges to overcome. Until a few years ago, UMUC used a similar but more advanced type of simulation in the Homeland Security Management graduate introductory course, named as San Luis Rey simulation exercise. The exercise involved the use of multiple web pages that included maps, location of critical infrastructure and other resources of a fictitious city and required students to employ their critical thinking skills in developing threat assessment and emergency response policies for the city. The results of the satisfaction survey seemed promising initially (Boubsil & Gayol, 2006), however the simulation exercise required extensive propping up by a teaching assistant. Later we received mixed reviews from students about the benefits of the tool. Due to the diminishing returns from the benefits of the use of San Luis Rey, the San Luis Rey exercise was ultimately discontinued.

Today, virtual worlds and intelligent agents make up the elements of the state-of-the-art real world simulation exercises. For example, Play2Train, a virtual world platform is used to replicate tabletop exercises. The United States Centers for Disease

Control (CDC), Emory University, the University of Illinois at Chicago's Center for the Advancement of Distance Education (CADE), Seton Hall University, and Idaho State University are known to have used Play2Train (Hewitt et al, 2009). Play2Train uses Second Life software tool that uses avatars (intelligent agents) that mimic human behavior. Hewitt et al (2009) used Second Life resources as well as Play2Train in their Master of Healthcare Administration online program for allowing students enhance their discovery, critical thinking, and analytical skills. The results were promising. Although students enjoyed the tool, they had impediments with technology fluency and preparation time. These simulation tools reveal that role playing enhances student learning (Battersby, 2008; Oliver & Carr, 2009). Jones and Warren (2009) note that it takes too long to discover these tools and the benefits may not outweigh the time spent. Oliver and Carr (2009) also question the link between learning and playing computer games or computer game like simulations. Murphy and Gazi (2001) reported similar concerns much earlier.

This research builds on the findings of a longitudinal study, Best Online Instructional Practices, conducted by the Office of Evaluation and Assessment at UMUC (Lewis & Abdul-Hamid, 2006). According to Lewis and Abdul-Hamid, in the area of technology utilization, structured systematic activities focusing on facilitating student learning are the most influential on student outcomes. Students tended to be more engaged in classes that used active learning tools such as simulations and learning modules. They were also more likely to succeed in comparison to other courses. Using role playing, simulations, or other activities to supplement lecture and discussions in learning was associated with about 17 percent increase in student success (Abdul-Hamid, 2005 & 2010).

### **Objectives of the Study**

Our objectives in this study were, (1) to determine the effectiveness of online scenario simulation tools on student learning and comprehension as related to the emergency

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management and related fields; (2) to identify the strengths and weaknesses of those tools; (3) to compare those tools to traditional methods of teaching; (4) to uncover facts that relate to student demographics that this researcher did not previously know; and (5) to develop better tools through the findings of the study.

Due to time and resource restraints, this researcher decided to survey the existing tools used in asynchronous online learning environments in UMUC.

### **Methodology**

This researcher searched first the existing programs in the areas of emergency management, criminal justice, and homeland security to see whether any computerized online scenario simulation tools were being used. This researcher identified 3 courses, 2 of which were offered as part of the undergraduate Criminal Justice program, and one in the Biosecurity and Biodefense/Homeland Security Management graduate specializations. This researcher then targeted all of the online sections of those courses offered in one particular semester. The students were surveyed via an online survey tool to assess their satisfaction with the simulation tool as well as their perception on how much the tools contributed to their learning. To augment the survey, this researcher also virtually visited each online classroom; collected statistics on the participation, presence, interaction, and student grade distributions, and conducted correlation studies among student satisfaction, actual performance, and demographics. The areas this researcher surveyed included students': 1) understanding the material, 2) improvement of skills in processing, testing, validating assumptions, 3) improvement in decision making skills, 4) getting closer to real-life experience, 5) connecting events and objects (or actions), 6) improvement of visualizing, conceptualizing, comprehending, 7) consensus gathering, 8) effective crisis communication, 9) effective use of resources, 10) effective emergency response to large scale crises, 11) student-to-student interaction, and 12) student-to-faculty interaction. This researcher especially focused on the three components of the community of inquiry framework (COI) in relation to 1) cognitive presence, 2) social

presence and 3) teaching presence (Garrison, 2007). The survey instrument included a questions in the form of a statement covering each of the 12 areas (see above) that was similar to the following: “The tool helped understand the material better”. The students were then asked to rate their degree of agreement with each statement based on a 4-point Likert scale that consisted of 4- Strongly Agree, 3- Agree, 2- Disagree, and 1- Strongly Disagree. Note that a neutral point was not used in the scale. This researcher used Cronbach’s alpha in order to correctly group the questions and assure internal reliability of the survey instrument. See the appendix of the document for the questionnaires.

### **Assumptions**

This researcher tested all 3 of the simulation tools used in 3 different courses, in terms of whether they helped students understand the material better, improve their decision making skills, and helped them get close to a real-life experience. Additionally, this researcher tested 2 of the 3 online scenario simulation tools used in the undergraduate Criminal Justice curriculum in terms of whether they helped students connect events and objects (or actions), as well as visualization, and conceptualization, and improvement of students’ skills in processing, testing, and validating assumptions. This researcher also tested the tool used in the graduate program against its usefulness for helping students learn consensus gathering, effective crisis communication, effective use of resources, as well as effective emergency response to large scale crises. In all cases, this researcher also looked at whether there was an increased student-to-student interaction and/or student-to-faculty interaction during the timeframe which the simulation activity was assigned which this researcher assumed as proxies of the evidence of enhanced learning activity. This researcher also tested the assumption that the students who responded favorably to the areas this researcher surveyed also received better grades, and hence the tools contributed and/or facilitated learning (Renda-Tanali & Abdul-Hamid, 2011).

## **Simulation Tools Surveyed**

Tool 1: “Crime Scene Simulation”, an individual activity was assigned to students during the second part of the semester as part of the introductory course named Introduction to Criminalistics and carried a weight of 20% of the overall course grade. This is a computer game-like simulation where students virtually move around a fictitious crime scene, examine objects, process evidence, place them in an evidence box, interview the witness, and record details in a journal. After all the evidence is collected, students enter into a virtual Crime Lab and request the appropriate tests for each evidence item collected, such as fingerprint analysis, forensic biology, toxicology, medico-legal autopsy, and firearm examination. After all the tests are performed, a detailed “crime scene report” is generated. Students are graded based on the correctness of the evidence collected and the correctness of the tests. The crime lab yields no results if incorrect tests are requested.

Tool 2: “Cold Case Simulation”, again an individual activity, was assigned as a requirement for the undergraduate course named Medical and Legal Investigations of Death that teaches an intensive look at medical and legal investigations into causes of death. The assignment again carried a weight of 20% of the overall course grade. Again, through a semi computer game-like simulation, students examine past reports and evidence from the original investigation. Once they are familiar with the homicide case and the people involved, they proceed to interview select persons of interest. As the simulation progresses and students encounter new evidence, they are able to submit that evidence for various types of forensic testing. As students proceed with their investigation, they gather evidence, other documents such as test results, reports, and witness statements. These items are placed into their binder as they are created or discovered. The deliverable is an “arrest warrant report”, and the objective of the simulation is to gather enough evidence, secure an indictment from the district attorney, and solve the case.

Tool 3: “Biological Attack simulation” was assigned as a requirement for a

graduate level Biosecurity and Bioterrorism course that teaches students a review of bioterrorism, biosecurity, and government biodefense strategy, including the history and science of biological agents in agriculture and society. This simulation carried 25% of the grade and was used in lieu of final exam. The goals were to describe the pathogenesis of the infectious agent, including its diagnosis, treatment and preventive strategies; to identify key players and their roles in public health emergency preparedness and response; to establish a response command structure following a public health bioterrorism crisis; demonstrate knowledge of laws, regulations, other vital components at federal and state level disaster response, demonstrate proficiency in identifying, allocating, and/or augmenting resources; and to apply crisis and consequence management skills with effective media communications. This was a multimedia scenario-based simulation exercise enhanced with intercept messages, audio-video clips and pictures to create a realistic experience. Each student was assigned a specific role in their group as a task force member in response to a message that asserted that a bioterrorist attack has occurred.

### **Results and Findings**

Due to the voluntary nature of the surveys, the response rate was around 35% concerning all three simulation exercises. In other words, a total of 95 students responded to the survey out of a population of 282. For the Crime Scene Simulation, 51 students out of 145 students responded (35.2 %), for the Cold Case Simulation 26 out of 76 (34.2%), and for Bioattack Simulation 18 out of the 51 students who received surveys responded (35.3%).

Age and gender demographics of the participants are shown on Figure 1 below. The undergraduate population who used Tools 1 and 2 had a majority of females (69% and 88% respectively). On the contrary, the graduate students consisted mostly of males (83%). As for the age distribution, the undergraduate students are younger in average than the graduate students.

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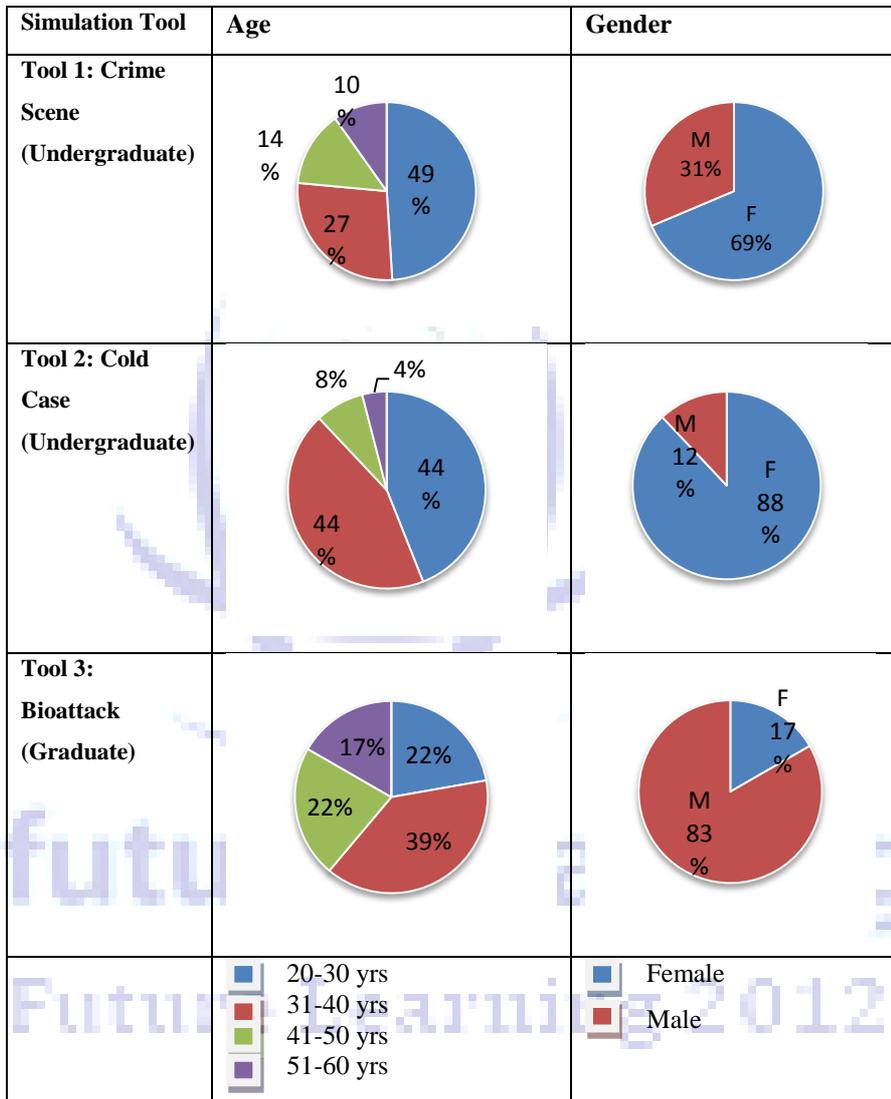


Figure 1: Age demographics

This researcher conducted correlation analyses among the parameters using Pearson Correlation Coefficient method. Pearson's correlation coefficient between two

variables is defined as the Covariance of the two variables divided by the product of their standard deviations.

$$\rho_{X,Y} = \frac{E(XY) - E(X)E(Y)}{\sqrt{E(X^2) - (E(X))^2} \sqrt{E(Y^2) - (E(Y))^2}} \quad (1)$$

**Table 1:** Pearson Correlation Coefficient ranges

<b>1.1. Correlation</b>	<b>1.2. Negative</b>	<b>1.3. Positive</b>
<b>1.4. None</b>	1.5. -0.09 to 0.0	1.6. 0.0 to 0.09
<b>1.7. Small</b>	1.8. -0.3 to -0.1	1.9. 0.1 to 0.3
<b>1.10. Medium</b>	1.11. -0.5 to -0.3	1.12. 0.3 to 0.5
<b>1.13. Strong</b>	1.14. -1.0 to -0.5	1.15. 0.5 to 1.0

## Comprehension

In all three cases, majority of the students agreed that the tool(s) helped their understanding of the material, gave them hands on experience, mirrored a real world experience, and improved their decision making skills. Table 2 below shows the summary. This researcher also tested the correlation between the degrees of agreement of each attribute to each other, and found that students were generally consistent in their assessment of the benefits of the tool. For example, those students who agreed that the tool helped their understanding of the material better also agreed that it gave them a hands-on experience, it mirrored real-life experience and improved their decision making skills in each simulation case, with slight variations in the degree of correlation. The Pearson correlation coefficient was measured mostly as medium (between 0.3 and 0.5) or high (0.5-1.0) among these attributes with the exception of the Bioattack

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simulation where understanding the material did not consistently correlate with the other attributes.

**Table 2:** Comparison of results on learning parameters among three simulations

	Crime Scene		Cold case		Bioattack	
	Agree	Inter-item correlation	Agree	Inter-item correlation	Agree	Inter-item correlation
Understanding material	84%	Strong $r > .5$	84%	Strong $r > .5$	100%	Strong to low
Hands-on experience	84%	Strong $r > .5$	88%	Strong $r > .5$	100%	Strong to medium
Mirroring real-life experience	84%	Strong $r > .5$	68%	Strong $r > .5$	89%	Strong to medium
Improving decision making skills	82%	Strong $r > .5$	75%	Strong $r > .5$	89%	Strong to medium

Again, as shown in Table 3 below, majority of the students who used Crime Scene Simulation and the Cold Case File Simulation agreed that the tool helped them (1) validate and test their assumptions; (2) make connections between events and objects; and (3) helped visualizing and conceptualizing things related to crime scene and/or a murder case. Those statements were not assessed in the Bioattack case since they were not relevant. As Table 3 indicates, an overwhelming majority of the students who responded to the Bioattack survey agreed that the tool helped them (1) understand effective emergency response; (2) improve their consensus gathering skills; (3) learn effective use of resources in a large scale biological attack situation; and (4) improve their effective crisis communication skills. These were not tested for the previous two cases since the nature of the assignment was not related. The correlation coefficient among the parameters ranged from mostly Strong (0.5-1.0) to Medium (0.3-0.5) and to Low (0.1-0.3). The specifics are shown in Table 3.

**Table 3:** Comparison of results among each tool on content-related competencies

	Crime Scene		Cold case		Bioattack	
	Agree	correlation	Agree	correlation	Agree	correlation
<b>Validating and testing assumptions</b>	80%	Strong $r > .5$	75%	Strong $r > .5$	N/A	N/A
<b>Making connections between events and objects</b>	80%	Strong $r > .5$	84%	Strong $r > .5$	N/A	N/A
<b>Helps visualizing, conceptualizing</b>	88%	Strong $r > .5$	92%	Strong $r > .5$	N/A	N/A
<b>Understanding effective emergency response</b>	N/A	N/A	N/A	N/A	100%	Strong $r > .5$ (consensus, resources, eff. Crisis comm.), Medium (understanding, hands-on, real-life, decision making)
<b>Improve consensus gathering skills</b>	N/A	N/A	N/A	N/A	94%	Strong (decision making, eff. EM response, resources, eff. Crisis comm.) Medium (hands-on, real-life), Low (understanding)
<b>Learn effective use of resources in EM response</b>	N/A	N/A	N/A	N/A	100%	Strong (effective EM response, consensus, effective Crisis comm.) Medium (understanding, hands-on, real-life, decision making)
<b>Improve effective crisis communication skills</b>	N/A	N/A	N/A	N/A	94%	Strong

### **Interaction**

Although this researcher assumed that interaction (both between student and the faculty and student-to-student) helped understanding the material better, this researcher received mixed results from the surveys. As seen from Table 4, students rated the

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simulation tools as a contributor to student-to-student interaction as low in the first two tools (37% and 40% agreed), and as overwhelmingly high (94% agreed) in the third tool. This result was expected since the first two tools were individual assignments and the third one was a group effort. On the other hand, this researcher had mixed results on the assessment of student-to-faculty engagement. 76% of the students stated that the Crime Scene Simulation exercise increased their interaction with the instructor, whereas only 44% of those who used the Cold Case and 50% of those who used Bioattack simulations agreed. The differences in results could be attributable to several factors. Was the increased interaction about asking the instructor on how to use the tool or because students had stimulated thoughts that prompted them to ask more questions to the instructor to enhance their understanding of the content? To find out, this researcher had a second but similar question which was formulated as “The tool gave me ideas to interact with the instructor”. As seen from Table 4, the 78%, 71%, and 71% agreement rates indicate that more students found the tools helpful in terms of increased interaction with the instructor than those did not.. The correlation analysis between the learning parameters (discussed above) and the interaction yielded a range of results from Low to Medium in the Crime Scene simulation, and mostly Strong to Medium in both the Cold Case simulation and the Bioattack simulation.

**Table 4:** Comparison of results among each tool on interaction parameters

	Crime Scene		Cold case		Bioattack	
	Agree	Correlation	Agree	Correlation	Agree	Correlation
Student to student engagement	37%	Medium (decision making, understanding, technology) low on all others	40%	Strong (making connections; visualizing and conceptualizing; engaging & approaching faculty); Medium (hands-on, mirroring,	94%	Strong (consensus, effective Crisis communication) Medium (understanding, hands-on, decision making, effective EM response, effective use of resources, interaction with faculty)

				decision making, assumption testing); Low (understanding,)		
Engaging with faculty	76%	Medium	44%	Strong	50%	Strong (decision making, consensus gathering, eff. Crisis comm., approaching faculty) Medium (understanding, hands-on, real-life, eff. EM response, resources, engaging with students)
Approaching faculty	78%	Low - Medium	71%	Strong (hands-on, real-life, making connections, visualizing, engaging), Medium (understanding, decision, assumption testing,)	71%	Strong (understanding, real-life, decision making, consensus gathering, eff. Crisis comm., engaging with faculty, technology) Medium (hands-on, eff. EM response, resources, engaging with students),
Student to student engagement	37%	Medium (decision making, understanding, technology), low on all others	40%	Strong (making connections; visualizing and conceptualizing; engaging & approaching faculty); Medium (hands-on, mirroring, decision making, assumption testing); Low (understanding)	94%	Strong (consensus, eff Crisis comm.) Medium (understanding, hands-on, decision making, eff. EM response, resources, interaction w/faculty), Low (real-life)

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It is important to note that this researcher did not find any meaningful correlation between the actual grades and the responses at the individual classroom level for any of the three exercises.

However, when this researcher correlated the average course grade distributions for each section with the student responses, for the Crime Scene simulation and for the Cold Case file simulation we were able to uncover Medium to Strong correlation between the percentage of “A” grades awarded by the instructors and the percentage of students who agreed that the tools helped their learning. This researcher did not find any correlation between the grade distribution and student satisfaction rating for the Bioattack simulation.

### **Impediments**

This researcher tried to uncover factors that impeded the effective use of the simulation tools as well, thus this researcher asked the students to rate statements such as “Technology worked at all times”, and asked them to provide the amount of time they spent working on the exercise. This researcher also assessed students’ familiarity with the online learning environment although since these were all required courses, this researcher did not uncover any major differences in user familiarity. This researcher observed that majority of the students had no technical problems although there were reported bugs in some cases. Especially there were comments regarding the lack of “saving” feature or not being able to issue an “arrest warrant report” in the Cold Case File simulation unless all of the steps were done correctly. One interesting fact this researcher uncovered from two of the exercises was that there was a negative correlation between the amount of time spent working on the exercise and better learning. This researcher see from Table 5 that there is negative correlation between the time spent and the students’ confirming that the tool gave a hands-on experience and/or real-life experience, and/or helped testing assumptions and making connections.

**Table 5:** Comparison of results among each case on technology and time spent

	Crime Scene		Cold case		Bioattack	
	Agree	Correlation	Agree	Correlation	Agree	Correlation
Technology worked	74%	Medium	56%	Strong (hands-on, real-life), Medium (understanding, decision-making, assumption testing, making connections, engaging/approaching faculty), Low (visualizing, engaging w/students, no. of classes)	89%	Strong (understanding, hands-on, real-life, decision making, effective crisis comm., engaging with students, approaching faculty) Medium (consensus, engaging with faculty, time spent) Low (effective use of EM response, effective use of resources)
Time spent	Average	Medium (approaching faculty), low otherwise	Average	NEGATIVE Medium (negative: hands-on, real-life, assumption testing, making connection), Low (negative: understanding, interaction)	67 % More than 8 hours	NEGATIVE Medium (real-life, technology), Low on others
# of classes taken	61% more than 4	Low negative on all, no correlation with interaction	92% more than 4	Low	89% more than 4	Medium (hands-on) Low on others

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**Demographic effects**

Since the first two exercises were offered in the undergraduate curriculum, the average age of the students were lower than the average age of the graduate students who were assigned the Bioattack tool (See Table 6 below). Interestingly, this researcher uncovered a Strong negative correlation between the time spent and age in the Cold Case Exercise. Also, again interestingly this researcher found Low to Medium negative correlation between the degrees of satisfaction in some of the learning parameters and age in all three exercises. It appears, as the respondent’s age increases, the degree of utility from the simulation exercise decreases.

This researcher did not study the gender issues in this research.

**Table 6: Correlation statistics against age**

	Crime Scene		Cold case		Bioattack	
		correlation		correlation		correlation
<b>Age</b>	49% betwe en 20-30 years, 27% betwe en 30-40 yrs	Medium (negative: mirroring real- life; improve decision making; assumption testing; making connections); Low (negative: understanding, hands-on exp., visualizing); Low (positive: engaging w/students & faculty, no of classes taken)	44% betwe en 20- 30 years, 44% betwe en 30- 40 yrs	Large (time spent), Medium (negative: understandin g, assumption testing, visualizing, interaction), Low (negative: hands-on, decision- making, making connections, engaging w/other students, no. of classes taken)	22% 20-30 yrs, 39% 30-40 yrs, 22% 41-50, 17% 50-60 yrs	Medium (negative: understandi ng), Low (negative: real-life, time spent) Low (decision making, effective crisis comm., engaging with faculty, # of classes)

## **Conclusions and Recommendations**

The results give us strong clues that the simulation tools described above help student comprehension and, provide near real-life and/or hands-on experience. At least in two of the simulation tools this researcher studied, there is a correlation between student satisfaction and grades.

However, the jury is out in terms of enhanced student-to-student and/or student-to-faculty interaction. The findings neither support nor deny that thesis.

None of the tools that this researcher looked at had any major technological impediments. All were well-tested against software bugs and were reportedly bug free. Unsurprisingly, there was a negative correlation between reporting technical hurdles with the software simulation and the utility of the tool.

Another factor that affected the success of the simulation tool use was age. The findings support the thesis that as the age increases, the degree of satisfaction or utility from online scenario simulation exercises diminishes. Age plays an important role in designing the content for the student audience. This issue merits further attention in future studies.

It is important to note that the tools that were subject of this research were rudimentary in nature, short of many state-of-the-art computer gamelike features such as multiplicity of scenarios, actors, and random discoveries. For example, the crime scene simulation had one witness to interview, not multiple witnesses (which is usually the case in real life cases). There were only a few questions to choose from for the witness to answer, and the right question would lead the user to advance to the next step and so on. Ideally a more stimulating learning environment can be created with the use of multiple witnesses and multiple interview question options. Moreover, the tools should allow room for changing/alternating between multiple scenarios. The more sophisticated (game like) features would possibly make the tool closer to real life. That should not mean however that the more money spent means a better tool; each additional dollar spent should contribute to the richness of the tool in terms of enhancing learning. Expanded

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studies may look at a possible link between the dollar amount spent for development and the student success outcome.

In future studies, similar assessments can be made to cover other institutions and other disciplines. It is important to understand the audience demographics, their background and interests as well as their abilities when designing and using online scenario simulation tools. As the world moves fast towards a virtual digital environment, these and similar tools will become more popular. Researchers and educators not just in the emergency management related disciplines but from other practical disciplines should continue to look for ways of using and improving these computerized scenario simulation tools, and sharing their success stories. As the younger generation spends a lot of time on social media (e.g. Twitter, Facebook, Youtube, Flickr ), these tools can be enhanced by integrating social media use into the simulation but with a strong emphasis on the learning aspect.

## **References**

1. Abdul-Hamid, H. & Ko, S. (2010) Incorporating Real World Experience Into the Online Classroom: Effective, Research-Based Approaches. Proceedings of the 16<sup>th</sup> Annual Sloan Consortium International Conference on Online Learning, Orlando, FL.
2. Abdul-Hamid, H. & Lewis, K (2005). Identifying Effective Online Instructional Practices in Undergraduate and Graduate Level Courses. Proceedings of E-Learn Conference, Vancouver, Canada.
3. Agostinho, S., Meek, J., & Herrington, J. (2005). Design methodology for the implementation and evaluation of a scenario-based online learning environment. *Journal of Interactive Learning Research*, 16(3), 229-242. Retrieved from ERIC database.
4. Battersby, D. (2008). Games and simulations in online learning – Edited by David Gibson. *British Journal of Educational Technology*, 39(6), 1136. doi:10.1111/j.1467-8535.2008.00908\_7.x.
5. Bojanova, I. & Pang, L. (2010). Enhancing graduate courses through creative application of cutting edge technologies. *International Journal of Learning*, 17(3), 225-240. Retrieved from <https://thelearner.com/journal/>.

6. Boubstil, O. & Gayol, Y. (2006). *Assessing the effectiveness of online simulation exercise in Homeland Security education*. Powerpoint slides presented for Sloan C-ALN.
7. Charsky, D., Kish, M., Briskin, J., Hathaway, S., Walsh, K., & Barajas, N. (2009). Millennials need training too: Using communication technology to facilitate teamwork. *TechTrends: Linking Research & Practice to Improve Learning*, 53(6), 42-48. doi:10.1007/s11528-009-0342-2.
8. Garrison, D.R. (2007). Online community of inquiry review: Social, cognitive, and teaching presence issues. *Journal of Asynchronous Learning Networks*. pp. 61-72.
9. Hewitt, A., Spencer, S., Mirliss, D., & Twal, R. (2009). Preparing graduate students for virtual world simulations: Exploring the potential of an emerging technology. *Innovate: Journal of Online Education*, 5(6), Retrieved from ERIC database.
10. Jones, G., & Warren, S. (2009). The Time Factor: Leveraging intelligent agents and directed narratives in online learning environments. *Innovate: Journal of Online Education*, 5(2), Retrieved from ERIC database. Lewis, C., & Abdul-Hamid, H (2006). Implementing Effective Online Teaching Practices: Voices of Exemplary Faculty. *Innovative Higher Education* 31, no.2: 83-98.
11. Limson, M., Witzlib, C., & Desharnais, R. (2007). Using web-based simulations to promote inquiry. *Science Scope*, 30(6), 36-42. Retrieved from Education Research Complete database.
12. Monahan, T., McArdele, G., & Bertolotto, M. (2008). Virtual reality for collaborative e-learning. *Computers & Education*, 50(4), 1339-1353. Retrieved from ERIC database.
13. Murphy, K., & Gazi, Y. (2001). Role plays, panel discussions, and simulations: Project-based learning in a web-based course. *Educational Media International*, 38(4), 261-70. Retrieved from ERIC database.
14. Oliver, M., & Carr, D. (2009). Learning in virtual worlds: Using communities of practice to explain how people learn from play. *British Journal of Educational Technology*, 40(3), 444-457. doi:10.1111/j.1467-8535.2009.00948.x.
15. Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon*. MCB University Press, 9(5), October 2001.
16. Renda-Tanali, I.& Abdul-Hamid, H. (2011). An assessment of the benefits of online scenario simulation tools in homeland security and emergency management education, *Journal of Homeland Security and Emergency Management* (8) 2, Article 16. DOI: 10.2202/1547-7355.1917
17. Seabury, B. (2005). An evaluation of on-line, interactive tutorials designed to teach practice concepts. *Journal of Teaching in Social Work*, 25103-115. Retrieved from ERIC.
18. Spinello, E., & Fischbach, R. (2004). Problem-based learning in public health instruction: A pilot study of an online simulation as a problem-based learning approach. *Education for Health: Change in Learning & Practice (Taylor & Francis Ltd)*, 17(3), 365-373. doi:10.1080/13576280400002783.

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19. Tao, Y., Guo, S., & Lu, Y. (2006). The design and the formative evaluation of a web-based course for simulation analysis experiences. *Computers and Education*, 47(4), 414-432. Retrieved from ERIC database.
20. (2009). Learning online with games, simulations, and virtual worlds: Strategies for online instruction (Jossey-Bass Guides to Online Teaching and Learning). *Distance Education Report*, 13(24), 7. Retrieved from Education Research Complete database.



## Appendix: Survey Questions

### Tool 1: Crime Scene Simulation

1. I understand that my participation is entirely voluntary and by clicking on the corresponding button, I agree to collaborate with the researchers and complete the survey. (by clicking on the Decline button, this survey will terminate) Accept/Decline
<b>To what degree do you agree to the following statements in relation to the COLD CASE SIMULATION exercise used in the class?</b>
2. This simulation exercise helped me understand the material better.
3. The simulation gave me a hands-on opportunity to understand the material.
4. It deepened my understanding of the subject as it mirrored real life situations.
5. The simulation helped to improve my decision-making skills.
6. The simulation improved my skills in processing, testing and validating assumptions.
7. The simulation improved my skills about making connections between events and objects.
8. The simulation helped me visualize, conceptualize and comprehend situations related to crime scene investigation.
Strongly Disagree/Disagree/Agree/Strongly Agree/Agree
<b>To what degree do you agree with the following in relation to INTERACTION with faculty and/or students:</b>
9. The simulation helped me engage with other students.
10. The simulation improved my interaction with the instructor.
11. The simulation gave me ideas for questions about the subject matter to approach the instructor.
Strongly Disagree/Disagree/Agree/Strongly Agree/Agree
<b>To what degree do you agree with the following in relation to the USABILITY of the simulation exercise used in the class:</b>
12. Technology functioned well at all times.
Strongly Disagree/Disagree/Agree/Strongly Agree/Agree
<b>To what degree do you agree with the following in relation to the LEVEL of USE of the simulation exercise used in the class:</b>
13. Overall how much time have you spent working on the exercise? 1 hour or less/ 2 to 4 hrs/5-6 hrs/7-8 hrs/8+ hrs
14. The total time allocated in the syllabus for the exercise was: Too short/Adequate/Too long
15. What did you like the MOST about the simulation exercise? Explain.
16. What did you like the LEAST about the simulation exercise? Explain.

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<p>17. What is your UMUC program/specialization?</p> <p>18. What academic area is your highest degree earned in? State the degree.</p> <p>19. How many webtycho classes have you taken to date excluding the online classes you were enrolled in the semester that just ended?</p> <p>20. Before taking CCJS 320 have you taken a course that used any scenario simulation tools like the one used in this class?</p> <p>21. What is your current occupation?</p>
<p>22. Age</p> <p>20-30 yrs/31-40 yrs/41-50 yrs/51-60 yrs/60+ yrs</p>
<p>23. Gender</p> <p>M/F</p>

**Tool 2: Cold Case Simulation**

<p>1. I understand that my participation is entirely voluntary and by clicking on the corresponding button, I agree to collaborate with the researchers and complete the survey. (by clicking on the Decline button, this survey will terminate) Accept/Decline</p>
<p><b>To what degree do you agree to the following statements in relation to the COLD CASE SIMULATION exercise used in the class?</b></p>
<p>2. This simulation exercise helped me understand the material better.</p> <p>3. The simulation gave me a hands-on opportunity to understand the material.</p> <p>4. It deepened my understanding of the subject as it mirrored real life situations.</p> <p>5. The simulation helped to improve my decision-making skills.</p> <p>6. The simulation improved my skills in processing, testing and validating assumptions.</p> <p>7. The simulation improved my skills about making connections between events and objects.</p> <p>8. The simulation helped me visualize, conceptualize and comprehend situations related to homicide investigation.</p> <p>Strongly Disagree/Disagree/Agree/Strongly Agree/Agree</p> <p>To what degree do you agree with the following in relation to INTERACTION with faculty and/or students:</p> <p>9. The simulation helped me engage with other students.</p> <p>10. The simulation improved my interaction with the instructor.</p> <p>11. The simulation gave me ideas for questions about the subject matter to approach the instructor.</p> <p>Strongly Disagree/Disagree/Agree/Strongly Agree/Agree</p>
<p>To what degree do you agree with the following in relation to the USABILITY of the simulation exercise used in the class:</p>
<p>12. Technology functioned well at all times.</p> <p>Strongly Disagree/Disagree/Agree/Strongly Agree/Agree</p>

To what degree do you agree with the following in relation to the LEVEL of USE of the simulation exercise used in the class:
13. Overall how much time have you spent working on the exercise? 1 hour or less/ 2 to 4 hrs/5-6 hrs/7-8 hrs/8+ hrs
14. The total time allocated in the syllabus for the exercise was: Too short/Adequate/Too long
15. What did you like the MOST about the simulation exercise? Explain. 16. What did you like the LEAST about the simulation exercise? Explain. 17. What is your UMUC program/specialization? 18. What academic area is your highest degree earned in? State the degree. 19. How many webtycho classes have you taken to date excluding the online classes you were enrolled in the semester that just ended? 20. Before taking CCJS 420 have you taken a course that used any scenario simulation tools like the one used in this class? 21. What is your current occupation?
22. Age 20-30 yrs/31-40 yrs/41-50 yrs/51-60 yrs/60+ yrs
23. Gender M/F

**Tool 3: Bioattack Simulation**

1. I understand that my participation is entirely voluntary and by clicking on the corresponding button, I agree to collaborate with the researchers and complete the survey. (by clicking on the Decline button, this survey will terminate) Accept/Decline
<b>To what degree do you agree to the following statements in relation to the BIO ATTACK SCENARIO SIMULATION exercise used in the class?</b>
2. This simulation exercise helped me understand the material better. 3. The simulation gave me a hands-on opportunity to understand the material. 4. It deepened my understanding of the subject as it mirrored real life situations. 5. The simulation helped to improve my decision-making skills. <b>6. The simulation improved my knowledge of establishing an effective emergency response structure during bioterrorism attacks.</b> <b>7. The simulation improved my consensus gathering skills.</b> <b>8. The simulation helped me understand what resources are needed during a public health bioterrorism emergency.</b> <b>9. The simulation helped improve my understanding of effective crisis communication.</b> Strongly Disagree/Disagree/Agree/Strongly Agree/Agree

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To what degree do you agree with the following in relation to INTERACTION with faculty and/or students:

10. The simulation helped me engage with other students.  
11. The simulation improved my interaction with the instructor.  
12. The simulation gave me ideas for questions about the subject matter to approach the instructor.  
Strongly Disagree/Disagree/Agree/Strongly Agree/Agree

**To what degree do you agree with the following in relation to the USABILITY of the simulation exercise used in the class:**

12. Technology functioned well at all times.  
Strongly Disagree/Disagree/Agree/Strongly Agree/Agree

To what degree do you agree with the following in relation to the LEVEL of USE of the simulation exercise used in the class:

13. Overall how much time have you spent working on the exercise?  
1 hour or less/ 2 to 4 hrs/5-6 hrs/7-8 hrs/8+ hrs

14. The total time allocated in the syllabus for the exercise was:  
Too short/Adequate/Too long

15. What did you like the MOST about the simulation exercise? Explain.  
16. What did you like the LEAST about the simulation exercise? Explain.  
17. What is your UMUC program/specialization?  
18. What academic area is your highest degree earned in? State the degree.  
19. How many webtycho classes have you taken to date excluding the online classes you were enrolled in the semester that just ended?  
20. Before taking BSBD 641 have you taken a course that used any scenario simulation tools like the one used in this class?  
21. What is your current occupation?

22. Age  
20-30 yrs/31-40 yrs/41-50 yrs/51-60 yrs/60+ yrs

23. Gender  
M/F

## E-learning in Higher Education Institutions Comparing Students Satisfaction at Virtual University of Pakistan and King Khalid University, Kingdom of Saudi Arabia

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**Abstract:** *The Internet and communication technologies has changed the way we lived and study, the access to information and the learning experience has been transformed completely, moreover traditional models of higher education particularly the delivery mechanisms, interaction with teacher and within course material and other resources. For developing countries low literacy rate and poor quality of education is a life-sized hurdle to gear up them to join elite group of developed countries, furthermore providing high quality and transparent education to masses is a huge challenge. Full time availability of experienced highly qualified incredible teachers is very difficult in developing countries. Superior teacher are limited to big cities only, while the vast percentage of population lived in small cities and villages. Getting high quality education from good teachers is not the right of only few, who can afford to enroll in top local institutions or even able to travel foreign countries. So E-learning is considered by the governments of developing countries as a very effective and powerful instrument leading to a possible solution for providing high quality and transparent education to masses. E-Learning has enabled the universities to fully utilize the knowledge and experience of limited number of inspiring teachers. Course material created by these astounding teachers can be used for long period of time and they can provide support and guidance even living in some other city or country by the use of internet and communication technologies. In this research we will try to study E-learning initiatives taken by two universities of different countries. These universities are different in nature i.e. Virtual University of Pakistan (VU) is total E-learning enabled university equipped with state of the art IT infrastructure including four satellite TV channels also having private sector participants providing laboratory and examination center facilities. King Khalid University (KKU), Kingdom of Saudi Arabia is using E-learning technologies in parallel with conventional face to face teaching offering blended courses and monitoring through learning management system. We will try to analyze these higher education institutions' success in providing higher education with reference to student satisfaction. A paper based questioner will be used to collect data from students of each university; collected data will be analyzed by the use of SPSS software package. This statistical software will help us to ascertain conclusions about student's satisfaction at above mentioned universities.*

**Keywords:** E-Learning, Distance Learning, Higher Education institutions, Student Satisfaction

### Introduction

The trend of distance education got some popularity in 1970s when universities started use of broadcast technologies such as radio and television. As this method of distance

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education gained acceptance, universities began to broadcast lecture at multiple times so that participant could watch at their convenience. Since the 1990s, modern information and communication technologies such as internet, word wide web, and satellite television were introduce in distance education which transformed distance learning into E-Learning. E-learning is the most recent evolution of distance learning; a learning situation where instructors and learners are separated by distance, time, or both (Raab, Ellis, & Abdon, 2002). E-learning uses network technologies to create, foster, deliver, and facilitate learning, anytime and anywhere. The benefits of elearning have been discussed in many articles (Bouhnik & Marcus, 2006; Liaw, Huang, & Chen, 2007; Raab et al., 2002; Shotsberger, 2000). Research by Ramsden and Entwistle in Britain in the early 1980s, with a Course Perception Questionnaire established a link between students' perception of satisfaction with their learning environment and their quality of learning (level of engagement and learning outcomes)(Ramsden&Entwistle 1981). It is also recognized that student satisfaction with online learning is a complex and multidimensional construct that includes a wide range of factors (Saadé & Kira 2006).

Higher education institutions are increasingly blending their degree programs with E-learning many are offering 100% E-Degrees programs. There are many reasons for the development of such programs one is to fade the demographics and geographic barriers. E-learning degree programs have actually created new challenge for students who were once bound to local universities or colleges. However, the quality of an e-learning program is the most important aspect so the student's satisfaction with these degree programs is considered highly significant in higher education.

The aim of this research is to compare student satisfaction in two universities King Khalid University Kingdom of Saudi Arabia and The Virtual University of Pakistan. Briefly we will explain about both universities how they are incorporating E-Learning in their degree programs. After brief introduction about working of these universities we will present statistical analysis of student satisfaction of both universities.

## **Virtual University of Pakistan**

The Virtual University, Pakistan's first University, based completely on modern Information and Communication Technologies, was established by the Government as a public sector, non-profit institution with a clear mission: to provide extremely affordable world class education to aspiring students all over the country. Using free-to-air satellite television broadcasts and the Internet, the Virtual University allows students to follow its rigorous programs regardless of their physical locations. It thus aims at alleviating the lack of capacity in the existing universities while simultaneously tackling the acute shortage of qualified professors in the country. By identifying the top Professors of the country, regardless of their institutional affiliations, and requesting them to develop and deliver hand-crafted courses, the Virtual University aims at providing the very best courses to not only its own students but also to students of all other universities in the country. The Virtual University of Pakistan holds a Federal Charter, making its degrees recognized and accepted all over the country as well as overseas (Virtual University of Pakistan, 2012).

The University opened its virtual doors in 2002 and in a short span of time its outreach has reached over sixty cities of the country with more than a hundred associated institutions providing infrastructure support to the students. Pakistani students residing overseas in several other countries of the region are also enrolled in the University's programs.

## **How Virtual University of Pakistan Works**

The Virtual University of Pakistan delivers education through a judicious combination of broadcast television and the Internet. VU courses are hand-crafted in meticulous detail by acknowledged experts in the field. Lectures are then recorded in a professional studio environment and after insertion of slides, movie clips and other material, become ready for broadcast. Course lectures are broadcast over free-to-air television and are also made available in the form of multimedia CDs and DVDs. They can also be made available as

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streaming media from the Virtual University's servers. The multiple formats allows for a high degree of flexibility for students who may view the lectures at a time of their choosing within a 24-hour period. Additionally, students can use the lectures to review an entire course before their examinations – a facility simply not available in the conventional face-to-face environment.

In addition to the prescribed texts, comprehensive reading material / lecture notes in the form of web-enabled content are provided through a comprehensive Learning Management System (LMS) hosted on the VU Web Servers and accessible over the Internet. The full power of hyperlinks is utilized for making the on-line experience a truly powerful one. The LMS also provides an e-mail facility to each and every student as well as discussion boards for interaction within the VU community.

An important feature of the LMS is a Question/Answer board where VU faculty provides answers to questions posed by students on the subject matter covered in the lectures. The Question/Answer board (also known as the Moderated Discussion Board) is extremely fine grained, providing separate sessions for each lecture of each course. In addition, read-only access is made available to previous question/answer sessions and this constitutes an extremely useful study resource for students. VU faculty monitors this board on a continuous basis and answers to student questions are provided within a short space of time. Assignments are handed out through the LMS and also submitted by the students through the same mechanism. Pop-quizzes and practice tests are also conducted through the LMS.

### **Examination System**

VU has developed its own unique examination system using the latest technologies. Under this system, the University's thousands of students individually create their date sheets having first selected a city and center of their convenience. Thus, working professionals may choose evening hours or even Sundays to take their semester exams, while regular full-time students may choose morning sessions on weekdays. Such a

seemingly impossible approach is made possible by the fact that each and every one of the students gets a unique computer generated question paper to solve. No two papers are alike. The question papers are generated from a Question Bank that has been populated for this purpose by experienced instructors and is continuously refreshed with new questions added on a daily basis. Using this revolutionary system, Midterm and Final term Examinations for every semester are conducted in a formal proctored environment at exam centers carefully designated for the purpose throughout the country while also maintaining an eye on student convenience. To ensure the sanctity of the examination process, invigilators are appointed by the university's examination department. The formal examination atmosphere ensures critical quality assurance of the student assessment system. Other than contributing to the high quality of VU education, the most satisfying feature of the VU examination system is the convenience that it provides to full-time students and working professionals alike.

### **King Khalid University**

The merger of Imam Mohammad Ibn Saud Islamic University and King Saud University in the Southern Region of Saudi Arabia into one entity under the new identity of 'King Khalid University' in the year 1998. King Khalid University strives for a leading role with regional roots, international dimensions, knowledge and research excellence and effective community contribution through qualitative competence. King Khalid University commits to providing relevant academic environments for high-quality education, conducting innovative scientific research, providing constructive community services, and maximizing the employment of knowledge techniques (King Khalid University, 2012).

King Khalid University has a separate deanship for promoting and implementing E-learning. The e-Learning Deanship in King Khalid University works to contribute effectively to enable the University members to achieve their changing needs using the tools, practices and environment provided by the e-learning system. Enabling

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the University of improving the efficiency and effectiveness of education to achieve satisfaction of its members, involving e-learning in all educational activities of the University.

### **Levels of e-Learning in the University**

Three levels of E-Learning are available at the University level one is Supportive e-Learning: Students attend classes in conventional face to face mode but they make use of the e-learning systems, tools and environment to support and facilitate the learning process. This type of e-learning is compulsory for all courses of the university. The level 2 is blended e-Learning: A certain percentage of face-to-face classroom attendance is replaced by e-learning activities on the web site of the course; making use of LMS system, tools and E-learning environment. Third level is Full e-Learning: Face-to-face classroom attendance is replaced by e-learning activities on the web site of the course; making use of LMS system, tools and e-learning environment. This does not include the final exam; and whatever the instructor or the college decides about face-to-face classroom attendance. Blended and full e-learning types are instructors' choice. If instructors are interested in teaching online blended or full e-learning courses they can apply for it with to approval of head of department and dean.

### **LMS Explanation**

Black Board is being used as Learning Management System. It can be accessed from anywhere and at any time. It is the basic system to facilitate E-learning. It is being used to upload courses and manage users and contents. As a part of LMS University is using *Illuminate Live* application which allows instructors to conduct live lectures, regardless of the place without any failure of the advantages of face-to-face lectures or meetings to save time and resources. It enhances the interaction between instructors and students and between students themselves through different means of participation and interaction like clear bidirectional voice, instant messages, live video, dashboards, multimedia files

and other applications – all within a graphical interface. Another application Tegrity facility is also available this application enables instructors to record their audio and video lectures. It allows the instructor to record the lecture and make it available to students via e-learning system (Blackboard), so that they can attend at any time and from anywhere. Students can refer to the lecture at any time and as many times they want develop their understanding.

### **Data Collection**

A paper based questioner in English language was use for collection of data from both countries, but for Saudi Arabia on the very paper we have to provide Arabic language translation along with English. Though medium of instructions in King Khalid University is English but students are not good at English. Even after providing questionnaire in Arabic many students just take it as formality and selected one answer for all questions “Not Satisfied” or “Neither Satisfied nor Dissatisfied” or “Very Satisfied”. This behavior stated that they do not understand the question or they do not take it seriously, we discarded such questioners which are filled like this. We collected data from about 65 students but more than 50% of the questionnaires were discarded. On the other hand from Virtual University of Pakistan students were considerate and not a single questionnaire was found like this no of the questionnaire was discarded.

### **Statistical Analysis**

The instrument included questions about demographics (5variables), perceptions, educational technologies, user, issues, satisfaction and prospects (12 variables) on 10-point scale representing Very Satisfied =10, Satisfied = 8, Neither Satisfied or Dissatisfied = 6, Dissatisfied =4, Very Dissatisfied =2. The data collection instrument was analyzed by three specialist initially we made about 25 question including demographic and students satisfaction but with detail discussion we included 17 question 5 as demographic and 12 are directly about student satisfaction. Primary data from

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questionnaire was keyed into SPSS 18.0 to create a database. As a first step we run Cronbach's alpha to test internal consistency/ reliability on 12 variables of questionnaire and got the value 0.0908 which suggesting that the items have relatively high internal consistency. Therefore, the satisfaction properties of the scale were found acceptable and can be used to student's satisfaction toward E-learning. Data was analyzed into descriptive tables. Furthermore, independent sample T-Test was performed on the collected data of the both universities.

**Results**

The problem of the study was “Is there a statistically significant difference between KKU and VU student satisfaction?” We mentioned earlier that we have collected data from 65 students of KKU and 30 students of VU; more than half of the questionnaire was filled without care by KKU students so we discarded. We included 30 correctly filled questionnaires from each university so taking 60 students as sample size. Table 1 provides the information about frequencies in collected data.

**Table 1:** Sample size and frequencies

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid KKU	30	50.0	50.0	50.0
VU	30	50.0	50.0	100.0
Total	60	100.0	100.0	

Table 2 provides information regarding gender 23 participants were male and 37 were female from both universities.

**Table 2:** Gender information

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Male	23	38.3	38.3	38.3
Female	37	61.7	61.7	100.0
Total	60	100.0	100.0	

Table 3 provides information regarding age groups of sample, group one consist on age between 18-22 in dominating in sample 36 students belongs to this group.

**Table 3:** Age frequency distribution

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 18-22	36	60.0	60.0	60.0
23-27	14	23.3	23.3	83.3
28-32	8	13.3	13.3	96.7
33+	2	3.3	3.3	100.0
Total	60	100.0	100.0	

Table 4 represents the result of independent sample t-test for both universities in APA format. The independent sample t test reveal that there is statistically significance difference between the mean number of satisfaction at KKU (M =74.933, s = 19.622) and that VU has (M = 98.993, s = 12.766),  $t(58) = 5.614, p = 0.000, \alpha = 0.05$ .

**Table 4:** Independent Sample T-Test

	Groups	N	$\bar{X}$	SS	t	Sd	p
<b>Satisfaction Score</b>	KKU	30	74.933	19.622	-5.614	58	0.000
	VU	30	98.933	12.776			

## Discussion

Results are pretty self-explanatory that the student satisfaction at VU is much higher than the KKU. Especially in the questions about quality of facility, course content and course outline which make the mean score to 98.933 out of 120 with standard deviation of 12.66 while KKU's mean score is 74.933 with standard deviation 19.622. We learnt the reason by looking at the university faculty profiles that VU is bringing the best teachers available in the country having teaching experience at world's top universities ,

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some are permanent faculty at foreign universities like Oxford. Course content is carefully decided by specialist of the field with the participation of industry peoples. Students get access to the course outline and content on day one when they start the course, so no confusion about course material.

On the other hand KKU satisfaction level is low, because KKU is using E-Learning in parallel with conventional face to face learning so students do not give it value some time take it as burden. Determination and commitment is very necessary for E-Learning environment. Some previous research explains our point of view. Considering the responses of students who participated in e-learning courses, it is possible to better understand the reasons why students are often dissatisfied with the e-learning experience. Bouhnik and Marcus (2006) stated that students' e-learning dissatisfaction was based on the following disadvantages:

- Lack of a firm framework to encourage students to learn.
- A high level of self-discipline or self-direction is required.
- Absence of a learning atmosphere in e-learning systems.

As the face to face learning is also available in KKU so students prefer to take full face to face courses, one other interesting thing found in many of KKU colleges that internet is not available for students. Students can only use LMS at home but for online exams E-Learning deanship ensures temporary availability of internet at college.

### **Conclusion**

Student learning differs since both their habits and the thinking process differs depending on what the student is trying to learn. If the student's learning process is different and can vary from student to student then student satisfaction can also vary from individual to individual. In our research statistically we conclude that Virtual University of Pakistan students are much satisfied than King Khalid University Kingdom of Saudi Arabia. On the basis of our research we can suggest a few things to both universities. KKU needs to improve many things, first thing first internet availability at its campuses, without internet thinking about E-Learning is a daydream. Though the

medium of instruction at KKU is English but the students English language skill is very poor, they need to work on their English departments also. Course outline provided to teachers are written in Arabic but the medium of instruction is English why can't understand? For full E-Learning level or blended level teacher's work is increased, because student's response toward E-Learning is not good they complain we do not understand then at the end teacher also arrange face to face classes. KKU E-learning deanship must select their good teachers for preparation of full E-learning course materials including video lectures. For online course preparation KKU can learn from VU's experience. VU is going fine but need some slight changes, VU students are less capable in practical skills but very good in theory, so VU should focus on practical training. VU lectures are recorded in English and Urdu in mix form means teacher uses both languages during lecture delivery. We suggest that that VU should use the 100% English language in its video lectures; this will increase student's language skill and also attract international students.

## **References**

1. Raab, R. T., Ellis, W. W., & Abdon, B. R. (2002). Multisectoral partnerships in e-learning A potential force for improved human capital development in the Asia Pacific. *Internet and Higher Education*, 4, 217–229.
2. Bouhnik, D., & Marcus, T. (2006). Interaction in distance-learning courses. *Journal of the American Society Information Science and Technology*, 57(3), 299–305.
3. Ramsden P. & Entwistle N.J. (1981) Effects of academic departments on students' approaches to studying. *British Journal of Educational Psychology* 51, 368–383.
4. Saadé R.G. & Kira D. (2006) The emotional state of technology acceptance. *The Journal of Issues in Informing Science and Information Technology* 3, 529–539.
5. Virtual University of Pakistan (2012). ABOUT VIRTUAL UNIVERSITY. [ONLINE] Available at: <http://www.vu.edu.pk/>. [Last Accessed 20 October 2012].
6. King Khalid University (2012). *Deanship of E-Learning*. [ONLINE] Available at: <http://www.kku.edu.sa/>. [Last Accessed 20 October 2012].

## **A Multiplatform M-Learning System For More Qualified Courses**

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***Abstract:** Thanks to a recent British Council<sup>2</sup> initiative Anadolu University, Okan University two universities in Turkey and a commercial trainer in Turkey are collaborating with one university, University of Wolverhampton in the United Kingdom on an exciting and innovative project. The use of mobile devices in formal education is still an emergent field and one where the socio-technical context is changing rapidly and is evolving differently in different countries and cultures. The focus for this project is the development, deployment and evaluation of a mobile app to support undergraduate/graduate programmes, initially aspects of marketing. The combination of the three universities creates a target student population covering both distance students, that is Open and Distance Learning (ODL), open and distance learning, and 'formal', that is face-to-face, students. The funding is to support capacity-building and knowledge-sharing, and teams from the partner institutions have worked together on surveying the digital 'habits', that is access, expectations and experiences of mobile digital technologies, of their very different staff and student populations. This paper describes work-in-progress and reports on the significance and context of the project, and on its early findings.*

**Keywords:** Collaboration, University, M-Learning, Mobile Application, Open and Distance Learning

### **Introduction**

The Information society is a society in which individuals can obtain, process, interpret and create information. Such information is also available ubiquitously and can be accessed systematically from any location. A society that functions within a system of free and open information should lead to major social transformation (s). Education has an important role in this process.

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In the 21st century, higher education has been reconstructed by an increased need for education, a changing of the nature of information, rapid developments in information and communication technologies and by a differentiation of expectations and demographic characteristics of learners (Kukulska-Hulme & Traxler, 2007). “The new perspective viewing education as a key to remaining competitive in the national and international enterprises lead to an inquiry for new, effective and efficient methods in education” (Demiray & Sever, 2009).

According to ITU (International Telecommunications Union) there are over 6 billion mobile phone subscriptions worldwide and over 70% of these subscriptions come from the developing countries (2011). This level of usage and devices within people’s possession means that there are clear opportunities for mobile education which leads to a growing need for development and awareness-raising to inform the debate about how children are using mobile phones (GSMA, 2012)

The huge expansion of smartphones also triggers this condition. In Europe smartphones, which are forecast to grow at 33% per year, and more recently tablets, which are forecast to grow at 57% per year, are further driving an explosion in mobile data traffic according to GSMA (2011). Africa as a developing continent on the other hand is currently the fastest growing and second largest market for mobile phones (GSMA and Kearney, 2011). As a result of all this growing inquiry, mobile learning has been considered as an important educational innovation opportunity incorporating different collaborative approaches.

The UK-Turkey Higher Education Grant Programme is an opportunity to address some of these issues from a transnational standpoint The Grant Programme is specifically targeted to build on existing good practice by deepening and broadening industry co-operation with Higher Education and research through bilateral collaboration between Turkish and British institutions (British Council, 2011).

In this respect Turkish universities have been steadily building mobile learning capacity and Turkey affords a rich variety of commercial and research challenges and

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possibilities along with the research and academic resources to explore them. Three universities; Wolverhampton from the UK and Anadolu University & Okan University from Turkey have built this collaboration in the subject area of ICT (mobile learning). This paper explains this collaboration around the development of courses for academic and business life.

Our project aim is to create a multi-platform system for mobile devices with touch screen (such as iPad, iPhone, HTC, Samsung), as the touch screen devices have a higher usability rate than smart phones and mobile phones (Nielsen, 2009; Ondin and Akgun, 2011). After creating the system, it will be tested through a pilot scheme in the UK and Turkey, and data acquired from higher institutions in Turkey and the UK will be compared. Prior to this we developed a digital habits survey for learners and academic staff in order to inform the platform's development. In parallel with getting results, the system will be able to adapt all courses in higher education and continuing education according to the needs of target groups. We have located the development in the subject area of mobile business marketing and will re-imagine the pedagogy and practice in this area.

### **Mobile Learning**

A generally accepted definition for mobile learning is (Sharples et al.) "Any sort of [technology enhanced] learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the opportunities offered by mobile technologies" (Adapted from O'Malley et al., 2003). This indicates the dual nature of learning assisted by mobile devices, which could be in a fixed location such as a classroom or workplace, or across contexts supported by a variety of fixed and mobile technology. For the former, the focus is on enabling learning with handheld technology. For the latter, the emphasis is on the mobility of the learner in a technology-rich environment.

Mobile learning is a new learning method that is capable of focusing on the

development of user performance. According to this approach, mobile learning provides the ability to create knowledge through the subjects with a reliable link and portable digital tools. In addition, interaction with other data, provides students with the connectivity and access to just in time information that allows them to be more productive (Wexler, Brown, Metcalf, Rogers, & Wagner, 2008). Mobile Performance Support Systems have also been developed to improve the performance of the user in private companies, the military and educational institutions. Users can solve the problems they encounter in a task, and seek out further guidance in suite on how best to approach a particular difficulty.

In short, mobile learning is an educational format that provides accessibility for educational and other types of content without being connected to a particular physical location. This also benefits from dynamically generated services and allows the user to communicate with others, and increases the productivity of the individual and business performance.

### **Global Overview**

The global mobile learning research community is about ten years old. In this time, the community has persuasively demonstrated that mobile devices can deliver learning to people, communities and countries where other educational interventions have been too expensive, difficult or demanding. The community has also demonstrated that mobile devices can extend, enhance, enrich, challenge and disrupt existing ideas and assumptions about learning. The community has also challenged existing conceptualizations and theories of learning itself and has shown that mobiles can raise motivation for learning amongst disenfranchised and disengaged learners. Much of this work has taken place within the university sector, often with those universities specializing in ODL (open and distance learning), but perhaps across only a range of countries. In this respect Turkish universities have been steadily building mobile learning capacity and Turkey affords a rich variety of commercial and research

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challenges and possibilities along with the research and academic resources to explore them.

The global community now seems to be at a tipping point, when the challenges of scale, sustainability, equity, blending and embedding might be finally addressed and the current project will add to our evidence especially into the formats and approaches that might be sustainable across several different domains. The community has hitherto worked largely within institutional contexts. The global community has also however worked mainly in small-scale, fixed-term subsidized projects staffed by enthusiasts, growing out of the conceptions, foundations, aspirations and limitations of e-learning. The current project is working at the edge of these domains hopefully informing the community about more varied contexts.

These developments of mobile learning initially took place when technology was scarce, difficult and expensive; now technology is ubiquitous, cheap and reliable. Everyone now has mobile technology, they own it, choose it, understand it; but undoubtedly, because of predominantly social use may now have (limited) opinions and ideas about its educational value and its education use, and about its place within the economy of knowledge. This is the wider context for the current project.

The project also takes place as we see a growing shift in the global balance and focus within the mobile learning community itself as US practitioners, developers, researchers, funders and corporations make their interests, their perceptions and their perspectives felt within the established community. These might take mobile learning away from its European roots in highly theorized ideas about informal and contextual learning towards mobile training, downloadable apps and the connected classroom. The Turkish university partners have links into both the UK and the US mobile learning communities and this interesting dynamic (or tension).

According to comScore whitepaper E-commerce and M-Commerce are on the rise despite the backdrop of continued economic uncertainty. There is also a rise of Smartphones especially in EU5 countries with 42% penetration. In the UK there are 26

million smartphone users by 2012 (comScore, 2012).

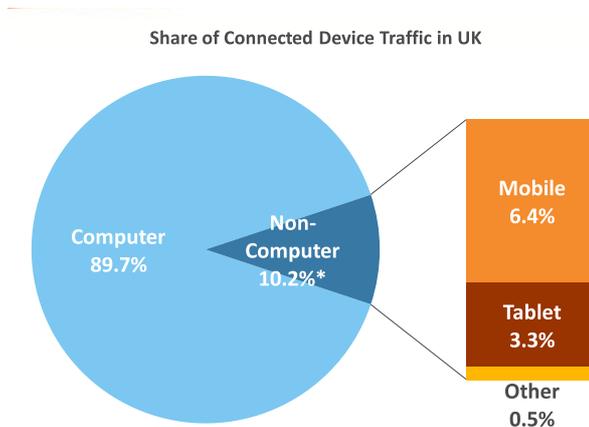


Figure 1: Share of Connected Device Traffic in UK

Source: comScore Device Essentials, UK, January 2012. Not sure how this fits

## **E-Learning & Mobile Learning in Turkey**

There was a 1225% growth rate between 2000-2009 of internet users and considering the very high rate usage of applications there would be more Internet users who use the mobile applications in Turkey (Yıldırım, 2011). This also brings a lot of opportunities within the educational arena. The 'Fatih Project', for example which offers tablets to all primary & high school students and smart boards for schools, is an impressive attempt to leverage participation and skills in ICT for Turkish citizens. This also brings an opportunity to have the first types of mass mobile learning applications that differs from classical education systems, although this will require changes within the educational approach in formal situations. Mass education is not personalised so there will be tensions between the two approaches. On the other hand the global trends push through mobile learning because of the unique benefits of mobile learning such as facilitation of any time anywhere that composes social personalized learning and it is also cost efficient.

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According to the “Turkey: Vision 2023” report, educational systems should be flexible, unlimited by space and time, enhance creativeness and imagination, and support personal improvement by valuing individual differences (The Scientific and Technological Research Council of Turkey, 2004). This statement of the report runs in parallel with the nature of mobile learning since mobile technologies allow individuals to learn, access resources, and capture, store and manage everyday events anytime and anywhere (Sharples, Corlett & Westmancott, 2002).

The first works related with mobile learning encouraged by the mobile operators and also some technology firms such as Ester (Erdem, 2011), which started to do mobile applications for students affairs to the universities.

Turkey has a great experience with Anadolu University’s Open Education Faculty Programs on this distance-learning alternative and Anadolu University became one of the mega universities of the world. In recent days, Anadolu University has been working intensively on several mobile and online learning projects such as digital books, free educational podcasts, and mobile education applications, etc. For example, Mobile Academic Research Support (MARS) produced by Anadolu University is the first comprehensive mobile training application in Turkey. On the other hand foundation universities such as Okan University are able to act quickly to easily implement innovative approaches to education because of their innovative vision and ability to work closely in tandem with the aims of several industrial sectors. There are several trials of mobile learning from Okan University distance education center to understand and create some successful m-learning materials. These studies have been carried out since 2009.

### **Introduction and Context to the Project**

The goal of this project partnership is to share good practice in flexible, adaptable high-quality research and industry-informed mobile learning through collective technologies, experiences, networks, events, courses and publications, and support graduate and post-

graduate academic research exchange, work-related training & development and internships between our partners. The shared education and skills systems can create opportunities for people throughout their lives in different forms.

Okan University and Anadolu University collaborate with the University of Wolverhampton in order to improve their mobile learning vision, to develop advanced mobile learning applications, and follow the latest developments in education and technology innovations for increasing the delivery of accredited ('qualified') courses in higher education in Turkey and Britain. In this way, multi-platform mobile learning systems, including Android and iOS versions (for tablets and smartphones and portable media players) will be built and tested in the higher education institution project partners with support and technical assistance from Enocta.

Enocta currently supplies e-learning and m-learning products to 236 corporate companies and universities in Turkey. This number includes 14 of the 17 banks, all national telecom companies, and 90% of all insurance and pharmaceutical companies. With this experience, Enocta is capable of providing the necessary industrial support to this project. Three or more corporate customers of Enocta will participate in the test and evaluation phases. These customers can be selected from different sectors, such as telco, banking-finance and retail. Enocta is currently located in the Middle East Technical University's Technopolis campus, which is a renowned location for efficient well-organised university & industry cooperation projects. Enocta is a link between universities and the business sector.

Founded in 1999, Okan University is a dynamic University with over 7,000 students at present. It offers 52 undergraduate, 26 graduate and 3 PhD programmes, within 5 Faculties, 2 Graduate Institutes and Schools of Applied Sciences and Health Sciences. Okan University also has a Vocational School that offers two-year, associate degree programmes in various professional fields. It has emphasized university-business cooperation since its establishment. Working together with various business sectors, the university has developed curricula and internship programmes for its students to enhance

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their employability skills. True to its motto, “The University Closest to the Business World”, Okan University effectively combines theory and practice to best prepare students for professional life.

Anadolu University is a pioneering ODL university in Turkey, which is also one of the mega universities in the world. The university has around 1,500,000 registered students nationwide and also in many countries in Western Europe. Internationalisation is at the top of the agenda of the university; there are 700 agreements within 400 universities in the world, mainly in Europe. Anadolu University is the first institution in Turkey to provide higher education by the modern distance education model, the Anadolu University Distance Education System. The university, with its distance education model, offers educational opportunities to Turkish citizens living not only in Turkey but also in the Turkish Republic of Northern Cyprus and Western European countries. The University aims to increase the education level of Turkish citizens by meeting the demand for higher education.

The project aim is to create a multi-platform system for mobile devices with touch screen (such as iPad, iPhone, HTC, Samsung), as the touch screen devices have a higher usability rate than smart phones and mobile phones (Nielsen, 2009; Ondin and Akgun, 2011). After creating the system, it will be tested through a pilot scheme in the UK and Turkey, and data acquired from higher institutions in Turkey and the UK will be compared. In parallel with getting results, the system will be able to adapt all courses in higher education and continuing education according to the needs of target groups.

The partners will also collaborate with industry with Enocta's assistance. Employees will be able to benefit from work-related training. They will get a certificate when they finish all modules of the marketing course after dissemination of the system. Thus, they will provide professional improvement in the context of lifelong learning.

We will develop an infrastructure for mobile learning, to establish a new foundation in learning and continuing education. As a first step, a marketing course has been chosen for this project because technology and marketing are linked (Hansen,

2008), as are technology and marketing education (Paladino, 2008), and the partners each has competences in marketing. Mobile marketing will become an extremely important position for the Turkish market hence the resonance between the topic and the teaching. By the end of 2008 there were more than 10 different sectors starting to use mobile marketing and mobile campaigns. They reached 17 million unique users from these campaigns in Turkey. Consumers of all brands would like to use this type of marketing media for their communication strategies. If the mobile marketing applications are used at appropriate times with an appropriate attitude without disturbing the consumer this would be a great opportunity by marketers. Businesses will determine the most appropriate mobile applications based on the demographic markets they are targeting. New marketing strategies are established by developing information and communication technologies. In this system, the course will contain the new marketing strategies (including social media and last technologies in ICT). Thus, this system will be able to be used by industry workers for training. As a result, both students and workers will benefit from the mobile course on marketing. These assumptions will however be tested by surveys exploring the digital habits of the various target groups. Overall, the expected impacts of the multi-platform mobile learning system on marketing education are: promoting intercultural understanding; paving the way for increasing the delivery of accredited mobile learning courses; and disseminating mobile learning courses in service training.

In terms of research methodology, a mix of quantitative and qualitative data will be used to create an understanding of both measured impact and process. The project will deploy one module across three different student constituencies, namely distance learning students on a formal course, campus-based students on a formal course and informal learning interested in on-going professional development. The module will stay constant in order to compare its effectiveness with these three groups. Preliminary survey work will look at their respective demographics and digital habits in order to explore the different relationships between their access, ownership, competence and

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familiarity with mobile digital technology and their engagement and success with the module of 'Marketing Management' Course. It is of course wholly possible that the variations in these within each group will be greater than the variations between the groups and this would lead to a conclusion that one module could support different types of students but must nevertheless possibly address wide variations in habits, needs, expectations and preferences. The other possibility is that the three groups are distinct and different, and that they can most effectively be targeted by specific modules customised to their specific habits, habits, needs, expectations and preferences. Either way, the research will be a valuable insight into mobile materials and course development.

## **Conclusion**

Mobile learning is an important educational innovation opportunity. The use of mobile devices in formal education is still an emergent field and one where the socio-technical context is changing rapidly and is evolving differently in different countries and cultures. Anadolu University and Okan University from Turkey, and University of Wolverhampton from UK has collaborated for exploring the effects of mobile learning to improve quality of higher education by establishing a new foundation in learning and continuing education. Therefore, the three universities began an exciting and innovative mobile learning project named as "A Multi-Platform Mobile Learning System for More Qualified Courses in the ICT Era" thanks to a recent British Council initiative. The aim of this project is to create a multi-platform system for mobile devices with touch screen (such as iPad, HTC, Samsung). The focus for the project is to design, development, deployment and evaluation of a mobile application. Marketing course has been chosen for this project because new marketing strategies are established by developing information and communication technologies and mobile marketing would become an extremely important position for the Turkish market. Thus, the mobile learning course will contain the new marketing strategies (including social media and last technologies

in ICT). As a result, both students and workers will benefit from the mobile course on marketing as well as this system will be able to be used by industry workers for training. The funding is to support capacity-building and knowledge-sharing, and teams from the partner institutions have worked together on surveying the digital 'habits', that is access, expectations and experiences of mobile digital technologies, of their very different staff and student populations.

## References

1. British Council. (2011). Retrieved <http://ihe.britishcouncil.org/sites/default/files/UK-Turkey%20HE%20partnerships%20call%20for%20proposals%20revised.pdf>. December 20, 2011.
2. comScore. (2012). European\_Digital\_Trends-Shifting\_Consumption\_Habits. Whitepaper, comScore.
3. Demiray, U. & Sever N. (2009). The Challenges For Marketing Distance Education In Online Environment: An Integrated Approach, Demiray, U and N. Serdar Sever, (2009). Anadolu University Publications No: 1904/72, Print ISBN 978-975-06-0596-3, Electronic ISBN 978-975-98590-6-0, Anadolu University, pp.762, Eskisehir-Turkey.
4. Erdem, N. S. (2011). Mobil Yaşam, Mobil Öğren. G. Telli Yamamoto (Ed), Mobil Yaşam ve Uygulamaları (pp. 92-95). İstanbul, Turkey.
5. GSMA. (2012, 09 02). <http://www.gsma.com/publicpolicy/myouth/>. Retrieved 09 02, 2012 from <http://www.gsma.com/publicpolicy/myouth/>
6. Hansen, D.E. (2008). Knowledge Transfer In Online Learning Environments. Journal of Marketing Education, 30(2), 93-105.
7. Kukulka-Hulme, A (2007). Mobile Usability in Educational Contexts: What have We Learnt?, The International Review of Research in Open and Distance Learning, 8 (2).
8. Kukulka- Hulme, A. & Traxler, J. (Ed.)(2005). Mobile Learning: A Handbook For Educators and Trainers. London: Routledge.
9. Nielsen, J. (2011). Mobile Usability Update retrieved 09 26, 2012 from <http://www.useit.com/alertbox/mobile-usability.html> .
10. Ondin, Z. & Akgun, T. (2011). Kullanılabilirlik ve Mobil Öğrenme. Mobil Yaşam ve Uygulamaları, (Gonca Telli Yamamoto Ed.) İstanbul, ISBN: 978-605-62095-2-9 .
11. Paladino, A. (2008). Creating An Interactive And Responsive Teaching Environment to Inspire Learning. Journal of Marketing Education, 30(3), 185-188.

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Future-Learning 2012, Nov. 14-16, İstanbul**

12. Sharples et al. (no date). retrieved 1 18, 2012 from [http://thesaurus.telearn.org/Mobile\\_learning](http://thesaurus.telearn.org/Mobile_learning).
13. Wexler, S., Brown, J., Metcalf, D., Rogers, D., & Wagner, E. (2008). The e-Learning Guild Report Mobile Learning. retrieved 1 12, 2009 from <http://www.elearningguild.com/research/archives/index.cfm?id=132&action=viewonly>



## A Colleger's Best Friend: Mobile Phone or PC?

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***Abstract:** The aim of this study is to investigate the university students' transition process from computer usage to mobile phone usage in different domains. In order to collect the data to perform the required analyses, a quantitative survey is applied to 172 college students in five different Turkish universities in 2011 fall term. The data are examined using Pearson's product-moment correlation analysis. In order to evaluate the results, correlation coefficient, means and standard deviations are used. According to the results, a statistical significant relation is found between mobile phones and PCs in the domains of social media usage, Internet usage, and e-mail usage. However, significant relation couldn't be found between mobile phones and PCs in gaming domain.*

**Keywords:** mobile phone usage; computer usage; social media; Pearson's product-moment correlation analysis

### Introduction

Human being is in a continuous change process since it came into the world. Each process has its own characteristics and prominent features. Nowadays these change process is happening even more rapidly. Moreover, advances in the science and technology have introduced new concepts and usages to our daily lives. One of these usages is Internet. Internet, which is of these new usages and which is started to be used widespread since 2000s, also started to change the communication perception of users.

Other advances in the technology also brought mobile phones to our lives and the mobility concept became more and more important. Mobility is defined as the interaction and communication performed without any geographical limitations. Mobile phones are one of the most important tools that satisfy mobility property and at the same time it provides users to be reached anytime and anywhere (Kristoffersen & Ljungberg, 1999). Mobile phones are currently very important for end users since their usage have been increasing dramatically.

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Mobile device sales to end users in the world totaled 1.6 billion in 2010 with a 31.8 % increase from 2009. On the other hand, smart phone sales increased up to 72.1% from 2009 (Gartner Inc., 2012). Mobile phones are intensely used for phone calls and SMS messages. Moreover, it is used to perform e-mail operations, Internet surf, by most people. Computers start to give place to mobile phones in many areas since they provide several features such as Internet access, GPS (Global Positioning System), e-mail tools, music operations, etc. Especially college students use their mobile phones for daily routines, for social media tools, for Internet access.

According to (Lenhart et. al., 2010), 75% of teenagers, 58% of 12 year olds, and 93% of adults aged from 18 to 29 own a cell phone. In the last five years, it is seen that mobile phone usage increased dramatically even among young people. In 2010, 58 % of 12 year olds owned a cell phone whereas in 2004 the ratio was 18 %. In terms of Internet usages, it is seen that 93 % of 12-17 year old teenagers and again 93 % of adults use Internet technology. In terms of social media usages, 73 % of adults have a Facebook account, 48 % of adults have a MySpace account and 14 % of adults have a LinkedIn account.

In Turkey, the Internet usage between ages 16 and 74 was 13.3% in 2004, and has reached to 37.6% as of 2010 (T.R. Prime Ministry SPO, 2011). It is seen that the time spent by Internet users on social networking sites and the number of users joining social network sites increase day by day. 92,5% of the users have a Facebook account in Turkey and the time spent on social networks per user is 9.3 hours in a month. Turkey is in the fourth place in the world with this statistics. The average time spent worldwide on social networks is 5.4 hours (comScore Inc., 2011).

All of these statistics either in the world or in Turkey show that the Internet, mobile phone, and social media usages increase exponentially. Smart phones in the last years have gained the ability to perform most of the things that can be performed by computers in the daily life with the advances in the technologies such as improved processing power, Internet connection, 3G and GPS, etc. In addition, users can use their

mobile phones instead of PCs for daily routines. In this study, college students' transition process from computer usage to mobile phone usage in different domains is investigated. The research also tries to determine if the college students use their mobile phones in daily routines instead of their PCs.

With these aims, our study tries to answer following research questions:

- Do university students use their mobile phones for their daily routines instead of their PCs? If yes, in which domains?
- Is there a statistically significant relation in terms of usage duration between mobile phone and PCs in different usage domains?

The remainder of this paper is organized as follows. In Section 2, the methodology of the research is described. In Section 3, the findings of the Pearson's product-moment correlation analyses are given. In Section 4, the findings of the study are discussed. Finally we present our conclusion in section 5.

## **Method**

### **Research Method**

In this study, the data collected from college students are analyzed using one of the quantitative research methodologies, Pearson's product-moment correlation analysis. Pearson's product-moment correlation analysis measures the correlation between two variables. It provides the result of the correlation strength and direction of the relationship. If the change in one variable affects other one in the same or reverse direction, it can be said that two variables are correlated. In order to perform Pearson's product-moment correlation analysis, SPSS 16.0 (Statistical Package for Social Sciences) (IBM SPSS, 2012) software is used.

Moreover, Pearson's product-moment correlation analysis' results are interpreted and discussed together with the means and standard deviations of the variables.

## **Participants**

The target population of this research is the college students in Turkey. 172 college students who are currently studying in Isik University, Anadolu University, Marmara University, Bogazici University, Istanbul Aydin University participated to the study. 56% (96 people) of the students are male whereas 44% (76 people) of the students are female.

## **Data Gathering**

In order to collect the required data from the user, a questionnaire is applied which consists from two different parts. In the first part of the questionnaire, the demographic characteristics of the users are gathered whereas the quantitative data on mobile and computer usage are collected in the second part. Questionnaires are performed face-to-face conversation in order to minimize falsified answers. After gathering the required data, they are inputted to SPSS software and saved.

## **Validity and Reliability Study**

In order to carry out the validity of the questionnaire, first the questionnaire is discussed by four people. After the preparation of the survey questionnaire, it is again debated to prevent false analyses. Finally, an expert's opinion is gathered and final version of the questionnaire is prepared.

In order to test the reliability, Cronbach's alpha coefficient (Cronbach, 1951 and Bland et. al., 1997) is used. The reliability analysis is performed on the data with SPSS 16 software. According to the results, Cronbach's alpha coefficient is found as .700 which means that the data are satisfactorily reliable to be analyzed (Bland et. al., 1997).

## **Findings**

In this section, the results of the Pearson's product-moment correlation analysis are given

in four different subsections; social media usage, e-mail usage, Internet usage, and gaming usage.

### **Social Media Usage Findings**

In the very first analysis, users' social media usage durations via mobile and PC are analyzed. The results of the Pearson's product-moment correlation analysis and other statistical data are given in Table 1.

As it can be seen from the table, the mean and standard deviation of the social media usage from mobile phones is 3,17 hours and 4,47 hours respectively. The mean and standard deviation of the social media usage from mobile phones is 3,11 hours and 2,91 hours respectively.

Pearson's product-moment correlation analysis results show that there is a statistically significant relation between two variables ( $r=.341$ ;  $p=.000<.01$ ). Pearson correlation coefficient ( $r=.341$ ) indicates that the relationship between two variables is in positive direction and moderate.

**Table 1.** Pearson's product-moment correlation analysis results between social media usage via mobile phones and PCs

	Social media usage via mobile phones	Social media usage via PCs
Social media usage via mobile phones	X = 3,17 hours SD = 4,47 hours N = 172	r = .341
Social media usage via PCs	p < .01	X = 3,11 hours SD = 2,91 hours N = 172

*Note: X: Mean, SD: Standard deviation, N: Sample size, r: Pearson correlation coefficient, p: Significance value*

### **E-mail Usage Findings**

In the second analysis, e-mail usage durations via mobile phones and PCs are analyzed.

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The results of the Pearson's product-moment correlation analysis and other statistical data are given in Table 2.

**Table 2.** Pearson's product-moment correlation analysis results between e-mail usage via mobile phones and PCs

	E-mail usage via mobile phones	E-mail usage via PCs
E-mail usage via mobile phones	X = 1,59 hours SD = 3,47 hours N = 172	r = .180
E-mail usage via PCs	p < .05	X = 1,70 hours SD = 3,00 hours N = 172

*Note: X: Mean, SD: Standard deviation, N: Sample size, r: Pearson correlation coefficient, p: Significance value*

As it can be seen from the table, the mean and standard deviation of the e-mail usage from mobile phones is 1,59 hours and 3,47 hours respectively. The mean and standard deviation of the social media usage from mobile phones is 1,70 hours and 3,00 hours respectively.

Pearson's product-moment correlation analysis results show that there is a statistically significant relation between two variables ( $r=.180$ ;  $p=.018<.05$ ). Pearson correlation coefficient ( $r=.180$ ) indicates that the relationship between two variables is in positive direction and at low level.

### Internet Usage Findings

In order to understand users' Internet usage behavior, Internet usage durations via mobile phones and PCs are analyzed. The results of the Pearson's product-moment correlation analysis and other statistical data are given in Table 3.

As it can be seen from the table, the mean and standard deviation of the Internet

usage from mobile phones is 1,69 hours and 3,26 hours respectively. The mean and standard deviation of the social media usage from mobile phones is 2,89 hours and 2,49 hours respectively.

**Table 3.** Pearson's product-moment correlation analysis results between Internet usage via mobile phones and PCs

	Internet usage via mobile phones	Internet usage via PCs
Internet usage via mobile phones	X = 1,70 hours SD = 3,26 hours N = 172	r= .430
Internet usage via PCs	P<.01	X = 2,89 hours SD = 2,49 hours N = 172

*Note: X: Mean, SD: Standard deviation, N: Sample size, r: Pearson correlation coefficient, p: Significance value*

Pearson's product-moment correlation analysis results show that there is a statistically significant relation between two variables ( $r=.430$ ;  $p=.000<.01$ ). Pearson correlation coefficient ( $r=.430$ ) indicates that the relationship between two variables is in positive direction and at moderate level.

### **Gaming Findings**

In the final analysis, gaming durations via mobile phones and PCs are analyzed. The results of the Pearson's product-moment correlation analysis and other statistical data are given in Table 4.

As it can be seen from the table, the mean and standard deviation of the Internet usage from mobile phones is 0,60 hours and 0,85 hours respectively. The mean and standard deviation of the social media usage from mobile phones is 1,46 hours and 2,13 hours respectively.

Pearson's product-moment correlation analysis results show that, statistically significant relation between two variables ( $r=.089$ ;  $p=.246>.05$ ) couldn't be found.

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Pearson correlation coefficient ( $r=.089$ ) indicates that there is not a relationship between two variables.

**Table 4.** Pearson's product-moment correlation analysis results between gaming via mobile phones and PCs

	Gaming via mobile phones	Gaming via PCs
Gaming via mobile phones	X = 0,60 hours SD = 0,85 hours N = 172	$r = .089$
Gaming via PCs	$p > .01$	X = 1,46 hours SD = 2,13 hours N = 172

*Note: X: Mean, SD: Standard deviation, N: Sample size, r: Pearson correlation coefficient, p: Significance value*

## Discussion

In this section, Pearson's product-moment correlation analysis results, means and standard deviations are discussed. When the means of the variables are evaluated, it is seen that, college students are using their mobile phones more than PC then their PCs in terms of e-mail usage, Internet usage, and gaming (See Table 5).

**Table 5.** Means and Standard deviations of the usage durations

	Social media usage (hour)	E-mail usage (hour)	Internet usage (hour)	Gaming (hour)
via mobile phones	X = 3,17 SD = 4,47	X = 1,59 SD = 3,47	X = 1,70 SD = 3,26	X = 0,60 SD = 0,85
Via PCs	X = 3,11 SD = 2,91	X = 1,70 SD = 3,00	X = 2,9 SD = 2,49	X = 1,46 SD = 2,13

*Not: X: Mean, SD: Standard deviation*

In terms of social media usage, college students use their mobile phones more than PCs with a slight difference. However, social media usage performed by mobile phones has a higher standard deviation. Thus, it can be stated that social media usage via

mobile phones are scattered among students. It can be said from the results that the students who give importance to the social media tools use them more frequently than other people, especially via mobile phones.

Statistically significant difference between social media usage via mobile phones and PCs denotes that social media usage via mobile phones increases when social media usage via PCs increases. Mobile applications and mobile web pages developed by social media providers favor this issue since they provide an accessible mobile platform to social media sites. So, users may use these platforms easily via mobile phones. One of the reasons of the high usage durations of social media via mobile phones can be thought as the ease of access to these platforms.

As stated earlier, there is a statistically significant difference between e-mail usage via mobile phones and PCs, however it the strength of the relation is low. Nowadays, e-mail tools are integrated to the most of the mobile phones and users can easily use these tools to send and receive e-mails. However, college students may not need to check their e-mails frequently as opposed to working people. Instead, they use more frequently alternative communication methods such as social media tools. Thereby, the low relation strength in e-mail usage can be taught as a result of students' alternative communication attitudes.

In terms of Internet usage durations, it is seen that the Internet usage via mobile phones increases when Internet usage via PCs increases. However, when the means are investigated, it is seen that PCs are used more frequently. Furthermore, the standard deviation of the Internet usage via mobile phone is quite more than Internet usage via PCs. Small screens of the mobile phones and the fact that many websites do not provide mobile websites; it is understandable that the users do not prefer to hang out on the web sites too much. As the mobile web sites become widespread, we think that these durations will increase dramatically.

Gaming is found as the only domain that there is not any significant difference between mobile phone and PCs. It clarifies that the gaming via mobile phones does not

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increase even the gaming via PCs increases. Moreover, gaming durations via PCs is much more than gaming via mobile phones. We think that, limited processing power and small screens of mobile phones have a big impact on this result. Games that need high processing power and 3D graphics and also multiplayer games cannot be provided via mobile phones and it is not surprising to have such a result.

We further wish to compare our study with other studies in the literature. According to (Kreutzer, 2009), 78 % of users use both their PCs and mobile phones, 14% percent of the users use only mobile phones and 4% of users use only their PCs for Internet access and 3% use none of them. Similar results are also found in social media and e-mail usages. The results also show that mobile phones are used frequently in some domains.

According to another research study performed in 2004 (Ishii, 2004), it is found that the rate of the Internet usage via mobile phones is much lower than computers, because many subscribers do not actually use mobile Internet service. It is also found that there is a significant overlap between PC Internet users and mobile Internet users. 65% of mobile Internet users (23.6% of the total population) use both PCs and mobile phones to access the Internet. Moreover, the mobile Internet occupies 26.1% of the total time spent on the Internet. A weekly average time spent on the mobile Internet is 43.6 minutes, while a weekly average time spent on the PC Internet is 123.4 min. Our research results may give that the mobile Internet services usage increased from 2004 to 2001, however demographic characteristics of the samples should also be taken into account.

## **Conclusion**

Mobile phones are used by college students in several domains. According to the research results, if mobile phones provide functions similar to PCs in the same domain, mobile phones are frequently used by college students. However, in the domains those

mobile phones cannot provide similar functions to computers, college students less prefer their mobile phones and they use their computers for these domains.

According to the Pearson's product-moment correlation analysis performed in four different usage domains, it can said that there is a significant relationship in Internet usage, e-mail usage and social media usage between mobile phones and PCs. However, the strength of the relationship in email usage is found low. A significant relationship in terms of gaming couldn't be found.

As a final result, it is seen that college students use their mobile phones intense in most domains and if mobile phones can provide similar functions to computers, users have intention to use their mobile phones.

## **References**

1. Bland, J. M., Altman, D. G., (1997). Statistics notes: Cronbach's alpha. *BMJ* 1997; 314 doi: 10.1136/bmj.314.7080.572
2. comScore Inc., (2011). The Rise of Social Networking in Latin America, Available online at: [http://www.comscore.com/Press\\_Events/Presentations\\_Whitepapers/2011/The\\_Rise\\_of\\_Social\\_Networking\\_in\\_Latin\\_America](http://www.comscore.com/Press_Events/Presentations_Whitepapers/2011/The_Rise_of_Social_Networking_in_Latin_America), Access date: 20 Dec 2011.
3. Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), pp. 297-334.
4. Gartner Inc., Available online at: <http://www.gartner.com/it/page.jsp?id=1543014>, Access date 10 Jan 2012
5. IBM SPSS, Available online at: <http://www-01.ibm.com/software/analytics/spss/>, Access date 16 Dec 2011
6. Ishii, K., (2004). Internet use via mobile phone in Japan. *Telecommunications Policy*, Vol. 28, Issue 1, pp. 43–58
7. Kreutzer, T., (2009). Internet and Online Media Usage on Mobile Phones among Low-Income Urban Youth in Cape Town. “Mobile 2.0: Beyond Voice?” ICA Pre-conference workshop, Chicago, Illinois.
8. Kristoffersen, S. and Ljungberg, F. (1999). Mobile use of IT. In *Proceedings of the 22nd Information Systems Research Seminar in Scandinavia Conference*, Vol. 2, pp. 271–284.
9. Lenhart, A., Purcell, K., Smith, A., and Zickuhr, K., (2010). *Social Media & Mobile Internet Use Among Teens and Young Adults*. Pew Internet & American Life Project. Available online at: <http://pewinternet.org/Reports/2010/Social-Media-and-Young-Adults.aspx>, Access date 18 Jan 2012

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Innovations in Learning for the Future 2012: e-Learning  
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10. T.R. Prime Ministry State Planning Organization (SPO), (2011). Information Society Statistics of Turkey 2011, Available online at: [http://www.bilgitoplumu.gov.tr/Documents/1/Yayinlar/Turkish\\_Information\\_Society\\_Statistics\\_2011.pdf](http://www.bilgitoplumu.gov.tr/Documents/1/Yayinlar/Turkish_Information_Society_Statistics_2011.pdf), Access date: 22 Jan 2012.



## The Analysis of Category of Educational Applications in Online Mobile Application Markets

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**Abstract:** Education has widely broad effect in every part of human-life. It generally separated to two main parts; formal and informal education. The formal education, school training, provides a fundamental knowledge for people. Because of the inadequacy in formal education and constraints in daily-life, people try to find out new training ways. Many platforms give chance to people in order to improve own self. Thanks to development in information technology, mobile devices become one of those ways. In the early year of improvement of mobile devices, they could be used for just talking and text messaging. Nowadays they have much more qualifications, such as sharing, storing information, taking photos, connecting to internet and etc. because of those qualifications; there is a new concept, called "smartphones". Because of their increasing performance, portability, and facilitating in developing applications, mobile devices have huge effect in human-life. The increasing development of software, in mobile devices, directed the companies to build mobile application marketing. Thus the mobile application marketing becomes an important product of the development in mobile technology. The mobile device users can swiftly and safely upload the applications by using mobile application marketing. Those Markets provide to easily access to their users by categorizing their applications. Nowadays indisputable leaders of smartphone marketing are Android and IOS (iPhone). Likewise the highest qualified mobile devices have mostly Android or IOS operating system. Those operating systems try to give better service by developing their software. Besides they also provide "software development environments for mobile devices" to the users. There are hundreds of resources about how to develop an application. Thus, to develop mobile applications become easier for software developer. Nowadays because of the enthusiastic mobile software developers, there are lots of applications. They can be uploaded to mobile application markets and ready for downloading. There are many categories in those mobile application markets. Education is one of those categories. The goal of this research is to create awareness in mobile education category by specifying the level of sufficiency. In this research, the best IOS and Android 50 applications, which are under the education category in online application markets, will be analyzed by specifying keywords for every application. According to intense of those keywords, it will be discussed what kind of mobile education software in online application markets, how they serve to their users and what kind of inadequacy in those applications. The results will be presented in the full paper.

**Keywords:** Mobil devices, Education application, Mobile application marketing, Google Play, App Store

### Introduction

Rapid and ever continuous change process in technology is making possible the delivery of information in more effective form. This "active transformation process" of technology is providing a lot of new devices and applications to individual users.

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Perhaps, the mobile technologies are the most preferred among the others technologies.

Mobile devices facilitated learning provides significant advantages in the form of time saving and location independence. Informal type of learning also offers the service monitoring and evaluation facilities (Ally M., 2009).

In appropriate mobile learning environment individual feels comfortable and safe which gives strength to mobile learning.

Mobile learning is defined as any training attained by one or more than one hand held devices (Traxler, 2005). Mobile learning performed by using a variety of mobile devices can be referred as of e-learning (Quinn, 2000).

Mobile technologies are cellular communication structure which based on sending and receiving radio signals (Ygnace, J. L., Drane C., 2001; Mobile Technology, 2012). Professional and common users are using mobile technologies, available as portable devices which are defined (Yamamoto, Ozan, Demiray, 2010). Mobile technologies provide the liberty to use them any time anywhere and each upcoming model is more powerful and lightweight then previous.

One of the first products offered by the mobile technologies is cell phones. The principal aim of the GSM operators is to provide voice and text communication over these devices but as the device hardware and software becomes more powerful they tried to implement more facilities for users. These devices are not limited to only powerful hardware and software they are also known as smart having some artificial intelligence.

Apart from mobile phones nowadays there are many other mobile devices in use. These devices, brought drastic changes to individual's life, such as education, social life, work, daily routines and become indispensable in many areas (Aydogdu Karaaslan and Budak, 2012; Al-Hussein and Cronje, 2010; Chen and Katz, 2009; Swan, Kratcoski and Hooft, 2007). As the result of this inevitability to users, demand for the applications that runs on mobile devices increased. To meet this intensified requirement of mobile applications a whole new market come in to existence know as mobile market.

At mobile market compatible applications with different platforms and

categories such as paid and free are available for mobile Internet users. This allows developers to develop and upload applications and user can download easily if paid the user can buy seamlessly, are described as a media applications (Android Compatibility, 2012; Official Apple Store, n.d.; Google Play, n.d.). In these application stores applications are listed in numerous categories such as shopping, entertainment, finance, news, multimedia, social media, sports, healthcare, transportation, education.

Various applications are available in market for specific model of mobile devices, many of them are specifically developed for education and training. Compatible devices can download and install such application and gain knowledge in diverse areas.

This kind of learning style on mobile platform provides;

- Lifelong Learning
  - Learning without realizing
  - On Demand Learning,
  - Time and Location Independent Learning
  - Location adjusted Learning Conditions
- (Bulun, Gülnar ve Gülan, 2004; Naismith, Lonsdale, Vavoula, Giasemi, Sharples, 2004)

According to technological definitions by O'Malley et al (2003), mobile learning is not fixed it can occur anytime anywhere. Today mobile devices equipped with mobile learning applications available under the category of education and training are used. Different operating systems are used as platform for mobile learning applications here we present data in the form of table describing which operating system is more popular for mobile learning.

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**Table 1:** September 2012-updated mobile operating system usage statistics  
(Mobile/Tablet Operating System Market Share, 2012)

Mobile Operating System	Developer	Usage rate (percentage)
iOS	Apple Inc.	63.48
Android	Google	22.1
Java ME	Sun Microsystems	9.34
Symbian	Nokia	1.83
Blackberry OS	Research in Motion	1.78
Windows Phone	Microsoft Corporation	.7
Kindle	Quanta Computer	.44
Bada	Samsung Electronics	.1
Samsung OS	Samsung Electronics	.09
Windows Mobile	Microsoft	.08
Other Mobile OS		.06

Table 1 present current statistics regarding current use operating system used for mobile learning based on this information iOS (App Store) and Android (Google Play) operating systems are most widely used and have distinctive advantages.

Apple Inc. launched iOS 2007 it is a closed source proprietary operating system. This operating system runs over Apple iPhone, iPad, iPod, iPod Touch and Apple TV also use second generation operating system. (Mobile/Tablet Operating System Market Share, 2012; Tudor, B., 2010)

The Apple store (App Store) is a digital application distribution platform developed by Apple Inc. for iOS. The App Store coming with iPhone 3G was launched on 10th of January 2008 as an update to iTunes contents. The users, by searching among the applications, can download to their devices the required applications from the applications developed with iOS SDK (Software Development Kit).

The Android is an open source coded & free of cost operating system which was developed by firm then Google Inc. purchased in 2005 (Tudor, B., 2010; Queru, J.B., 2011). This Linux based operating system is continuously maintained by Google.

The Operating system made available for use in 2007 has been released in market by loading to new devices made by many firms (Open Handset Alliance, 2007).

Google Play known as Android Market as well, which was launched on 23rd of November 2008 is a digital distribution service launched by Google, works as the online store hosting music, film, magazine and Android applications. Two big operating systems are also offering many paid or free of cost applications to the users under the category education and training (Google Play, 2012).

The purpose of this work is to determine from the user perspective that in which areas are found in educational applications intensively. In the application markets where they search solution in the pursuit of every kind of application they may need. Results will discuss that in which areas of mobile education applications have shortcomings. The aim of this study is to provide guide line to free developers and firms in deficient areas so that they can develop educational applications.

## **Method**

In the study, universe and sample were defined primarily. Constraints which faced were stated. Descriptive analysis was used. Findings were commented and suggestions were offered.

## **Universe and Sample**

This study's universe is App Store and Google play leading mobile application markets. Its sample is first 50 free/paid applications listing by application market in education category.

## **Constraints**

Chosen applications were selected by application markets' sorting based on their consideration criteria.

## Implementation

Below implementation steps were followed in the study:

1. The first 50 free/paid applications of App Store and Google Play under the category of education and their web sites are listed.
2. Keywords was determined considering description text and display image on their web pages for each one application gathering web page links 100 application. Keyword lists were analyzed for each one application and main categories were created like astronomy, biology, foreign language considering their keyword frequency and relation between. List of keywords and main categories was reviewed twice by two researchers. The result was optimized and differences were resolved.
3. Applications were classified by main categories.
4. Main category and related applications are stated in tables and figures.
5. End of the study, common main categories were defined rely on findings. Also suggestions were offered to developers.

## Findings

In this study, the first 50 applications in Google Play and the App Store have been analyzed. Main categories' codes were defined. Also defined codes, their descriptions and their App Store – Google Play versions were stated in table 2.

**Table 2:** Descriptions of main categories and their existing application market.

Main Category Codes	Description	Generated App Store Code	Generated Google Play Code
AST	Astronomy	ASAST	GPAST
BOY	Coloring	ASBOY	GPBOY
MUZ	Music	ASMUZ	GPMUZ

<b>Main Category Codes</b>	<b>Description</b>	<b>Generated App Store Code</b>	<b>Generated Google Play Code</b>
OKU	Learned To Read	ASOKU	GPOKU
OÖE	Preschool Education	ASOÖE	GPOÖE
YDİL	Foreign Language	ASYDİL	GPYDİL
VİD	Informational Videos	ASVİD	GPVİD
SAN	Art	ASSAN	GPSAN
BEC	Ability	ASBEC	-
HAYT	Life	ASHAYT	-
DERS	Course Content	-	
LMS	Learning Management System	ASLMS	-
ARK	Driving	-	GPARK
DİN	Religious	-	GPDİN
KPSS	KPSS exam	-	GPKPSS
SOZ	Dictionary	-	GPSOZ
TAR	History	ASTAR	GPTAR
BİO	Biology	ASBİO	-
MAT	Mathematics	ASMAT	-
COG	Geography	ASCOG	-
SAT	Chess	ASSAT	-
KARM	Hybrid Course Content	ASKARM	-
ÖDT	Homework Tracking	ASÖDT	-
SİM	Smileys	ASSİM	-

Main category codes which created for analyzed applications were stated in

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figure 1 with relational representation. Also figure 1 shows special market prefixes (AS or GP) for each main category code.



**Figure 1: Main category codes**

By examining the table 2, every two application market there are 9 main areas are finding common and 15 areas are found in different. These common areas are examined, investigated the scope of work practices;

- Application related to Astronomy
- Coloring activates Application
- Hosts music events
- Content with reading support Reading
- Pre-school education activities
- Contributing to learning a foreign language
- Experts in the field of personal interviews, conference records, including short courses in nature
- Esthetics arts
- History Knowledge

The results of applications had been seen. On the areas of basic education category, the different percentages encountered in analyzed markets. Number and percentage distribution according to Google Play areas of applications are given in Table 3.

**Table 3:** Frequencies of main categories for Google Play

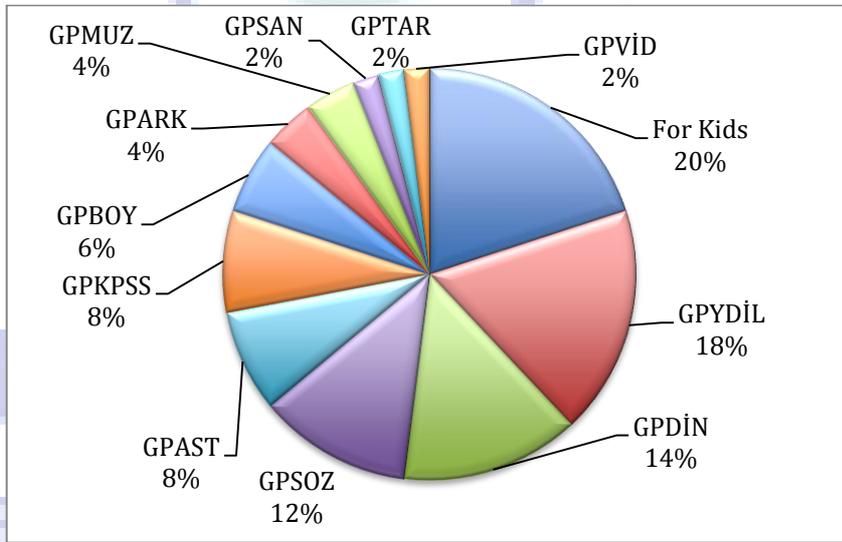
Main Category Codes	Number	Proportion (Percentage)
GPYDİL	11	22
GPDİN	7	14
GPSOZ	6	12
GPAST	4	8
GPKPSS	4	8
GPOKU	4	8
GPOÖE	4	8
GPBOY	3	6
GPARK	2	4
GPMUZ	2	4
GPSAN	1	2

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GPTAR	1	2
GPVID	1	2

By examining the Table 3, it is found that the use of foreign language teaching is (22%), religious practices application (14%) and dictionary applications (12%). Similarly, applications, providing basic information about astronomy, which supports the KPSS exam preparation, reading content with supporting applications and providing pre-school education activities are around (8%).

In the Google Play application store, in education category application for children were investigated are presented in figure 2.



**Figure 2:** Google Play applications

Figure 2, depicts that the Google Play has 20% of applications for children. In this percentage; GPOKU and GPOÖE while all capture all application areas; in GPBOY except one application, all applications are designed for adults in the area. Similarly, analyzing the GPYDİL one field of applications is designed for children.

This study was also conducted for App Store and considered following areas. Table 4 percentage distribution at the App Store application areas is provided.

**Table 4:** Frequencies of main categories for App Store

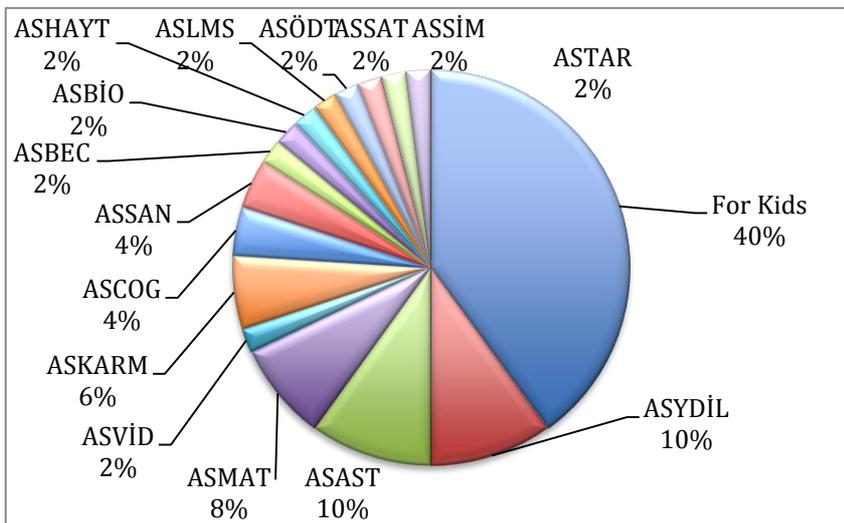
Main Category Codes	Number	Proportion (Percentage)
ASOÖE	7	14
ASYDİL	6	12
ASAST	5	10
ASBOY	5	10
ASMAT	5	10
ASVİD	4	8
ASKARM	3	6
ASCOG	2	4
ASOKU	2	4
ASSAN	2	4
ASBEC	1	2
ASBİO	1	2
ASHAYT	1	2
ASLMS	1	2
ASMUZ	1	2
ASÖDT	1	2
ASSAT	1	2
ASSIM	1	2
ASTAR	1	2

Table 4 is depict the results based on pre-school education (ASOÖE) based applications that have the highest percentage (14%). 12% of application are for foreign

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language learning. Similarly after that astronomical and application that provides information about mathematic and coloring application is around 10%.

Investigation are presented about App Store application for children education. Applications shown in figure 3 offer this convenience for children.



**Figure 3:** App Store applications

Figure 3 shows the percentage of children application in Google Play which is 40%. ASBOY, ASMUZ, ASOKU and ASOÖE all areas of application are included in this percentage. By examining other application areas with these keywords; ASVİD 3, ASYDİL and ASMAT, it is clear that one of three application was designed for children.

While examining the education category of the Apple Store applications and Google Play store, except astronomy and History, in many different applications and course content follow a discipline. Asmat, ASBİO, Ascog application areas such as; Mathematics (2%), biology (2%), geography (4%) specific disciplines which offers follow-up question and answer. ASKARM (6%) in applications offer question answer based format with follow-up facilities.

App Store and Google Play application markets are comparable in terms of percentage values of the common areas. In the figure 4 App Store and Google Play application are given as percentage of comparison in terms of the common areas.

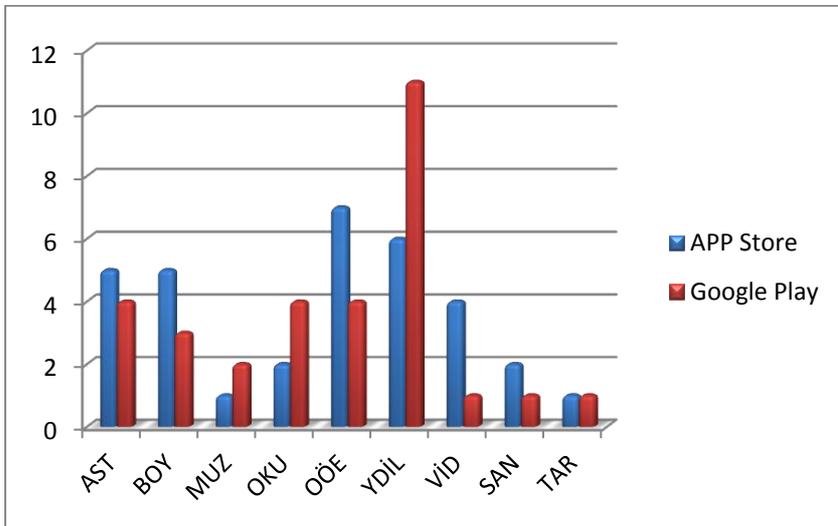


Figure 4: Comparison of App Store and Google Play applications

Analysis of figure 4 show that the top 50 applications, applications like YDİL, OKU and MUZ of Google Play and App Store both have major areas of implementation. Similarly, AST, SIZE, OÖE, VİD and SAN based on the main areas of application options in the App Store application offered by Google Play.

The study results were evaluated for the two applications market numbers and proportions given in table 5.

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**Table 5:** Frequencies of main categories

Main Category Codes	Number	Proportion (Percent)	Main Category Codes	Number	Proportion (Percent)
YDİL	17	17	SAN	3	3
OÖE	11	11	ARK	2	2
AST	9	9	COG	2	2
BOY	8	8	TAR	2	2
DİN	7	7	BEC	1	1
OKU	6	6	BIO	1	1
SOZ	6	6	HAYT	1	1
MAT	5	5	LMS	1	1
ViD	5	5	ÖDT	1	1
KPSS	4	4	SAT	1	1
KARM	3	3	SİM	1	1
MUZ	3	3			

From the Table 5, it is shown that applications on a foreign language with the highest level (17%). According to the values of these applications the pre-school education is (11%) then astronomy (9%), coloring (8%), and religious (7%) respectively show in Figure 5.

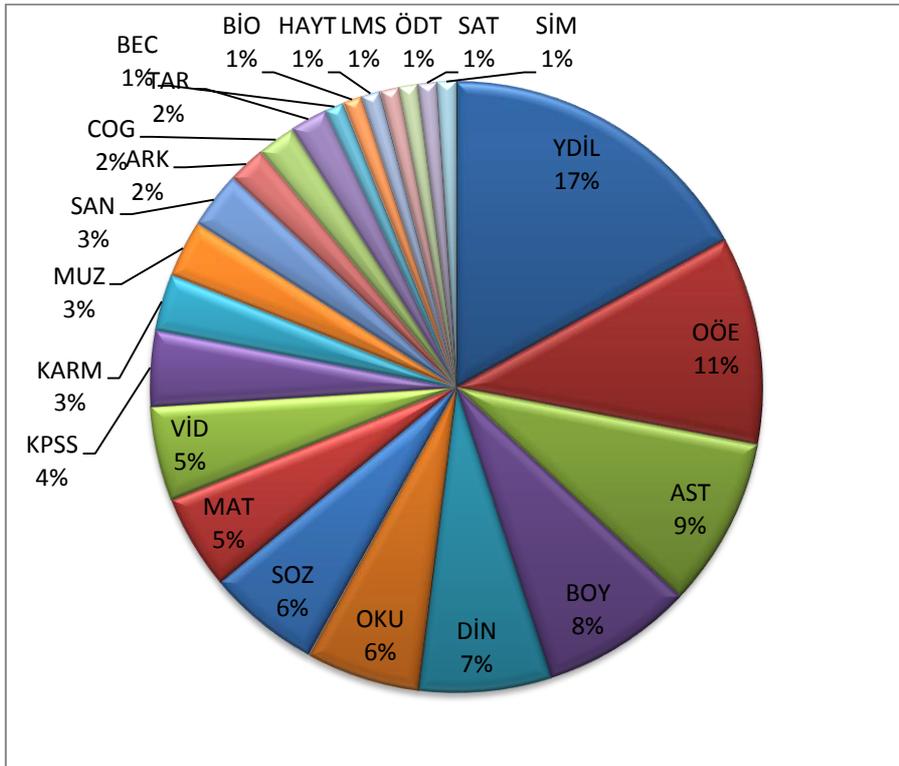


Figure 5: Proportions of App Store and Google Play applications

## Discussion and Conclusion

Today in reality qualities of mobile technologies are getting better and they earned a good place in market. Mobile applications offered by the applications centers are a remarkable contribution for making mobile technologies indispensable now a day. Many free application offering information on interesting topics about life, information about new skills and also entertain to users.

This study is based on two big players in the mobile application markets such as App Store and Google Play. In this study we considered 50 most preferred application under education category. The main areas of application store examined was and

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training.

Examining the applications under the education category of two giant application stores, App Store and Google Play, it is seen that primarily at the beginning of the highlights of the preferred embodiments and applications that support foreign language learning activities for children and including pre-school applications. Similarly, the application market of Google Play in the practice of education under the category of the religious content has been noticed.

- In education category of the App Store application market provides;
- More applications are related to these areas like mathematics, astronomy, biology, geography
- The hybrid implementations with course options
- Application is question answer based with performance monitoring

Considering both application markets, higher frequencies were observed in the applications related to foreign language, preschool education, astronomy, coloring and religious. However, some areas were identified for which mobile educational applications were not in enough numbers such as formal courses, hobbies, musical instruments, personal development, world history, local geographies, sociology, philosophy, and logic. Therefore, there is need for mobile educational applications for such areas in order to fill the gap determined.

As a result, it is clear these two applications store offered applications under the education category. Training provided under the category of these applications must be submitted by clearer and better organized boundaries.

## **Reference**

1. Ally, M. (2009). *Mobile Learning Transforming The Delivery of Education and Training*. Canada: AU Press.
2. Android Compatibility. (2012). Retrieved from 6 November, 2012, from <http://developer.android.com/guide/practices/compatibility.html>

3. Brewer, T. (2008). Apple Introduces The New iPhone 3G. Retrieved 22 October, 2012, from <http://www.apple.com/pr/library/2008/06/09Apple-Introduces-the-New-iPhone-3G.html>
4. App Store (iOS). (2012). Retrieved 22 October, 2012, from [http://en.wikipedia.org/wiki/App\\_Store\\_\(iOS\)](http://en.wikipedia.org/wiki/App_Store_(iOS))
5. Aydoğdu Karaaslan, İ., Budak L. (2012). Research on the Use of Mobile Phone Features by University Students and Its Impact on Their Communication Practices in Everyday Life. Journal of Yasar University, 26 (7), 4548-4525.
6. Bulun, M., Gülnar B., Güran S. (2004). Eğitimde Mobil Teknolojiler. The Turkish Online Journal of Education Technology. 3. 165-169.
7. Chen Y.F., Katz J. (2009). Extending Family to School Life: College Students Use of the Mobile Phone. Human-Computer Studies. 67.
8. El-Hussein, M. O. Cronje, J. C. (2010). Defining Mobile Learning in the Higher Education Landscape. Educational Technology & Society. 13 (3). 12–21.
9. Tudor, B. (2010). Gartner Says Worldwide Mobile Phone Sales Grew 35 Percent in Third Quarter 2010; Smartphones Sales Increased 96 Percent. Retrieved 22 October, 2012, from <http://www.gartner.com/it/page.jsp?id=1466313>
10. Google Play. (n.d.). Retrieved 22 October, 2012, from <https://play.google.com/about/>
11. Google Play. (2012). Retrieved 22 October, 2012, from [http://en.wikipedia.org/wiki/Google\\_Play](http://en.wikipedia.org/wiki/Google_Play)
12. Queru, J.B. (2011). ICS Is Coming To AOSP. Retrieved 22 October, 2012, from <https://groups.google.com/forum/?fromgroups=#!msg/android-building/T4XZJCznqF8/WkWhGUYb4MAJ>
13. Mobile Technology. (2012). Retrieved from 6 November, 2012, from [http://en.wikipedia.org/wiki/Mobile\\_technology](http://en.wikipedia.org/wiki/Mobile_technology)
14. Mobile/Tablet Operating System Market Share. (2012). Retrieved 22 October, 2012, from <http://www.netmarketshare.com/mobile-market-share>
15. Official Apple Store. (n.d.). Retrieved 22 October, 2012, from <http://store.apple.com/us>
16. Open Handset Alliance. (2007). Retrieved 22 October, 2012, from [http://www.openhandsetalliance.com/press\\_110507.html](http://www.openhandsetalliance.com/press_110507.html)
17. Traxler, J. (2005). Defining mobile learning. Proceeding of International Conference on Mobile learning. IADIS. 261-266.
18. Quinn, J.B. (2000). Outsourcing Innovation: The New Engine of Growth. Sloan Management Review. 41 (4). 13-28.
19. O'Malley, C., Vavoula, G., Glew, J. P., Taylor, J. & Sharples, M. (2005). Guidelines for Learning/Teaching/Tutoring in a Mobile Environment. Retrieved 22 October, 2012, from [http://www.mobilearn.org/download/results/public\\_deliverables/MOBIlearn\\_D4.1\\_Final.pdf](http://www.mobilearn.org/download/results/public_deliverables/MOBIlearn_D4.1_Final.pdf)

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20. Yamamoto, G. T., Ozan, O & Demiray, U. (2010). Drugstore For Learners: Learning Vitamins D-E-M-T-U Learning, accepted for presentation at the Future-Learning 2010 International Conference, May 10-14, 2010 Istanbul-Turkey.
21. Swan K., Kratcoski A., Hooft M. (2007). Highly Mobile Devices, Pedagogical Possibilities, and How Teaching Needs to Be Reconceptualized to Realize Them. Educational Technology. 47.
22. Naismith, L., Lonsdale, P., Vavoula, G., Sharples, M. (2004). Mobile Technologies And Learning. ISBN: 0954859413
23. Ygnace, J. L., Drane C. (2001). Cellular Telecommunication And Transportation Convergence. 2001 IEEE Intelligent Transportation Systems Conference Proceedings. 16-22.



## **Factors Affecting Team Based Learning in a Blended Course**

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***Abstract:** The main goal of the study is to explore various factors that affect team-based learning in a blended learning environment. Factors taken into consideration in this study were specialization, credibility, coordination, group harmony, group atmosphere, and cognitive absorption level. Sixty pre-service teachers majoring in early childhood education from an undergraduate blended course participated in this study. The data was obtained via three questionnaires administered throughout Fall 2012: cognitive absorption scale, group harmony, group atmosphere, and a field measure of transactive memory systems. Data analysis was conducted using correlations and multiple linear regression techniques. Results indicated that participants' cognitive absorption to Facebook was not related to their postings. Also, group harmony was significantly associated with participants' transactive memory.*

**Keywords:** Blended learning, social media, team-work, team based learning

### **Introduction**

As an instructional strategy, team based learning (TBL) uses group of learners to promote active and effective learning. There are many benefits of TBL. Specifically, TBL settings encourages its members to productively interact with each other to negotiate meaning, to share knowledge, and to reach consensus if necessary (Cortez, Nussbaum, Woywood,& Aravena, 2008; Nussbaum et al., 2009). In addition, according to Fink (2002) and Michaelsen and Sweet (2008), TBL does not just increase the quality of performance that team showed comparing to individual performance, individual learning is greater comparing with individuals learning on their own. Now, the question is whether TBL need to be used only in face-to-face settings. The answer is no without any doubts.

The rapid development in technologies has influenced the ways of teaching and learning. One way is to use of social media sites (SMS) for teaching and learning. Specifically, in Turkey alone, the number of people who have Facebook account is about 32 million and among those people, 42 percent of them are between the age of 18 and 24. Also, there are almost 13 million Turkish people who have Twitter account and

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200 thousand Turkish people have @Blogger account. Considering these numbers, use of Facebook or other SMS in education need to be, and actually is, a promising field for educators. In some studies (i.e., Figl, Motschnig-Pitrik & Derntl, 2006; Gomez, Wu & Passerini, 2010; Palsolé & Awalt, 2008) TBL has been implemented in blended learning environments where learning takes place both in face-to-face and online settings and those studies have a common result: success of TBL adaptation with learner satisfaction. However, in face-to-face, online and/or blended settings, there are many factors affecting team outcomes including communication, listening, trust, roles, managing stress, social skills, common mistakes, motivation, and so on (Johnson et al., 2010). In addition, group atmosphere and group harmony are considered two other factors that affect team outcomes (Burke, Aytes & Chidambaram, 2001; Williams, Duray & Reddy, 2006).

In this study, the main goal is to explore various factors that affect team-based learning in a blended learning environment. Factors taken into consideration in this study were specialization, credibility, coordination, group harmony, group atmosphere, and cognitive absorption level. Since the analyses are still in process, the preliminary analysis results are shared in this paper.

## **Method**

### **Participants**

The study was conducted at a government university that is located in the east side of Turkey. A total of 60 early childhood teacher candidates participated in the study. All of them were full time students. There were 11 male and 49 female participants who were between 19 and 23 years old. Among the participants, 4 of them did not have a Facebook account. Although at the beginning of the semester they obtained their account and completed all tasks, they were unable to fill out the cognitive absorption scale; thus, they were not included in any of the analysis.

## **Procedures**

The data was being collected as a part of course entitled Science Education in Early Childhood and data collection is still in progress. The course was given at the fall semester of the third year. At the beginning of the semester, a Facebook group page (FGP) was created by the instructor and all students were invited to the group. All announcements about the course were/are given through FGP.

The course content, assignments, and the resources were introduced to the juniors in the first week of the semester. Also, two questionnaires were filled by students about their expectations from the course and their cognitive absorption to Facebook. Then, they were asked to make a group of three or four. There were total of 19 groups – 16 groups with three people and 3 groups with four people. Two groups were consisted of males, four groups were mixed, and the rest were consisted of females.

At the beginning of the semester, some assignments were completed within groups, some were completed between groups. At the end of each assignment, students were/are asked to fill out questionnaires about their groups – transactive memory systems, group atmosphere and group harmony. The data used in this paper was obtained after students completed asynchronous discussions through Facebook.

## **Instruments**

The data used in this study was obtained from four instruments: Cognitive Absorption Scale (CAS), a field measure of transactive memory systems, group harmony questionnaire, and group atmosphere questionnaire. The first instrument, Cognitive Absorption Scale (CAS), was developed by Agarwal and Karahanna (2000). It was translated into Turkish by Koçak-Usluel and Kurt-Vural in 2009. Although the instrument measures participants' cognitive absorption to web, for this study the term "web" in the instrument was replaced with "Facebook." The instrument consists of four factors: time, curiosity, pleasure, and focusing of attention. The Cronbach Alpha values were 0.88, 0.90, 0.90, and 0.82, respectively. A field measure of transactive memory

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systems (TMS) were developed by Lewis (2003). It was translated into Turkish by Alsancak (2010). The measure have three factors: specialization, credibility, and coordination with Cronbach Alpha reliability coefficients values of 0.70, 0.79, and 0.87 respectively. The group harmony questionnaire was developed by Price and Mueller (1986) and translation was completed by Alsancak in 2010. The reliability score for this instrument is 0.92. The last instrument is the group atmosphere questionnaire developed by Fiedler (1967) and Alsancak (2010) translated it into Turkish. The Cronbach Alpha value is 0.93. Since the instruments were tested for reliability and their reliability coefficients reported were high, they were accepted as reliable instruments. In addition to the data obtained from those questionnaires, the total number of participants' comments in asynchronous discussions was calculated.

## Results

The descriptive results about each survey are given in Table 1 and Table 2. As seen from the Table 1, the group members reported that their group specialization and coordination and the trust that they feel to the other group members were high. In addition, in terms of group harmony score and group atmosphere score were above the average.

**Table 1.** Descriptive Statistics of three instruments

	Expected				Observed			
	N	$\bar{X}$	Min	Max	$\bar{X}$	Min	Max	SD
TMS								
CAS Specialization	56	9	3	15	9.84	6	14	2.01
CAS Credibility	56	12	4	20	15.65	7	20	3.07
CAS Coordination	56	15	5	25	19.29	9	25	3.72
Group harmony								
	56	15	5	25	19.57	8	25	3.77
Group atmosphere								
	56	18	6	30	24.16	8	30	4.98

Table 2 shows the descriptive statistics for cognitive absorption scale. According to the results, students reported that their cognitive absorption to Facebook is at moderate level.

**Table 2.** Descriptive Statistics for Cognitive Absorption Scale

Cognitive Absorption Scale			
	N	$\bar{X}$	SD
Time	56	3.02	1.21
Curiosity	56	2.78	0.92
Pleasure	56	2.87	0.83
Focusing of attention	56	3.07	1.03

One assignment of the course was related to the asynchrone discussions. The main goal of this assignment was to encourage teacher candidates to share their pedagogical and content knowledge to each other and to provide solutions to their problems posted by the other group members. In order to get a common measurement scale representing teacher candidates' posts, related variable was divided into four groups representing low, low-medium, medium-high, and high exposure. Thus, the scores of this variable range from one to four. While a score of one represents low participation, a score of four refers to high participation into the discussion. As seen in Table 3, while some participants did not post any comments, there are some others who had as many as 27 posts.

**Table 3.** Descriptive Statistics for Teacher Candidates' Posts

	N	$\bar{X}$	Min	Max	SD
Number of posts	56	9.25	0	27	7.01
Low participation	14	2.07	0	3	.92
Low/Medium participation	12	5.5	4	7	1.24
Medium/High participation	15	9.2	8	12	1.37
High participation	15	19	13	27	4.88

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Table 4 shows the correlations between individual transactive memory system scores and group harmony, group atmosphere, and posting level. The test results showed positive, high and significant correlation between the TMS scores and group harmony scores and group atmosphere scores. However, there is no significant correlation between posting level and TMS and its subscales. In addition, negative but not significant correlation was found between cognitive absorption scores and TMS scores.

**Table 4.** Correlation results

	N	TMS Specilization	TMS Credibility	TMS Coordination	TMS Total score
Group harmony	56	.356*	.543*	.611*	.679*
Group atmosphere	56	.491*	.482*	.432*	.594*
Posting level	56	-.016	.161	.099	.121
CAS	56	-.123	-.181	-.031	-.134

Note. \*  $p < .01$

For further analysis, basic linear regression model with stepwise option was applied to test whether group harmony, group atmosphere and/or number of posting explained a significant amount of variance in individual transactive memory. The results showed that only one independent variable (group harmony) explained a significant amount of variance in participants' transactive memory score,  $R^2 = .461$ , adjusted  $R^2 = .451$ ,  $F(1, 55) = 46.202$ ,  $p = .000$ . In other words, 46.1% of the variance was explained by this variable.

In addition, basic linear regression model with stepwise option were applied to test whether group harmony, group atmosphere, transactive memory, and cognitive absorption explained a significant amount of variance in number of posting. None of the independent variables entered the equation.

## **Discussion**

Team-based learning in educational settings – face-to-face, online or blended– has the potential to help students improve various skills including communication skills, interaction skills, problem solving skills, and critical thinking skills (Michaelsen & Sweet, 2008; Smart & Csapo, 2003). There exist studies that focus on factors affecting team outcomes. Similarly, in this study, possible relationship among participants' transactive memory, group harmony, group atmosphere, cognitive absorption level, and participation level were investigated in a blended learning environment – face-to face and Facebook as a social media. Although huge amount of data was and is still being collected, in this paper, a small portion of data was used.

The results showed that during the completion of online assessment as a group, students were satisfied with their team in terms of their specialization, credibility, and coordination skills. In addition, team members were happy with their group harmony and group atmosphere. One possible explanation of such result is that participants were allowed to make their own groups. In other words, participants had the option to choose with whom they preferred to work. Also, another explanation is the limit in the number of the people in each group, which helped team members to know each other better and which did not allow some team members to bear the burden of the work load while completing the tasks. In the literature, various categories including team-related knowledge, skill, attitude, dynamicity, and environment, were strongly correlated to team performance in online and face-to-face environment (see Lee & Johnson, 2008; Mathieu et al., 2000). In this blended learning course, participants' transactive memory score, group harmony, and group atmosphere have been tracked down over time. Further analyses will be run to determine any changes – significant or not – in order to find out the influences affecting them.

The results also showed that participants' cognitive absorption level while using Facebook was at moderate level and this absorption level did not affect their online postings. One critical point is that there was a considerable range in the number of posting. While two students never posted, other participants submit their thoughts as

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much as 27 times. Differential usage could have been due to differences in motivation and interest in the activity, but usage could also have been related to how comfortable participants felt with technology or specifically with Facebook. Significant research is needed to ensure that all teacher candidates benefit from online resources as much as others who have more technological skills.

## References

1. Agarwal, R. & Karahanna, E. (2000) Time flies when you're having fun: cognitive absorption and beliefs about information technology usage, *MIS Quarterly*, 24,4, 665-694
2. Burke, K., Aytes, K., & Chidambaram, L. (2001). Media effects on the development of cohesion and process satisfaction in computer-supported workgroups - An analysis of results from two longitudinal studies. *Information Technology&People*,14(2)
3. Cortez, C., Nussbaum, M., Woywood, G., & Aravena, R. (2008). Learning to collaborate by collaborating: A face-to-face collaborative activity for measuring and learning basics about teamwork. *Journal of Computer Assisted Learning*, 25(2), 126–142.
4. Fiedler, F.E. (1967). *A theory of leadership effectiveness*. New York: McGraw-Hill.
5. Figl, K., Motschnig-Pitrik, R., & Derntl, M. (2006). Team and community building of students of business informatics: Influence factors in blended environments. In *Proceedings of 5th international conference on networked learning (NLC'06)*. UK: Lancaster.
6. Fink, L. D. (2002). Beyond small groups: Harnessing the extraordinary power of learning teams. In L. K. Michaelsen, A. B. Knight, & L. D. Fink (Eds.), *Team-based learning: A transformative use of small groups* (pp. 3–27). Westport, Conn: Praeger Press.
7. Gomez, E. A., Wu, D., & Passerini, K. (2010). Computer-supported team-based learning: The impact of motivation, enjoyment and team contributions on learning outcomes. *Computers & Education*, 55(1), 378–390.
8. Johnson, T. E., Sikorski, E. G., Mendenhall, A., Khalil, M., & Lee, Y. M. (2010). Selection of team interventions based on mental model sharedness levels measured by the team assessment and diagnostic instrument (TADI). In D. Ifenthaler et al. (Ed.), *Computer-Based Diagnostics and Systematic Analysis of Knowledge* (pp. 335–354). NY: Springer Science+Business Media.
9. Lee, M., & Johnson, T. E. (2008). Understanding the effects of team cognition associated with complex engineering tasks dynamics of shared mental

- models, Task-SMM, and Team-SMM. *Performance Improvement Quarterly*, 21(3), 73–95.
10. Lewis, K. (2003). Measuring transactive memory systems in the field: scale development and validation. *Journal of Applied Psychology*, 88(4), 587–604.
  11. Mathieu, J. E., Heffner, T. S., Goodwin, G. F., Salas, E., & Cannon-Bowers, J. A. (2000). The Influence of Shared Mental Models on Team Process and Performance. *Journal of Applied Psychology*, 85(2), 273–283
  12. Michaelsen, L. K., & Sweet, K. (2008). The essential elements of team-based learning. *New Directions for Teaching and Learning*, 116, 7–27.
  13. Nussbaum, M., Alvarez, C., McFarlane, A., Gomez, F., Claro, S., & Radovic, D. (2009). Technology as small group face-to-face Collaborative Scaffolding. *Computers & Education*, 52(1), 147–153.
  14. Palsolé, S., & Awalt, C. (2008). Team-based learning in asynchronous online settings. *New Directions for Teaching and Learning*, 116, 87–95.
  15. Price, J. L., & Mueller, C. W. (1986). *Handbook of Organizational Measurement*. Marshfield, MA: Pitman
  16. Smart, K. L., & Csapo, N. (2003). Team-based learning: Promoting classroom collaboration. *Issues in Information Systems*, 4(1), 316–322.
  17. Williams, E. A., Duray, R., Reddy V. (2006). Teamwork orientation, group cohesiveness, and student learning: A study of the use of teams in online distance education. *Journal of Management Education*, (30).



## **Social Networking Website Analyses: Usable and Instructional Facebook**

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**Abstract:** *Social networking websites are playing essential roles in current era. Therefore, their usability plays an important role for their dissemination around the world. Moreover, social networking websites are looking for a place in education sector. This study focuses on fulfilling a gap in the research methods and instruments regarding social networking websites' usability issues and their alternative use for education. Facebook, as the mostly use social networking websites, was selected as a cased for the research context. With the extended potential of interaction, the intense multi-purposeful tools and the huge number of members, Facebook has a potential for being utilized for instructional activities.*

*The researchers attempt to fulfill a gap in the field of social networking studies. The researchers scrutinized the existing instruments, research findings and designs of previous studies. Afterwards, the researchers created two quantitative instruments from the literature and then applied necessary strategies for reliability and validity processes. Following the instrument development, the study was implemented. The simple convenience sampling method was administered for the study in order to have a large sample size to increase the probability of representing the population. To this end, the study instruments were uploaded to the QuestionPro.com both in Turkish and English. In subsequent to announcing the instruments on Facebook, the instruments stayed online for two weeks. As a remark, two instruments were announced in different times.*

*Firstly, the participants (n=289) perceived Facebook as a routine, usable, safe and a social tool. Facebook is the leading example of social networking websites. The participants of this study are satisfied with its usability, especially its search capability and its embedded content. On the other hand, the participants seem to question its speed and level of interactivity. This might be the result of overloaded interface elements, such as videos and photos.*

*Although Facebook offers many usage alternatives to its users, the participants focus on its social relationship establishment features. The participants use Facebook for keeping in touch with other people and sharing much information. Flirting and playing games were not listed as the reasons for using Facebook for this group of participants. Additionally, the participants were not in favor of presenting information where other users might reach them directly (phone number or address).*

*Second phase of the study focuses on utilization of social networking websites in instructional contexts. The study showed that participants (n=239) are not sure about possible effects of using Facebook for education. It might be a reason that the participants have not experienced or witnessed such kind of learning activities on Facebook. To sum up, Facebook, as a usable tool, has a capacity for integration into instructional activities.*

**Keywords:** Social networking web sites, uses and gratification theory, instructional use of social networking, Facebook

## **Introduction**

After the settlement of the Information and Communication Technologies (ICTs), digital transformation of our daily routines has been introduced quickly. The ways of human to human interaction styles have been also affected from these transformations. Different ICTs have been perceived as another way of communicating with other people (Greene, 2008; Paulus & Scherff, 2008). The social interaction has been conveyed through the mediation of ICTs. In parallel, ICT users have been introduced with new websites whose purpose is to create a context for their users to communicate through different embedded tools. The social networking websites, as a new phenomenon, have offered a variety of opportunities for their members; meeting with new people, participating common interest groups, sharing photos or videos, chatting and providing personal updates (Hinduja & Patchin, 2008; Lampe, Ellison, & Steinfield, 2008). The integrated free-of-charge tools have become an addiction for all people from all over the world.

Facebook, as found on 2004, has become one of the most leading social networking websites for the entire world population (Google's Double Click AdPlanner, 2011). Many other social networking websites imitated different Facebook tools within their structures. Hence, Facebook has created a trading strategy which made it high ranked within other websites. In that sense, the usability and gratification issues of Facebook will affect not only its structure but also other national or international social networking websites (Global faces and networked places, 2009).

With the extended potential of interaction, the intense multi-purposeful tools and the huge number of members, Facebook has a potential for being utilized for instructional activities. Facebook offers fundamental online learning tools to its users (file sharing and chatting) and creating a community in the form of classroom (picture and video sharing, allowing comments on them) (Kert & Kert, 2010).

Therefore, the literature demands on the studies regarding assessing usability concerns of social networking websites and their potential roles for benefiting in education. Facebook, with its immense number of registered members, provides a

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context for conducting research studies. These studies are significant for many stakeholders, such as tertiary education institutions, adult learning organizations, social networking web designers, instructional designers, many teachers and students, and researchers of online environments.

### **Purpose and research questions**

The social networking websites (especially Facebook) are getting popular all around the world. People from different countries or different socio-economical status are connecting to these websites and interact with each other. These easily accessible and usable websites can be transmitted from their daily use to instructional use so that admired social networking websites can be functionalized for learning and teaching purposes. To this end, this study aims to reflect on two vital concerns of social networking websites; their usability issues and their instructional potentials. Due to its wide-range utilization, Facebook was selected as a case for the research.

Nonetheless, the literature suffers from the lack of instruments and methods for assessing social networking websites' usability issues and instructional potential. To this end, the researchers developed two quantitative instruments as the preliminary steps for further research studies. This study concentrates on two essential research questions (a) what are general perceptions of Facebook users about its usability, and (b) how do Facebook users consider its utilization for instructional purposes?

### **Method**

The researchers attempt to fulfill a gap in the field of social networking studies. The researchers scrutinized the existing instruments, research findings and designs of previous studies. Afterwards, the researchers created two quantitative instruments from the literature and then applied necessary strategies for reliability and validity processes. Following the instrument development, the study was implemented. The simple convenience sampling method was administered for the study in order to have a large

sample size to increase the probability of representing the population (Fraenkel & Wallen, 2000). To this end, the study instruments were uploaded to the QuestionPro.com both in Turkish and English. In subsequent to announcing the instruments on Facebook, the instruments stayed online for two weeks. As a remark, two instruments were announced in different times.

## **Results and conclusion**

### **Usability Issues**

The result shows that there was a gender balance among the participants (n=289) where the majority of the participants had at least undergraduate level of education (n=134) and half of the participants perceived themselves as “somewhat of an expert” (n=140). The participants enlisted the social networking websites they registered (Table 1). After Facebook, Youtube was the most favorite social networking website among the participants.

**Table 1:** List of the participants' social networks

Social Network	n	Social Network	n
Facebook	283	Yahoo360	30
Youtube	194	LinkedIn	26
Windows Live Spaces	86	Orkut	3
MySpace	48	Hi5	2
Other	43	Friendster	1

The participants were asked to indicate their general idea about visual design of Facebook (Table 2) where half of the participants were gathered around “satisfactory” option.

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**Table 2:** The participants' answer on how Facebook looks

Options	n
Very poor	4
Poor	25
Neutral	117
Satisfactory	114
Very satisfactory	29
Total	289

When the participants were asked how often they access to their Facebook accounts, half of the participants selected “several times a day” option (Table 3).

**Table 3:** The participants' responses on how often they access their profiles

Options	n
Several times a day	119
About once a day	55
3 to 5 days a week	43
1 to 2 days a week	41
Every few weeks	13
Less often	9
Don't know	8

Regarding the security and privacy issues on Facebook, the participants were asked two questions; (i) whether their profile could be seen by anyone, and (ii) whether their profile has fake information (Table 4). Nearly half of the participants' profiles could be seen by “only friends”, whereas nearly all of the participants noted that they don't have any fake information in their profiles.

**Table 4:** The participants' profile visibility and degree of fake information

Profile Visibility			Profile Fake Information		
Options	n	%	Options	n	%
Everyone	72	24,9	All	20	6,9

Profile Visibility			Profile Fake Information		
Options	n	%	Options	n	%
My Networks and Friends	54	18,7	Most	10	3,5
Friends of Friends	4	1,4	Some	14	4,8
Only Friends	136	47,1	Very little	18	6,2
Customizable	9	3,1	None	220	76,1
Don't Know	13	4,5	Don't know	6	2,1
Total	288	99,7	Total	288	99,7
Missing	1	0,3	Missing	1	0,3

Afterwards, the participants were given seventeen questions regarding to their personal profile information and their preliminary usage (Table 5). The participants don't provide direct-access information, such as phone number and home address. On the other hand, email addresses mostly appear in profiles. Nearly half of the participants have friends where they never met or spoken to.

**Table 5:** Questions on profile information

	Yes	No	Don't Know
Does your Facebook profile include your phone number?	29	249	9
Does your Facebook profile include your first name?	277	9	1
Does your Facebook profile include your last name?	268	18	1
Does your Facebook profile include your full date of birth?	225	55	7
Does your Facebook profile include your home address?	16	260	11
Does your Facebook profile include your email address?	214	65	8
Does your Facebook profile include your religion?	91	177	19
Do you use Facebook from your Mobile Phone?	30	254	3
Do you actively use Facebook groups to send or check group related messages?	115	154	18
Are you an administrator of any Facebook group?	80	203	4
Do you have people in your Facebook friend-list that you have never actually met or spoken to?	144	138	5
Have you received any Facebook request for contact from people you would prefer to forget?	135	135	17

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	Yes	No	Don't Know
Did you feel a pressure to join Facebook?	38	241	8
Do you feel special when you have a picture comment in Facebook?	136	129	22
Did you encounter any system error in Facebook?	160	101	26
Have you ever read Facebook's Term s of Service in full?	89	184	14
Have you ever read Facebook's Privacy Policy in full?	69	199	19

The participants were provided with six usability features where the participants selected among options from “poor” to “excellent” (Table 6). From the table, nearly half of the participants perceive Facebook as a usable tool with “Good” features.

**Table 6:** The usability issues on Facebook

	Poor	Fair	Good	Excellent	No Opinion
Presentation (background color, font style and size, layout...)	11	59	178	32	7
Content (value, relevancy, currency, sufficiency...)	13	74	146	47	7
Search capability	16	62	146	59	4
Navigability (clear site map, logical sequencing of pages,)	30	81	131	36	9
Speed (short response time for access to a page)	43	95	107	39	3
Interactivity (ability to customize the web site)	41	84	108	34	20

Moreover, the participants were asked to choose among forty six reasons about why they use Facebook. The participants preferred to use Facebook for keeping in touch or reconnecting with other people. Moreover, the participants use Facebook to amuse themselves with its tools, e.g. videos. On the contrary, the participants rarely use Facebook for flirting or gaming purposes.

Subsequent to reason oriented question, the participants were asked to read twenty sentences in relation to Facebook and state their agreement level from “strongly agree” to “strongly disagree”. From the mean scores, it is observed that the participants (n=266) agree with the statement emphasizing the addictive nature of Facebook. Yet, the participants do not take security into consideration (M=2,58) as they should be. Factor analysis applied on twenty items and four factors revealed as follows; Facebook as a routine tool, Facebook as a usable tool, Facebook as a safe tool and Facebook as a social tool. The reliability coefficient, Cronbach alpha was calculated as .75.

#### **4.2. Instructional Issues**

In the second phase of the study, the researchers focused on using Facebook in education (n=239). Most of the participants are students (n=215) which is a desired condition for focusing on instructional issues on Facebook. Furthermore, the participants answered the questions on whether or not they participated any online activity and to what extent they perceive themselves knowledgeable about Facebook (Table 7). It seems that nearly half of the participants had experience on online activities. Additionally, more than half of the participants perceived themselves as knowledgeable on utilizing Facebook.

**Table 7:** Participation to online activities versus the participants' knowledge of using Facebook

		Knowledge of using Facebook					Total
		Poor	Fair	Good	Very Good	Excellent	
Participation to online activity	Yes	6	6	54	23	16	105
	No	12	15	76	18	13	134
Total		18	21	130	41	29	239

The participants were given thirty-five sentences on utilization of Facebook for learning and teaching processes. The participants asked to state their agreement

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level on a five point Likert scale from “strongly agree” to “strongly disagree”. The results showed that the participants are undecided on Facebook as learning or teaching tool. The order of Facebook tools for facilitating learning in an online instructional context are ranked as; “Online Friends” (M=2.74), “Wall” (M=2.65), “Photos” (M=2.57), “Links” (M=2.52), “News Feed” (M=2.50), and “Videos” (M=2.44). There is a slight tendency toward participating a course on Facebook.

After the factor analysis, the entire survey included twenty-one items with three meaningful factors; Facebook as an instructional tool, Facebook as a communication tool, and Facebook as a preferable tool. The reliability coefficient, Cronbach alpha was calculated as .94.

### **4.3. Conclusion**

It is obvious that social networking websites are getting important and integrated within our current lives. As Coyle and Vaughn (2008) indicated youth is registering more than one social networking websites. This is also true for the participant of this study. Furthermore, demographics summarize that social networking websites are for everyone, regardless of their gender, education level, or occupations.

Facebook is the leading example of social networking websites. The participants of this study are satisfied with its usability, especially its search capability and its embedded content. On the other hand, the participants seem to question its speed and level of interactivity. This might be the result of overloaded interface elements, such as videos and photos.

Although Facebook offers many usage alternatives to its users, the participants focus on its social relationship establishment features. Similar to Richter and Koch (2008) study, the participants use Facebook for keeping in touch with other people and sharing much information. Flirting and playing games were not listed as the reasons for using Facebook for this group of participants. Additionally, the participants were not in favor of presenting information where other users might reach them directly (phone number or address).

The study results of the first part provide clues for social networking website designer for increasing usability of their websites. Moreover, it is essential to understand Facebook miracle on current era. The instrument could be replaced within other studies and supported with qualitative research methods for deeper understanding.

Second phase of the study focuses on utilization of social networking websites in instructional contexts. The study showed that participants are not sure about possible effects of using Facebook for education. It might be a reason that the participants have not experienced or witnessed such kind of learning activities on Facebook. Similar to this study, in their research; Towner, VanHorn and Parker (2007) identified that most of the Facebook users who attend university are cautious about using Facebook in education where they agree that Facebook is important for social relations. Therefore, good examples should be delivered on Facebook in accordance with the preliminary results of this study. Additionally, more research studies should be implemented on instructional activities on social networking websites in general and Facebook in specific.

Many other researchers offer to take advantage of using social networking websites in education and remark on several points and precautions. For instance, Coutts, Dawson, Boyer, and Ferdig (2007) urge that students should learn about how to deal with their online identities on social networking websites. This study revealed that very few Facebook members read Facebook's Terms of Service and Privacy Policy. This shows that participants do not pay attention to their online identities from the beginning. Moreover, the relationship between and among teachers and students on a social networking website is a dilemma. In Baran's study (2010) all students supported the idea that membership of teachers to Facebook is appropriate and half of the students noted that Facebook provided a chance to know more about their classmates.

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## References

1. Baran, B. (2010). Facebook as a formal instructional environment. *British Journal of Educational Technology*, doi: 10.1111/j.1467-8535.2010.01115.x
2. Coutts, J., Dawson, K., Boyer, J. & Ferdig, R. (2007). Will you be my friend? Prospective teachers' use of Facebook and implications for teacher education. In R. Carlsen et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2007* (pp. 1937-1941). Chesapeake, VA: AACE.
3. Coyle, C. L. & Vaughn, H. (2008). Social networking: Communication revolution or evolution?. *Bell Labs Technical Journal*, 13(2), 13-18.
4. Global faces and networked places (2009, March). *A Nielsen report on social networking's new global footprint*. Retrieved October, 15, 2010, from [http://blog.nielsen.com/nielsenwire/wp-content/uploads/2009/03/nielsen\\_globalfaces\\_mar09.pdf](http://blog.nielsen.com/nielsenwire/wp-content/uploads/2009/03/nielsen_globalfaces_mar09.pdf)
5. Google's Double Click AdPlanner. (2011). *The Google.com*. Retrieved May, 15, 2011, from <http://www.google.com>
6. Greene, H. C. (2008). The role socially constructed shared knowledge in learning to teach: Collaboration and reflection in a computer-mediated environment. *The Teacher Educator*, 43, 1-28.
7. Fraenkel, J. R., & Wallen, N. E. (2000). *How to design and evaluate research in education* (4th ed.). New York: McGraw-Hill.
8. Hinduja, S. & Patchin, J. W. (2008). Personal information of adolescents on the Internet: A quantitative content analysis of MySpace. *Journal of Adolescence*, 31, 125-146.
9. Kert, S. B. & Kert, A. (2010). The usage potential of social network sites for educational purposes. *International Online Journal of Educational Sciences*, 2(2), 486-507.
10. Lampe, C., Ellison, N. B. & Steinfield, C. (2008). Changes in use and perception of Facebook. *Proceedings of CSCW*, San Diego, California, USA.
11. Paulus, T. & Scherff, L. (2008). "Can anyone offer any words of encouragement?" online dialogue as a support mechanism for preservice teachers. *Journal of Technology and Teacher Education*, 16 (1), 113-136.
12. Richter, A. & Koch, M. (2008). Functions of social networking services. *Proceeding at 8th International Conference on the Design of Cooperative Systems*, Carry-le-rouet, Institut d'Etudes Politiques d'Aix-en-Provence, France, 87-98.
13. Towner, T. L., VanHorn, A. M., & Parker, S. L. (2007). Facebook: Classroom tool for a classroom community?. Paper presented at *the annual meeting of the Midwest Political Science Association*, Chicago, USA. Retrieved June 21, 2009, from [http://www.allacademic.com/meta/p197133\\_index.html](http://www.allacademic.com/meta/p197133_index.html)

## **The MSc. in Information Technologies of Distance Education: Are we ready for the future education?**

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**Abstract:** Paper presents the results of self-analysis of the second-cycle study programme Information Technologies of Distance Education (hereinafter “the Programme”) in the field of Informatics Engineering is implemented by Kaunas University of Technology (hereinafter “the University, KTU”) in cooperation with Vilnius Gediminas Technical University. This programme was established in 2002 as the first joined online based Master degree programme in Lithuania. The goal of the self-analysis, which covers the last 5 years, is to evaluate the strong and weak points of the Programme and to prepare recommendations for the improvement to meet the challenges of future education. The side goal is to analyse the possibilities to establish the international joined distance education Master degree programme together with Middle East Technical University, Turkey.

**Keywords:** a self-analysis, Information Technologies, Distance Education, Master degree programme

### **Introduction**

The increasingly technology-rich world has profound implications for education, and the information and communication technologies (ICT) may provide significant educational benefits. First, ICT can provide tools for enriching the teaching and learning process by opening new opportunities and avenues. In particular, ICT can enhance the customisation of the educational process, adapting it to students’ particular needs. Second, education role in preparing students for adult life means that it must provide students with the skills needed in a society in which ICT-related skills and competences are increasingly indispensable. The development of these competences is becoming an integral part of the goals of compulsory education. Finally, in a knowledge economy driven by ICT, people who do not master these competences may suffer from a “digital divide” which can affect their capacity to fully participate in the economy and society. It is the role of education to bridge this divide.

In the future, it is expected that technological developments will continue to

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advance at unprecedented speed. Trends include increases in computing power accompanied by decreases in cost; a shift from networked to ubiquitous computing; computing based on bioscience; smart drugs and cognitive enhancement; brain-machine interfaces; 3D printing and plastic electronics; complex and intertwined socio-technical systems. (Redecker et al., 2011)

To ensure life-long learning, distance education (DE) is of primary importance due to its possibilities. The students may study at the convenient time, in acceptable pace and in the desired place, for example, at home or work. This is ensured not only by DE, but also IT-based education methods and electronic (e-) learning grounded on it. The document of the European Commission initiative Youth on the Move of 2010 states that high-quality teaching and learning must be promoted in all levels of education system, whereas the fundamental competence of knowledge society, such as learning to learn, ability to make full use of the possibilities of IT and e-learning are gaining even more importance. (Youth, 2010)

### **Demand for the e-learning programme**

In Lithuania, the life-long learning system is implemented in universities, colleges, vocational schools, adult training centres and other related institutions. Distance Study Centres, operating in many higher education institutions, aim at developing and improving IT-based higher education study and continuing education system. Among other weaknesses, the Strategy for Ensuring Lifelong Learning 2008-2013 of the Republic of Lithuania still emphasises that, according to the data of the European Universities Continuing Education Network, only about 40% of universities consider life-long learning an important priority of their activity. In the practice of the universities, the concept of life-long learning implies short professional training courses, distance and adult education, but it lacks a single united model of life-long learning strategy (Strategy, 2008). Meanwhile, the results of the Study of the Demand for Distance Education Service Providers, carried out by KTU Centre of E-learning Technologies in 2007, suggest that this is because the staff at the institutions providing

education services lack knowledge and skills in preparing high-quality DE material, organizing the DE process effectively and developing the accessibility of educational material. As many as 92% of respondents indicated that they lack knowledge in organizing technology-based studies and wish to improve their knowledge and skills in this area. Similarly, IT specialists lack pedagogic knowledge necessary for developing new and effective DE IT as well as improving the existing ones. For this reason, there is a great need of specialists having knowledge and skills in IT, pedagogy and DE. The demand for DE specialists who are able to apply IT in teaching and learning is also proved by the European Union initiative Youth on the Move, includes a strategy of EU Europe 2020 Strategy of the EU till 2020 (Youth, 2010).

Formal education of DE specialists in Lithuania was initiated in 2003 after preparing second-cycle study programme Information Technologies of Distance Education in three universities (Kaunas University of Technology, Vilnius University and Vilnius Gediminas Technical University (VGTU)), which is currently provided in cooperation by KTU and VGTU. The programme was prepared by implementing the national ITMIS Programme (Information Technologies for Science and Studies), approved by the Minister of Education and Science, and based on the examples of the famous universities worldwide, namely: University of Maryland, USA, provides Master of Distance Education, currently Master of Distance Education and E-Learning, programme since 2000; similar programme is also offered by Carl von Ossietzky Universität Oldenburg, Germany; Athabasca University, Canada, offers Master of Education of Distance Education programme since 1994; University of London, UK, offered Master of Distance Education programme.

The demand for a study programme that prepares specialists in information technologies of distance education (ITDE) is also supported by a great number of entrants and students admitted to the programme in five-year period. Only last year the number of entrants diminished in all areas due to the demographic and other reasons, thus, the number of applicants to the programme under analysis also has slightly dropped. Nevertheless, ITDE specialists with a master's degree capable of

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implementing and developing life-long learning system are necessary not only in the education sector: every institution, organization or company require the organization of staff training and qualification improvement courses as well as preparation of e-learning tools. Such trainings accessible not only during working hours, but after as well (i.e. e-learning), can be arranged by responsible staff, but they require knowledge and skills in DE organization that may be gained in the second-cycle study programme under analysis.

### **Purpose, aims and pursued learning outcomes of the programme**

The purpose, aims and pursued learning outcomes of the programme are determined by the need for the programme, i.e. the necessity of specialists with knowledge and skills in information engineering, pedagogy and DE organization:

- **Information engineering-related activity:** design, development and application of IT tools for learning;
- **Pedagogy-related activity:** application of up-to-date approaches and methods in teaching and learning using IT;
- **Distance education-related activity:** organization and implementation of distance studies applying up-to-date pedagogic approaches and methods as well as IT.

After graduating, the ITDE specialists are able to work in education institutions, adult training and regional professional training centres, universities and colleges that require specialists capable of organizing distance learning process, design, implement or simply apply and employ the possibilities of IT to support e-learning, arrange training for acquiring or improving qualification at the time, place and speed convenient to the students.

The programme is targeted towards specialists with a higher education degree in different fields, rather than exclusively for the graduates of Informatics or Informatics Engineering. The programme provides a possibility for the specialists with informatics or informatics engineering qualification to expand and for others to deepen

the knowledge in the application of informatics engineering in distance learning and acquire the necessary skills and abilities. After graduating from the programme, the specialists with informatics or informatics engineering qualification are able to design and implement IT tools, apply them in the learning process, organize and conduct distance studies using up-to-date IT and pedagogic approaches. Similarly, after graduation, the specialists in other fields are capable of applying (selecting and using) up-to-date IT tools in learning, organizing and conducting distance studies by applying modern IT and pedagogic approaches.

The main aim of the programme is to prepare masters of Information Technologies having comprehensive knowledge and skills in designing, implementing and applying information technologies and their tools in distance studies by using up-to-date teaching and learning approaches and methods; able to develop electronic teaching and learning tools and content, arranging and implementing high-quality distance studies by ensuring possibilities of life-long learning.

The aims and learning outcomes of the programme were last reviewed and specified during the preparation of the self-analysis. Under the order generally accepted in the University, the pursued learning outcomes were regrouped according to the Euro-Inf Framework Standards and Accreditation Criteria for Informatics Degree Programmes, prepared by the international academic network EQANIE. The specification of the aims and pursued learning outcomes of the programme was discussed with the staff of the Faculty. The staff also participated in training for self-analysis preparation groups organized by KTU Academic Department. By applying the methodology presented during the training, the pursued learning outcomes were compared to the second-cycle outcomes of Dublin Descriptors to verify the correspondence.

## **Study process**

Admission to the programme is carried out separately in KTU and VGTU, but afterwards all admitted students study the subjects together and are assessed by the

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same teacher who lectures on the respective subject, except for the Research Projects and Final Degree Projects. If the subject is taught by a teacher from the university other than the student was admitted to, the examination results are submitted to the university which the student belongs to.

As the lectures are organized in the form of video conferences, using Video Presentation System ViPS, and the number of premises for conducting the classes is sufficient, it is possible to prepare a reasonable timetable. The students can take part in lectures conducted as video conferences from any place where they have Internet access.

The studies are conducted applying the following methods and approaches, which stress the development of skills and competence: search and analysis of scientific and applied literature as well as other data, research papers, Final Degree Projects and their defence, group work (projects, individual tasks, and group tasks during practical classes, reports and their presentations), practical trainings, discussions and seminars. Academic and other support for the students of the second-cycle programme is continuous.

To assess the achievements of students thoroughly and objectively a ten-point criteria-based proportional system and accumulative evaluation system, stimulating systematic work during the whole semester, are applied. Individual work (laboratory work, course papers, projects, individual tasks, etc.) done during the semester is assessed by grades; the final grade is given during the examination session by multiplying separate grades by weight coefficient and summing up the results.

### **Video Presentation System ViPS**

Video Presentation System ViPS – a HTML, Javascript and Flash based e-learning system. The purpose of the system is to let students and lecturers create and review video lectures and recordings in the internet. ViPS is compatible with all browsers and friendly to computer and internet line resources. System can be set up on any servers, which support PHP, JAVA and FLASH technologies.

### Recordings' dependence hierarchy

Video Presentation System's ViPS uses hierarchy to group recordings. Every recording belongs to session or study subject. This depends if recording was done in conference or in lecture. Session or study subject is a kind of channel, which has the functionality to manage recordings and user rights. Every channel belongs to conference or study subject. Conferences and study programs belong to institution, which organizes the conference or proposes study programs to the learners (Figure 1, a) part).

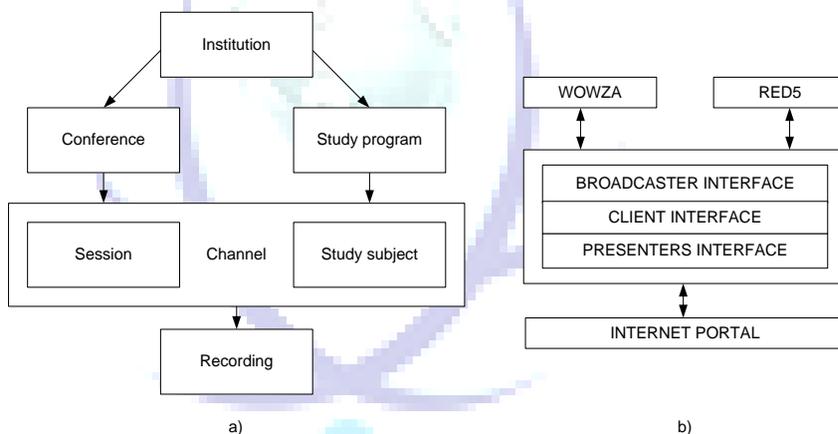


Figure 1: a) Recordings dependence hierarchy; b) Component schema.

Presenters and lecturers can broadcast live video and manage recordings. Recordings are created automatically during live broadcast. Learners and conference participators can view live broadcasts and review recordings, also subscribe to channels to be informed by email when new recordings are created.

Presenter can show slides, broadcast computer screen, chat with participators in chat window, get questions from them. Participators can see presenter's video, which is in sync with slides. They can also chat in chat window, post questions to the presenter.

Video Presentation System can support unlimited amount of live broadcasts at one time and lots of presenters can broadcast/record their presentations simultaneously.

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### **ViPS system components**

Conceptual component scheme is depicted in Figure 1, b) part. ViPS consists of 3 main parts:

- Broadcast software;
- Interfaces for presenter, client and broadcaster
- Internet portal.

The synchronization of interfaces is ensured with RED5 RTMP server. For each of broadcast RED5 server creates a separate room, where all user interfaces are connecting. Other RTMP server WOWZA is used for video and audio stream broadcast and recording. RED5 server can also be used instead, but WOWZA is more reliable.

Systems background is an internet portal is based on Drupal CMS system. Internet portal is used for user, institutions, broadcast and recordings management. It also integrates Flash interfaces.

ViPS system has 3 types of users:

- Broadcaster – administrates broadcast, starts and end broadcast, uploads slides
- Presenter – show slides, can chat with clients, can answer questions
- Client – is a learner who can give questions, chat and watch presenter.

User interfaces are created with Flash technology, which is working in any modern browser.

Broadcaster's interface has main broadcasting management functions. User can start and end broadcast. When broadcast is started, WOWZA RTMP server creates a FLV format recording, which is available after broadcast for review. Additionally, slides` upload can be done with broadcasters interface. User can upload JPG format or PNG format picture archive or PPT format file.

With presenter's interface user can show slides to viewers. Information about presenter's active slide is transferred to RED5 server in shared object. The slide is in

sync with video broadcast. This interface also has screen share possibility. Screen share is based on JAVA Webstart.

With client's interface there is a possibility to watch a presenter, give questions, chat, see active slide.

RED5 server synchronizes interfaces, creates a separate room for each of the session. Slide sequence is saved into special XML file with slide time and URL address. Another XML file is used for saving chat discussion, screen share timing and questions.

Kaunas University of Technology continuously improves video conferencing system as a main tool for video lecturing. In the framework of the Eureka project "Virtual Communication and Meeting Centre", a distributed platform that would enable migration of all aspects of conferences, lectures or meetings to a virtual environment as well as to enhance traditional events with innovative collaboration, content authoring, knowledge sharing and semantic web technologies is under development. The platform will offer integration services for separate repositories and will allow creation of new services on the top of them. Additionally, it would offer an easy tool for managing data and users from one location. This will improve the quality of video lecturing in the Master degree programme; also, it will be a useful platform for international collaboration with East Technical University, Turkey.

## **Conclusions**

The Master degree Programme Information Technologies of Distance Education is targeted towards specialists with a higher education degree in different fields, rather than exclusively for the graduates of Informatics or Informatics Engineering. The programme provides a possibility for the specialists with informatics or informatics engineering qualification to expand and for others to deepen the knowledge in the application of informatics engineering in distance learning and acquire the necessary skills and abilities.

The process of self-analysis and the findings were very significant for the

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Programme improvement and also, for preparation to start a discussion between Kaunas University of Technology and Middle East Technical University concerning the joined Master degree Programme in Distance Education.

## **References**

1. Redecker, Ch., Leis, M., Leendertse, M., Punie, Y., Gijsbers, G., Kirschner, P., ... Hoogveld, B. (2011) The Future of Learning: Preparing for Change. JRC European Commission.
2. Strategy for Ensuring of Lifelong Learning. (2008) Approved by the Order No. ISAK-2795/A1-347 of 15 October 2008 of the Minister of Education and Science and the Minister of Social Security and Labour.
3. Youth on the Move – An initiative to unleash the potential of young people to achieve smart sustainable and inclusive growth in the European Union. (2010) European Commission.



## **Potential of Social Media in e-Learning: Are We Close to Finding Some Answers?**

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**Abstract:** *The interest in new and innovative e-learning solutions has been increasing steadily in the past decade. New technologies enable the creation of powerful collaborative learning environments by facilitating communication and interaction. Social media, one of the emerging technologies, has great potential to be used as a formal and informal learning tool if one is to consider the social aspect of learning. There are many studies reflecting the potential of social networks as learning tools. The recent studies try to explore different aspects of the potential of using social media for learning purposes. There is an emerging need to review those studies in this scope to see the big picture and to find some answers to develop innovative learning environments. This paper aims at demonstrating the potential of using social media in e-learning through the review of related selected studies which emphasize the practices for better and more innovative e-learning solutions. The purpose of this study is to review and discuss the results of selected recent research studies in the scope of using social media in e-learning. A systematic collection procedure was developed by the researchers by following some criteria to obtain a pool of articles and then a selection methodology was applied to have the list of articles to be reviewed. Systematic review methodological approach is applied to review the selected recent studies. It is expected that the results of this study will contribute to the field of e-learning in terms of indicating the potential of using social media.*

**Keywords:** Social Media, Social Learning, e-learning, Information Technologies, Distance Education

### **Introduction**

The various economic, social and technological changes in the past decade have resulted in a steady increase in the interest in in new and innovative e-learning solutions. The focus of the knowledge society is shifting towards lifelong learning and collaborative knowledge construction which cannot be driven by a fixed, structured curriculum but by knowledge work in a networked learning community, which have become an integral part of our daily lives. New technologies enable the creation of powerful collaborative learning environments by facilitating communication and interaction. These online collaborative learning environments have revolutionized the approach to education, training, and learning at a distance. Today, the new forms of “web-based learning”, “online learning”, or “e-learning” hold promises for both

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distance education and conventional education on behalf of lifelong learning. Because of the social nature of learning, users may happen to perform learning activities while they are connected to social networks. As they share links, videos, etc. or commenting on each other's posts; informal or even formal learning can be supported and enhanced. Inevitable development of social networks supported by improving technology and social media has become an inseparable part of the 21st Century. These social networks not only support easy and instantaneous communication, but also form a base for individualized and social learning. The existing social networks such as Facebook, Twitter, LinkedIn, etc. are attracting ever more users each day. These mediums, while supporting fast and easy communication, also present various opportunities for individual and group learning. Interactive social learning is not a new idea since learning itself is a social activity. Unfortunately, this aspect was ignored for a long time. Now, though, through the technology of accessing the internet and online social media anywhere, anytime, people are able to learn from each other and work collaboratively. With this new and innovative approach to education, training, and learning at a distance, better constructions for both distance education and lifelong learning are being formed. The main concept of these innovations is to perform social learning.

According to Blanken, Hoeven, and Wals (2009, p.11), some of the characteristics of social learning are learning from each other together, learning more in heterogeneous groups, creating trust and social cohesion to make use of the different ways in which people view the world, and working together for collective meaning making and sense making. Since social media is ready to promote all these aspects of social learning; users can and most often do perform learning activities while they are connected to social networks.

There are many studies reflecting the potential of social networks as learning tools. For example, Selwyn (2009) states that the results of his study point out the importance of Facebook as a medium for “the informal, cultural learning of ‘being’ a student, with online interactions and experiences allowing roles to be learnt, values

understood and identities shaped.” He adds that it should “therefore be seen as an increasingly important element of students’ meaning-making activities, especially where they reconstruct past events and thereby confer meaning onto the overarching university experience.” (Selwyn, 2009)

Other examples show similar results for various applications and different cultures. One can point out the cell-phone social network of Makoe (2010), created for students of South Africa. Gloor, Paasivaara, Schoder and Willems (2007) have studied with students taking a course globally and were able to analyze the forming of collaborative groups among them. Wang (2012) has seen the success of Facebook as a collaborative learning tool for the Taiwanese students. While all these studies point out the success of social networks in one form or another, they also state their shortcomings, some of which have been solved by other studies. Through this paper, the results of selected recent research studies in the scope of using social media in e-learning will be reviewed and discussed. Thus, all these works with their results and recommendations will be accessed more easily and form a picture showing researchers of the field if their work has been a success.

## **The Study**

The main purpose of this study is to discuss the results of selected recent research studies in the scope of using social media in e-learning. There is a vast amount of research trying to explore the potential of using social media in e-learning, resulting in a need to put them together in a meaningful way so that what has been done and to what extent can be seen and used for future works.

## **Methodology**

This study followed the methodology proposed in different review articles. To obtain a pool of articles, a systematic collection procedure was used. These articles were gathered by searching for relevant keywords on the web sites of various publishers.

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While selecting the articles forming this pool, the researchers used the following criteria: Only the articles which were published in journals with citation indexes were used. Also, no articles published before 2003 were chosen. Then a selection methodology was applied to have the list of articles to be reviewed. First, the chosen articles of the pool were indexed and tagged in an excel file, specifying their types, aims, results and recommendations. Through the help of this file, any papers that were not research papers were eliminated; and the researches that were mentioned in more recent papers were ignored.

After this last elimination process, remaining papers were classified according to their areas of interest and the types of participants they had. The subcategories for these two subjects are knowledge building processes, social network types, measurement instruments; and K12 students, university students, adult learners, teachers respectively. Most studies were able to be listed under both categories, and were analyzed accordingly. Lastly, the failings and recommendations of the papers were studied to find the common shortcomings and foreseeable general trends for future research.

### **Review of recent studies**

The area of the use of social networks in e-learning is a vast one. This is why, to be able to examine it with any semblance of accuracy, one must try to split it to relevant smaller parts. To that extend, in this study, two main classifications as to the way most of the researches are done were constructed. First, the different areas of interest of the relevant researches were studied and then the concerned participants became the focus of the review.

Analyzing the papers written in the field, one can see three distinct areas of interest. The researchers work on developing a new instrument or measuring the efficiency of either the instruments or the social networks, they investigate the idea of knowledge communities or the process of knowledge building directly, or they work on the dynamics of various social networks. The first part of this study is based on these

three titles.

To be able to begin understanding about any field, one must first try to develop ways to measure the variables of said field. The field of the use of social networks in e-learning is not different. While studying the various works, it is easy to distinguish the pursuit of developing and analyzing such measurement instruments. Various researchers have contributed to this subject by creating new tools and studying them, or by contemplating the social networks as measurement tools. In this context, Usluel and Mazman (2009) have tried to develop an adoption scale, while Toikkanen and Lipponen (2009) worked on the usefulness of Social Network Analysis (SNA). Chan and Liebowitz (2006) used the SNA to develop a knowledge map, showing an innovative way of using social media; and Ackland (2009) proposed that social media can also become a research tool itself.

Social networks provide an interactive medium through which it becomes possible to form knowledge societies, and build knowledge. Most of the studies concerning the role of social media on e-learning focus on this aspect of the field. The researchers have studied various points, from the formation of identity in knowledge societies to the different models of knowledge building and effects of the use of social media in learning. The knowledge building process begins with the forming of online communities, and the identities users create when joining them. Focusing on this, Greenhow and Robelia (2009) studied the effects of social network services (SNS) on high school students' identity formation. Some researchers such as Gloor, Paasivaara, Schoder and Willems (2008), Baker-Doyle and Yoon (2011), Wang (2010), Selwyn (2009) and Ahn (2012) have also studied the way online knowledge communities are formed and the way they operate; contributing to the field by providing insights about efficient virtual collaboration, access to social capital, and different knowledge building characteristics throughout the social networks. There are also researchers such as Ram, Ai, and Ram (2011) and Lang (2011) who focus on communities formed by a common interest instead of as a part of formal education. Finally, Jin, Cheung, Lee and Chen (2009) and Huang and Liu (2009) contribute to the field by researching on the

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ways to keep users participating, and trying to find models explaining the knowledge flow and organization of the communities.

When studying the use of social networks in e-learning, one may also investigate the social networks themselves; both as anonymous online mediums connecting users and specific networks and their characteristic effects. Looking at the field, it is easy to see that the most studied social network is FaceBook, although there are other similar and sometimes different online networks used in education. Bulkley and Alstyne (2010), Bicen and Cavus (2011), Buzzetto-More (2012) and Wang (2012) studied the effects and the efficiency of FaceBook, confirming the relationship between the network structure and performance, listing the ways students use social media, and showing its role on cross-cultural collaboration. Others such as Glezou, Grigoriadou and Samarakou (2010), Kaltenbrunner, Gonzalez, Querol and Volkovich (2011) and Makoe (2010) worked on other, local SNSs; contributing to the knowledge about their use in lifelong learning and the suitability of devices such as cell phones as tools for social interaction.

When studying the researches done in the field, one can see four distinct participant types. The studies focusing on participants and their relevance to the social networks instead of the social networks themselves study with K12 students, university students, adult learners or teachers. To that extend, the papers focusing on concerned participants were also reviewed according to these four groups.

The studies of the field focusing on children and teenagers are smaller compared to others, but steadily growing. Since the K12 education is more structured and organized compared to others, it is natural that integration of social media to this formal education is slower, resulting in the studies focused on either the formation of identity of learners or their perceptions of social networks, such as the works of Greenhow and Robelia (2009) and Ahn (2012). On the other hand, the K12 group is the only group where the concern about the safety of students and possible harm to participants is also studied intently, as can be seen in the study done by Vandoninck, d'Haenens, De Cock and Donoso (2011).

The biggest study group is university students, as it is easy to integrate social networks to their formal and informal education as most of them already use these media daily. Still, students of different cultures, coming from different backgrounds, or studying in different areas show some differences in how they use these mediums, making it very important to find and examine these differences in order for social networks to be efficient in education. The older studies in the area, such as the ones done by Lockyer and Patterson (2008) and , Gloor, Paasivaara, Schoder and Willems (2008) focus on exploring the potential of social networks, or are done to understand how university students interact through these mediums, whereas newer studies have shifted their focus on either various different areas that the students study, or the similarities and differences in the social media use of students of different cultures as these general studies began giving results. For example, Lang (2011), Buzzetto-More (2012) and Wang (2012) explored the use of social media on students with different majors or with different cultural backgrounds; while Bicen and Cavus (2011), researched the preferences of university students.

One other group of focus is adult learners, who either participate in lifelong learning activities or have formed online communities due to their areas of interest or companies. The studies completed with adult learners mostly aim to either help the participants by improving knowledge flow through their online communities or to understand the structures of communities formed by adults. Chan and Liebowitz (2006), Kim, Suh and Jun (2011) and Bulkley and Alstynne (2010) worked with adult learners to discover their problems in using social media at work and to help them with a more effective SNS structure, or to understand the dynamics behind their use of and role in social networks.

The last distinct participant group is that of teachers. Researchers studying teachers see them as either members of communities which are formed around the common interest of teaching, or as the facilitators of social networks through their lectures. While teachers as members of online communities are technically not different from any other adult learner groups, they are listed under this topic since their

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experiences in these communities eventually contribute to their use of social networks in their lectures. Some examples of studies done with teachers are that of Baker-Doyle and Yoon (2011), Veletsianos and Kimmons (2012), Ranieri, Manca and Fini (2012) and Ulrich and Karvonen (2011); who investigated their access to social capital and their experiences in social networking sites as well as mechanisms controlling teacher forums and the attitudes of instructors towards integration of social networks into formal education and their effects.

## **Results and Discussion**

Throughout this paper some of the recent studies about the use of social networks on e-learning were reviewed with the aim of demonstrating the potential of the field. Different categories were created and the review was constructed under these titles with the aim of providing a clear picture. Since most studies focus on both a specific area of the field and a distinct group of participants, both categories were examined.

Analyzing the different areas of interest that various studies focus on, three main categories were distinguished. The results of the first one, measurement instruments show that the researchers of the field have been able to develop some instruments that are reliable and consistent; although there is a remaining need for better and more detailed instruments as well as for generalizing their use to different settings and creating ways to use them effectively for providing help in solving problems of social networks. The second area of interest that the researches focus on is the knowledge societies, knowledge building and their mechanics; and the results in this area show that students show a higher success rate in terms of their grades, and also do tend to have higher social capital. On the other hand, the results also point out that most online communities do not form naturally, but users will continue to contribute as long as they are satisfied and find the media useful. The last item of the areas that researchers focus on is the social networks themselves. Most of the studies were done on FaceBook, although some other SNSs were also analyzed, showing that social media is an effective tool for collaboration, and is used more and frequently and

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more effectively when the users become more comfortable. One other result of this area is that while local SNSs are not yet as common or improved as the more popular social networks, they have the potential.

The second category was that of different groups of participants. Their results showed that social networks contribute to the K12 students' identity development and allow them to show twenty-first century skills. This group also show higher social capital when using social media. Results of studies on the risks of subjecting this age group to SNSs point to the fact that "adolescents living in lower SES families, teens with either low or high self-confidence and those having a bad relationship with their parents are more at-risk (Vandoninck, d'Haenens, De Cock and Donoso, 2011)". University students form the most studied participant group; since they are very active users of social networks and most of them expect these media to be part of their education. Results of studies on this group consistently show positive outcomes from the use of social networks in education, although some authors state the continuing difficulty in integrating them to formal education. As of now, they are more effective in providing informal learning environments and providing social support. The social networks of adult users are mostly in the form of organizational networks. They can join experts to those that are in need of their expertise, and work as mediums for tacid knowledge flow. The results show that they have the potential to be very effective but many users encounter problems as not all of these organizational networks are very organized, and some experts do not use them effectively, putting them out of reach. The last participant group is that of teachers. The results of studies in this area show that teachers can use these networks to establishing and maintaining meaningful connections; although they do not naturally build these networks. Several studies show that online networks formed by teachers and educational experts vary in their aims, attitudes and members. Results of studies focusing on teacher attitudes and intentions as to their use of SNSs in education indicate that their attitudes do not affect the class content of online courses.

## **Recommendations**

Looking at the results of various studies and their implications; it is easy to see that there is an ever growing need to integrate social networks into formal education, as well as fine tuning organizational social networks for better performance. While the benefits and positive effects of SNSs have been proven repeatedly, the lack of relevant content that would target their effects to desired solutions is also apparent. Other than these specific needs, to better understand the mechanics and effects of social media, it is advisable to continue trying to use social networks in wider, and more varying environments, as well as for longer time to observe their long term effects.

## **References**

1. Ackland, R. (2009). Social Network Services as Data Sources and Platforms for e-Researching Social Networks. *Social Science Computer Review*, 27(4), 481-492.
2. Ahn, J. (2012). Teenagers' Experiences With Social Network Sites: Relationships to Bridging and Bonding Social Capital. *The Information Society*, 28(2), 99-109.
3. Arjen E.J. Wals, Noor van der Hoeven, Harm Blanken, (2007). The acoustics of social learning. *Wageningen Academic Publishers*, The Netherlands, 2009.
4. Baker-Doyle, K. J., & Yoon, S. A. (2011). In search of practitioner-based social capital: a social network analysis tool for understanding and facilitating teacher collaboration in a US-based STEM professional development program. *Professional Development in Education*, 37(1), 75-93.
5. Bicen, H., & Cavus, N. (2011). Social network sites usage habits of undergraduate students: case study of Facebook. *Procedia Social and Behavioral Sciences*, 28(0), 943-947.
6. Bulkley, N., & Alstynne, M. W. V. (2010). An Empirical Analysis of Strategies and Efficiencies in Social Networks. *Management*, 38.
7. Buzzetto-More, N. A., (2012). Social Networking in Undergraduate Education. *Interdisciplinary Journal of Information, Knowledge, and Management*, 7, 63-90.
8. Chan, K., & Liebowitz, J. (2006). The synergy of social network analysis and knowledge mapping: a case study. *International Journal of Management and Decision Making*, 7(1), 19.
9. Glezou, K., Grigoriadou, M., Samarakou, M. (2010). Educational Online Social Networking in Greece: A Case Study of a Greek Educational Online Social Network. *The International Journal of Learning*, 17(3), 399-420.
10. Gloor, P. A., Paasivaara, M., Schoder, D., & Willems, P. (2008). Finding collaborative innovation networks through correlating performance with social

- network structure. (M. Paasivaara, P. Willems, & D. Schoder, Eds.) *International Journal of Production Research*, 46(5), 1357-1371.
11. Greenhow, C., & Robelia, B. (2009). Informal learning and identity formation in online social networks. *Learning Media And Technology*, 34(2), 119-140.
  12. Huang, Y.-M., & Liu, C.-H. (2009). Applying adaptive swarm intelligence technology with structuration in web-based collaborative learning. *Computers & Education*, 52(4), 789-799.
  13. Jin, X.-L., Cheung, C. M. K., Lee, M. K. O., & Chen, H.-P. (2009). How to keep members using the information in a computer-supported social network. *Computers in Human Behavior*, 25(5), 1172-1181.
  14. Kaltenbrunner, A., Gonzalez, G., Ruiz De Querol, R., Volkovich, Y. (2011). Comparative analysis of articulated and behavioural social networks in a social news sharing website. *New Review of Hypermedia and Multimedia*, 17(3), 243-266.
  15. Kim, S., Suh, E., & Jun, Y. (2011). Building a Knowledge Brokering System using social network analysis: A case study of the Korean financial industry. *Expert Systems with Applications*, 38(12), 14633-14649.
  16. Kocak Usluel, Y., Guzin Mazman, S. (2009). Social Networks Adoption Scale. *Educational Sciences and Practice*, 8 (15), 137-157.
  17. Lang, A. (2011). Exploring the potential of social network sites in relation to intercultural communication. *Arts and Humanities in Higher Education*, 11(1-2), 120-139.
  18. Lockyer, L., & Patterson, J. (2008). Integrating Social Networking Technologies in Education: A Case Study of a Formal Learning Environment. *2008 Eighth IEEE International Conference on Advanced Learning Technologies*, (July), 529-533. Ieee.
  19. Makoe, M. (2010). Exploring the use of MXit: a cell-phone social network to facilitate learning in distance education. *Open Learning The Journal of Open and Distance Learning*, 25(3), 251-257.
  20. Ram, A., Ai, H., Ram, P., & Sahay, S. (2011). Open Social Learning Communities. *Human Factors*, 1.
  21. Ranieri, M., Manca, S., & Fini, A. (2012). Why (and how) do teachers engage in social networks? An exploratory study of professional use of Facebook and its implications for lifelong learning. *British Journal of Educational Technology*, 43(5), 754-769.
  22. Selwyn, N. (2009). Faceworking: exploring students' education-related use of Facebook. *Learning Media And Technology*, 34(2), 157-174.
  23. Toikkanen, T., & Lipponen, L. (2009). The applicability of social network analysis to the study of networked learning. *Interactive Learning Environments*, 19(4), 365-379.
  24. Ulrich, J., & Karvonen, M. (2011). Faculty instructional attitudes, interest, and intention: Predictors of Web 2.0 use in online courses. *The Internet and Higher Education*, 14(4), 207-216.

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25. Vandoninck, S., D'Haenens, L., De Cock, R., & Donoso, V. (2011). Social networking sites and contact risks among Flemish youth. *Childhood A Global Journal Of Child Research*, 19(1), 69-85.
26. Veletsianos, G., & Kimmons, R. (2012). Scholars and faculty members' lived experiences in online social networks. *The Internet and Higher Education*, (0), 1-8.
27. Wang, C. M. (2012). Using Facebook for cross-cultural collaboration: The experience of students from Taiwan. *Educational Media International*, 49(1), 63-76.
28. Wang, L. (2010). How social network position relates to knowledge building in online learning communities. *Frontiers of Education in China*, 5(1), 4-25.



## The Effects of the Social Network Sites on Socialization: A Survey Study with the Personal Opinions and Attitudes to Socialization among University Students

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**Abstract:** *The purpose of this study is to examine the effects of the social network sites on socialization. In the coverage of the study, data was obtained through a 12 item questionnaire with 191 (59 female, 131 male and 1 did not declare his / her gender) university students between 24th December 2011 and 21th January 2012. Data was collected via internet in Google Docs survey. The SPSS (version 16.0) program was used to examine the data. Pearson product-moment correlation coefficient test, independent-samples t-test and chi-square test were applied to analyze the data. Mean and standard deviation also were used to analyze the data. The results showed that when the age goes up, the internet usage also goes up. Furthermore, they showed that when computer usage or social network sites' usage go up, the time for family life also go up. In addition to this, females use social network sites more than male use.*

**Keywords:** Social network sites, socialization, university students, internet usage, Facebook.

### Introduction

New technological improvements that quickly change have broken new ground that could not be estimated before 15-20 years to the world. The industry of computer has been rapidly spread out over all countries. "Could we have ever imagined back in the 80s that computers would play such a huge role in our lives?" asked Hamilton in 2006. The answer of this question would be most probably no in those days. What about now? We cannot live without computers in any moments. We use computers for every day for variety of purposes. For example, we use computers for shopping, banking, gaining information, reservation and so on. According to the study that was conducted by Turkish Statistical Institution (TSI) in Turkey between 2004 and 2011, the computer usage percentage has been increasing gradually. While the computer usage was 23.6 %

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in 2004, this ratio was 46.4 % in 2011. In addition to this, according to the same study, 92.3 % of higher education students use computer in 2011.

With the development of computer sector, the internet sector has already developed. This development of internet technology has brought new tendency to our daily life. Shortly, internet has become an inseparable part of our lives. According to the study that was conducted by Turkish Statistical Institution (TSI) in Turkey between 2004 and 2011, the internet usage percentage has been increasing gradually. While the internet usage was 18.8 % in 2004, this ratio was 45.0 % in 2011. Furthermore, according to the same study, 91.0 % of higher education students use internet in 2011. In addition to this, internet has made many ways to create new communication skills like mailing, messaging and so on. However, without any doubt, the social network sites (SNSs) can be described as the biggest innovations in the internet today. The term "social networking" is associated with forming connections with other people using the internet. It brings up images of websites that allow people to speak to others without regard for geographic, social or economic barriers. This allows for an incredible opportunity to connect with people of similar interests, when physical barriers might have kept them from even learning of each other's existence otherwise (Smith, 2011).

A SNS is an internet site that typically provides a core set of services in which members can build a personal profile, create and maintain a relational network of friends or contacts, and communicate with these individuals in various ways over the internet (Ryan & Magro & Sharp, 2011). The concomitant adoption of "Web 2.0" technologies like social networking sites (SNSs) that allow individuals to be identified by and communicate with mass-scale audiences (Stefanone & Lackaff & Rosen, 2010). A social networking site is an online location where a user can create a profile and build a personal network that connects him or her to other users (Lenhart & Madden, 2007). Since their introduction, social network sites (SNSs) such as MySpace, Facebook, Cyworld, and Bebo have attracted millions of users, many of whom have integrated these sites into their daily practices. Some sites cater to diverse audiences,

while others attract people based on common language or shared racial, sexual, religious, or nationality-based identities. Sites also vary in the extent to which they incorporate new information and communication tools, such as mobile connectivity, blogging, and photo/video-sharing (boyd & Ellison, 2007).

Since the release of the first social network site (SNS) in 1997, the growth of these online communities has skyrocketed (Ahn, 2011). There are hundreds of SNSs at the present time and millions of people use these sites. And, the SNSs are getting more and more popular. The more the increase in popularity of SNSs gets, the more the new users are observed. A great deal of activities can occur between the people in these online communities. The social interaction between the people can easily occur in these SNSs. A social network service consists of a representation of each user (often a profile), his/her social links, and a variety of additional services. Most social network services are web-based and provide means for users to interact over the internet, such as e-mail and instant messaging (Social Networking Service in Wikipedia, 2012).

The internet has made it increasingly easier for people to get connected with each other whether that is with long-distance family, friends, or to find new loves and friendships. Social networking sites such as MySpace, Facebook, Classmates, Hi-5, and other similar sites are designed to allow people to share their creativity, pictures, and information with others. Sometimes people do this to find romance, sometimes they do it to find friends with similar interests, and sometimes they do it to keep in touch with family (Bautista, n.d.). SNSs like Facebook are nowadays very popular on-line communities with large people populations. For example, think about Facebook SNS. Mark Zuckerberg and his college roommates launched Facebook in February 2004. Now, it has over 800 million active users. It is a serious number, is not it? There are just a few countries that have more than 800 million citizens in the world.

## **Problem Statements and Purpose of Study**

When it comes to mention SNSs, socialization must be discussed. Socialization is very important to maintain a good life. In order to feel well-being day, people must allow 2-3 hours on their own. Providing that people allow time to themselves, stress and anxiety decrease and health gains strength. However, the reverse of the medal is quite different.

It is believed that over using the SNSs causes people isolate themselves from society. It affects the socialization negatively. There is lack of face to face interaction. While people may still interact with one another in more “traditional ways” such as coffee or phone calls, today many people are more apt to learn or receive the latest news about one another through Facebook rather than from a personal inform. How many people learn about the happenings of family and friends online (Goessi, 2010)? Sometimes, people commit a crime because of affecting negatively. Sometimes, they divorce from their pair. But why? Clearly, at this point, there is a need to determine how the SNSs affect socialization.

SNSs are virtual environment. People can make connection to others virtually. Compared to other communication tools, this is the easiest way since there are many alternatives. Once people enter the online community, they begin to create their own network and start to meet new friends. In doing so, they eliminate the people who do not share the same interests or goals. Furthermore, it conduces to addiction. Sometimes, they spend the more than half of their day in front of the computer. SNSs are defined as time waste. Especially, for the students. Many families are worried about their children about over using internet and spending much more time by participating SNSs. They believe that SNSs are harmful for their children.

Compared to early schools, universities are defined to be more difficult. Students have to spend much more time for their success. They gain deeply knowledge in their own profession in universities. Universities are the last gate opening to life for many students. They also have to arrange time for themselves. Considering all these, university students have limited time for themselves. And, they should have a time

planning. There are many SNSs such as Facebook, hocam.com and so on in which university students can participate. If university spends their limited time for SNSs, what happens? Hence, it should be examined how the SNSs affect university students' life. The purpose of this study is to examine the effects of the SNSs on socialization among university students. Also, this study aims to determine the relationship between the computer usage, the internet usage and the SNSs' usage. Furthermore, it intends to take personal opinion about the participating of SNSs. Finally, it purposes to determine the relationship between the SNSs' usage and other social activities like reading book or family life.

### **Limitations of the Study**

- This study is limited with only university students.
- The data collection tool is limited with only 12 items questionnaire.
- The questionnaire language is limited with only Turkish.
- The reliability and validity are limited with the honest of the participants' opinions.
- The participants are limited with those who reached the survey link on the internet.

### **Method**

#### **Participants**

Participants of this study are people who are studying at universities as two years university student, bachelor of science student and master of science student. The study uses data from 191 people, whose age interval changes from 18 to 32. They are predominantly male, of whom there are no gender, education status or age limitations. This study includes 59 (30.9 %) female, 131 (68.6 %) male and 1 (0.5 %) did not declare his / her gender.

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**Table 1: Gender Distribution vs Education Status**

		Education Status			Total
		Two Years University	BS	MS	
Gender	Female	3	51	5	59
	Male	10	110	11	131
	Unknown	0	0	1	1
Total		13	161	17	191

### Instruments

The 12 item quantitative survey (attached to the appendix) was attempted to explore the participants' opinions about the socialization. The survey also includes information about the purpose of the study and warnings about data security and privacy. Having made the literature research, the survey items were written by the researchers. It includes 4 questions about the participant personal information (their demographic information like age or gender), 8 questions about their opinions. The questions on the survey are both selection and supply type. After writing the survey items, the survey was sent to the course instructor to get approve. After it was approved, data collection procedure started.

### Data Collection Procedures

After determining the questions, the survey was prepared with the help of Google Docs since it is so easy to prepare a survey in Google Docs. Also, it is easy to deliver the survey to the participants and to prepare data for analysis. After preparing the survey, the link<sup>3</sup> that was generated by Google Docs was shared in social networks such as Facebook, Twitter, MSN and some mail lists. Those who reached the link were warned that "This study includes some questions about you and your opinions about socialization. It takes nearly 2-3 minutes to complete the survey. We would be glad with your participation. Thank you for your concern." and asked whether they were

<sup>3</sup> <https://docs.google.com/spreadsheet/viewform?formkey=dHVpbHlXTh5bU1tczQwMVFBcDVRtnc6MQ>  
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willing to participate the survey or not. Of those who agreed, the survey was given to them to take their opinions. This survey is a cross-sectional survey since information was collected at just one point in time, even though it took 29 days to gather all the data. Data was obtained between the 24th December 2011 and 21th January 2012. They completed the survey with respect to their opinions about socialization.

### **Data Analysis and Data Analysis Procedure**

For the data analysis, SPSS (version 16.0) program was used. This study uses inferential statistics to determine the difference and to show the relation between the variables. Pearson product-moment correlation coefficient test was used to determine whether there was a relation between the two numeric variables. Pearson product-moment correlation coefficient test was also used to determine the relation direction and its strength if there was a relation. Independent-samples t-test and chi-square test were used to determine whether there was a difference in the variables. For these all three test techniques, the probability values were also analyzed. In addition to these, Mean and standard deviation also were used to analyze the data.

After collecting the data from participants, the data was prepared for the analysis. Firstly, the data was downloaded from Google Docs in the MS Excel form. Next, some corrections were made on the data. For example, “teacher” transferred to “government official”. Also, some string data was handled. For instance, “half hour” transferred to “0,5” or “-” and “never” transferred to “0,0”. At this point, there was 477 data. Then, the invalid data was extracted from the data set. 72 participants’ data was not analyzed since their data was not valid. Some of them manipulated the study and some of them entered the data wrongly. At this point, there stayed 405 data. After that, the data was converted to SPSS language. Some fields such as gender were categorized. Next, the target group was chosen from the data. At this point, there stayed 191 data to analyze. Finally, the data was transferred to SPSS program. 2 participants’ data was not analyzed since they were too late to participate the study.

## **Hypotheses of Study**

- There is not a statistically significant relationship between the age and the time for the internet usage in a day.
- There is not a statistically significant relationship between the time for the SNSs' usage in a day and the time for the family life in a week.
- There is not a statistically significant relationship between the time for the computer usage in a day and the time for the reading book in a day.
- There is not a statistically significant difference in the time for the TV watching in a day for those who think that attending SNSs is a must and for those who don't think.
- There is not a statistically significant difference in the education status for those who think that using internet helps socialization and for those who don't think.
- There is not a statistically significant relationship between the age and the time for the SNSs' usage in a day.
- There is not a statistically significant difference in the time for the family life in a week for those who think that attending SNSs is a must and for those who don't think.
- There is not a statistically significant relationship between the time for the computer usage in a day and the time for family life in a week.
- There is not a statistically significant difference in the time for the SNSs' usage in a day for males and females.
- There is not a statistically significant difference in the gender for those who think that using internet helps socialization and for those who don't think.

## **Findings and Results**

Question 1: When questioned "Is there a statistically significant relationship between the age and the time for the internet usage in a day?", the findings are shown in the table 2.

**Table 2:** The results of the Pearson product-moment correlation coefficient test to determine the relationship between the age and the time for the internet usage in a day.

	Age	Time for the Internet Usage in a Day
Age	$\bar{X} = 22.06$	$r = 0.185$
	SD = 2.204	
	N = 191	
Time for the Internet Usage in a Day	$p = 0.011 < 0.05$	$\bar{X} = 4.789$
		SD = 2.8765
		N = 189

According to the table 1, it can be said that the mean score of the age is 22.06 and its standard deviation is 2.204 of 191 participants. Also, the mean score of the time for the internet usage in a day is 4.789 and its standard deviation is 2.8765 of 189 participants. The relation coefficient of two variables is 0.185 and its probability value is 0.011 ( $p < 0.05$ ).

The relationship between the age and the time for the internet usage in a day was investigated using the correlation analysis. There was a small strength, positive and statistically significant correlation between the two variables,  $r = 0.185$ ,  $p = 0.011 < 0.05$ , with higher age associated with higher time for the internet usage in a day. Hence, there is a statistically significant relationship between the age and the time for the internet usage in a day.

Question 2: When questioned “Is there a statistically significant relationship between the time for the SNSs’ usage in a day and the time for the family life in a week?”, the findings are shown in the table 3.

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**Table 3:** The results of the Pearson product-moment correlation coefficient test to determine the relationship between the time for the SNSs' usage in a day and the time for the family life in a week.

	Time for the SNSs' usage in a Day	Time for the Family Life in a Week
Time for the SNSs' usage in a Day	$\bar{X} = 2.460$	r = 0.143
	SD = 2.1557	
	N = 186	
Time for the Family Life in a Week	p = 0.056 > 0.05	$\bar{X} = 5.385$
		SD = 8.4400
		N = 183

According to the table 3, it can be said that the mean score of the time for the SNSs' usage in a day is 2.460 and its standard deviation is 2.1557 of 186 participants. Also, the mean score of the time for the family life in a week is 5.385 and its standard deviation is 8.4400 of 183 participants. The relation coefficient of two variables is 0.143 and its probability value is 0.056 ( $p > 0.05$ ).

The relationship between the time for the SNSs' usage in a day and the time for the family life in a week was investigated using the correlation analysis. There was a small strength, positive and statistically not significant correlation between the two variables,  $r = 0.143$ ,  $p = 0.056 > 0.05$ , with higher time for the SNSs' usage in a day associated with higher time for the family life in a week. Hence, there is not a statistically significant relationship between the time for the SNSs' usage in a day and the time for the family life in a week.

Question 3: When questioned “Is there a statistically significant relationship between the time for the computer usage in a day and the time for the reading book in a day?”, the findings are shown in the table 4.

**Table 4:** The results of the Pearson product-moment correlation coefficient test to determine the relationship between the time for the computer usage in a day and the time for the reading book in a day.

	Time for the Computer Usage in a Day	Time for the Reading Book in a Day
Time for the Computer Usage in a Day	$\bar{X} = 5.486$	$r = -0.105$
	SD = 2.9266	
	N = 190	
Time for the Reading Book in a Day	$p = 0.159 > 0.05$	$\bar{X} = 0.865$
		SD = 1.0208
		N = 184

According to the table 4, it can be said that the mean score of the time for the computer usage in a day is 5.486 and its standard deviation is 2.9266 of 190 participants. Also, the mean score of the time for the reading book in a day is 0.865 and its standard deviation is 1.0208 of 184 participants. The relation coefficient of two variables is -0.105 and its probability value is 0.159 ( $p > 0.05$ ).

The relationship between the time for the computer usage in a day and the time for the reading book in a day was investigated using the correlation analysis. There was a small strength, negative but statistically not significant correlation between the two variables,  $r = -0.105$ ,  $p = 0.159 > 0.05$ , with higher time for the computer usage in a day associated with lower time for the reading book in a day. Hence, there is not a

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statistically significant relationship between the time for the computer usage in a day and the time for the reading book in a day.

Question 4: When questioned “Is there a statistically significant difference in the time for the TV watching in a day for those who think that attending SNSs is a must and for those who don’t think?”, the findings are shown in the table 5.

**Table 5:** The results of the independent-samples t-test to determine the difference in the time for the TV watching in a day for those who think that attending SNSs is a must and for those who don’t think.

	Groups	N	$\bar{X}$	SD	t	df	p
How many hours do you spend on watching TV in a day?	Those who think that attending SNSs is a must	40	0.688	0.9916	-1.651	178	0.101
	Those who don’t think that attending SNSs is a must	140	1.139	1.6459			

According to the table 5, it can be said that the mean score of hours that is spent on watching TV of those who think that attending SNSs is a must is 0.688 and its standard deviation is 0.9916 of 40 participants. Also, the mean score of hours that is spent on watching TV of those who don’t think that attending SNSs is a must is 1.139 and its standard deviation is 1.6459 of 140 participants. The probability value is 0.101 ( $p > 0.05$ ).

According to the table 6, the probability value of the Kolmogorov-Smirnov test is 0.582. Since  $p = 0.582 > 0.05$ , it can be said that the mass in which every two variables are chosen shows normal distribution in its own.

**Table 6:** The results of the Kolmogorov-Smirnov test to ensure that the mass in which every two variables are chosen shows normal distribution in its own.

		How many hours do you watch TV in a day?
Most Extreme Differences	Absolute	0.139
	Positive	0.000
	Negative	-0.139
Kolmogorov-Smirnov Z		0.777
Asymp. Sig. (2-tailed)		0.582

According to the table 7, the probability value of the Levene's Test for Equality of Variances test is 0.137. Since  $p = 0.137 > 0.05$ , it can be said that the variances that belong to every two groups are equal to each other.

**Table 7:** The results of the Levene test to ensure that the variances that belong to every two groups are equal to each other.

		Levene's Test for Equality of Variances	
		F	Sig.
How many hours do you spend on watching TV in a day?	Equal variances assumed	2.233	0.137
	Equal variances not assumed		

According to these results, there is a difference between the mean scores of the time for TV watching for two groups. Independent-samples t-test was conducted to compare the mean scores for those who think that attending SNSs is a must and for those who don't think. There was not a significant difference in the mean scores for those who think that attending SNSs is a must ( $M = 0.688$ ,  $SD = 0.9916$ ) and for those

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who don't think that attending SNSs is a must [ $M = 1.139$ ,  $SD = 1.6459$ ;  $t(178) = -1.651$ ,  $p = 0.101 > 0.05$ ].

Question 5: When questioned "Is there a statistically significant difference in the education status for those who think that using internet helps socialization and for those who don't think?", the findings are shown in the table 8.

**Table 8:** The results of the Chi-square test to determine the difference in the education status for those who think that using internet helps socialization and for those who don't think.

			Do you think using internet helps socialization?		Total	$\chi^2$	df	p
			Yes	No				
Education Status	Two years university	Count	8	5	13	4.489	2	0.106
		%	61.5	38.5	100.0			
	BS	Count	97	60	157			
		%	61.8	38.2	100.0			
	MS	Count	6	11	17			
		%	35.3	64.7	100.0			
Total		Count	111	76	187			
		%	59.4	40.6	100.0			

According to the table 8, it can be said that for the question of "Do you think using internet helps socialization?"; 8 (61.5 %) of two years university students said yes and 5 (38.5 %) of them said no, 97 (61.8 %) of BS students said yes and 60 (38.2 %) of them said no and 6 (35.3 %) of MS students said yes and 11 (64.7 %) of them said no. The probability value is 0.106 ( $p > 0.05$ ).

Chi-square test was conducted to determine whether there is a statistically significant difference in the education status for those who think that using internet helps socialization and for those who don't think ( $\chi^2 (1, 187) = 4.489, p = 0.106$ ). Since  $p = 0.106 > 0.05$ , it can be said that there is not a statistically significant difference in the education status for those who think that using internet helps socialization and for those who don't think.

Question 6: When questioned "Is there a statistically significant relationship between the age and the time for the SNSs' usage in a day?", the findings are shown in the table 9.

**Table 9:** The results of the Pearson product-moment correlation coefficient test to determine the relationship between the age and the time for the SNSs' usage in a day.

	Age	Time for the SNSs' usage in a Day
Age	$\bar{X} = 22.06$	$r = 0.017$
	SD = 2.204	
	N = 191	
Time for the SNSs' usage in a Day	$p = 0.819 > 0.05$	$\bar{X} = 2.460$
		SD = 2.1557
		N = 186

According to the table 9, it can be said that the mean score of the age is 22.06 and its standard deviation is 2.204 of 191 participants. Also, the mean score of the time for the SNSs' usage in a day is 2.460 and its standard deviation is 2.1557 of 186 participants. The relation coefficient of two variables is 0.017 and its probability value is 0.819 ( $p > 0.05$ ).

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The relationship between the age and the time for the SNSs' usage in a day was investigated using the correlation analysis. There was a small strength, positive but statistically not significant correlation between the two variables,  $r = 0.017$ ,  $p = 0.819 > 0.05$ , with higher age associated with higher time for the SNSs' usage in a day. Hence, there is not a statistically significant relationship between the age and the time for the SNSs' usage in a day.

Question 7: When questioned "Is there a statistically significant difference in the time for the family life in a week for those who think that attending SNSs is a must and for those who don't think?", the findings are shown in the table 10.

**Table 10:** The results of the independent-samples t-test to determine the difference in the time for the family life in a week for those who think that attending SNSs is a must and for those who don't think.

	Groups	N	$\bar{X}$	SD	t	df	p
How many hours do you spend time with your family outside your house in a week?	Those who think that attending SNSs is a must	41	5.500	8.5206	0.174	177	0.862
	Those who don't think that attending SNSs is a must	138	5.239	8.3939			

According to the table 10, it can be said that the mean score of hours that is spent with family of those who think that attending SNSs is a must is 5.500 and its standard deviation is 8.5206 of 41 participants. Also, the mean score of hours that is spent with family of those who don't think that attending SNSs is a must is 5.239 and its standard deviation is 8.3939 of 138 participants. The probability value is 0.862 ( $p > 0.05$ ).

**Table 11:** The results of the Kolmogorov-Smirnov test to ensure that the mass in which every two variables are chosen shows normal distribution in its own.

		How many hours do you spend time with your family outside your house in a week?
Most Extreme Differences	Absolute	0.085
	Positive	0.054
	Negative	-0.085
Kolmogorov-Smirnov Z		0.480
Asymp. Sig. (2-tailed)		0.975

According to the table 11, the probability value of the Kolmogorov-Smirnov test is 0.975. Since  $p = 0.975 > 0.05$ , it can be said that the mass in which every two variables are chosen shows normal distribution in its own.

**Table 12:** The results of the Levene test to ensure that the variances that belong to every two groups are equal to each other.

		Levene's Test for Equality of Variances	
		F	Sig.
How many hours do you spend time with your family outside your house in a week?	Equal variances assumed	0.424	0.516
	Equal variances not assumed		

According to the table 12, the probability value of the Levene's Test for Equality of Variances test is 0.516. Since  $p = 0.516 > 0.05$ , it can be said that the variances that belong to every two groups are equal to each other.

According to these results, there is a difference between the mean scores of the time for family life for two groups. Independent-samples t-test was conducted to compare the mean scores for those who think that attending SNSs is a must and for those who don't think. There was not a significant difference in the mean scores for those who think that attending SNSs is a must ( $M = 5.500$ ,  $SD = 8.5206$ ) and for those

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who don't think that attending SNSs is a must [ $M = 5.239$ ,  $SD = 8.3939$ ;  $t(177) = 0.174$ ,  $p = 0.862 > 0.05$ ].

Question 8: When questioned "Is there a statistically significant relationship between the time for the computer usage in a day and the time for family life in a week?", the findings are shown in the table 13.

**Table 13:** The results of the Pearson product-moment correlation coefficient test to determine the relationship between the time for the computer usage in a day and the time for family life in a week.

	Time for the Computer Usage in a Day	Time for the Family Life in a Week
Time for the Computer Usage in a Day	$\bar{X} = 5.486$	$r = 0.150$
	$SD = 2.9266$	
	$N = 190$	
Time for the Family Life in a Week	$p = 0.043 < 0.05$	$\bar{X} = 5.385$
		$SD = 8.4400$
		$N = 183$

According to the table 13, it can be said that the mean score of the time for the computer usage in a day is 5.486 and its standard deviation is 2.9266 of 190 participants. Also, the mean score of the time for the family life in a week is 5.385 and its standard deviation is 8.4400 of 183 participants. The relation coefficient of two variables is 0.150 and its probability value is 0.043 ( $p < 0.05$ ).

The relationship between the time for the computer usage in a day and the time for the family life in a week was investigated using the correlation analysis. There was a small strength, positive and statistically significant correlation between the two

variables,  $r = 0.150$ ,  $p = 0.043 < 0.05$ , with higher time for the computer usage in a day associated with higher time for the family life in a week. Hence, there is a statistically significant relationship between the time for the computer usage in a day and the time for family life in a week.

Question 9: When questioned “Is there a statistically significant difference in the time for the SNSs’ usage in a day for females and males?”, the findings are shown in the table 14.

**Table 14:** The results of the independent-samples t-test to determine the difference in the time for the SNSs’ usage in a day for females and males.

	Groups	N	$\bar{X}$	SD	t	df	p
How many hours do you spend time with SNSs in a day?	Females	57	2.632	1.9697	0.711	183	0.478
	Males	128	2.387	2.2446			

According to the table 14, it can be said that the mean score of hours that is spent with SNSs of females is 2.632 and its standard deviation is 1.9697 of 57 participants. Also, the mean score of hours that is spent with SNSs of males is 2.387 and its standard deviation is 2.2446 of 128 participants. The probability value is 0.478 ( $p > 0.05$ ).

**Table 15:** The results of the Kolmogorov-Smirnov test to ensure that the mass in which every two variables are chosen shows normal distribution in its own.

		How many hours do you spend time with SNSs in a day?
Most Extreme Differences	Absolute	0.135
	Positive	0.135
	Negative	-0.041
Kolmogorov-Smirnov Z		0.850
Asymp. Sig. (2-tailed)		0.465

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According to the table 15, the probability value of the Kolmogorov-Smirnov test is 0.465. Since  $p = 0.465 > 0.05$ , it can be said that the mass in which every two variables are chosen shows normal distribution in its own.

**Table 16:** The results of the Levene test to ensure that the variances that belong to every two groups are equal to each other.

		Levene's Test for Equality of Variances	
		F	Sig.
How many hours do you spend time with SNSs in a day?	Equal variances assumed	0.067	0.796
	Equal variances not assumed		

According to the table 16, the probability value of the Levene's Test for Equality of Variances test is 0.796. Since  $p = 0.796 > 0.05$ , it can be said that the variances that belong to every two groups are equal to each other.

According to these results, there is a difference between the mean scores of the time for SNSs for two groups. Independent-samples t-test was conducted to compare the mean scores for females and males. There was not a significant difference in the mean scores for females ( $M = 2.632$ ,  $SD = 1.9697$ ) and for males [ $M = 2.387$ ,  $SD = 2.2446$ ;  $t(183) = 0.711$ ,  $p = 0.478 > 0.05$ ].

Question 10: When questioned "Is there a statistically significant difference in the gender for those who think that using internet helps socialization and for those who don't think?", the findings are shown in the table 16.

**Table 17:** The results of the Chi-square test to determine the difference in the gender for those who think that using internet helps socialization and for those who don't think.

			Do you think using internet helps socialization?		Total	$\chi^2$	df	p
			Yes	No				
Gender	Female	Count	34	24	58	0.009	1	0.923
		%	58.6	41.4	100.0			
	Male	Count	76	52	128			
		%	59.4	40.6	100.0			
Total		Count	110	76	186			
		%	59.1	40.9	100.0			

According to the table 17, it can be said that for the question of “Do you think using internet helps socialization?”; 34 (58.6 %) of females said yes and 24 (41.4 %) of them said no, 76 (59.4 %) of males said yes and 52 (40.6 %) of them said. The probability value is 0.923 ( $p > 0.05$ ).

Chi-square test was conducted to determine whether there is a statistically significant difference in the gender for those who think that using internet helps socialization and for those who don't think ( $\chi^2(1, 186) = 0.009, p = 0.923$ ). Since  $p = 0.923 > 0.05$ , it can be said that there is not a statistically significant difference in the gender for those who think that using internet helps socialization and for those who don't think.

## **Discussions**

The results indicated that the age and the time for the internet usage in a day have positive correlation. Many argue that the internet usage increases age by age. That is the more the age gets, the more the internet usage increases. So, from the findings, it is clear that when the age gets increase, the internet usage increases. There is a small strength, positive and statistically significant (  $p = 0.011 < 0.05$  ) correlation between the two variables with higher age associated with higher time for the internet usage in a day. It means like people beliefs; the internet usage is getting higher from the early age to the lately age. According to the study that was conducted by Turkish Statistical Institution (TSI) in Turkey between 2004 and 2011, the internet usage percentage, which is 65.8 % in 2011, is in the top position for the 16-24 age interval. Also, the age interval of this study's participants is 18-32. They are near the same. This finding supports the TSI finding.

An important result has been found that the time for the SNSs' usage in a day and the time for the family life in a week have positive correlation. Many believe that the SNSs' usage disturbs family life. That is the more the time for the SNSs' usage is, the less the time for family life is. But, from the results, it is obvious that when the time for the SNSs' usage gets increase, the time for the family life increases. There is a small strength, positive but statistically not significant (  $p = 0.056 > 0.05$  ) correlation between the two variables with higher time for the SNSs' usage in a day associated with higher time for the family life in a week. It means opposite to people beliefs; the SNSs' usage does not affect family life much negatively. However, this result is not statistically significant.

The results indicated that the time for the computer usage in a day and the time for the reading book in a day have negative correlation. Many argue that the computer usage decreases the time that is dedicated to reading book. That is the more the computer usage gets, the less the time for the reading book is. So, from the findings, it is clear that when the computer usage gets increase, the reading book decreases. There is a small strength, negative but statistically not significant (  $p = 0.159$  )

$> 0.05$  ) correlation between the two variables with higher time for the computer usage in a day associated with lower time for the reading book in a day. It means like people beliefs; the computer usage affects reading book negatively. According to the Report of Reading Book in 2011, the percentage of reading book is 4.5 % in Turkey. Compared to the computer usage percentage, which is 46.4 % in Turkey (Turkish Statistical Institution, 2011 ), this ratio is very low.

The statement that whether there is a difference between the mean scores of the time for TV watching for the time for those who think that attending SNSs is a must and for those who don't think is observed. From the results, it can be said that those who think that attending SNSs is a must watch TV less than those who do not think attending SNSs is a must. Maybe, those who think that attending SNSs is a must spend their time by using SNSs and they do not have enough time to watch TV. They might follow news or their interest by SNSs. That is why this result occurs.

The statement that whether there is a statistically significant difference in the time for the SNSs in a day for females and males is observed. From the results, it can be said that females use SNSs more than males. According to the study that was made by Pingdom (2009), generally, females use SNSs more than female use. This statistic supports this study's finding.

Helping people to improve their social skills is an important and challenging task. If we are to be successful in this effort, we need to provide much more time. After an age, the characteristic of people fit and does not change. The focus of this study is to ascertain the personal opinions and attitudes to socialization. At this point, a famous phrase (by Molière) comes that "I always do the first line well, but I have trouble doing the others.". So, in order to do all the lines well...

## **Suggestions**

- Same of qualitative questions will might be added to the study to take participants' deeply opinions.
- Some other questions about socialization or social network sites will might be added

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to make other tests.

- The study will might be made with large population.
- The data will might be collected by face to face ( not on internet ).
- The study will might be made with people who have different education status.
- The study will might be made with specific population like a faculty, a university or a city.

### **Acknowledgements**

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### **References**

1. Ahn, J. (2011). Digital Divides and Social Network Sites: Which Students Participate in Social Media? *Journal of Educational Computing Research*, Vol. 45(2) pp. 147-163.
2. Bautista, E. (n.d.). Immigration: Fraudulent Marriage [On-line]. Retrieved on 5 January 2012 from <http://asianjournalusa.com/immigration-fraudulent-marriage-p10421-82.htm>
3. boyd, d. m. & Ellison, N. B. (2007). Social Network Sites: Definition, History, and Scholarship. *Journal of Computer-Mediated Communication*, Vol. 13(1), article 11.
4. Goessi, L. (2010, September 21). How Does Social Networking Affect Socialization [On-line]? Retrieved on 29 December 2011 from <http://www.helium.com/items/1958968-how-does-social-networking-affect-socialization>
5. Hamilton, M. (2006, July 19). The Importance of a Computer Education [On-line]. Retrieved on 20 December 2012 from <http://ezinearticles.com/?The-Importance-of-a-Computer-Education&id=247004>
6. Lenhart, A. & Madden, M. (2007, January 3). Social Networking Websites and Teens: An Overview.

7. Pingdom (2009, November 27). Study: Males vs. Females in Social Networks [On-line]. Retrieved 21 January 2012 from <http://royal.pingdom.com/2009/11/27/study-males-vs-females-in-social-networks/>
8. Report of Reading Book (2011). [On-line]. Retrieved on 24 January 2012 from <http://dehakitabevi.ticaretimiz.com/n1410-2011-kitap-okuma.html>
9. Ryan, S. D. & Magro, M. J. & Sharp, J. H. (2011). Exploring Educational and Cultural Adaptation through Social Networking Sites. *Journal of Information Technology Education: Innovations in Practice*, Vol. 10.
10. Smith, B. (2011, February 9). The Great Importance of Social Networking [On-line]. Retrieved on 12 January 2012 from <http://www.sooperarticles.com/internet-articles/spam-articles/great-importance-social-networking-300688.html>
11. Stefanone, M. A. & Lackaff, D. & Rosen, D. (2010). The Relationship between Traditional Mass Media and "Social Media": Reality Television as a Model for Social Network Site Behavior. *Journal of Broadcasting & Electronic Media*, Vol. 54(3) pp. 508-525.
12. Turkish Statistical Institution (2011). Science, Technology & Information Society: Information Society. Retrieved on 24 January 2012 from [http://www.turkstat.gov.tr/VeriBilgi.do?tb\\_id=60&ust\\_id=2](http://www.turkstat.gov.tr/VeriBilgi.do?tb_id=60&ust_id=2)
13. Wikipedia (2012, January 9). Social Networking Service [On-line]. The Free Encyclopedia from Wikipedia. Retrieved on 20 January 2012 from [http://en.wikipedia.org/wiki/Social\\_networking\\_service](http://en.wikipedia.org/wiki/Social_networking_service)



## Appendix

### Opinion Survey about Socialization

Dear Participant,

This survey is prepared with homework purpose in the coverage of Scientific Research Techniques (ENF519) course given in the master program with thesis in the Informatics department (ENF) in the Graduate School of Natural and Applied Sciences (FBE) at Istanbul University (IU). The purpose of this survey is to take people's opinions about socialization. The answers given to the survey are kept secret and they are not shared with the third people surely. The results of the survey are not announced surely and they are only used for the analysis in the coverage of homework.

Thank you for allowing time.

Informatics Department Students

#### Part A: Personal Information

**Please, answer the demographic questions stated below.**

1-) Age (please supply as numeric):

.....

2-) Gender:

Female       Male

3-) Education Status:

Secondary school or below       High school       University for 2  
years       Bachelor       Master       Doctorate

4-) Occupation:

Not working       Retired       Retired and working       House  
wife       Officer       Student       Private sector       Self-  
employed person       Other (please supply) .....

#### Part B: Survey Questions

**Please, answer the questions stated below that best describes you.**

1-) Approximately, how many hours do you use computer in a day (please supply as numeric):

.....

2-) Approximately, how many hours do you use internet in a day (please supply as numeric):

.....

3-) Approximately, how many hours do you spend time with social network sites (Facebook, Twitter, MySpace and so on) in a day (please supply as numeric):

.....  
4-) Approximately, how many hours do you watch TV in a day (please supply as numeric):  
.....

5-) Approximately, how many hours do you read book in a day (please supply as numeric):  
.....

6-) Approximately, how many hours do you spend time with your family outside your house (shopping, trip, picnic, eating, cinema, theater and so on) in a week (please supply as numeric):  
.....

7-) Do you think that attending social network sites is a must?  
 Yes       No

8-) Do you think that using internet helps socialization?  
 Yes       No

**End of the survey. Thank you for your participation...**



## **A Descriptive Analysis on Multitasking Behaviors of Digital Natives in Turkey**

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**Abstract:** *Digital natives have some characteristics that are so different from the previous generations', related to a broad range from use of technology to views of life. From this point, it is aimed to analyze multitasking behaviors of digital natives in Turkey, within the scope of the following questions: What are the multitasking behaviors of digital natives in Turkey? How is being multitasker influential on digital natives' educational lives? Dominant-less dominant quantitative-qualitative sequential mixed research method was used in the study. In the less dominant quantitative part, descriptive model was used; a questionnaire was used as the data collection tool in order to determine the multitasking behaviors of digital natives as well as their demographic information. Findings from this part were analyzed by using percentage frequency distributions. The findings were also used for choosing the participants of the qualitative part. In the dominant qualitative part, case study model was used; focus group interviews were carried out in order to have detailed information about multitasking behaviors of digital natives. Findings from this part were analyzed using descriptive analysis method. The target mass are youths of 13-17 years old, being digital natives. The universe of the study is youths of 13-17 years old in Turkey; study universe is youths of 13-17 years old in İstanbul. In the quantitative part, study sample determined by disproportional group sampling method and stratified according to age, gender, and socio-economic status. The study sample size is 494. In the qualitative part, the focus group is consisted of 10 participants who were selected by maximum variation sampling of purposive sampling methods. Multitasking behavior is a very distinctive characteristic of digital natives. This behavior is influential on individuals in various extents from their self-development to academic or professional careers. While multitasking is valid for any activity, in this study, it is addressed to media tools usage, focusing on the Internet. It gets important to examine on behaviors of digital natives in digital learning environments, especially in the present days which e-Learning and mobile learning become dominant by the use of the Internet and social media in learning environments. Hopefully, the study provides some results that enable the researchers to make some suggestions for digital natives' educational lives. According to the results, it is observed that the rate of being multitasker among digital natives is very high. Multitaskers think multitasking very natural and they feel very comfort while doing multitasking. On the other hand, losing attention is a very common obstacle for digital natives to do multitasking. In conclusion, the results provide valuable information for getting to know digital natives by presenting the nature of their multitasking behaviors. Therefore, the study is worth in terms of providing information to apply on the related fields as well as providing some starting points for the future research.*

**Keywords:** Digital natives, Multitasking, Social media, Mobile learning, e-Learning

### **Introduction**

The society of the information age that we live in is named as the information society.

Current technologies have a powerful role on shaping the information society by means of being effective on all the areas of life. Digitalization has started in all the areas with the emergence of the Internet; digital culture has become an inseparable part of the information society (Türkoğlu, 2010). A new generation appeared who was born and has been raised in the world of such a society. In fact, there is plenty of naming for them but in this study we focus on Prensky's (2001) definition of "native speakers of the digital language of computers, video games and the Internet"; and he calls them as "digital natives". Digital natives are people born after 1980 and surrounded by digital media and other digital technologies.

Digital natives have the characteristics that are so different from the previous generations', related to a broad range from the use of technology to the views of life. As the common characteristics of them, digital natives (1) are used to receiving information really fast, (2) like to parallel process and multi-task, (3) prefer their graphics before their text rather than the opposite, (4) prefer random access, like hypertext, (5) function best when networked (6) thrive on instant gratification and frequent rewards, and (7) prefer games to "serious" work (Prensky, 2001).

Multitasking behavior is a very distinctive characteristic of digital natives. Even Wallis (2006) called the new generation as Generation "M" (M stands for Multitasking). Multitasking is defined in Britannica as "the running of two or more programs (sets of instructions) in one computer at the same time" (Encyclopedia Britannica, 2012). Although the term multitasking originally belongs to computer sciences, it has been using by various disciplines other than computer sciences such as media and human sciences. This behavior is influential on individuals in various extents from their self-development to academic or professional careers. While multitasking is valid for any activity, in this study, it is addressed to media tools usage, focusing on the Internet.

The research done by Rideout et al. (2010) shows that in the USA, multitasking proportion among youths aged 8-18 increase gradually; multitasking proportion is 16% for 1999, 26% for 2004, and 29% for 2009. They define multitasking

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proportion as “the proportion of media time that is spent using more than one medium concurrently”. This finding is very important because it implies that the rate of multitasking behavior for youth people is getting raised in parallel to developments in technology.

On the other hand, it becomes an issue to be considered whether multitasking behavior has positive or negative effects on digital natives. For example, Hembrooke and Gay (2003) say that multitasking may have a negative impact on learning due to cognitive overload. Also, Junco (2012) states frequency of multitasking with Facebook and text messaging were negatively predictive of overall semester GPA while other ICTs, such as using email, searching for information not related to class, IMing, and talking on the phone during class were not related to GPA. He explained this by students' overloading their ability to process information and to engage in deeper learning while switching between activities. In such a world that multitasking behavior becomes widespread, its effects then becomes more of an issue. Especially in the present days when e-Learning and mobile learning become dominant by the use of the Internet and social media in learning environments.

In this study, it is aimed to analyze multitasking behaviors of digital natives in Turkey, within the scope of the following questions: What are the multitasking behaviors of digital natives in Turkey? How is being multitasker influential on digital natives' educational lives? Research questions related to the former are: Do digital natives show multitasking behaviors? How are multitasking behaviors of digital natives distributed with regard to age, gender, and socio-economic status (SES)? Research questions related to the latter are: Why (or not) do digital natives do more than one activity while online? How do digital natives do more than one activity while online, especially while studying?

## **Method**

Dominant-less dominant quantitative-qualitative sequential mixed research method was used in the study. In the less dominant quantitative part, descriptive model was used. In

the dominant qualitative part, case study model was used.

## **Participants**

The target mass are youths of 13-17 years old, being digital natives. The universe of the study is youths of 13-17 years old in Turkey; study universe is youths of 13-17 years old in İstanbul. In the quantitative part, study sample determined by disproportional group sampling method and stratified according to age, gender, and socio-economic status and its size is 494 (Uğraş, 2012). 21% of participants are 13 years old, 20% are 14 years old, 17% are 15 years old, 20% are 16 years old, and 22% are 17 years old. 48% of participants are female, and 52% are male. 54% of participants are from low SES, and 46% are from high SES.

In the qualitative part, the focus group is consisted of 10 participants who were selected among participants of the quantitative part. These participants were selected by maximum variation sampling of purposive sampling methods with the criterion of showing multitasking behavior. There are one multitasker and one non-multitasker in each age group.

## **Instruments**

In the quantitative part, a questionnaire was used as the data collection tool in order to determine the multitasking behaviors of digital natives as well as their demographic information (Uğraş, 2012). In the qualitative part, focus group interviews were carried out with semi-structured interview questions in order to have detailed information about multitasking behaviors of digital natives (Uğraş, 2012).

## **Analyses**

Findings from the quantitative part were analyzed by using percentage frequency distributions. Findings from the qualitative part were analyzed using descriptive analysis method. Before descriptive analysis, interviews were transcript as text. Then,

descriptive analysis performed through four stages: First, a thematic framework was developed. Second, transcripts were annotated and organized for each theme. Third, findings were obtained. Finally, findings were discussed.

## **Results and Discussion**

In order to answer research questions, data from both quantitative and qualitative parts were analyzed. The results and their discussion are given below.

### **Multitasking behaviors of digital natives**

In the quantitative part, the following research questions were tried to be answered within the scope of the question “What are the multitasking behaviors of digital natives in Turkey?”:

- Do digital natives show multitasking behaviors?
- How are multitasking behaviors of digital natives distributed with regard to age, gender, and socio-economic status (SES)?

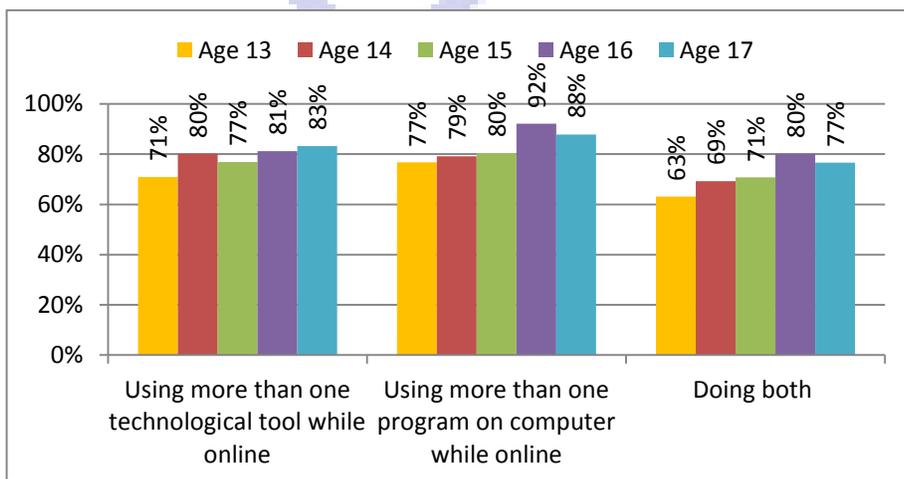
Multitasking behavior of digital natives were analyzed in terms of: (1) Using more than one technological tool while online, (2) Using more than one program on the computer while online. The former was asked as “Do you do more than one activity at the same time while you are online? For example watching TV, listening to music, or talking on the cell phone while searching the Web for your homework...”. The latter was asked as “Do you do more than one activity on the computer at the same time while you are online? For example checking your e-mails, posting to your Facebook profile, or doing chat while searching the Web for your homework...”. Table 1 shows the distribution of positive answers addressing to these cases.

**Table 1:** Distribution of multitasking behaviors

	Yes	
	f (N=494)	%
Using more than one technological tool while online	388	79%
Using more than one program on the computer while online	412	83%
<b>Doing both</b>	<b>356</b>	<b>72%</b>

From Table 1, we see that the rate of digital natives who use more than one technological tool while online is 79%; that of digital natives who use more than one program on the computer while online is 83%; that of digital natives who behave in both ways is 72%.

When multitasking behavior of digital natives were analyzed with regard to age, the distribution in Figure 1 is obtained.



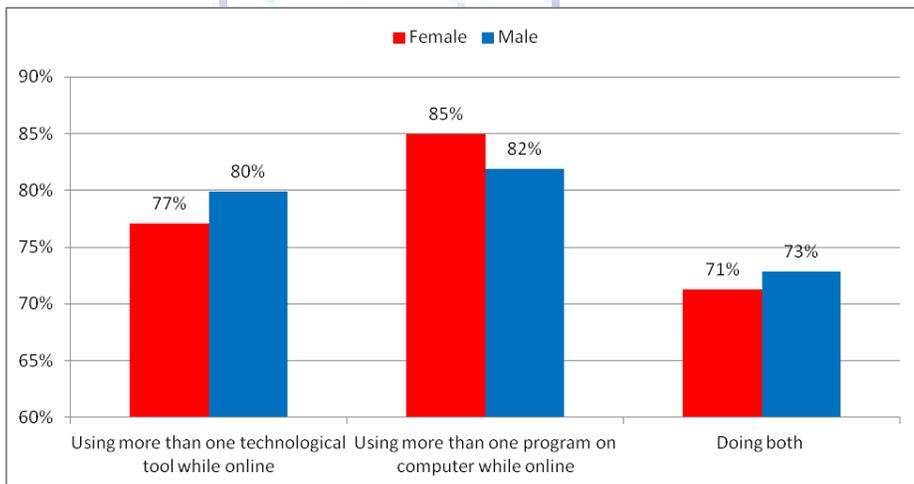
**Figure 1:** Distribution of multitasking behaviors with regard to age

As we see from Figure 1, the rates of multitasking behavior for each age group

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are almost the same and close to each other. The highest rate among digital natives who use more than one technological tool while online belongs to 17 years old (83%). The highest rate among digital natives who use more than one program on the computer while online belongs to 16 years old (92%). The highest rate among digital natives who behave in both ways belongs also to 16 years old (80%).

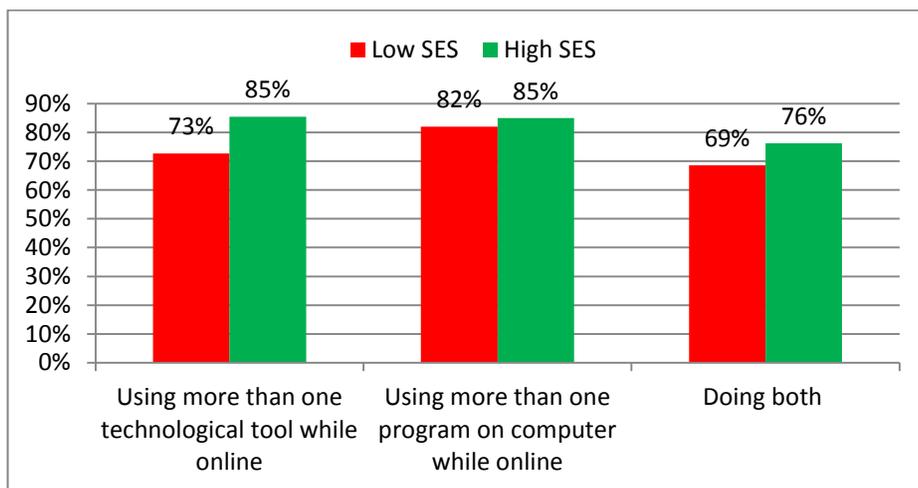
When multitasking behavior of digital natives were analyzed with regard to gender, the distribution in Figure 2 is obtained.



**Figure 2:** Distribution of multitasking behaviors with regard to gender

As we see from Figure 2, the rates of multitasking behavior for females and males are close to each other. The rate of using more than one technological tool while online is higher among males (80%) than females (77%). The rate of using more than one program on the computer while online is higher among females (85%) than males (82%). The rate of behaving in both ways is higher among males (73%) than females (71%).

When multitasking behavior of digital natives were analyzed with regard to SES, the distribution in Figure 3 is obtained.



**Figure 3:** Distribution of multitasking behaviors with regard to SES

As we see from Figure 3, the rates of multitasking behavior among digital natives from high SES are higher than those from low SES. The rate of using more than one technological tool while online is higher among high SES (85%) than low SES (73%). The rate of using more than one program on the computer while online is higher among high SES (85%) than low SES (82%); but those rates are close to each other. The rate of behaving in both ways is higher among high SES (76%) than low SES (69%).

Although the rates of multitasking behavior among digital natives with regard to age, gender, and SES it can easily be seen that all those rates are very high. In other words, it is widespread among digital natives to use more than one technological tool and/or more than one program on the computer while online. Similarly, as a result of their study with people aged from 14 to 65+ in Britain, Helsper and Enyon (2009) found that multitasking behavior was observed with the significantly highest rate at 14-17 age range (%87) among all the age ranges. Also, Rideout et al. (2010) found that only 13% of 13-18 aged youths were not computer multitasker in the USA in 2009. Computer multitasker means who “use a totally different medium while he/she is also

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using the computer –for example, watching TV, reading, or text messaging”. Another 40% of that age group said they use another medium or text message most of the time while they are using the computer; another 26% said they do so some of the time; another 17% said they do so a little of the time. In the project of Media Habits of MENA (Middle Eastern and North African) Youth, participants aged 13-28 stated their choices about other activities they usually engaged in while watching TV. According to the results, 53% send and receive cell phone text messages, 50% talk on the phone, 41% send and receive email, 39% listen to music, 36% browse online, 35% do their homework or work, 19% play video games, and 17% read (Melki, 2010). All those findings together with the findings of this study show that multitasking behavior among digital natives are very widespread all over the world.

### **Effects of being multitasker on digital natives’ educational lives**

In the qualitative part, the following research questions were tried to be answered within the scope of the question “How is being multitasker influential on digital natives’ educational lives?”:

- Why (or not) do digital natives do more than one activity while online?
- How do digital natives do more than one activity while online, especially while studying?

Thematic framework was developed in parallel to these research questions, respectively: (1) Reasons for being multitasker (or non-multitasker), (2) Multitasking style, (3) Feelings while multitasking. There are one multitasker participant and one non-multitasker participant in each age group. Participants were labeled with their age and multitasking behavior, such as 13-M where 13 stands for age and M stands for multitasker or 13-nonM where 13 stands for age and nonM stands for non-multitasker.

The first theme is “reasons for being multitasker (or non-multitasker)”. The theme was analyzed within the scope of participants’ answers to the following questions: You reported that you (don’t) use more than one technological tool while online, why? You reported that you (don’t) use more than one program on the

computer while online, why? Multitasker participants agreed that multitasking is natural. For example, the participant coded as 13-M stated that “I don’t do otherwise” about using more than one technological tool at the same time. Similarly, 15-M said that “in general, I already behave like that” about using more than one program on the computer at the same time. On the other hand, non-multitasker participants have a common feature that they didn’t have enough opportunity to get experience in multitasking. The reasons behind not having enough opportunities vary from not using even ICT extensively to not having more than one technological tool to use at the same time. For example, the participant coded as 13-nonM stated that “We have no computer. I don’t use the Internet much.” 16-nonM said that “There is no TV in the room which I do my homework, there is a desktop.” On the other hand, we come up losing concentration becomes another reason underlying not being multitasker, as in the quotation “I don’t do multitasking since I can lose concentrate” that quoted from 15-nonM.

The second theme is “multitasking style”. The theme was analyzed within the scope of participants’ answers to the following questions: You reported that you use more than one technological tool while online, how? How do you feel when you are using more than one technological tool while online, especially while studying? You reported that you use more than one program on the computer while online, how? How do you feel when you are using more than one program on the computer while online, especially while studying? All the multitasker participants said they were feeling very comfort while doing multitasking. One of them, 13-M, even said “I like to behave like that so much.” Although all the multitasker participants said they were doing more than one activity at the same time when online, it is observed that their multitasking behavior may change. Some multitaskers don’t have any trouble with this behavior. Sometimes they don’t use a specific tool or program depending on the activity they are doing at that time in order to affect their attention in the negative way. For example, 13-M stated that “While I am doing homework, I rather listen to music.” Some others have a little trouble with multitasking but they may handle this by doing activities

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consecutively. 14-M said that “For instance, I play games while waiting the completion of music download or check if the play is downloaded while looking at my Facebook profile.” Some multitaskers pay attention for the activity of doing homework. Those are who have no trouble with multitasking while doing any activity except doing homework, because of losing concentration. For example, 16-M stated that “While doing homework, if the other programs open on my computer are related to my homework, there is no problem. But if not, then I do in sequence.”

Although data for this part comes from the answers of multitaskers, the answers of non-multitaskers should be considered also. As stated above, some non-multitaskers state that the reason behind their non-multitasking behavior was losing concentration. Therefore, the relation between concentration and multitasking appears obviously. This is not surprising; there is plenty of research about cognitive load. They state that attempting doing more than one task at a time overloads the capacity of the human information processing system (Koch et al., 2011; Tombu et al., 2011).

## **Conclusion**

It gets important to examine on behaviors of digital natives in digital learning environments, especially in the present days which e-Learning and mobile learning become dominant by the use of the Internet and social media in learning environments. Hopefully, the study provides some results that enable the researchers to make some suggestions for digital natives' educational lives.

According to the results, it is observed that the rate of being multitasker among digital natives is very high. The rate of digital natives who use more than one technological tool while online is 79%; that of digital natives who use more than one program on the computer while online is 83%; that of digital natives who behave in both ways is 72%. According to multitaskers, multitasking is very natural and they feel very comfort while doing multitasking. On the other hand, non-multitasker participants have a common feature that they didn't have enough opportunity to get experience in multitasking. Although all the multitasker participants said they were doing more than

one activity at the same time when online, it is observed that their multitasking behavior may change. Some prefer which activities they are going to do together; some prefers doing activities in sequence; some pay special attention deciding on an activity while doing homework at the same time. Losing attention is a very common obstacle for digital natives to do multitasking.

In conclusion, the results provide valuable information for getting to know digital natives by presenting the nature of their multitasking behaviors. Therefore, the study is worth in terms of providing information to apply on the related fields as well as providing some starting points for the future research. It is suggested that there should be more investigations especially on cognitive load while executing multiple tasks. Because the findings of this study relay on the self-reporting of participants on both questionnaire and interviews, there is the need for empirical data in order to get deeper findings to discuss about positive and negative issues on multitasking.

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### **References**

1. Encyclopedia Britannica. (2012). Multitasking. *britannica.com*. Retrieved Apr 05, 2012, from <http://www.britannica.com/EBchecked/topic/397270/multitasking>
2. Helsper, E. and Enyon, R. (2009). Digital Natives: Where is the Evidence? *British Educational Research Journal*, 1-18, Retrieved Feb 20, 2012, from <http://eprints.lse.ac.uk/27739>
3. Hembrooke, H. and Gay, G. (2003). The Laptop and the Lecture: The effects of multitasking in Learning Environments. *Journal of Computing in Higher Education*, 15(1), 46-64.
4. Junco, R. (2012). In-class multitasking and academic performance. *Computers in Human Behavior*, 28(2012), 2236–2243.
5. Koch, I., Lawo, V., Fels, J., and Vorländer, M. (2011). Switching in the cocktail party: Exploring intentional control of auditory selective attention. *Journal of Experimental Psychology. Human Perception and Performance*, 37(4), 1140–1147.

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6. Melki, J. (2010). *Media Habits of MENA Youth Project*. Working Paper Series #4, American University of Beirut, Retrieved Feb 02, 2012, from [http://www.aub.edu.lb/ifi/public\\_policy/arab\\_youth/Documents/working\\_paper\\_series/ifi\\_wps04\\_ay\\_Melki.pdf](http://www.aub.edu.lb/ifi/public_policy/arab_youth/Documents/working_paper_series/ifi_wps04_ay_Melki.pdf)
7. Prensky, M.C. (2001). Digital Natives Digital Immigrants. *On the Horizon*, MCB University Press, 9(5), 1-6.
8. Rideout, V.J., Foehr, U.G. and Roberts, D.F. (2010). *Generation M2 Project: Media in the Lives of 8- to 18-Year-Olds*. A Kaiser Family Foundation Study. Retrieved Oct 08, 2011, from <http://www.kff.org/entmedia/upload/8010.pdf>
9. Tombu, M. N., Asplund, C. L., Dux, P. E., Godwin, D., Martin, J. W., and Marois, R. (2011). A unified attentional bottleneck in the human brain. *In Proceedings of the national academy of Sciences of the United States of America*. Vol. 108(33).
10. Türkoğlu, T. (2010). *Dijital Kültür (Digital Culture)*. İstanbul: Beyaz Yayınları, 978-9755991665.
11. Uğraş, T. (2012). A Descriptive Analysis on New Media Usage Habits of Digital Natives in the Context of Information Society in Turkey. (Unpublished master's thesis). İstanbul University, Turkey.
12. Wallis, C. (2006). *genM: The Multitasking Generation*, Time Magazine, Retrieved Jan 20, 2012, from <http://www.time.com/time/magazine/article/0,9171,1174696-1,00.html>





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## **Segmenting Student Profiles on the Usage of Social Networking Media: A Case Study on Facebook**

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**Abstract:** Social networking (SN) media such as Facebook, MySpace, LinkedIn and Twitter are communications technologies which are used by students today. The SN media has the potential of being used for various reasons such as communicating with friends and colleagues, providing and receiving education, creation of social capital. SN media has become widely used and adopted by millions of users with a great number of purposes in mind. Facebook is one of the most popular and commonly used SN media for college students. Currently Facebook has a diverse community of users at all levels of education and areas of society, including companies and universities. It is important to consider the necessity of using SN medias, and especially Facebook, for educational purposes as they are being used very intensely among young individuals. As the academic literature is reviewed, we can realize that these types of studies are now being conducted. There has been significant interest and growth in the number of educational institutions which are using social networking media in order to support learning and teaching. As the future objective of this study is to use e-learning platforms for educational purposes in our Faculty, we are aiming at segmenting the students according to their Facebook usage profiles to be able to apply the new technology of using Facebook for educational purposes. Segmentation and creating usage profiles for students is thought to be a useful technique because this technique would improve the performance and effectiveness of designing and organizing the e-learning platforms. These profiles would be beneficial in targeting the students by understanding their Facebook usage better and designing more suitable e-learning platforms for them. Therefore, these appropriate tools would improve students' educational performances. The application of segmentation is thought to achieve better performance than those who do not apply this technique. A major contribution of this study is that it leads to comparing the differences among individuals (age, department and nationality), analysing the amount of time spent on Facebook, and realizing individual preferences in Facebook usage among university students. Our sample frame was limited to undergraduate students at the Faculty of Economics and Administrative Sciences at the Near East University in Cyprus. Participants in this study consisted of 173 volunteer undergraduate students. In order to reach the aims in a scientific way, the sample was selected by the method of random sampling. The data collection form titled "Students' Facebook Usage" was prepared by the authors. The data collection form consisted of two sections: First section embodies 5 questions on personal information. In the second section, 6 questions were asked to learn students' opinions on Facebook usage. The results obtained in the study were analyzed, described, and later interpreted by creating tables using appropriate statistical techniques in the direction of the suggestions of statistical experts. Descriptive statistics, independent sample t-tests, and crosstabulation analysis for comparative analyses were used to analyze and interpret the data. The main results of the study indicate that same of the students check their Facebook account once a day and most of the students spend only 0-1 hours each day on Facebook. Another important finding of the study is that there are no statistically significant differences among individuals according to nationalities, departments and ages towards time spent on Facebook. As for the purposes of checking their Facebook account, most of the participants log on to Facebook to specify their location and to check in to see where their friends are at that time.

**Keywords:** Facebook, social networking sites, student profiles, segmentation, student Facebook usage

## **Introduction**

Social networking (SN) media such as Facebook, MySpace, LinkedIn and Twitter are widely used today as communications technologies by students and by other groups of the society. Also, the SN media has the potential of being used for various reasons such as communicating with friends and colleagues, providing and receiving education, creation of social capital and so on. SN media is an online setting which allows users to register and connect to each other in order to communicate or share resources, and have a primary focus on social interpersonal communication (Sánchez-Franco, Villarejo-Ramos & Martín-Velicia, 2010). On the other hand, Ross et al. (2009) argued that these systems are used by students for legitimacy as well as for socializing. Starting in the 1990s, social networking media has been engaging its user with one or more social connections that allows one to bond with the outside world.

Today's SN media began in 1997 with the launch of SixDegrees.com which allowed users to create their own profiles, search for their friends, and surf the Friends list starting from 1998 (Boyd & Ellison, 2007). Since that time, SN media has become widely used and adopted by millions of users with a great number of purposes in mind. Facebook is one of the most popular and commonly used SN media (Mazman & Usluel, 2010) for college students and could be regarded as the one website that indeed paved the way for SN media into the mainstream culture (Roblyer et al., 2010). According to Hirschorn (2007, p. 154), "*Facebook was started by Mark Zuckerberg, 23, while he was a student at Harvard in 2004*". "*At first, Facebook.com was limited to college students at Harvard with a university email address*" (Boyd & Ellison, 2007, p. 218). Later, when Facebook was opened up to university students, it became a big phenomenon. After Harvard, other universities were given Access to use Facebook but they were all required to have university email addresses associated with those institutions. This requirement kept the site relatively secure and contributed to users' perceptions of the

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site as an intimate, private community. This changed in 2005, when Facebook opened its doors to people outside the university network (Boyd & Ellison, 2007). Facebook is one of the most commonly used social networking media today with more than 900 million monthly active users and 550 million daily active users. 50% of them log on to Facebook in any given day (Facebook, 2012). Facebook's mission is to give people the power to share and make the world more open and connected. Millions of people use Facebook everyday to keep up with friends, upload an unlimited number of photos, share links and videos, and learn more about the people they meet. Facebook now has a diverse community of users at all levels of education and areas of society, including companies and universities.

In this respect, it is also important to consider the SN media which is a web-based means for people to share information in an online community with approved followers. There have been significant increases in the use of SN media for both business and personal reasons in the past couple of years (Lane & Coleman, 2011). The reason why many people choose to use SN media is to transfer immediate information to users (Lane & Coleman, 2011). In 2008, the Pew Internet and American Life Project reported that over 35% of the adult population routinely engages in these media, up from under 8% in 2005 (Wink, 2010). SNSs allow users to create a profile and then view and visit this account, and share their experiences with their social contacts as well as maintaining pre-existing social connections (Ellison, Steinfield & Lampe, 2007). However, users with different profiles tend to use the SN sites for different purposes and with different intensities. For example, Park (2010) argues that younger individuals use SN media as entertainment while older individuals use them for communication. On the other hand, Hargitti (2007) surveyed a diverse group of young adults and found that people with more experience and autonomy of use were likely to use the SN media more often. Another study has shown that when we consider the intensity of use of SN media, the 18 to 24 year old age group is a predominant user of these communication methods (Licoppe & Smoreda, 2008).

It is also important to consider the necessity of using SNSs, and especially Facebook, for educational purposes as they are being used very intensely among young individuals. Possibilities intended for allocating e-learning platforms on Facebook have drawn the attention of educators and researchers to become interested in the e-learning platforms. As the academic literature is reviewed, we can realize that these types of studies are now being conducted (see Mazman & Usluel, 2010; Sheldon, 2008; Moorman & Bowker, 2001). However, there are very limited studies on creating e-learning environment in the literature. Accordingly, well structures educational platforms on behalf of distance learning should be structured. There is a need to organize well-structured educational platforms for distance learning. As an objective for using this new technology in our Faculty, we are aiming at segmenting the students according to their Facebook usage profiles to be able to apply the new technology of using Facebook for educational purposes in the future.

### **Research Questions**

The purpose of this study is to review the intensity and examine differences among students' use of their Facebook accounts. The study mainly focuses on answering the following questions.

1. What is the intensity of students' Facebook use?
2. For what purpose do students check their Facebook account?
3. Are there any differences according to age towards time spent on Facebook in a day?
4. Are there any differences according to nationality towards time spent on Facebook in a day?
5. Are there any differences according to departments towards time spent on Facebook in a day?

## **Methodology**

As the future objective of this study is to use e-learning platforms for educational purposes in our Faculty, we are aiming at segmenting the students according to their Facebook usage profiles to be able to apply the new technology of using Facebook for educational purposes. Segmentation and creating usage profiles for students is thought to be a useful technique because this technique would improve the performance and effectiveness of designing and organizing the e-learning platforms. These profiles would be beneficial in targeting the students by understanding their Facebook usage better and designing more suitable e-learning platforms for them. Therefore, these appropriate tools would improve students' educational performances. The application of segmentation is thought to achieve better performance than those who do not apply this technique (Dibb, Stern & Wensley, 2002).

## **Participants**

Our sample frame was limited to undergraduate students who use Facebook at the Faculty of Economics and Administrative Sciences at the Near East University in Cyprus. Participants in this study consisted of 173 volunteer undergraduate students. The study was conducted during the 2011-2012 Spring Semester. In the study, in order to reach the aims in a scientific way, the sample was selected by the method of random sampling. The characteristics of the respondents are presented in Table 1.

The sample was comprised of 73.4% male and 26.6% female. Considering Table 1, 15% of them are from TRNC, 46.8% are from Turkey and 38.2% are from other nationalities (Nigeria, Turkmenistan, Azerbaijan, etc). Table 1 illustrates all of the descriptive statistics for the 173 students. Students ranged in age from 18 to 25+ years with a mean of 4.91 and a standard deviation of 2.02. An average student is in the year of 2.42 of their University degree and has a standard deviation of 1.09. The survey has been conducted on selected departments of The Near East University. Accordingly, 37% of students belong to Computer Information Systems department, 13.3% to Economics,

17.9% to Banking and Finance department, 13.9% to Business department, 15.6% International Relations department and 17.9% to Maritime Management Department. In addition, Table 1 demonstrates the percentage of Facebook users among the students attended to the survey which implies that a large number of students are Facebook users in the Near East University (96%).

**Table 1:** Profile of the participants

<b>Demographic characteristics</b>	<b>Mean or % (N)</b>	<b>SD</b>
<i>Gender</i>		
Male	73.4 (127)	
Female	26.6 (46)	
<i>Nationality</i>		
TRNC	15 (26)	
TC	46.8 (81)	
Other	38.2 (66)	
<i>Age<sup>1</sup></i>	21.91	2.02
<i>Year in University<sup>2</sup></i>	2.42	1.09
<i>Department</i>		
CIS	21.4 (37)	
ECON	13.3 (23)	
B&F	17.9 (31)	
BUS	13.9 (24)	
IR	15.6 (27)	
MM	17.9 (31)	
<i>Facebook members</i>		
<i>Users</i>	96 (166)	
<i>Nonusers</i>	4 (7)	

Notes: <sup>1</sup> represents 1=18, 2=19, 3=20, 4=21, 5=22, 6=23, 7=24, 8=25+; <sup>2</sup> 1=first year, 2=sophomore, 3=junior, 4=senior; CIS means department of Computer Information Systems, ECON means Department of Economy, B&F means department of Banking and Finance, BUS means department of Business Administrative, IR means department of International Relations and MM means department of Maritime Management.

### **Data Collection Tools**

Data collection form “*Students’ Facebook Usage*” was prepared by the authors related to students’ opinions. The data collection form consisted of two sections: First section

consisted of 5 personal information. In the second section, 6 items were prepared to learn students' opinions on Facebook usage and time spent on Facebook.

### **Data Analysis**

The results obtained in the study were analyzed, described, and later interpreted by creating tables using appropriate statistical techniques in the direction of the suggestions of statistical experts. Descriptive statistics, independent sample *t*-tests, and cross tabulation analysis for comparative analyses were used to analyze and interpret the data.

## **Results and Discussion**

### **The Intensity of Students' Facebook Usage**

As this study aims at segmenting the students according to their Facebook usage profiles, it is crucial to analyze the intensity of Facebook usage. In order to get a clear picture of the intensity, we need to look at the students' daily Facebook account check and also the number of hours they spend on Facebook because these two factors both determine the intensity of their Facebook use. Table 2 shows us how many times students check their Facebook account in a day and Table 3 shows how many hours students spend on Facebook in an average day.

**Table 2:** Students' daily Facebook account check

	<b>Frequency</b>	<b>Percent</b>
Once	53	30.6
Twice	37	21.4
3 times	27	15.6
4-5 times	32	18.5
6-10 times	12	6.9
11-15 times	6	3.5
16+	6	3.5
Total	173	100.0

According to the data above, most of the students who attended the survey check their Facebook account once a day with 30.6% while 21.4% of them check their account twice. It can be seen from the statistics that irrefutable percentage of attendants check their Facebook account 4-5 times a day (18.5%). 7% of the students check their account more than 11 times a day which might not seem like a large number but still shows us that there is a group of students who use Facebook very intensely and spend a lot of their time on SNSs.

**Table 3:** Facebook usage of students in an average day (hours)

Hours	Frequency	Percent
0-1	81	46.8
2-3	67	38.7
4-5	19	11.0
6+	6	3.5
Total	173	100.0

According to the table above, the largest number of students (46.8%) spends only 0-1 hours a day on Facebook while 38.7% of the students spend 2-3 hours on Facebook in an average day. The remaining 14.5% spend more than 4 hours a day which shows us that not many students use Facebook in an uncontrolled way. However, Bicen and Cavus (2011) have shown in their article that in different departments of the same University, 32% of students use Facebook more than four hours in a day. These results are indeed happy results for the educational sector as they show that students do not actually spend a great amount of their time on social networking sites such as Facebook. Ross et al. (2009) has shown that 79% of the students surveyed use Facebook approximately one hour during the day. On similar grounds, Ellison, Steinfield & Lampe (2007) suggested that undergraduate students were spending only 10-30 minutes online in Facebook in an average day.

#### **Purpose of Checking Facebook Account**

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Table 4 shows us the percentages and the frequencies for students' five different purposes of checking their Facebook accounts. The students were given the possibility to choose more than one option because they might check their account different reasons. 88.4% of the students log on to Facebook to specify their location and 85.5% check in to see where their friends are at that time. Then, the percentage drops down to 63.6% with "other purposes" including "following upcoming activities, following the news, following what my boyfriend/girlfriend is posting on Facebook, playing games". Interestingly enough, the response to using Facebook for updating their status has a lower percentage of 59.5% and following what their friends are doing has the lowest percentage with 49.7%. It is important to discuss the outcomes of this analysis due to the fact that there are significant differences across students' purposes of checking their Facebook accounts.

**Table 4:** Students' purpose of checking Facebook account

(N=173)	Percentage	Frequency
To update my status	59.5%	103
To specify my location	88.4%	153
To follow what my friends are doing	49.7%	86
To see where my friends are at that time	85.5%	148
Other	63.6%	110

**Differences across Ages on the Intensity of Facebook Usage**

Table 5 below shows us the percentages and the frequencies of students' daily Facebook use in order to identify how much time students of different ages spend on Facebook in a day. Table 6 shows us the statistics to see whether there are significant differences across ages on time spent on Facebook in a day.

**Table 5:** Time spent on Facebook according to ages

Age	Time Spent				Total
	0-1	2-3	4-5	6+	
18	3 27.3%	5 45.5%	2 18.2%	1 9.1%	11 100.0%
19	5 35.7%	9 64.3%	0 .0%	0 .0%	14 100.0%
20	7 36.8%	8 42.1%	3 15.8%	1 5.3%	19 100.0%
21	11 52.4%	5 23.8%	4 19.0%	1 4.8%	21 100.0%
22	25 59.5%	11 26.2%	5 11.9%	1 2.4%	42 100.0%
23	10 40.0%	10 40.0%	3 12.0%	2 8.0%	25 100.0%
24	8 44.4%	10 55.6%	0 .0%	0 .0%	18 100.0%
25+	12 52.2%	9 39.1%	2 8.7%	0 .0%	23 100.0%
Total	81 46.8%	67 38.7%	19 11.0%	6 3.5%	173 100.0%

According to Table 5, students from age groups 18 (45.5%), 19 (64.3%), 20 (42.1%) and 24 (55.6%) spend mostly 2-3 hours on Facebook. On the other hand, students belonging to age groups of 21(52.4%), 22 (59.5%) and 25<sup>+</sup> (52.2%) spend mostly 0-1hours in a day on Facebook. It is interesting to see that 40% of students aged 23 spend 0-1 hours on Facebook and the same percentage (40%) spends 2-3 hours on Facebook.

**Table 6:** Chi-Square tests results

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.107 <sup>a</sup>	21	.452
Likelihood Ratio	25.409	21	.230
Linear-by-Linear association	2.486	1	.115
N of Valid Cases	173		

<sup>a</sup>17 cells (53.1%) have expected count less than 5. The minimum expected count is .38

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As can be seen from Table 6, when we consider the age differences towards spending time on Facebook, the Chi-Square test results show us that there are no significant differences in this study ( $p>0.5$ ). However, the study of Licoppe and Smoreda (2008) has shown that the intensity of use of SN media in the age of 18 to 24 years old age group is much higher and the 18-24 year old group is a predominant user of these communication methods. On top of this, Drigotti (2007) also finds that the high proportion of 18-24 users reflects the overall age distribution of Facebook users. Using technologies has a considerably important place in every person's life even though certain age groups might be using these technologies more intensely than others. However, as our case includes students of ages between 18 and 25+ which is a relatively homogenous group, having insignificant differences between ages was an expected outcome.

**Differences across Nationalities on the Intensity of Facebook Usage**

The table below investigates whether there are comparable differences towards Facebook usage between students from different nationalities. Considering the profiles of the students in our University, the three categories of nationalities were Turkish Republic of Northern Cyprus (TRNC) citizens, nationals of Turkish Republic (TC), and Other including students from any other nationality. Out of the 173 students interviewed, 26 were TRNC, 81 were TC, and 66 were other nationals. The table above shows us that half of the Turkish nationals use Facebook 0-1 hours a day, followed by other nationals with 45.5% and TRNC nationals with 38.5%. When we consider the intensity of Facebook usage by combining the categories into one, we can say that students are "intense users" if they use Facebook more than 4 hours each day, and "moderate users" if they use Facebook 0-3 hours a day. In this respect, 80.8% of TRNC nationals, 87.6% of TC nationals and 84.9% of other nationals are moderate users, making the TRNC nationals most intense Facebook users with 19.2% having a 4+ hours usage each day. However, it is also crucial to note here that 6.1% of students from other nationals use

Facebook for more than 6 hours a day whereas none of the TRNC nationals use it that much.

**Table 7:** Intensity of Facebook usage according to nationality

<b>Nationality</b>	<b>0-1</b>	<b>2-3</b>	<b>4-5</b>	<b>6+</b>	<b>TOTAL</b>
TRNC	10	11	5	0	26
% within nationality	38.5%	42.3%	19.2%	0.0%	100%
TC	41	30	8	2	81
% within nationality	50.6%	37.0%	9.9%	2.5%	100%
OTHERS	30	26	6	4	66
% within nationality	45.5%	39.4%	9.1%	6.1%	100%

Table 8 implies that according to the Chi-square Test result, there are no significant differences between nationalities towards time spent on Facebook in a day ( $p > .05$ ). Getting this result is not surprising when we consider TRNC and TC students because there is a similarity between the cultures of the two nations. Also, there were no differences between TC-TRNC and other nationalities and this result could be used as a research question for another study as cultural differences could tend to affect students' technology usage and perceptions.

**Table 8:** Time spent on Facebook according to nationalities

	<b>Value</b>	<b>df</b>	<b>Asymp. Sig. (2-sided)</b>
Pearson Chi-Square	5.174 <sup>a</sup>	6	.525
Likelihood Ratio	5.576	6	.472
Linear-by-Linear Association	.006	1	.938
N of Valid Cases	173		

<sup>a</sup>4 cells (33.3%) have expected count less than 5. The minimum expected count is .90

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**Differences across Departments on the Intensity of Facebook Usage**

Table 9 gives us information on the differences across departments towards time spent on Facebook usage and Table 10 shows us whether there are significant differences across departments on the intensity of Facebook usage.

**Table 9:** Time spent on Facebook according to departments

Department	Time Spent				Total
	0-1	2-3	4-5	6+	
B&F	12 38.7%	14 45.2%	4 12.9%	1 3.2%	13 100.0%
BUS	12 50.0%	10 41.7%	2 8.3%	0 .0%	24 100.0%
CIS	19 51.4%	10 27.0%	5 13.5%	3 8.1	37 100.0%
ECON	13 56.5%	9 39.1%	0 .0%	1 4.3%	23 100.0%
IR	15 55.6%	9 33.3%	3 11.1%	0 .0%	27 100.0%
MM	10 32.3%	15 48.4%	5 16.1%	1 3.2%	31 100.0%
Total	81 46.8%	67 38.7%	19 11.0%	6 3.5%	173 100.0%

As can be seen from Table 9, 45.2% of Banking & Finance students (n=31) and 48.4% of Maritime Management students (n=15) use Facebook 2-3 hours a day. However, most of the students from the other departments (50% of Business students, 51.4% of CIS students, 56.6% of Economics students and 55.6% of IR students) spend only 0-1 hours on Facebook. When interpreting these results, it is unexpected to see that B&F and MM students use Facebook and thus technology more intensely than other departments such as CIS which is a department that is closely associated with computers. Therefore, it would have been more expected to see students from that department to use Facebook more intensely.

**Table 10:** Chi-Square tests results

	<b>Value</b>	<b>df</b>	<b>Asymp. Sig. (2-sided)</b>
Pearson Chi-Square	13.474 <sup>a</sup>	15	.566
Likelihood Ratio	17.262	15	.303
Linear-by-Linear Association	.154	1	.695
N of Valid Cases	173		

<sup>a</sup>12 cells (50.0%) have expected count less than 5. The minimum expected count is .80

According to Table 10 above, the Chi-Square test result again show that there are no significant differences according to departments towards the usage of Facebook ( $p > .05$ ). This result can be explained due to the fact that all of these departments are under the same Faculty and students who are studying in these departments have similar perceptions, study similar lessons and their departments have similar basic structures. Therefore, significant differences according to departments could have existed if departments from different faculties were considered.

## **Conclusion and Future Studies**

Integrating the widely used Facebook into education necessitates new academic studies towards this end. In this respect, it is of utmost importance to research and analyse students' intensity of Facebook usage, their purposes for using Facebook and other related issues. These types of studies are gaining rising importance to this end and the use of social networking medias such as Facebook for enriched educational purposes will provide new ideas for researchers, educational institutions and academics all around the world.

In addition, Facebook is the most popular social networking media and it is widely used by students for various purposes. Also, a closer investigation of individual differences on perceptions and their direct and indirect effects on Facebook usage offers rich opportunities for future research.

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## References

1. Bicen, H., & Cavus. N. (2011). Social network sites usage habits of undergraduate students: Case study of Facebook. *Procedia-Social and Behavioral Sciences*, 28, 943-947.
2. Boyd, D., & Ellison, N. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, 13(1), 210-230.
3. Dibb, S. Stern, P., Wensley, R. (2002). Marketing knowledge and the value of segmentation. *Marketing Intelligence & Planning*, 20(2), 113-119.
4. Drigotti. (2007, November 26). Facebook stats: Age, gender, education level, political views, and relationship status. Message posted to <http://www.freezinghot.com/index.php/20071126/...>
5. Ellison, N., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook “friends”: Social capital and college student’s use of online social network sites. *Journal of Computer Mediated Communication*, 12(4), 1143-1168.
6. Facebook (2012). Facebook. Retrieved May 15, 2012, from <http://www.facebook.com/facebook>
7. Hargitti, E. (2007). Whose space? Differences among users and nonusers of social network sites. *Journal of Computer-Mediated Communication* , 13(1), 276-297.
8. Hirschorn, M. (2007, October). About Facebook. *The Atlantic*, 2-5. Retrieved May 15, 2012 from <http://www.theatlantic.com/magazine/print/2007/10/about-facebook/6181/>
9. Lane, M., & Coleman, P. (2011). Technology ease of use through social networking media. *Journal of technology research*, 3. Retrieved June 22, 2008 from <http://www.aabri.com/manuscripts/11758.pdf>
10. Licoppe, C., & Smoreda, Z. (2008). Are social networks technologically embedded? How networks are changing today with changes in communication technology. *Social Networks*, 27(4), 317-335.
11. Mazman, S. G., & Usluel, Y. K. (2010). Modeling educational usage of Facebook. *Computers & Education*, 55, 444-453.
12. Moorman, J., & Bowker, A. (2011). The university Facebook experience: The role of social Networking on the quality of interpersonal relationships. *The American Association of Behavioral and Social Sciences Journal*, 15, Retrieved May 15, 2012, from <http://aabss.org/Journal2011/04MoormanFinal.pdf>
13. Park, J. (2010). Differences among university students and faculties in social networking site perception and use. *Electronic Library*, 28(3), 417-431.
14. Roblyer, M. D., McDaniel, M., Webb, M., Herman, J., & Witty, J. V. (2010). Findings on Facebook in higher education: A comparison of college faculty and student uses and perceptions of social networking sites. *Internet and Higher Education* 13,134-140.
15. Ross, C., Orr, E. S., Sisic, M., Arseneault, J. M., Simmering, M. G., & Orr, R. R. (2009). Personality and motivations associated with Facebook use. *Computers in Human Behavior*, 25(2), 578-586.

16. Sánchez-Franco, M. J., Villarejo-Ramos, Á. F., & Martín-Velicia, F. A. (2010). Social integration and post-adoption usage of Social Network Sites An analysis of effects on learning performance, *Procedia Social and Behavioral Sciences*, 15, 256-262.
17. Sheldon, P. (2008). The relationship between unwillingness-to-communicate and students' facebook use. *Journal of Media Psychology*, 20, 67-75.
18. Wink, D. (2010). Social networking sites. *Nurse Educator*, 35(2), 49-51.



## **Text Usage and Typography as Visual Communication Tools in e-Learning Content**

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**Abstract:** *This study has two objectives: First, to put forth the text-use related mistakes encountered in general digital material as well as on the internet. Second, it aims to make concrete proposals for the design of an ideal text in compliance with typographic rules and methods. The preparation for this study involved a content analysis of mainly web based e-learning tools. The findings were then scrutinized from the angle of typographic design and consequently an assessment was made of which textual properties and methods to use for successful content design. It can be argued that this work is one of the first essays in its field with regards to the efficient use e-learning contents. Typography, in the sense of producing a writing in line with a specific form and pattern necessitates the conjunctive and coherent use of elements such as font type and size, line length and spacing etc. In this way typography is both a functional and artistic arrangement of elements such as letters, numbers, punctuation marks, symbols, lines and colors that all pertain to written and visual communication as well as a design language and percept constructed via these elements. The elementary function of writing is the transmission of thought and knowledge with the help of signs. In this communication, typography plays the role of a body of rules and methods that make writing legible as well as aesthetically pleasing. Regardless of how aesthetically pleasing it is, if a text cannot be read well then it is not fulfilling its function of "transmitting knowledge to the reader". Qualities of a text such as the organization of space, alignment, the use of upper and lower case, emphasis, font family, the anatomy of a letter, all directly influence the use and perception of writing as a communication tool. Properties such as serif or sans-serif fonts, their legibility on paper or a monitor, font size, emphasis tools such as bold, italic, underline as well as the font color, letter kerning, word-spacing, text-indent are all determined by typography. Typography has various rules and different methods to implement them. Errors in an e-learning content can only be eliminated with the sharp eyes and artistic point of view of trained and experienced typography professionals. The biggest problem faced by typography is balancing the light and dark areas in a text as well those between the text and pictures that are located on the same page. Ignoring this balance can render a document jumbled, illegible and incomprehensible. If letters, words, writings and pictures, graphics are in harmony, the document and its message will be very easy to understand. It is necessary to have a particular design and an accumulation of knowledge in order to produce interesting, informative and visually effective e-learning content. Only by taking into account the principles and recommendations provided by typography could visual pollution be prevented. Nowadays the importance of editing content in narrow sense and information design in broad sense are increasing. A good planning is the fundamental condition for a successful design. If a piece of information is arranged correctly, classified well and if it is presented effectively, and compiled in a suitable manner for the purpose, it can easily be detected by its receiver. If text and image elements are placed irregularly, perception and communication become more difficult and can cause a misunderstanding. Therefore visual balance between texts and images must be established very well. Colors, shapes and their placement must be well-balanced and able to draw attention. Also the eye must be able to easily follow the action of the page in line with the flow of information. If the text loses its meaning in terms of communication, it will be move away from its goal.*

**Keywords:** Text Usage, Typography, Visual Communication, e-Learning Content

## **Introduction**

We have observed the usage of ordinary, familiar and known simple patterns in compilation and presentation of written, visual, auditory, and electronic e-learning content. If our goal is to produce attractive, informative and eye-pleasing pages instead of to prepare a random content, it is necessary to have the accumulation of a certain design in this area. At this point, we can offer our message with visual communication tools taking into account the principles and recommendations provided by typography.

Typography, in the sense of producing a writing in line with a specific form and pattern necessitates the conjunctive and coherent use of elements such as font type and size, line length and spacing etc. In this way typography is both a functional and artistic arrangement of elements such as letters, numbers, punctuation marks, symbols, lines and colors that all pertain to written and visual communication as well as a design language and percept constructed via these elements.

The elementary function of writing is the transmission of thought and knowledge with the help of signs. In this communication, typography plays the role of a body of rules and methods that make writing legible as well as aesthetically pleasing. Regardless of how aesthetically pleasing it is, if a text cannot be read well then it is not fulfilling its function of “transmitting knowledge to the reader”.

Qualities of a text such as the organization of space, alignment, the use of upper and lower case, emphasis, font family, the anatomy of a letter, all directly influence the use and perception of writing as a communication tool.

Properties such as serif or sans-serif fonts, their legibility on paper or a monitor, font size, emphasis tools such as bold, italic, underline as well as the font color, letter kerning, word-spacing, text-indent are all determined by typography.<sup>4</sup>

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<sup>4</sup> Rubinstein, R. (1998). *Introduction to Digital Typography*, Boston: Addison-Wesley Longman Publishing Co., Inc. p. 12.

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The biggest problem faced by typography is balancing the light and dark areas in a text as well those between the text and pictures that are located on the same page. Ignoring this balance can render a document jumbled, illegible and incomprehensible.<sup>5</sup>

### **A) Visual communication - Design - Composition**

Visual communication is definable as exchanging of visual information among the people. Design is the creation of a plan or convention for the construction of an object or a system (as in architectural blueprints, engineering drawing, business process, circuit diagrams and sewing patterns). Also design means to provide a suitable solution to one's problem or break the problem to its simplest form to get its solution.<sup>6</sup>

In the visual arts - in particular painting, graphic design, photography and sculpture - composition is the placement or arrangement of visual elements or ingredients in a work of art or a photograph, as distinct from the subject of a work. It can also be thought of as the organization of forms and colors within the work of art.<sup>7</sup>

Composition is the act of combining parts or elements to form a whole. Also it is the plan, placement or arrangement of the elements of art in a work. In the visual arts – in particular painting, graphic design, photography and sculpture – composition is the placement or arrangement of visual elements or ingredients in a work of art or a photograph, as distinct from the subject of a work. It can also be thought of as the organization of the elements of art according to the principles of art.

Typography is very important in graphic design. Writing has an effect as content as well as visibility. It is possible to create graphic designs without painting,

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<sup>5</sup> Pektaş, H. (n.d.). "İnterneteki Tipografi Sorunları ve Görsel Kirlenmeye Karşı Öneriler", Retrieved May 19, 2012 from <http://www.fotografya.gen.tr/issue-6/hasip.html>

<sup>6</sup> "What is Designing?" (February 06, 2011). Retrieved July 11, 2012 from <http://designersdare.com/what-is-designing/>

<sup>7</sup> "Composition in Art," (2011). Retrieved July 10, 2012 from <http://www.infoplease.com/encyclopedia/entertainment/composition-art.html#ixzz2AnE4s1so>

illustration or color, but writing and typography are the basics of graphic designs. Only with the typographic elements you can produce effective designs.<sup>8</sup>

Richard E. Mayer points to the importance of typography while explains the multimedia principles (include all e-learning materials) and their effects on learning:<sup>9</sup>

**Multimedia:** Best use of words & pictures. Adding graphics to words can improve learning. Students learn better from words and pictures, rather than from words alone.

**Spatial contiguity:** Best placement of words & pictures. Placing text near graphics improves learning. Students learn better when corresponding words and pictures are presented near rather than far from each other.

## **B) Text-related concepts**

**Writing** is the form of human communication by means of a set of visible marks that are related, by convention, to some particular structural level of language.<sup>10</sup>

**Character** in informatics terminology, is a unit of information that roughly corresponds to a grapheme, grapheme-like unit, or symbol, such as in an alphabet or syllabary in the written form of a natural language.

**Letter** is a grapheme in an alphabetic system of writing, such as the Turkish alphabet and its descendants. Letters compose phonemes and each phoneme represents a phone (sound) in the spoken form of the language.

**Digit** is a symbol (a numeral symbol such as “2” or “9”) used in combinations (such as “29”) to represent numbers in positional numeral systems.

**Punctuation marks** are symbols that indicate the structure and organization of written language, as well as intonation and pauses to be observed when reading aloud.

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<sup>8</sup> “Tipografi Nedir?” (n.d.). Retrieved June 01, 2012 from [http://www.mikroegitim.com/tipografi\\_nedir.html](http://www.mikroegitim.com/tipografi_nedir.html)  
<sup>9</sup> Mayer, R. E. (2009). *Multimedia learning* (2nd ed). New York: Cambridge University Press., “Principles of Multimedia”. Retrieved July 01, 2012 from

<http://www.cognitivedesignsolutions.com/Media/MediaPrinciples.htm>

<sup>10</sup> “Writing,” (n.d.). Retrieved July 21, 2012 from <http://www.britannica.com/EBchecked/topic/649670/writing>

Symbol is an abstraction, tokens of which may be marks or a configuration of marks which form a particular pattern. Symbols of a formal language need not be symbols of anything. For instance there are logical constants which do not refer to any idea, but rather serve as a form of punctuation in the language (e.g. parentheses).

**Diacritical mark** is a glyph added to a letter, or basic glyph. Some diacritical marks, such as the acute (´) and grave (`) are often called accents. Diacritical marks may appear above or below a letter, or in some other position such as within the letter or between two letters.

**Grapheme** is the smallest semantically distinguishing unit in a written language, analogous to the phonemes of spoken languages. Graphemes include alphabetic letters, typographic ligatures, Chinese characters, numerical digits, punctuation marks, and other individual symbols of any of the world's writing systems.<sup>11</sup>

### **C) Text usage in e-learning content**

Typography is not a science. Typography is an art. There are those who'd like to 'scientificize'; those who believe that a large enough sample of data will somehow elicit good typography. However, this sausage-machine mentality will only ever produce sausages. That typography and choosing type is not a science trammled by axioms and rules is a cause to rejoice.

Before we get to the nitty-gritty of choosing type, let's briefly talk about responsibility. Fundamentally, the responsibility we bear is two-fold: first we owe it to the reader not to hinder their reading pleasure, but to aid it; second, we owe a responsibility to the typeface or typefaces we employ. Good typefaces are designed for a good purpose, but not even the very best types are suited to every situation.

It's worth mentioning here that these principles are equally applicable to any medium. Some of my favourite typefaces look dreadful on screen; and even good typefaces like Georgia or Verdana, designed especially for the screen, often look at best

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<sup>11</sup> "Grapheme," (April 26, 2012). Retrieved August 13, 2012 from <http://en.wikipedia.org/wiki/Grapheme>

mediocre on paper. Choosing type for the web is easier owing to fewer choices; however, that's beginning to change. We now have sIFR and 'web fonts', so it's all the more important to think carefully about the type we use. Is Times/Times New Roman—narrow set and designed for narrow columns—really appropriate for long-line extended text on screen?

If your text's final destination is paper, then **PRINT IT AND SEE**. Your type might look exquisite on screen, but a train wreck on paper. There really is no substitute for printing. If setting for the screen, then check it on both PC and Mac, and at different resolutions (screen sizes).<sup>12</sup>

Many consider sans serif type more legible for computer-based instruction or presentation, since the resolution of computer monitors is often not great enough to show the serifs.<sup>13</sup>

## **D) Typography**

The elementary function of writing is the transmission of thought and knowledge with the help of signs. In this communication, typography plays the role of a body of rules and methods that make writing legible as well as aesthetically pleasing. Regardless of how aesthetically pleasing it is, if a text cannot be read well then it is not fulfilling its function of "transmitting knowledge to the reader".

Typography is the design or selection of letter forms to be organized into words and sentences to be disposed in blocks of type as printing upon a page.

Typography (from the Greek words *typos* = form and *graphie* = writing) is the art and technique of arranging type in order to make language visible. The arrangement of type involves the selection of typefaces, point size, line length, leading (line spacing), adjusting the spaces between groups of letters (tracking) and adjusting the space between

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<sup>12</sup> Boardley, J. (April 4, 2008). "On Choosing Type". Retrieved July 21, 2012 from <http://ilovetypography.com/2008/04/04/on-choosing-type/>

<sup>13</sup> Lohr, L. L. (2008). *Creating Graphics for Learning and Performance: Lessons in Visual Literacy*, New Jersey: Pearson/Merrill/Prentice Hall p. 228.

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pairs of letters (kerning). Type design is a closely related craft, which some consider distinct and others a part of typography; most typographers do not design typefaces, and some type designers do not consider themselves typographers.<sup>14</sup> In modern times, typography has been put into motion -in film, television and online broadcasts- to add emotion to mass communication.

Typographic concepts and methods:

We can list like this typographic concepts and methods according to editing the text-heavy documents in e-learning content:

**Letters - Texts:**

Letter is the basic element of typographic processes and shows every signs of alphabet. We denominate all the letters, numbers and punctuation marks as “character”. Capital letters are known *majuscule* and lower case letters are known *minuscule*.<sup>15</sup>

Font is traditionally defined as a quantity of sorts composing a complete character set of a single size and style of a particular typeface. For example, the complete set of all the characters for “9-point Verdana” is called a font, and the “10-point Verdana” would be another separate font, but part of the same font family, whereas “9-point Verdana boldface” would be another font in a different font family of the same typeface. One individual font character might be referred to as a “sort,” “piece of font,” or “piece of type”.

Font nowadays is frequently used synonymously with the term *typeface*, although they had clearly understood different meanings before the advent of digital typography and desktop publishing.<sup>16</sup>

**Font size:** Font size is the dimension of text characters, measured in units called points (pts); a point is equal to 1/72inch.<sup>17</sup> If the size is very big the number of perceived

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<sup>14</sup> Pipes, A. (1997). *Production for Graphic Designers*, 2nd Edition, New Jersey: [Prentice Hall](#) Inc. p. 40.

<sup>15</sup> Sarsılmaz, E. (April 01, 2010). “Tipografi - Tasarlanmış Yazının Sanatı”, Retrieved August 23, 2012 from <http://www.slideshare.net/EnformatikSeminerleri/tipografi-seminer-sunumu>

<sup>16</sup> Beal, V. (July 24, 2012). “An Introduction to Fonts”. Retrieved July 30, 2012 from [http://www.webopedia.com/quick\\_ref/fonts.asp](http://www.webopedia.com/quick_ref/fonts.asp)

words are reduced. If it is very small the letters can not be seen. For the distance of reading about 30-35 cm. the font size must be average 9-11 points.<sup>18</sup>

**Line length:** One of the most important problems in the e-learning documents, especially in the web pages is text line length. It should not be over 8-12 words in single-column text groups, and not be over 6-7 words multi-column texts. If a text line is 70 letters long it cant be read.<sup>19</sup>

**Style:** A font family consists all of the measures and styles of a text character. Generally font families are formed normal, *italic*, **bold** and **bold italic** styles.<sup>20</sup>

In body text if we want to emphasize a word, we make it *italic*. Other options are making the text bold, underlined, UPPER CASE, or changing color. But the point to be noted is choosing only one of these styles.<sup>21</sup>

**Upper and lower case letters:** UPPER CASE LETTERS ARE NOTICEABLE AT FIRST GLANCE. But these are not uset in body text merely subheads. In the texts that including upper and lower case letters, the writing passages are more easily detected on the pages.<sup>22</sup>

**Color of typography:** Color is one of the most important elements of e-learning documents because of its significance, discriminant, directivity and highlighting attributes. Color draws 40 percent more attention than white-black. Information can be presented more effectively by the color. Many functions can be performed by the color, for example, to separate the title from the text, to draw attention to a message, to distinguish between groups of information, to provide fluency texts.<sup>23</sup>

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<sup>17</sup> Beal, V. (July 24, 2012). Op. cit.

<sup>18</sup> Pektaş, H. (March 2001). "İnternette Görsel Kirlenme", TÜBİTAK Bilim ve Teknik Dergisi, Ankara, p. 72, Retrieved May 19, 2012 from <http://www.hasippektas.com/in.gors.html>

<sup>19</sup> Pektaş, H. (March 2001). Op. cit.

<sup>20</sup> "Tipografi," (August 09, 2012). Retrieved August 20, 2012 from <http://freelancegrafiker.blogspot.com/2012/08/tipografi.html>

<sup>21</sup> "Tipografi," (August 09, 2012). Op. cit.

<sup>22</sup> "Tipografi," (August 09, 2012). Op. cit.

<sup>23</sup> Pektaş, H. (March 2001).Op. cit.

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**Numbers:** To place the numbers on a line is similar to the capital letters and aligned according to the baselines. If the numbers are using in the lowercased body text their sizes may be reduced. The spaces of the digits are arranged like letters.<sup>24</sup>

**Punctuation marks:** These marks play an important role in the typographical arrangements of texts. But there is a common mistake: Inch mark (``) is used instead of quotation mark (“”), and also foot mark (‘) instead of apostrophe (’).<sup>25</sup>

### **Spaces**

The spaces display the text and image on the page. Extra space rest the eyes and provides convenient detection. But little space creates confusion and chaos, makes it difficult to detect. At least 4 mm. space must be between the text and image. If images divide text into two parts, it should be preferred not to divide a sentence, but a paragraph.<sup>26</sup>

According to Prof. Martin R. Baeyens,<sup>27</sup> the biggest problem faced by typography is the balance between dark and light areas of the letters. To leave a space between the words is enough. Multiple spaces impair the texture of text. To insert more than enough space between letters reduces readability.

**Editing letter spacing:** Letters are graphic elements in their own right. Each letter has its own unique visual weight and shape. When they came side by side with the letter A with the letter L, requires a separate regulation. Because the letter L has a very negative (white) area. The relationship between the previous and latter each letter carefully requires the spaces.<sup>28</sup>

**Editing word spacing:** Generally the space which letter “i” can be squeezed so easily between the two words is acceptable measuring.<sup>29</sup>

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<sup>24</sup> “Yazı ve Tipografi,” (November 14, 2008). Retrieved July 04, 2012 from <http://www.grafikerler.net/yazi-ve-tipografi-t32567.html>

<sup>25</sup> “Tipografi,” (August 09, 2012). Op. cit.

<sup>26</sup> Pektaş, H. (March 2001). Op. cit.

<sup>27</sup> “Tipografi,” (n.d.). Retrieved July 20, 2012 from <http://www.aed.org.tr/tipografi.html>

<sup>28</sup> “Yazı ve Tipografi,” (November 14, 2008). Op. cit.

<sup>29</sup> “Yazı ve Tipografi,” (November 14, 2008). Op. cit.

**Editing line spacing:** This means to edit spaces between the typesetting texts. These spaces are formulated with punto measuring. For example if a word has 12 points letters this means the measurement from the baseline of a text line to the next baseline is 12 points.<sup>30</sup>

**Editing paragraph and column spacing:** In the traditional method the first word of the paragraph starts a little inside. However, the difference is not enough to separate a paragraph from another. In this case one space is given between the two paragraphs.<sup>31</sup>

**Widows and orphans:** In the text, the character number of word in the last line must be at least seven letters. Otherwise the word in the last line called *widow word*. This is a typographic problem. Alike the word in the first line has less than seven characters is named *orphan word*. In order to prevent this error, it needs to make the right hyphenation.<sup>32</sup>

**Alignment:** It means settlement of the text between margins. Generally the text is aligned to only one margin, to left or to right. It is called left-margined or right-margined. The text also aligned with the two margins is named justified.

Left-aligned is the most common form of text regulation. Right-aligned is not preferred in long texts. It is an alignment method is used in the titles and subtitles.<sup>33</sup>

Centered-aligned is not suitable for text regulations, because of eye strain. It is generally used on headings.<sup>34</sup>

Justified alignment or justification is the typographic alignment setting of text within a column or “measure” to align along both the left and right margin. Text set this way is said to be “justified” and provide the text easy to read. In this style hyphenation is

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<sup>30</sup> “Yazı ve Tipografi,” (November 14, 2008). Op. cit.

<sup>31</sup> “Yazı ve Tipografi,” (November 14, 2008). Op. cit.

<sup>32</sup> Sarsılmaz, E. (April 01, 2010). Op. cit.

<sup>33</sup> “Tipografi Nedir?” (January 10, 2009). Retrieved July 08, 2012 from <http://www.grafikerler.net/tipografi-nedir-t37231.html>

<sup>34</sup> Emine Sarsılmaz, Op. cit.

required, otherwise visual and typographical errors which called “white river” may occur.<sup>35</sup>

### **Special effects**

**Hanging indent:** In word processing, a paragraph that has all lines but the first indented. A hanging indent is also known as a hanging paragraph. With many word processors, you can create hanging indents by specifying a negative indentation for the first line of each paragraph.<sup>36</sup>

**Bullet:** Bullet (•) is a typographical symbol or glyph used to introduce items in a list. Generally we use bullets when we give place to a quote.<sup>37</sup>

**Ligature:** Ligature occurs where two or more graphemes are joined as a single glyph. Ligatures usually replace consecutive characters sharing common components and are part of a more general class of glyphs called “contextual forms”, where the specific shape of a letter depends on context such as surrounding letters or proximity to the end of a line. (e.g. f i → fi, f l → fl)<sup>38</sup>

**Dingbat:** Dingbat is set of fonts showing pictures instead of letters. Dingbat is a typographical ornament, or a symbol such as an arrow or a pointing finger. Many type foundries continue to produce dingbats for people who work with letterpresses, and dingbats are also available in the form of digital fonts for people who work on computers.<sup>39</sup>

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<sup>35</sup> “Tipografi Nedir?” (January 10, 2009). Op. cit.

<sup>36</sup> “Tipografi Nedir?” (January 10, 2009). Op. cit.

<sup>37</sup> Boulton, M. (April 13, 2005). “Five Simple Steps to Better Typography”, Retrieved July 10, 2012 from [http://www.markboulton.co.uk/journal/comments/five\\_simple\\_steps\\_to\\_better\\_typography/](http://www.markboulton.co.uk/journal/comments/five_simple_steps_to_better_typography/); and also “5 Adımda Doğru Tipografi,” (July 20, 2006). Retrieved July 10, 2012 from <http://opereysin.com/dersler/438-5-adimda-dogr-u-tipografi-bolum-1/>

<sup>38</sup> “Tipografi Nedir?” (January 10, 2009). Op. cit.

<sup>39</sup> “Tipografi Nedir?” (January 10, 2009). Op. cit.

**Initial:** In a written or published work, an initial is a letter at the beginning of a work, a chapter, or a paragraph that is larger than the rest of the text. It shows a new part like a new chapter.<sup>40</sup>

**Typographic Contrast:** Most online readers don't read line by line, instead they scan (from one point to another). For this reason, designers create typographic contrast and flow by emphasizing certain text. Contrast is important because not all the content within a page have the same value, some have greater significance than the others. By creating contrast, you can direct the reader's attention to the important messages and at the same time enhance the visual appearance.<sup>41</sup> When typographic contrast used letter and line spacing must be increased.<sup>42</sup>

## **Conclusion**

Graphic design means visualization of communication. The visualized design reaches to people more rapid and easy. The writings, photographs and pictures are the essential elements of graphical communication. In visual design, the messages must be clear, unambiguous and aesthetic. Graphical design concept can be defined the solving a problem.

The surfaces of graphic design is two-dimensional. Designer try to give his message in this area. This four-sided area is the basic establishment place of composition. Typography, photography and illustrations which will take place in the field of composition, must be placed in a certain clearance. Proper placement of these elements increases the power of design. Magazines, brochures, posters, books, packaging products, such as graphic design materials covered by design. Designing refers to planning. Design process means to order the confusion and difference. Order provides easily understanding of main message.

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<sup>40</sup> "Tipografi Nedir?" (January 10, 2009). Op. cit.

<sup>41</sup> "Typographic Contrast and Flow," (December 11, 2007). Retrieved July 06, 2012 from <http://webdesignerwall.com/tutorials/typographic-contrast-flow>

<sup>42</sup> Boulton, M. (April 13, 2005). Op. cit.

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Nowadays the importance of editing content in narrow sense and information design in broad sense are increasing. A good planning is the fundamental condition for a successful design.

If a piece of information is arranged correctly, classified well and if it is presented effectively, and compiled in a suitable manner for the purpose, it can easily be detected by its receiver. If text and image elements are placed irregularly, perception and communication become more difficult and can cause a misunderstanding.

Therefore visual balance between texts and images must be established very well. Colors, shapes and their placement must be well-balanced and able to draw attention. Also the eye must be able to easily follow the action of the page in line with the flow of information. If the text loses its meaning in terms of communication, it will be move away from its goal.

To make a page attractive is very important. Visual warning more attract the reader into the page. Simplicity eliminate unnecessary elements. A good design mustn't tire the reader. If the page has too much information, reader can be confused. At the first time when we give a lot of knowledge, the reader will get bored.

When we look at a page or monitor our eyes detect the sameness and differences by instinct. If the designers work successfully the artworks make sense and the messages are good transmitted. Successful designs post the content completely and simply. This provide elegance to the document.

There are too many rules and different methods to implement them in typography. E-learning content can be perfectly produced, merely with the sharp eye and artistic point of view of the trained and experienced specialist in typography.

## **References**

1. "5 Adımda Doğru Tipografi," (July 20, 2006). Retrieved July 10, 2012 from <http://opereysin.com/dersler/438-5-adimda-dogru-tipografi-bolum-1/>
2. Beal, V. (July 24, 2012). "An Introduction to Fonts". Retrieved July 30, 2012 from [http://www.webopedia.com/quick\\_ref/fonts.asp](http://www.webopedia.com/quick_ref/fonts.asp)

3. Boardley, J. (April 4, 2008). "On Choosing Type". Retrieved July 21, 2012 from <http://ilovetypography.com/2008/04/04/on-choosing-type/>
4. Boulton, M. (April 13, 2005). "Five Simple Steps to Better Typography", Retrieved July 10, 2012 from [http://www.markboulton.co.uk/journal/comments/five\\_simple\\_steps\\_to\\_better\\_typography/](http://www.markboulton.co.uk/journal/comments/five_simple_steps_to_better_typography/)
5. "Composition in Art," (2011). Retrieved July 10, 2012 from <http://www.infoplease.com/encyclopedia/entertainment/composition-art.html#ixzz2AnE4s1so>
6. "Font," (May 30, 2012). Retrieved June 20, 2012 from <http://en.wikipedia.org/wiki/Font>
7. "Grapheme," (April 26, 2012). Retrieved August 13, 2012 from <http://en.wikipedia.org/wiki/Grapheme>
8. Lohr, L. L. (2008). *Creating Graphics for Learning and Performance: Lessons in Visual Literacy*, New Jersey: Pearson/Merrill/Prentice Hall p. 228.
9. Mayer, R. E. (2009). MULTIMEDIA LEARNING (2nd ed). New York: Cambridge University Press., "Principles of Multimedia". Retrieved July 01, 2012 from <http://www.cognitivedesignsolutions.com/Media/MediaPrinciples.htm>
10. Pektaş, H. (March 2001). "İnternette Görsel Kirlenme", TÜBİTAK Bilim ve Teknik Dergisi, Ankara, p. 72, Retrieved May 19, 2012 from <http://www.hasippektas.com/in.gors.html>
11. Pektaş, H. (n.d.). "İnternetteki Tipografi Sorunları ve Görsel Kirlenmeye Karşı Öneriler", Retrieved May 19, 2012 from <http://www.fotografya.gen.tr/issue-6/hasip.html>
12. Pipes, A. (1997). *Production for Graphic Designers*, 2nd Edition, New Jersey: Prentice Hall Inc. p. 40.
13. Rubinstein, R. (1998). *Introduction to Digital Typography*, Boston: Addison-Wesley Longman Publishing Co., Inc. p. 12.
14. Sarsılmaz, E. (April 01, 2010). "Tipografi - Tasarlanmış Yazının Sanatı", Retrieved August 23, 2012 from <http://www.slideshare.net/EnformatikSeminerleri/tipografi-seminer-sunumu>
15. "Tipografi," (August 09, 2012). Retrieved August 20, 2012 from <http://freelancegrafiker.blogspot.com/2012/08/tipografi.html>
16. "Tipografi," (n.d.). Retrieved July 20, 2012 from <http://www.aed.org.tr/tipografi.html>
17. "Tipografi Nedir?" (n.d.). Retrieved June 01, 2012 from [http://www.mikroegitim.com/tipografi\\_nedir.html](http://www.mikroegitim.com/tipografi_nedir.html)
18. "Tipografi Nedir?" (January 10, 2009). Retrieved July 08, 2012 from <http://www.grafikerler.net/tipografi-nedir-t37231.html>
19. "Typographic Contrast and Flow," (December 11, 2007). Retrieved July 06, 2012 from <http://webdesignerwall.com/tutorials/typographic-contrast-flow>

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20. "What is Designing?" (February 06, 2011). Retrieved July 11, 2012 from <http://designersdare.com/what-is-designing/>
21. "Writing," (n.d.). Retrieved July 21, 2012 from <http://www.britannica.com/EBchecked/topic/649670/writing>
22. "Yazı ve Tipografi," (November 14, 2008). Retrieved July 04, 2012 from <http://www.grafikerler.net/yazi-ve-tipografi-t32567.html>



## Uploaders

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**Abstract:** Our “Let’s Learn Together” project aims to encourage collaboration among students. It is based on communication and interaction. Through this project, the school community is enjoying a further level of sustained collaborative learning. At the beginning of the project, a wall display near the library invited students to list any area where they felt significantly proficient and were willing to share their proficiency with those who needed support in that area. These areas range from Maths, Turkish, English, German, Social Studies, Science and Technology to Design Technology, Music, Dance and hobbies. This project contributes to students’ reflection, inquiry, communication and self-assessment skills. It improves their awareness of their own strengths and areas for improvement. It encourages caring and taking action for the good of others. It allows students to enjoy learning with and from each other. We are researching into the use of video casts and podcasts in schools, and will be sharing our further findings in our poster presentation at the conference. Technological stimuli are abundant for students. We aimed to turn that into an advantage. As students are more likely to participate in activities with a technological aspect, we decided to extend our “Let’s Learn Together” project to include technology. Based on the premise that learning extends beyond school hours and school walls, we now have students uploading their own content to be downloaded by other students and to be listened to / viewed on the service bus, while walking, at home, using their mobile phones, laptops, PCs, tablet PCs, etc. Any time. Any place. The rundown of the project sequence was as follows: Students recorded their voice or video content on areas and topics where they felt especially proficient, such as in Science, “Heat and Energy”, and in Turkish, “The Use of Adverbs” and had a chance to share these with their friends in need of support in those areas. We uploaded these on the web: <http://istekbarisilkokulu.podomatic.com/> <http://istekbaris45.podomatic.com>, <http://istekbaris678.podomatic.com/>. Students can download a variety of content, including explanations, demonstrations, shortcuts, summaries, hints, tips, etc on their PCs, tablet PCs, mp3 players and mobile phones, and listen to / watch them on the service bus, at home, before going to sleep, etc. This way, they are able to share and enjoy giving to others, as well as polishing their own awareness of the topic they help others learn. Rather than just access ready-made information, they produce content. They become “Uploaders”.

**Keywords:** Uploaders, Podcasting, Collaboration, Collaborative Learning,

## Introduction

### Where we began

As we strive to become a “better school”, we are looking for ways to “integrate” innovative, effective strategies, tools and other components into our school’s practices.

We have been extending collaborative learning beyond the classroom. Technology

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integration is also one of our focus areas. Our conference poster explains how we have integrated collaboration and technology in one project.

Our “Let’s Learn Together” project, which is based on student-student interaction for learning, aims to encourage collaboration among students. It is based on communication and interaction. Through this project, the school community is enjoying a further level of sustained collaborative learning. As evidenced by our project, collaborative learning offers additional enjoyment, enduring understanding and improved social skills to students.

We aimed to add to this project, the additional stimuli technology brings to learning environments and situations. We use a variety of educational technology tools in our school. Students have access to the internet in various parts of the school, including the Information Technology laboratory, the library, and classrooms. We have smartboards and computers in classrooms and other learning environments, and use a variety of software in classrooms, in the IT lab and use web-based software for homework. From time to time, students are encouraged to bring their own technological devices, such as laptops, notebooks, tablet PCs and smart phones and use them in the classroom under the teachers’ guidance.

As a good way of integrating technology into our “Let’s Learn Together” project, we introduced “podcasting” to the school community.

“When used educationally, podcasts can empower students and teachers to become content producers rather than content consumers, and they can give them audiences beyond the classroom. Student-created podcasts reinforce course concepts, develop writing skills, hone speaking ability, and even help parents stay current on classroom activities.

“Podcasting is delivering audio content to iPods and other portable media players on demand, so that it can be listened to [or viewed] at the user’s convenience. The main benefit of podcasting is that listeners can sync content to their media player and take it with them to listen [or view] whenever they want to. Because podcasts are

typically saved in MP3 [or MP4] format, they can also be listened to on nearly any computer”, or any other technological device with a media player facility.

Podcasts allow our students to use technology to create/produce and learn together.

## **Methodology**

### **How we did it**

At the beginning of our “Let’s Learn Together” project (Figure 1), a wall display near the library invited students to list any area where they felt significantly proficient and were willing to share their proficiency with those who needed support in that area. These areas range from Maths, Turkish, English, German, Social Studies, Science and Technology to Design Technology, Music, Dance and hobbies. The “matchmaking” wall display list also includes a column for the days-times-place such students are available for sharing their “expertise”. Interested students sign up (Figure 2) and meet with the “expert” students at the designated break-times in the announced place and sharing begins.



**Figure 1:** Uploaders – “Let’s Learn Together” announcement to students

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**Figure 2:** Uploaders – “Let’s Learn Together” students sign up

This ongoing project contributes to students’ reflection, inquiry, communication and self-assessment skills. It improves their awareness of their own strengths and areas for improvement. It encourages caring and taking action for the benefit of others. It allows students to enjoy learning with and from each other. (Figure 3)



**Figure 3:** Uploaders – “Let’s Learn Together” Grade 5 student teaching “Use of Adverbs in Turkish”

Once the project was in place, it met with such enthusiasm from the students that we thought we needed to extend it beyond school borders. We then researched into the use of videocasts and podcasts in schools. Technophiles among our teaching staff prepared presentations for the other teachers. ( Figure 5) We found a free-of-charge podcasting site and set up pages for grade levels. Students were then informed about and invited to contribute to the podcasting facility as part of the “Let’s Learn Together” project. They began to record audio and video files to share their “expertise” with other students in an asynchronous setting.

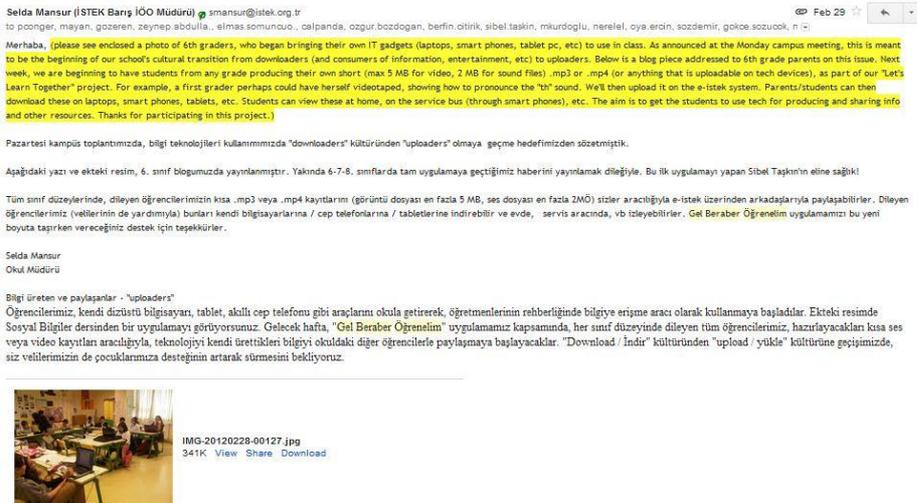


Figure 5: Uploaders – Announcement e-mail to teachers

The creation of the files took many forms. Social Studies homework projects were recorded with help from families, strengthening the parent-student-school connection and collaboration. (Figure 6) Turkish lessons included 2-3 minute end-of-lesson consolidation audio-recording under the supervision of the teacher. (Figure 7) Parents signed permission forms for the broadcasting of their children’s recordings,

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which were then uploaded on our podcast page to be shared with others: other students from our school and the general public.



**Figure 6:** Uploaders – A Social Studies Lesson with students’ own technological devices



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**Figure 7:** Uploaders – A Turkish Lesson with students’ own technological devices

## **Discussion**

### **Challenges turned into opportunities**

Technological stimuli are abundant for students. We aimed to turn that into an advantage. As students are more likely to participate in activities with a technological aspect, we decided to extend our “Let’s Learn Together” project to include technology. Based on the premise that learning extends beyond school hours and school walls, we now have students uploading their own content to be downloaded by other students and to be listened to / viewed on the service bus, while walking, at home, using their mobile phones, laptops, PCs, tablet PCs, etc. Anytime. Any place.

We ran into some problems while uploading sound files onto the free podcasting site. Recordings produced by students at home in certain formats had poor sound quality. We solved this problem by using a free format/code converting software.

## **Conclusions**

### **Where we are now and what we suggest to others**

The rundown of the project sequence was as follows: Students recorded their voice or video content on areas and topics where they felt especially proficient, such as in Science, “Heat and Energy”, and in Turkish, “the use of adverbs” and had a chance to share these with their friends in need of support in those areas. We uploaded these on the web:

<http://istekbarisilkokulu.podomatic.com> (Figure 8)

<http://istekbaris45.podomatic.com> (Figure 9)

<http://istekbaris678.podomatic.com> (Figure 10)

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**Figure 8:** Uploaders – Podcast page – ilkokul



**Figure 9:** Uploaders – Podcast page – Grade 5

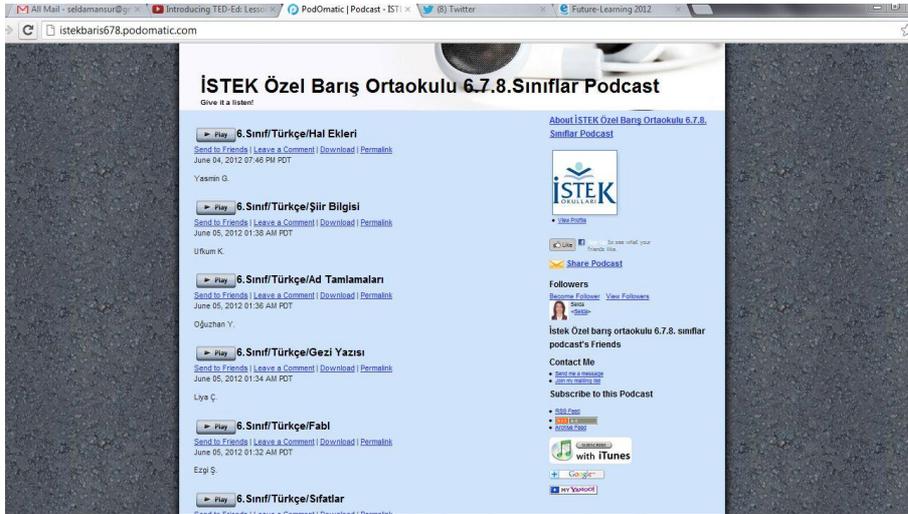


Figure 10: Uploaders – Podcast page Grades 6-7-8

Students can download this content which includes explanations, demonstrations, shortcuts, summaries, hints, tips, etc on their PCs, tablet PCs, mp3 and mp4 players, and mobile phones, and listen to / watch them on the service bus, at home, before going to sleep, etc. This way, they are able to share and enjoy giving to others, as well as polishing their own awareness of the topic they help others learn. Rather than just access ready-made information, they produce content. They become “Uploaders”.

Students on the “downloading” side of this collaboration say that hearing/watching their peers explaining or demonstrating difficult concepts, ideas, formulas, etc helps make their learning more enjoyable and enduring.

We are writing this paper during the very first week of the new school year, which will see many new additions to our podcast collection. By sharing our practice with other educators, we hope to follow the example of our students and share something we believe we are good at doing: integrating simple ideas and tools to enable students/learners to solve complex issues, such as learning. What we are doing can be

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defined as producing “a new library of curiosity-igniting” materials, as a TED video puts it.

## References

1. Smart, Maya Payne, Listening to Themselves: Podcasting Takes Lessons Beyond the Classroom,11/12/2008 from <http://www.edutopia.org/podcasting-student-broadcasts>
2. Podcasting News,What is podcasting?. 2004-10, from [http://www.podcastingnews.com/articles/What\\_is\\_Podcasting.html](http://www.podcastingnews.com/articles/What_is_Podcasting.html)
3. <http://ed.ted.com/>, <http://www.youtube.com/watch?v=FfJ5XG5i2aw&sns=em>
4. <http://www.edutopia.org/podcasting-student-broadcasts>
5. [http://www.podcastingnews.com/articles/What\\_is\\_Podcasting.html](http://www.podcastingnews.com/articles/What_is_Podcasting.html)
6. <http://www.youtube.com/watch?v=FfJ5XG5i2aw&sns=em>



## **Touchable Interactive Walls in High Schools**

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***Abstract::** The purpose of this study as a part of the learning environment to think the walls of the corridors of the school, contribute to students' learning by using touch screens. For this reason, Physics, History, Geography, Biology lessons with interactive applications, educational games, educational video, and electronic content of the photos were made with the touch panels. Touch panels, consisting of courses in the visual designs, forex content by pressure placed on the walls in the corridor.*

### **Introduction**

Widespread use of smart phones and tablets, increases the interest of students in the vehicles touch. According to our online survey, approximately one of every three students uses a tablet PC. The touchable walls are designed for taking into consideration the interests of the students.

### **Project**

Touch panels, consisting of courses in the visual designs, forex content by pressure placed on the walls in the corridor.

The touch panels consist of two 24-inch screens, two 42-inch screens and four computers.. These screens will be the appropriate height of the wall placing the teenager's physical structure is mounted on the walls. Especially 24-inch touch-screens, for use are more comfortable than the 42-inch screens . The wireless network to connect computers to the server with the touch screens and the entire system is managed from here.

The educational software and content management system are appropriate to the touch devices entirely in the touch screens. Buttons, photo and text displays in sizes designed to work seamlessly with intuitive features.

Software that runs in full screen on the touch screen so that the closure of the software and also prevented the formation of undesirable, such as damage to the system.

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Touch panels have been developed with Flash and PHP-based content management system.

Applications are grouped under three categories. These are as follows. "Enjoy" "Learn", "Watch".

"Enjoy" category has been developed for the game-based applications. Scores are recorded for increasing student motivation and so student's name and photo are showed in the three highest scoring.

"LEARN" has the following applications: drag and drop applications related to course content, tutorial, interactive applications such as simulation. These applications are designed to reinforce student learning and they don't save their scores.

"Watch" category applications are composed of instructional video, photos, and the sounds.

200 educational applications has been prepared by the department of educational technology that consist of the software specialist, graphic designer, and educational technologist. They were prepared by the support of the teachers in about 3 months.

Teachers and students can use applications on touch screen by entering their password. Students with content management system can add favorite applications, can see game-based applications's scores and also can see which applications are running. Thus, the number of times students used applications can be tracked by the system.

After completion of educational software in the digital panels on the wall where the panel is designed by supporting visual materials related to the course. Prepared visual designs for walls, are made more attractive by using cylindrical surfaces, with sound and lighting systems.

The school corridors with wall-level and digital dashboards , turned into a complete learning environment for the students. Students learn better lessons using interactive applications with digital walls.

Students during breaks using touchable walls both fun and learning reinforce learning as well as watching. Applications with content management system used by the students was seen as a very intense, it was decided to increase the number of applications in this direction.

### **Project Views**



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COĞRAFYA TARİH FİZİK BİYOLOJİ

ALİ MESUTCAN GÖK  
Bana Özel Çıkış

EN İYİLER

Tom İzabet

ÖĞLENDİRME KATILIMCI  
Ortalama Değerlendirme Puanı: 480

HAZIRLANAN YATIRIMCI  
Ortalama Değerlendirme Puanı: 450

İBANKA KATILIMCI  
Ortalama Değerlendirme Puanı: 170

EN YENİLER

Başarı Listeleri  
Tarih: 18-05-2012

Tom İzabet  
Tarih: 16-03-2012

Karışık Sorular Gözetimleri  
Tarih: 16-01-2012

Atatürk Amerikanlı Hayatı  
Tarih: 16-01-2012

Atatürk Meclis Konuşması  
Tarih: 16-01-2012

EN GÖZDELER

Tom İzabet  
Hiz: 318

Kim 1 Milyon İster  
Hiz: 205

Karışık Sorular Gözetimleri  
Hiz: 77

Önemli Padışahlar  
Hiz: 74

Atatürk Amerikanlı Hayatı  
Hiz: 55

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EĞLEN ÖĞREN İZLE

BİLFEN LİSELERİ E-UYGULAMALAR

COĞRAFYA TARİH FİZİK BİYOLOJİ

ALİ MESUTCAN GÖK  
Bana Özel Çıkış

ÖĞREN

Ardenizme  
Tarih: 04-01-2012  
Hiz: 76

Enerji Kaynakları  
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Hiz: 136

Enerji Tasarımı  
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Hiz: 66

Çevrelerin Sistemi  
Tarih: 04-01-2012  
Hiz: 490

Çölge  
Tarih: 04-01-2012  
Hiz: 100

Güneş Enerjisi  
Tarih: 04-01-2012  
Hiz: 116

Güneş Sistemi  
Tarih: 04-01-2012  
Hiz: 282

Hydroelektrik Sistemi  
Tarih: 04-01-2012  
Hiz: 187

Jedermal Sistemi  
Tarih: 04-01-2012

İşık Kırınımı  
Tarih: 04-01-2012

Harikalar  
Tarih: 04-01-2012

Okyanuslar Enerji  
Tarih: 04-01-2012

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Bana Özel Çıkış

BANA ÖZEL

ALİ MESUTCAN GÖK  
11 FENB / 71  
Ortalama Değerlendirme Puanı

FAVORİLERİM

Hydroelektrik Sistemi KALDIR

Cemide Bir Bifenli KALDIR

DOKUNDUKLARIM

Hydroelektrik Sistemi HIZ 187

Atatürk 1919 HIZ 11

Tom İzabet HIZ 650

Tom İzabet HIZ 318

Turizm Cenneti Türkiye HIZ 73

BAŞARILARIM

Tom İzabet PUAN 940

Türkiye'nin Akarsuları PUAN 870

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### **Conclusions**

Students, especially "Enjoy" category, educational games were shown more interest. Giving priority to game-based applications, thought to increase the appeal of digital billboards.

### **References**

1. (2012, Sep 10). Retrieved from <http://www.bilfenlisesi.com/euygulamalar>



## **Immersive 3D Online Gaming Technologies Engaging Students**

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***Abstract:** Internet-based communication is becoming an increasing part of the social, cultural, and economic fabric as nation-states expand infrastructure in response to demand (projected or actual). A significant aspect of this activity is driven by online gaming – a significance that tends to be strongly underestimated particularly by established institutions. Education institutions (generally) have been lethargic in the uptake of internet technologies, somewhat slower to adapt to education opportunities offered by real time (live) internet communications, partly in the belief that face-to-face training is a more efficient manner of engagement with a student/s. Some tertiary establishments have tinkered with on-line learning, spawning a plethora of two-dimensional, barren, and/or webcam driven online courses in the past decade without substantially responding to the most significant issue of engagement. Advantages of e-learning are well identified, though whole-hearted or lively on-line courses are notably rare. Possible budgetary constraints combined with an educator's doubts about the efficacy of anything less than face-to-face training has resulted in a failure to deliver educational content in an online environment which is as stimulating as online gaming environments. This paper claims that online gaming, which continues to grow at an astonishing rate (particularly in comparison with other economic activity), can have a noticeably positive effect on education technologies. This premise is further supported by recent publications showing a growing trend towards online Instructor Led Training (ILT) across the training industry compared to a simultaneous decline in face-to-face training. This paper demonstrates how commercially-driven training technologies can be readily adapted to education. A novel 'Immersive 3D' platform of education-technology is introduced (and demonstrated) that is likely to gain student engagement. The system is technologically advanced to the point where it is 'sufficiently simple' to be delivered entirely from a typical PC or laptop; is as user-friendly as any similar gaming technology, with educational content designed around the major premises set out by Edward Castronova's recent publications. Penultimate efficacy of future online learning will be governed by the level of engagement of a student (irrespective of bandwidth or other technological or hardware considerations). Given the exponential growth of online gaming, supported by increasing research into this phenomena, it is not unreasonable to explore the attractants of the online gaming worlds and extrapolate these attractants to an education environment. Also noteworthy is that more than one online gaming expert claims a relationship between gaming and education in a virtual environment or synthetic world. Recent book publications claiming the growing trend to on-line training and education also address the issue of student/participant engagement by a comparison of the technological solutions to on-line ILT: results indicate that Immersive 3D performs comparably, if not exceeds, comparative test results for 'Total Engagement.' In conclusion the writers claim that visual representation of subject matter by Immersive 3D graphics enhances student engagement, and that perceptions about hardware or economic constraints are no longer valid. Immersive 3D technologies have the opportunity to directly counter students' perception that education is failing them, by presenting education via electronic-arts media, basically in an environment to which about 70% of students relate – online gaming. It is not suggested, at this stage of development, that Immersive 3D technologies are likely to overtake face-to-face ILT in terms of engagement within a classroom environment. However, in outright terms of engagement plus economic efficiency Immersive 3D technologies (as presented) have all the positive elements of voice, video, content sharing, and the emotional engagement of a synthetic world whilst overcoming the dual challenges of student*

*participation over relative distance – simultaneously with allowing administrators flexible planning because of the scalability of Immersive 3D technologies.*

**Keywords:** Immersive 3D education, training, engagement, interactivity, education technology

## **Introduction**

At the time of this writing we are surrounded physically by evidence of a burgeoning world of fiber-optic and/or wi-fi communications: many streets in many cities lay exposed to earth-moving equipment as various forms of diggers prepare for the laying of further telecommunications cables – yet again. In short, society is rushing to enhance communications providing instantaneous information, valuable to some and valueless to others, as government agencies to e-commerce vendors embrace access to endless information deliverable on an equally increasingly wide range of communications devices.

Mankind's fascination with internet-based communication seems inexorable, but very clearly some forms of internet activity are more successful (when measured by the number of users) than others, none more so than online education. Universities which typically would have been at the forefront of fresh technologies and ideas have been slow to adopt the possibilities (generally). Even when education has been delivered online, the quality of the material (content) delivered has not been seen to be particularly engaging.

The advent of cheap web-cams only added to the misery of the user, forced to watch low-quality, distorted-by-wide-angle-lens facial expressions, poorly lighted, delivering an equally stimulating dialogue as some form of a lecture. At best these video-lectures are recognized as being tiring to the user. Even though many tools lay at the finger-tips of educationalists and administrators, engagement by educators in the internet can only be described as diffident, perhaps spurred on by the belief that face-to-face training or education was more effective, as perhaps administrators were overly cautious about costs.

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Beyond academia, in the world of commerce and gainful employment, e-commerce, social-networking, and online gaming were taking the world by storm. Online commercial activity today is measured in terms of billions of dollars annually, with double-digit growth rates that are the envy of many national economies or industries. To the further envy of educationalists claims are made (Castronova, 2005, pp2-3) “thousands of users interact with one another, on a persistent basis ... many hours of a day, every day, all year around.”

Edward Castronova is introduced to this paper because he is an academic and economist, accustomed to researching economic activity; describing himself in the words “a hard-headed person”. He observed the online gaming phenomena, again in his words he “felt strange about it” because all of this multi-billion dollar activity was happening outside the normal fields of research. He ultimately wrote a book, *Synthetic Worlds* (2005), which gained acclaim because of the insights, and it was the first serious works on the economics of online gaming. Notably it was the game-developers and not established academia forthcoming with praise: it was students of economics that first drew the attention of their professors to Castronova’s works.

Castronova profiled the users, clearly defining the users were not as socially inept as stereotyping suggested, but the users had a lot in common with many of regular students *and* educators. Castronova coined the phrase ‘synthetic worlds’ as a derivative of Virtual Reality (VR). Like many other users Castronova implicitly rejects VR on the grounds that it ‘failed’ to gain wide acceptance because of mechanically and graphically crude systems, described as a single person in a special room, wearing a big helmet, arms and legs wired up to something mobile – the very antithesis of human interaction.

Instead there has been an evolution of Massively Multi-Player Online Role-Playing Games (MMORPGs, pronounced as ‘mor-pegs’), under commercial names like *World of War*, *EverQuest*, *Star Wars Galaxies* and so on, with many millions of subscribers where Castronova claims in the introduction to his book “thousands of users

interact with one another in the guise of video game characters ... spending 20-30 hours per week inside the fantasy.”

From the computer games industry Castronova’s ‘synthetic worlds’ are emerging as an addictive source of pleasure, with just enough ‘realism’ that worlds become an important, almost life-like host of ordinary human affairs. The virtual or synthetic worlds feel so lifelike that users sublimate the imperfections, readily immersing themselves into the synthetic world in almost parallel existence. The game-playing and immersion affects sociality, relationships and emotion. The user or gamer becomes focused on mentally and emotionally engaging software, suspending disbelief – or becoming *immersed* in a synthetic world – because the environment is nominally genuine. The user becomes so involved mentally and emotionally that (he or she) suspends critical belief.

Despite hundreds of millions of game-playing users, both MMPORGs and MMO (*massively multiuser online*) games, Castronova claims an unwillingness of ‘senior management’ to address the impact of online games, even though these new frontiers may offer opportunity for something greater than simply having ‘fun’ at gaming.

Clark Aldrich, 2009, (*Learning Online with Games, Simulations, and Virtual Worlds*) made more vigorous claims “Games are a more natural way to learn than traditional classrooms”, claiming the motivational effect of digital games from “the emotional appeal of fantasy and sensory and cognitive components of curiosity.” Adlrich further claims that knowledge is only useful in context, and that virtual environments provide an emotional context which is necessary for new content to be absorbed. At the time the user has an emotional commitment to the content (game) chemicals are released in the amygdale and hippocampus that trigger the memory, according to Ledoux in 1998. The persistent involvement in games would suggest that users are emotionally involved.

## **Describing Synthetic or Virtual Worlds**

In his first major treatise about online gaming Castronova, 2005, (*Synthetic Worlds*) drew attention to his claimed “practical virtual reality,” calling the environment a synthetic world that was distinct from the cumbersome “virtual reality” technologies of the 1990s. Castronova published a further book (*Exodus to the Virtual World*, 2007) whereby he interchanges the terms synthetic and virtual worlds. Amongst other claims he states that hundreds of millions of people will “exit to the virtual world” over the next 20 to 40 years – over and above the hundreds of millions of gamers current for 2012.

A synthetic world is a three dimensional (3D) graphics-driven environment of ‘lifelike fantasy’ (authors’ term), whereby displays on a computer screen scroll in all directions at the right rate, as if the user is moving around. Environments are typically an utterly fantastic, but *conceivable*, space odyssey setting; or a pre-historic or futuristic *nature* setting; a combination of both, or an ‘ultra-urban’ setting in which the heroes battle with some form of prescient doom, et al. The point about the environments is the ability of the user to apparently move freely within them, and there are enough similarities with our knowledge of reality that the environments are plausible.

Many games are so-called single-shooter games, whereby the user basically points and shoots at whatever is displayed as a threat. Online gamers play against unknown competitors from individual computers located anywhere there is a network connection, each vying for some form of competitive advantage. These games currently attract subscriptions from at least 200 million gamers in the third-quarter of 2012, with one gaming developer (Electronic Arts) claiming a staggering 63% growth rate year-on-year. These games are the classic MMOs.

Other gamers choose to enter an environment which enables a greater depth of interaction between other players by designing and claiming a particular avatar that suits the user. The avatar moves around a virtual world, interacting both with the environment and other players. The apparent attraction of this gaming involvement is the user can basically take on the *role* of any particular avatar that suits the mood or personality or

objectives of the user – and *interact* with others in the same environment. More complex than MMOs, the avatar requires care and thinking – in other words, an emotional commitment. These avatar based role-playing games, are archetypical MMORPGs, with about 23 million monthly subscribers (third-quarter of 2012).

Emphasis is placed on the interaction of MMORPEG users because Castronova and many others (Prensky 2000, Pesce 2000; Berger 2002; Gee 2003; Squire and Jenkins 2004; Steinkuehler 2005) have demonstrated repeatedly that interactivity is a very powerful education tool. Opportunity for interactivity is started when a user creates an avatar, endowing it with a ‘personality’ which then commits a user to a relentless involvement because “the avatar’s attributes felt like they were your own personal attributes ... acquiring a real emotional investment” (Castronova, 2005, pp 32-34). Having endowed an avatar with an identifiable character, the user’s curiosity is frequently aroused as to who else the user will find and what will be the outcome of the encounter. The behaviour of the avatar becomes motivated by the decision of an actual human mind (Castronova, 2005, p 48).

Users of these virtual or synthetic worlds cut across a wide spectrum of the population, but more significantly earlier research in 2003 by Castronova showed that 70% of all college students played video games (today, interactive online games) at least “once in a while.” Other education-researchers pointed to interactivity of games as a feature that made excellent teaching and training tools.

### **Gaming Users and Interactivity**

Gaming users are not predominately teenagers and social outcasts (Castronova, 2005, p 62.), and the large majority of users are, or have been – tertiary students at some point in their lives. An intersection between gaming and education should be obvious, yet many administrators or senior-level management continue to shy away from gaming-tools with its obvious *engagement* of the student mind.

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Four different categories of users were identified early in the short history of virtual worlds: i) *Explorers*, those people who want to explore what is there and map it for others; ii) *Socializers*, who come to be with others, happiest with challenges that involve forming groups; iii) *Achievers*, people who come to build; and iv) *Controllers*, people who come to dominate others (Richard A. Bartle, 2003, *Designing Virtual Worlds*).

Synthetic worlds of extraordinary or slightly surreal 3D graphics in which the user is allowed or encouraged to move freely around in these ‘new worlds’ – which is one of the primary keys to engagement for the user or student. “New worlds being built ... provide a better life experience than the world we were born into.” (Castronova, 2005, pp 70-71). The three-dimensional world becomes sufficiently attractive – the users allow themselves to become immersed in the 3D environment.

Completing the psychological attractions to the 3D virtual worlds is the opportunity for the user or student to develop and use an avatar that they feel adequately reflects their perceptions of themselves. The avatar not only takes on the persona of the user, but then allows the user body movement within the 3D environment. Given that verbal communication accounts for as little as 30% of our communications, bodily and facial movement clearly account for another significant element of communication. In a virtual world “avatar-mediated communications is better than its competitors at facilitating the interactions that humans want to have ... synthetic worlds are a form of word-communications through text and voice that also enables a kind of physical bodily communication through gestures and position of the avatar” (Castronova, 2005, pp 69-70). Video (conferencing) is claimed by some educators to satisfying student engagement; whereas video gives both body and voice – it fails to allow users to mingle or to interact. For the student the video is both tiring and considered inferior to providing satisfactory engagement.

Many students, gamers, users respond to the oft-repeated Shakespearian adage “all the world’s a stage and the men and women merely players.” Students of all walks of life have been proven to enjoy playing.

The training industry, that is – the industry that provides training services for commercial considerations, has apparently been quicker to recognize and adapt to the advantages of immersive 3D platforms as a tool of training or education. Commercial training can be referred to as *Instructor Led Training*, (John Beck and Mitchell Wade, 2011) also referred to as ILT, and encompasses both face-to-face and online training. The most significant challenge for online training being the ability to keep participants engaged, “when a student lacks online engagement the training outcomes are less effective” (Beck and Wade, 2011) than face-to-face ILT.

It is recognized that learning is most effective when it is a collaborative process: interactivity offered by an avatar in a 3D synthetic world *is* that collaborative process. The ability to interact with the environment and to ‘fly around’ the location adds to the feelings of well-being for a user. Immersive-3D software that enables remote students or participants to create and control an avatar in a 3D education environment, complete with VOIP (Voice over Internet Protocols) and content sharing. (An example, brand-named ‘Virtual Learning,’ as demonstrated at this conference.)

Anecdotal research carried out by Beck and Wade, based on their definitions of four components of engagement (focus, empowerment, presence, intimacy), compared face-to-face training with video-conferencing, web conferencing, tele-presence and Immersive 3D. Out of a maximum score of 20 face-to-face training scored 20; tele-presence scored 17, Immersive 3D scored 17; video-conferencing scored 7, and web-conferencing scored 2.

## **Engagement**

‘Engagement’ is a key component of ILT, as it is equally important to any form of teaching: generating a satisfactory level of engagement with an online learner, student,

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or user, has been a difficult challenge to create effectively using virtual methods. ‘Total Engagement’ can be assessed through four components (Beck and Wade, 2011);

- *Focus* – which is the ability of attendees to indicate where they are looking by eye contact, by position, etc.
- *Empowerment* – is the ability for attendees to be actively engaged in the training and involves facial expressions and gestures.
- *Presence* – is the sensation of being in a shared space.
- *Intimacy* – is the ability to recognize attendees and have directional eye contact and directional sound in order to be able to tell who is speaking.

Observations are made by the authors of this paper about quality of graphics viewed in virtual worlds when compared to many of the ‘dry,’ two-dimensional or linear, texts delivered online that students are likely to gain greater pleasure from 3D graphics than pages reproduced from PowerPoint displays or textbooks. Enhanced with the ability of the user to ‘fly around’ the 3D environment at will, understandably the level of engagement will be greater – if only because of the visual effects. The environment encourages the user to *immerse* themselves into the synthetic world.

Engagement is maximized by role-playing, the unique capacity of MMORPEG virtual worlds: “perhaps the most critical incentive structure comes from ‘RP’ in MMORPEG, the role-playing aspect ... it has an immersive effect” (Castronova, 2005, pp 107-110). Bartle argues, 2003, that the core effect on a person is to aid in a journey of self discovery – revealed by the roles played. Interactivity and collaboration previously identified as keys to participation or engagement of students is provided uniquely by Immersive-3D environments.

Adding to the attractions of becoming immersed in a synthetic world is achievement of a defined goal, “advancement systems involve the enhancement of the avatar’s non-physical capital as consequence of specific actions; skill ratings; etc.” (Castronova, 2007) “Rules and rewards are incredibly powerful tools for shaping

behaviour.” Once users become emotionally committed to a synthetic world, their entire community will become focused on conquering the challenges that have been presented.

According to the Beck & Wade parameters of engagement, plus the observations by Bartle and Castronova about role-playing in a virtual world, combined with 3D graphics and a powerful opportunity for interactivity, the mechanisms of engagement become apparent.

Evidence is starting to emerge as to the efficacy of synthetic or virtual worlds as a training or education tool: Heiphetz and Woodhill, 2010 (*Training and Collaboration with Virtual Worlds*), build a cohesive case for the use of simulations “A simulation does not simply tell learners what and how to do something; rather it encourages thinking, acting, testing different approaches, and pursuing different strategies. Learners respond to the environment ...” (p 3, pp 141-161).

An evaluation of an online course by the University of Kansas Medical Center by Heiphetz and Woodhill drew conclusions that “the immersive setting provides ample opportunities to learn ... reduces the cognitive load for the students and improves the overall result ... The instructor can evaluate a student’s performance and provide feedback” (pp 171-172). A number of additional case studies were investigated extensively in the same book; IBM, World Bank, Cisco, amongst others.

### **Blending the Playing Space / Conclusion**

More than one writer about online gamers has commented that not all virtual worlds have games in them, commenting further that a synthetic world platform is well suited to education: the nexus between online games and education is not unknown. The thrust of this paper claims that *only* Immersive 3D platforms as defined earlier in the paper as role-playing participation in synthetic or virtual worlds provides a level of engagement that approaches that of face-to-face teaching and learning. It is particularly claimed “synthetic worlds engage motions and correspond to ones we have on earth ... one is spurred to complete tasks of advancement not merely for their own sake, but because it

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will enhances ones social prowess. The effects on the psyche are much the same as they are when such things are accomplished in ordinary life ... all can provide emotional highs” (Castronova, 2005 pp 113-125).

Referring to educational opportunities “... a future of increasing choices, increasing quality, and increasingly broad range of possible services being provided, from entertainment to communication to education to research” (Castronova, 2005, pp182-203).

Teaching – or, as psychologists call it, pedagogy – is defined as a kind of communication between two or more individuals that results in the transfer of knowledge or skills, according to Hungarian developmental psychologists Gyorgy Gergely and Gergely Csibra, 2011. To qualify as teaching, the teacher must also modify his or her behaviour by tailoring lessons based on the performance of the student. And the knowledge transferred must be information that can be applied to new people, objects, locations, or events – what is known as generalisable information. An Immersive 3d platform, such as Virtual Learning, readily meets all of the Gergely-Csibra criteria – but appears to offer an improved level of student engagement.

Heiphetz and Woodhill, 2010, drew conclusions about virtual worlds in the role of training and education that “instead of listening and taking notes, learners will (have the opportunity) to explore the actual situations for which they are training. Learning is becoming a more intense, but playful activity” and “decrease in the costs of powerful training (education) technologies”.

Nick Yee, a respected researcher into gaming, stated earlier in 2012 “understanding gaming motivations is important given the trend incorporating game-based mechanisms in non-gaming applications,” thereby underlining the evolution of *game-based* applications for commercial training and education. Virtual Learning is a platform that provides Immersive 3D on a student PC, while providing a level of engagement that apparently outperforms other modes of delivering online courses.

## **References**

1. Aldrich, C., (2009) Learning Online with Games, Simulations, and Virtual Worlds, San Francisco CA: John Wiley & Sons
2. Bartle, R. (2003) Designing Virtual Worlds, Indianapolis: New Riders
3. Beck, J., & Wade, M., (2011) Instructor Led Training,
4. Berger, A.A., (2002) Video Games: A Popular Culture Phenomenon. New York: Transaction Publishing
5. Castronova, E. (2005), Synthetic Worlds, Chicago: University of Chicago Press
6. Castronova, E. (2007), Exodus to the Virtual World, New York: Palgrave MacMillan
7. Csibra, G., & Gergely, G., (2011, April) Natural Pedagogy as Evolutionary Adaption, doi: 10.1098/rstb, Phil. Trans. R. Soc. B, 2011, vol.366 no. 1567, pp 1149-1157
8. Gee, J.P., (2003), What Video Games have to Teach Us About Learning and Literacy, New York: Palgrave MacMillan
9. Heiphetz, A., & Woodhill, G., (2010) Training & Collaboration with Virtual Worlds, USA: McGraw Will
10. Jenkins, P.S., (2003), The Virtual World as a Company Town – Freedom of Speech in Massively Multiplayer Online Role Playing Games, Journal of Law 8.1 (July)
11. Pesce, M., (2000) The Playful World: How Technology is Transforming Our Mind, New York: Ballantyne Books
12. Prensky, M., (2000) Digital Game-Based Learning, McGraw Hill
13. Squire, K., & Jenkins, H., (2004) Harnessing the Power of Games in Education, Insight 3.1,: 5-33
14. Steinkeuhler, C. A., (2004) Learning in Massively Multiplayer Online Role Playing Games, in Proceedings of the Sixth International Conference of the Learning Sciences, 521-28
15. Yee, N., (2012) On-Line Gaming Motivations – Palo Alto Research Center

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