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Message from the Editor-in-Chief

Dear Readers,

The Turkish Online Journal of Educational Technology (TOJET) is a refereed academic journal publishing educational technology related research and review articles. TOJET has two steps for review process. During the first step, the Editor-in-Chief makes screening review on the candidate articles. In this review process, the candidate articles could be sent to two reviewers or rejected. TOJET has a 'double blind' review process. TOJET doesn't give the names and institutional affiliations of the authors to reviewers and authors' name to authors. TOJET tries to get helpful and formative feedback for authors. Reviewers are given review form and write their recommendations on the form. The review project usually takes six to twelve months because of receiving many candidate articles. It shows us TOJET is respected by international academicians.

The Turkish Online Journal of Educational Technology is online journal and published only through internet. In online system, accessing articles is available in one place and delivered to all over the world using internet. TOJET's quality research papers on theory, applications and development of educational technology can be reached easily from Asia, America, Europe, Australia, and others through internet.

The Turkish Online Journal of Educational Technology is the center of research about educational technology used in instruction. The main goal of TOJET is to establish a bridge for the gap between theory and practice. To help bridge the gap, TOJET provides readers with the new developments in educational technology world-wide and a main source for academics and professionals in the expanding fields of educational technology. Articles consist of all kinds of quality research on theory, applications and development of educational technology.

TOJET is interested in academic articles on the issues of educational technology. The articles should talk about using educational technology in classroom, how educational technology impacts learning, and the perspectives of students, teachers, school administrators and communities on educational technology. These articles will help researchers to increase the quality of both theory and practice in the field of educational technology.

I am always honored to be the editor in chief of TOJET. I am always proud of TOJET for its valuable contributions to the field of educational technology.

The guest editor of this issue was Prof. Dr. Hüseyin EKİZ. TOJET thanks and appreciates the guest editor and the editorial board who have acted as reviewers for one or more submissions of this issue for their valuable contributions. TOJET's reviewers are drawn quite widely from all over the world.

TOJET and Bogazici University will organize the 10th International Educational Technology Conference (IETC 2010) in April 2010 in Istanbul - Turkey. The web page of IETC is "www.iet-c.net".

We are pleased to announce that TOJET has commissioned two special issues (July, 2010 and October, 2010) for the presented papers at the International Educational Technology Conference 2010. The guest editor of these issues is Prof. Dr. Yavuz AKPINAR from Bogazici University. TOJET thanks Prof. Dr. Yavuz AKPINAR to organize IETC-2010 conference and special issues for TOJET.

Call for Papers

TOJET invites article contributions. Submitted articles should be about all aspects of educational technology and may address assessment, attitudes, beliefs, curriculum, equity, research, translating research into practice, learning theory, alternative conceptions, socio-cultural issues, special populations, and integration of subjects. The articles should also discuss the perspectives of students, teachers, school administrators and communities.

The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJET.

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A BOARD GAME ABOUT SPACE AND SOLAR SYSTEM FOR PRIMARY SCHOOL STUDENTS

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ABSTRACT

Visual elements that used in lessons are necessary because they make learning more permanent. Also the visuals that used in evaluation part of the lesson should decrease the anxiety of students and provide them with correct evaluation. The board games among the visuals which can be used in evaluation part are quite effective for getting feedback immediately. Standardizing and increasing the frequency of using games like this in evaluation part will provide evaluation more correct and more effective. In this direction with the aims of recognizing celestial objects in the space, universe, searchings about space, optical tools that used for observing space and evaluating the students' understanding level for planets' attributes.

In this study, there are parts such as preparation of the game, usage of it and the data gathered from semi-structured interviews. With this aim, interviews were conducted with 16 Science and Technology teachers and 40 7th grade primary school students. It was determined that teachers thought that the game activity in this study would increase the motivation of students and it could be used as an evaluation activity, also students enjoyed this game.

Key Words: Evaluation, board game, space and solar system, 7th grade students

INTRODUCTION

Games were described according to their different properties by different researchers. Dewey (1938) described the game as unconscious behaviors that weren't intended for a result. After all, Huizinga (1938) described the game as activities which were voluntary and in accordance with rules at a particular time and in a particular place. Game is preparation for later phases of life according to Gross (1919) and doing what is desired to do according to Gulick (1920). James and Mc Dugal indicated that games rely on instinctive motivations and for Patrick, it is activities that are done freely and spontaneously (as cited in Ergün, 1980). Accordingly, game can be described as pleasurable activities that are performed within particular rules, for a limited time and in place, in which individuals participate voluntarily, carried out with mental and physical abilities and gained some social behaviors.

Games are very important for physical, mental and emotional development (Egemen, Yılmaz&Akil, 2004). Children's abilities such as memorizing remembering, naming, matching and classifying develop while playing a game. They learn reasoning, relating cause and effect. Also they learn focusing, directing themselves to an aim, realizing the problems that appear in the game and finding solutions to these problems (Dağbaşı, 2007). Also children will recognize obeying the rules, learn winning, losing and communicating with the other people. Some games which require certain moves, will help physical development (Altunay, 2004). Romine (2004) conducted a research study that compared the lessons thought by traditional methods and the lessons thought by using the games. Using games in lessons increases students' motivation as well as social and academic abilities. If teacher turns learning into a play, students are naturally motivated to participate (Baines&Slutsky, 2009). Games which were used for foreign language education had positive effects in different studies that were done with different age groups. Students who were taught with games were more successful than the students who were taught with traditional methods (Susüzer, 2006; Kaya, 2007). And it was found in another study that, games made foreign languages easy to learn and students enjoyed the lessons because of the games (Fırat, 2007). Different researchers developed different games for educational use and investigated how effective they could be. Aycan et al. (2002) used two games for teaching periodic table and elements and compared these games in a research study. It observed that students didn't get bored and they had fun through applications. Smith (2002) designed an educational card game for children between the ages 9-13 and intended to increase students'

knowledge about satellites with this game. After implementing this game in three schools, positive results were gained. Opinions were positive about using a game similar to this one for educational purposes and participants enjoyed this game. Also it was seen that most of the students' keeping information about satellites in mind rate increased. A board game about cell topic was used in a study which was done in Switzerland with high school students. Again the students enjoyed playing the game. Furthermore 56% of the students stated they learned new information that they didn't know (Cardoso et al., 2008). Cordona et al. (2007) adapted a game about cell to DNA topic, performed it with high school students in another study and afterwards they invoked teacher and student opinions. Participant teachers and students accepted the game and the researchers reached the result of the game can be used for educating complex topics. Moğol and Özçifçi (2003) have the opinion that the card game they developed for using to educate basic formulas in physics would make boring topics like this more enjoyable and would make learning them easier. Altunay (2004) found in her research that, lessons thought with games would increase the achievement of students and while students in the control group forgot the information that they learned, experiment group didn't forget what they learned with games. Also, Şaşmaz-Ören and Erduran-Avcı (2004) reached results as the games are more effective on students' academic achievement in science and technology course. It was found in Songur's (2006) research, students' remembrance level, attitudes and interests towards Maths lessons and their Maths achievement increased by the lessons which were taught with games.

Measurement and evaluation is an important part of the education process. Besides showing how effective the education was, evaluation helps to make decisions about students and informs about the way that would be used for changing the behaviours of them (Şimşek, 2000). When applications are taken into account, it is seen that evaluation is more devoted to product. So evaluation devoted to grade is kept in the foreground (Yelken, 2006). In this direction, traditional methods are used while evaluation activities actualized in our country. Gelbal and Kelecioğlu (2007) stated that teachers mostly preferred traditional methods for recognizing students and determining their achievement rates in their study which they intended to determine the evaluation tools and methods that teachers prefer to use. Şimşek (2007) investigated the strategies, methods and techniques that teacher candidates used for designing activities and found that very few of them prefers to use teaching with game method and they rarely use games in activities they designed.

Students' anxiety of getting a grade causes them to perceive evaluation as a threat and apprehension tool and to tend learning the information superficially (Gürses et al., 2002). For this reason, while the evaluation activity has to provide feedback for teacher and student, students can't express themselves exactly and we move away from realistic results. Using games as evaluation activities will provide to get more realistic results. Because there is a different field every student can be more successful and some of them will prove their knowledge while they are playing (Yelken, 2006). In a study that was done by Özseveç (2006) the result gained as games and puzzles that are used in evaluation stage attract students' attention and positively affects their learning.

In this direction, the aim of this study is to design a game that can be used in evaluation part of the education, to make inferences about availability of this game by gaining teachers and students' thoughts about it. Based on this basic aim the following problem and sub-problem statements defined:

Problem: What are the teachers' and students' opinions about designed board game?

Sub-problems

1. What are the teachers' opinions about using the game as an evaluation activity?
2. What are the teachers' opinions about the context of the game?
3. What are the students' opinions about using the game as an evaluation activity?
4. What are the students' opinions about the context of the game?

The Importance of the Study

As the literature analysing pointed out there are a few number of researches about this field in our country. Especially researches about using games as evaluation activities weren't found. However, if the benefits of using games as activities in education take into account, it will be realized the requirement of making studies about increasing the frequency of using games. For providing this, researchers have to develop game samples that teachers can use and to present the games as activities. This study has been done for supplying mentioned requirements.

METHODOLOGY

Qualitative methods were used, while gathering and analysing data in this study which was done for investigating 7th grade students' and Science and Technology teachers' opinions about the prepared game for

using in evaluation part of the lesson. A board game designed as containing all acquisition of the Solar System and the Further of It unit which was 7th grade curriculum programme. The game was applied after the unit was completed because of it was designed as evaluation activity and it contains all topics of the unit. While preparing the game, we benefited by an activity about cell in Walker and Wood's (1994) handbook which they gave place to science activities. Prepared game was introduced to teachers and their opinions were received by an interview. Also students had an interview after they played the game.

Information about the Game

There are a board that players move on it, a dice, 45 question cards, 10 puzzle parts that will be given the players if they answer the questions correctly, totally 4 puzzles for each of the players and 4 player pawns in the game which designed as board game (see figures 1 and 2 in appendix).

“Space Hunters” (Turkish name; Gezegen Avcıları) is a board game which designed for evaluating students' recognizing level of celestial objects in the space, universe, searchings about space, optical tools that used for observing space and the understanding level for planets' attributes. Game was designed for 5 players. Questions of the game were formed by analysing the acquisitions of the Solar System and the Further of It unit and the activities in the textbooks.

Before starting the game,

1. Each player selects a spaceship (pawn) and put it on the space base (start) cell.
2. A player selected as space wise apart from the other 4 players. Space wise asks the randomly selected questions and gives the puzzle part, if the correct answer is given.
3. Each player throws the dice. The player who throws the highest number starts the game and the game continues at the clockwise.

While game starts, players throw the dice one by one and move their pawns as the number of dice. If there is a celestial object on the cell which one of the player's pawn stops, space wise asks a randomly selected space question. If player gives the correct answer, space wise will give the puzzle part which has the celestial object that players pawn on. Celestial object is put on the puzzle by player. If the player can't answer the question correctly, he/she won't be punished and it will be the other players' turn. If the celestial object was won before by a player, question isn't selected and again it will be the other players turn. According to the cell that player stops, one of the following must be done if the player stops on a cell:

- Giving one of the celestial objects to the player on the left
- Giving one of the celestial objects to the space wise
- Giving all of the celestial objects to the space wise
- Taking one of the celestial objects from the player on the right
- Taking a celestial object without answering a question from the space wise
- Waiting for two turns

When all of the puzzle parts are taken by players, the player who takes the most number of parts will be the winner and the game is over.

Pilot Study

The game was tried before the research with a group of students in a school apart from the sample for determining the problems that can appear and making a decision about the game time. After the applications we decided the time that game takes. The game takes average 20 minutes and a lesson time will be enough for completing game twice. When the game directed well, evaluating all of the students completes in a lesson time. Also some rules were added for organizing the playing process such as selecting space wise. During the pilot study, to be space wise was linked to the student's request. But most of the students wanted to be space wise. It was be difficult to select from among them. Therefore, it was thought that, it would be suitable to select students by chance. For the next applications, it was decided that students throw dice before starting the game. And the students that threw the highest number were selected as space wise. In this way, equal opportunities will have been given to all students.

Universe and Sample of the Study

This study's universe is 7th grade students who go to primary schools in Kocaeli and Science and Technology teachers who work in these schools. The teacher sample of the study is 16 Science and Technology teachers who

teach 7th grade and they were selected from ten primary schools that randomly selected through the central primary schools. The unit included to study, was the last unit of curriculum and most of the students didn't prefer going to school due to studying for SBS (Test of Determining Level). For defining student sample, two schools were selected among the ten schools which were selected before and 40 students were included to study from these schools. Because, these two schools could provide students to come to school, time for playing and evaluating the game.

Gathering Data

For gathering teachers' and students' opinions, two different interviews were prepared. Teacher opinions were got by 7 questions about the game, rules of the game, possible effects of it and their suggestions. Student interview consists of 8 questions about the evaluation activities they have done before, this game and the rules of it, the lessons and the units they wanted to play similar games. Prepared questions checked by an authority if they were relevant to and sufficient for the aim of this study. It was asked 16 teachers, if they accept the interview voluntary and different interview times and dates were determined, after the aim of the interview was explained and it was assured to be hidden their identities. Everything they said was recorded by using different enumeration forms for each teacher. All of the interviews were completed in 2007-2008 Education years, between 21st May and 5th June. First the game was introduced and then teacher opinions were taken during the interviews. Information was given about the game and the study and the meeting days with the students determined by going to schools before. When we went to schools in the days and at the times that determined, first the game was introduced to students and information about the game was given to them, and then game was started with the groups of five. After the game completed, semi-structured interview method was used and students' opinions were recorded by two different researchers.

Analysing the Data

While analysing the data, descriptive analysis method was used. The enumeration forms that were used during the interviews investigated one by one and similar answers were gathered in writing for each question. Afterwards, a coding key created by writing every different answer was under each question. For determining the reliability of the coding key, 5 forms were randomly selected from enumeration forms that filled out while interweaving with 16 teachers and 40 students. Selected forms and coding keys were given to two different researchers for reading and analysing. It was found that there was an agreement between the researchers who carried out the study and the other researchers.

FINDINGS AND COMMENTS

There are findings obtained from the study which teachers' and students' opinions about the designed game were investigated in it.

Findings Obtained From Teacher Opinions

Because of the number of teachers who participated the research was very few, teacher opinions in the interviews were tried to be given as they were.

When it was asked to teachers that the difficulty ratio of the game rules, and if they would have difficulty in explaining the game rules to students, only 1 teacher said that she would have difficulty in understanding the rules, so it would take time students to understand them. Some teachers' statements about this finding are like these;

“(Rules are) Easy. It won't take time to explain them to students. Students are familiar to games. They always play games in computers.”

“Children already accustomed to this type of games. I think it will attract their attention and they won't have difficulties”

“We have to explain the game. It can be played after explaining it in a lesson time. Even I have difficulty in understanding it.

When their opinions about using the game as an evaluation activity were asked, 13 teachers stated that it could be used as evaluation activity, 2 teachers said that it could be used but it would be difficult to give a grade and 1 teacher said it wouldn't be suitable to use it as evaluation activity. Some teachers' answers to this question listed below.

“It is interesting as an evaluation activity, but we can have difficulties. It is difficult to give grade.”

“It is also funny for me; I think children will enjoy it. But I had indecisions about giving grades. How the wise will be evaluated? Will it separately (be evaluated)?”

“I’m not committed to give grades to things like this. We use the evaluation activities at the end of the unit in the textbook for evaluating. I think (game activity) won’t truth to life. Students who like playing games will be more successful.”

When it was asked teachers to evaluate the activity with regard to time, availability of students’ qualifications and quantities, problems that can appear while controlling the class and the cost of the game, almost all of them thought there wouldn’t be any problems about time, but 1 teacher expressed it wouldn’t be suitable in point of time. While 11 teachers stated, students’ qualifications and quantities were suitable for the game, the others expressed their concerns like these.

“May be they can’t cognize the placement and will place (the part) where they want.”

“Students’ playing qualification will change up to groups in class.”

14 of the teachers expressed that they wouldn’t have any problem and 2 of them said that they would have a little problem with controlling the class.

“Class control won’t be a problem, anyway they prefer playing game.”

“There will be a little chaos while controlling class, but it can be at any times. It is a thing that they can like, so there won’t be a problem.”

“I group the students and make little contests and there is loud noise. When I say if they were quiet they would get point, there isn’t a problem. When there is a normal game, there is noise.”

All of the teachers stated it is appropriate.

“It can be made with cheaper materials. I can prepare it with a pasteboard and a pen.”

When their thoughts about preparing and making students to prepare a game like this asked, 10 teachers said that they could prepare, and they could make students to prepare it. 4 teachers said that they could prepare but they would prefer to make students to prepare it, 1 teacher said she could make students with a support and 1 teacher said she can’t prepare and can’t make students to prepare. Some teachers’ thoughts about these are below:

“We prepare game cards sometimes. We prepared a card game about magnetizing. They prepare puzzles more.”

“I prepare. I find it more appropriate making students to prepare it. They are more curious about thing like this.”

“I do but I would prefer to make students to do. There isn’t much time to do an extra thing.”

“I can make student to do it by taking a support from technology teacher.”

“I can’t do it by myself. I will use it if it is ready-made. It seems losing time to make students to prepare it. Anyway curriculum isn’t finished in time.”

When it was asked if the game was ready-made they could use it, all teachers answered as they would use the game.

“If I have chance, I will use. I won’t do one of the evaluation activities and I can pull it ahead the other.”

“If it comes ready-made, it will be easier. It will be an example for preparing new material. But everybody can’t reach it and doesn’t try to.”

“It is better, if it is ready-made. At least I will show it as an example and I will say to students that they can prepare it like this.”

“It is difficult to prepare. It will take up time. If it is ready-made, it will be better.”

“I don’t believe that this game come to us ready-made.”

When their thoughts asked about if it was a beneficial activity for students, all of the teachers stated it would be beneficial. But a teacher explained it would be more appropriate for smaller students.

“It will be beneficial, because they can learn easier when they see.”

“It will be beneficial for students. Everything that is visual and relies on information is beneficial.”

“They can be disinterested towards end of the year. It can attract their attention. There are troubles at school. Children are searching for differences. Games attract attention.”

“Especially it is appropriate for smaller classes. It is a game that I can buy to my child if I see it in toy shop.”

Teachers’ suggestions about game are given below with their statements;

“Puzzle parts and pawns can be tree dimensional.”

“An evaluation metric as rubric must be prepared for evaluating. It can be applied as performance assignment. A question bank can be started to prepare before.”

“It can be used for activating the lesson. It can be used for reinforcement. Some of the students can distract after 15-20 minutes. After all, some of the students’ level will be higher. It can be reduced for 4th, 5th and 6th grade students.”

“Its parts are small, they can lose. They can be magnetic.”

“Cards are always mixed thereby the rate of listening increases. If the number of the unknown questions noted, they can be checked over later. If unknown cards collected, they can be used for another activity. Also a different activity has to be prepared for the missing ones.”

“While selecting wise, we must be careful. Students who are leader minded must be selected. Students (who will be space wise) can be changed.”

Findings Obtained From Student Opinions

Eight questions were asked to students for determining students’ opinions about the game. Students’ answers were categorised according to their similarities and the tables below were arranged: Table 1 shows frequency and percentage distribution of the given answers to question by the students: “1. Which evaluation activities do your teacher use at the end of the topic?”

Table 1. Frequency and Percentage Distribution of the Answers Which Students Gave to First Question

Student Opinions	N	f	%
We do workbook questions and experiments.	40	20	50
Workbook, test and solving question.	40	10	25
We solve evaluation questions at the end of the unit and the questions for general review and we do activities rarely.	40	5	12.5
Generally evaluating with self evaluating form and questions at the end of the unit, source scanning	40	5	12.5
Total	40	40	100

When the answers that students gave to the “Which evaluation activities does your teacher use at the end of the topic?” question investigated, as seen on Table 1; 50% (f=20) of the students said they are evaluated with the questions in the workbook and with the experiments and 25% (f=10) of them said they are evaluated with the activities in the workbook, tests which were prepared by teachers and the solution of the questions. While 12.5% (f=5) of the students stated that they are evaluated by solving the questions for general review and rarely doing activities, 12.5% (f=5) of them stated that they are evaluated with self evaluating form and questions at the end of the unit. When the answer percentages were investigated, it is seen that traditional evaluation methods are used more.

Table 2 shows frequency and percentage distribution of the given answers to question; “2. How do you feel during the evaluation activities at school? Are you generally relaxed or do you feel anxious?” by the students.

Table 2. Frequency and Percentage Distribution of the Answers Which Students Gave To 2nd Question

Student Opinions	N	F	%
We want to be asked question.	40	13	32.5
We are very relaxed; we don’t have anxiety of exam.	40	12	30
In order to I can’t answer the question, I will get nervous.	40	8	20
I want to be asked question and also I am afraid for answering it wrong.	40	6	15
I feel anxious.	40	1	2.5
Total	40	40	100

On Table 2, according to distribution of the answers which students gave to “How do you feel during the evaluation activities at school? Are you generally relaxed or do you feel anxious?” question, 32.5% (f=13) of the students stated that they didn’t feel disturbed to be asked question and they are willing to answer the questions. Also 30% (f=12) of them said they didn’t feel anxiety of exam and they felt relax during the activities. On the other end, 20% (f=8) of them said they would get nervous in order to thought they couldn’t answer the question, 15% (f=6) of them said they wanted to be asked question but they were afraid for answering it wrong and 2.5% (f=1) of them stated he feel anxious during the activities. Findings points out most of the students feel relaxed during the activities in class. But it is seen that 37.5% (f=15) of the students have negative emotions during the evaluation activities. When the answers are analyzed, it is conspicuous that students are evaluated with questioning activities.

Frequency and percentage distribution of the given answers by the students to question; “3.You were evaluated with “Space Hunters” game. How differences appeared between the feelings during the other evaluation activities and this one? Can you compare?” are shown on Table 3.

Table 3. Frequency and Percentage Distribution of the Answers Which Students Gave To 3rd Question

Student Opinions	N	f	%
We didn't feel anxious; we wanted the turn came to us quickly.	40	20	50
We weren't afraid of can't answering questions; we understood the topic much better.	40	7	17.5
It is relaxed and beautiful, it looks like Monopoly.	40	5	12.5
It is visual and enjoyable, it's not like exam.	40	5	12.5
I felt anxious in order to can't answering questions.	40	2	5
I didn't fell anxious, because there isn't any punishment.	40	1	2.5
Total	40	40	100

According to distribution of the answers -as seen from Table 3- which students gave to “You were evaluated with “Space Hunters” game. How differences appeared between the feelings during the other evaluation activities and this one? Can you compare?” question, 50% (f=20) of the students said they hadn't felt anxious and they had wanted the turn had come to them quickly. 17.5% (f=7) of them expressed they hadn't been afraid of answering questions and they had understood the topic much better, 12.5% (f=5) of them said they had been relaxed while they had played the game, the game was beautiful and looked like Monopoly, 12.5% (f=5) of them thought it was visual and enjoyable, it wasn't like having exam and 2.5% (f=5) of them she hadn't felt anxious because there weren't any punishment in the game. It is seen that 95% (f=38) of the students didn't have any negative emotion. But 5% (f=2) of them expressed that they feel anxious about can't answering the questions correctly.

Table 4 shows frequency and percentage distribution of the given answers to “4. Do you have difficulty in understanding the game rules? Which rules you don't like?” question by the students.

Table 4. Frequency and Percentage Distribution of the Answers Which Students Gave to 4th Question

Student Opinions	N	f	%
The rules were easy but I didn't like to give parts.	40	20	50
Rules are easy, giving parts is bad but taking them is good.	40	10	25
I didn't have any problem.	40	7	17.5
Easy. Giving parts and waiting for two turns are bad.	40	3	7.5
Total	40	40	100

According to answers that students gave to “Do you have difficulty in understanding the game rules? Which rules you don't like” question, it is seen on table 4 that students didn't have difficulties in understanding the rules. On the other hand 50% (f=20) of the students didn't like the traps which they have to give puzzle parts, 25% (f=10) of them didn't like giving parts but like taking them and 7.5% (f=3) of them again didn't like giving puzzle parts and waiting for two turns. 17.5% (f=7) of the students stated that they didn't have any difficulties in understanding the rules.

Frequency and percentage distribution of the given answers to “5. Do you have suggestions for the game?” question by the students are displayed on Table 5.

Table 5. Frequency and Percentage Distribution of the Answers Which Students Gave to 5th Question

Student Opinions	N	f	%
There will be more traps.	40	6	15
It can be designed for other topics.	40	5	12.5
Planets have to be bought with money.	40	5	12.5
Sound effects can be added.	40	5	12.5
The number of puzzle parts will be increased.	40	5	12.5
It will be better if the number of cell was increased.	40	5	12.5
Time for answering the questions can be limited.	40	5	12.5
There will be point and reward.	40	2	5
Waiting for two turns will be removed.	40	1	2.5

Every planet will have point and the one who falls in black hole go down to zero point.	40	1	2.5
Total	40	40	100

According to answers, that students gave for “Do you have suggestions for the game?” question, as seen on Table 5; while 15% (f=6) of the students suggested increasing the number of traps, 12.5% (f=5) of them said it can be prepared for other topics. 12.5% (f=5) of students suggested that some money would be added to game and planets had to be bought with money, 12.5% (f=5) of them suggested that it could be sound effects which players would use when they wanted to answer the questions or when the answer wasn’t right, 12.5% (f=5) of them wanted number of puzzle parts to be increased and 12.5% (f=5) of them wanted number of cells to be increased, 12.5% (f=5) of them thought that time had to be limited for answering, 5% (f=2) of them thought there would be point or reward in the game, 2.5% (f=1) of them suggested the trap which they have to wait for two turns would be removed and 2.5% (f=1) of them suggested that every planet would have a particular point and the player who fell in black hole would go down to zero point.

They are shown on Table 6 that; frequency and percentage distribution of the given answers to “6. Would you like to do it if this game is given you as a performance assignment?” question by the students.

Table 6. Frequency and Percentage Distribution of the Answers Which Students Gave to 6th Question

Student Opinions	N	F	%
I would like preparing it and also playing it.	40	18	45
I would like playing it more.	40	5	12.5
I would like. It is more beautiful than the other performance assignments.	40	5	12.5
We would like to do it in group. It would be beautiful to making designs.	40	5	12.5
I would enjoy but I couldn’t design it.	40	3	7.5
I couldn’t design it.	40	2	5
It is enjoyable to prepare it as an assignment.	40	1	2.5
I would ask for help from another teacher.	40	1	2.5
Total	40	40	100

For the “Would you like to do it if this game is given you as a performance assignment?” question, 45% (f=18) of the students stated that they would like to prepare the game as assignment and also would like to play it as seen from Table 6. While 12.5% (f=5) of them said they would more like to play, 2.5% (f=1) of them said that preparing as an assignment would be more funny. 12.5% (f=5) of the students expressed if it was compared with the other assignments, this would attract their attention more, 12.5% (f=5) of them stated that if they had an assignment like this, they would more like to do it in groups, 7.5% (f=3) of them said they would enjoy it but they couldn’t design it and 2.5% (f=1) of them said that while preparing it he could ask for help from another teacher.

Table 7 shows frequency and percentage distribution of the given answers to “7. Is this game have to be used in the lessons in your opinion?” question by the students.

Table 7. Frequency and Percentage Distribution of the Answers Which Students Gave to 7th Question

Student Opinions	N	f	%
It will be noisy but it is enjoyable and we can understand much better.	40	15	37.5
It will be noisy; it will be difficult to teach lesson.	40	5	12.5
If the total of class is less, it will be good. If not there will be noise and it can’t be controlled.	40	5	12.5
It has to be used absolutely.	40	5	12.5
It must be lesson and after lesson game in order.	40	5	12.5
It can be applied at the end of the unit. Otherwise it is boring to play game always.	40	5	12.5
Total	40	40	100

When the answers of the students that they given for “Is this game have to be used in the lessons in your opinion?” question were investigated, it is seen on the Table 7 that; 37.5% (f=15) of the students said it would be noisy while playing the game in class but it would be enjoyable and they could understand the topics much better. 12.5% (f=5) of them thought it would be difficult to teach lesson, because it would be noisy and 12.5% (f=5) of them said if the total of class was less the application would be easier, because there would be less noise.

12.5% (f=5) of the students thought that games like this absolutely had to be used, 12.5% (f=5) of them thought that they had to do a revising lesson before the lesson that they would play the game and 12.5% (f=5) of them thought that it would be boring when they played it except at the end of the units.

Table 8 shows frequency and percentage distribution of the given answers to question by the students; “8. Would you like this game to be applied to other units? Which units will it be applied to in your opinion? Why?”

Table 8. Frequency and Percentage Distribution of the Answers Which Students Gave to 8th Question

Student Opinions	N	F	%
Physics is already boring; it will be more enjoyable. It can be applied all of the lessons.	40	10	25
Physics, because it is difficult.	40	6	15
Human and Nature, The Structure of The Matter and Physics; because they are enjoyable and attractive.	40	5	12.5
Physics, because it is boring.	40	5	12.5
Human and Nature, Electricity, Acid- Base, Atom; because there are conceptions which need information.	40	4	10
Chemistry; it is difficult, because there are formulas.	40	4	10
Ecosystem, Maths and the other lessons, because it is largely about conceptions.	40	4	10
Biology; because it attracts my attention.	40	1	2.5
Chemistry; because it is enjoyable.	40	1	2.5
Total	40	40	100

On Table 8; according to distribution of the answers that students gave to “Would you like this game to be applied to other units? Which units will it be applied to in your opinion? Why?” question, it was found that 37.5% (f=15) of the students wanted it to be designed for Physics because they thought this lesson was boring and they also thought it would be good to design games like this about the other lessons. And it was found that 15% (f=6) of them wanted a game about Physics because it was difficult, 12.5% (f=5) of them wanted games about Human and Nature, The Structure of The Matter and Physics topics; because they thought these topics were enjoyable and attractive, 10% (f=4) of them wanted games about Human and Nature, Electricity, Acid-Base and Atom topics; because they thought there were conceptions which need information in these topics, 12.5% (f=5) of them wanted games about Chemistry for making easy to understand chemical formulas and finding this lesson enjoyable, 10% (f=4) of the students wanted games about Ecosystem topic and the lessons like Maths and 2.5% (f=1) of them wanted a game about Biology; because it attracted her attention.

RESULTS AND DISCUSSION

In this study, following results were gotten by gathering teachers’ and students’ thoughts about the “Space Hunters” game.

- It was found that teachers’ opinions were similar about the evaluation activity which took place in this study would increase the students’ motivation. Also Pinder (2008) determined that board games were very effective to increase students’ motivation according to teacher thoughts in a study.
- Most of the teachers stated that this game could be applied during the lesson and be used for reinforcement. According to Güllü, Bozkurt and Bali’s (2009) study, teachers thought that educational games could be used in lessons.
- Participating teachers stated that they didn’t have difficulties in understanding games like this. But some teachers expressed they hesitated about how they could use it as an evaluation activity. It can be planned to develop a grading key for putting away teachers’ this problem.
- It was found that presenting a game like this ready-made would increase the rate of usage. Then correspondents’ attention must be called to this subject as soon as possible.
- It was found that traditional evaluating methods were usually used at lessons and some of the students couldn’t express themselves because of their negative emotions during these activities. But it is seen that these negative emotions decreased during the activity with the game in this study.
- It was seen that students who played this game didn’t have difficulty in understanding the rules and they quite enjoyed this game. It is the most important indication of this situation that students wanted the number of puzzle parts and the number of cells to be increased. Also in the other studies it was found that students were enjoy the game activities (Aycan et. al., 2002, Smith, 2002, Cordona et. al., 2008)

- While it was determined that most students weren't like some traps in the game, some students suggested to increasing the number of traps. This seems inconsistent, but it can be explained as students liked taking puzzle parts and didn't like giving them through the traps.
- The game can be adapted to the other topics and the other units in Science and Technology course as well as similar games can be prepared for other lessons. Especially preparing games for the units and topics that contains lots of abstract conceptions will make easy to teach these conceptions (Tatar & Cansüngü Koray, 2005). Also it will be beneficial that looking to students opinions while preparing the game.

It is the subject of further studies to develop the game according to teacher and student suggestions and to compare students' achievements in the game activity with their achievements in the other activities. Also, for making easier to evaluate student achievements, it can be thought to develop a rubric in other studies. It was seen that games increased the student motivation and results of a study about its effects on examination anxiety would be important.

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REFERENCES

- Altunay, D. (2004). Oyunla Desteklenmiş Matematik Öğretiminin Öğrenci Erişisine ve Kalıcılığa Etkisi. *Yüksek Lisans Tezi*. Ankara: Gazi Üniversitesi.
- Aycan, Ş., Türkoğuz, S., Arı, E., & Kaynar, Ü. (2002). Periyodik Cetvelin ve Elementlerin Tombala Oyun Tekniği ile Öğretimi ve Bellekte Kalıcılığının Saptanması. *V. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresinde Sunulmuş Bildiri*.
- Baines, L. A., Slutsky, R. (2009). Developing the Sixth Sense: Play. *Educational Horizons*, 87(2), 97-101.
- Cardoso, F. S., Dumpel, R., Gomes da Silva, L. B., Rodrigues, C. R., Santos, D. O., Cabral, L. M., Castro, H. C. (2008). Just Working With The Cellular Machine. *Biochemistry and Molecular Biology Education*, 36(2) 120-124.
- Cordona, S., Spiegel, N. C., Alves, G. G., Ducommun, J., Pons, A. H., Araujo- Jorge, T. C. (2007). Introducing DNA Concepts to Swiss High School Students Based on a Brazilian Educational Game. *Biochemistry and Molecular Biology Education*, 35(6), 416-421.
- Dağbaşı, G. (2007). Oyun Tekniği ve Arapça Öğretiminde Kullanımı. *Yüksek Lisans Tezi*. Ankara: Gazi Üniversitesi.
- Dewey, J. (1998, originally published in 1938). Experience and Education. Kappa Delta Pi, Indiana.
- Egemen, A., Yılmaz Ö., & Akil, İ. (2004). Oyun, Oyuncak ve Çocuk. *ADU Tıp Fakültesi Dergisi*, 5(2), 39-42.
- Ergün, M. (1980). Oyun ve Oyuncak Üzerine-I. Retrieved July 17, 2008 from <http://egitim.aku.edu.tr/oyun.pdf>
- Fırat, M. (2007). Yabancı Dil Öğretiminde Oyunun Kullanımı. *Yüksek Lisans Tezi*. Erzurum: Atatürk Üniversitesi.
- Gelbal, S., & Kelecioğlu, H. (2007). Öğretmenlerin Ölçme ve Değerlendirme Yöntemleri Hakkındaki Yeterlik Algıları ve Karşılaştıkları Sorunlar. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 33, 135-145.
- Gulick, L. H. (1920). Philosophy of Play. Association Press, USA.
- Güllü, D., Bozkurt, E., Bali, G. (2009). Ortaöğretim 12. Sınıf Öğrencileri İçin Kimya Derslerinde Oyun ile Eğitim: Organik Bileşiklerin Adlandırılması Oyunu. *Uluslararası V. Balkan Eğitim ve Bilim Kongresinde Sunulmuş Bildiri*.
- Gürses, A., Doğan, Ç., & Yalçın, M. (2002). Isı ve Sıcaklık Konusunun Öğretiminde Sürekli Değerlendirmeye Dayalı Öğretimin Etkinliğinin İncelenmesi. *V. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresinde Sunulmuş Bildiri*.
- Groos, K. (1919). The Play of Man. Appleton, Minnesota.
- Huizinga, J. (2003, originally published in 1938). *Homo Ludens: A Study of the Play Element in Culture*. Routledge, London.
- Kaya, Ü. Ü. (2007). İlköğretim I. Kademe Derslerinde Oyun Tekniğinin Erişime Etkisi. *Yüksek Lisans Tezi*. Afyonkarahisar: Kocatepe Üniversitesi.
- Moğol, S., & Özçifçi, S. (2003). Fizikte Bazı Denklemlerin Öğretimi İçin Kart Oyunu. Retrieved July 03, 2008 from <http://yayim.meb.gov.tr/dergiler/157/mogol.htm>
- Özsevegç, T. (2006). Kuvvet ve Hareket Ünitesine Yönelik 5E Modeline Göre Geliştirilen Öğrenci Rehber Materyalinin Etkililiğinin Değerlendirilmesi. *Türk Fen Eğitimi Dergisi*. 3(2), 36-48.

- Pinder, P. J. (2008). Utilizing Instructional Games to Improve Students' Conceptualization of Science Concepts: Comparing K Students Results with Grade 1 Students, Are There Differences? *Regional Eastern Educational Research Association Conference*. Hilton Head Island.
- Romine, X. (2004). Using Games in the Classroom to Enhance Motivation, Participation, and Retention: A Pre-test and Post-test Evaluation. *Culminating Experience Action Research Projects*, 5, 283-295.
- Smith, D. R. (2003). "Voyager" an Educational Card game. *Physics Education*, 38(1), 47-51.
- Songur, A. (2006). Harfli İfadeler ve Denklemler Konusunun Oyun ve Bulmacalarla Öğrenilmesinin Öğrencilerin Matematik Başarı Düzeylerine Etkisi. *Yüksek Lisans Tezi*. İstanbul: Marmara Üniversitesi
- Susüzer, K. (2006). Oyun Yoluyla Fransızca Öğretimi. *Yüksek Lisans Tezi*. Adana: Çukurova Üniversitesi.
- Şaşmaz Ören, F., Erduran Avcı, D. (2004). Eğitimsel Oyunla Öğretimin Fen Bilgisi Dersi "Güneş Sistemi Ve Gezegenler" Konusunda Akademik Başarı Üzerine Etkisi. *Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi*. 18, 67-76.
- Şimşek, A. (2007). Sınıf Öğretmenliği Öğrencilerinin Sosyal Bilgiler İçin Tasarladıkları Etkinliklerde Kullandıkları Strateji, Yöntem, Teknik ve Öğretim Materyalleri ve Bunları Tercih Nedenleri. *VI. Ulusal Sınıf Öğretmenliği Sempozyumunda Sunulmuş Bildiri*.
- Şimşek, S. (Güz 2000). Fen Bilimlerinde Değerlendirmenin Önemi. Retrieved July 20, 2008 from <http://yayim.meb.gov.tr/dergiler/148/7.htm>
- Tatar, N., & Cansüğü Koray, Ö. (2005). İlköğretim Sekizinci Sınıf Öğrencilerinin "Genetik" Ünitesi Hakkındaki Kavram Yanılgılarının Belirlenmesi. *Kastamonu Eğitim Dergisi*, 13(2), 415-426
- Yelken, T. Y. (2006). İlköğretim Sınıf Öğretmeni Adaylarının Sosyal Bilgiler Dersinde Tamamlayıcı Değerlendirme Yaklaşımları Konusundaki Görüşleri. *Sosyal Bilimler Araştırmaları Dergisi*, 2, 58-75.
- Walker, P., & Wood, E. (1994). Hands on General Science Activities; With Real Life Applications. A Wiley imprint, 233-243.

Figure 1. Question cards, puzzles and puzzle parts, spaceship (pawn)



Figure 2. All of pieces of “Space Hunters” game

A COMPARISON BETWEEN THE OCCURRENCE OF PAUSES, REPETITIONS AND RECASTS UNDER CONDITIONS OF FACE-TO-FACE AND COMPUTER-MEDIATED COMMUNICATION: A PRELIMINARY STUDY

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ABSTRACT

This study compares pauses, repetitions and recasts in matched task interactions under face-to-face and computer-mediated conditions. Six first-year English undergraduates at a Turkish University took part in Skype-based voice chat with a native speaker and face-to-face with their instructor. Preliminary quantitative analysis of transcripts showed that there were frequent instances of pauses, repetitions and recasts under both conditions. One-way variance analysis of the data demonstrated that the comparative frequency of pauses, repetitions and recasts did not differ statistically significantly under the two conditions. A semi-structured interview with the participants on perceived causes of such frequent elements suggested social and emotional reasons for hesitation, pauses, recasts and repetitions. These small-scale and preliminary findings suggest that further exploration of these modes of communication is merited, and that social and emotional factors may exert a common influence on the linguistic elements studied under both conditions.

Keywords: Computer-mediated communication, Learning English as a foreign language, Pause, Recast, Repetition, Social and emotional factors

INTRODUCTION

Claimed benefits of computer-mediated communication (CMC)

There is evidence that computer-mediated communication benefits “English as a foreign language” students’ communication skills. Dietz-Uhler and Bishop-Clark (2001) affirm positive effects of both synchronous and asynchronous CMC on consecutive face-to-face discussions. Heins et.al. (2007) report improved student participation, better use of the target language and higher degree of tutor control in computer-mediated communication in comparison with face-to-face interaction in language tutorials. Positive effect of CMC in reducing communication apprehension (Arnold, 2007) and improving the quality of language output (Keller-Lally, 2006) has also been reported. CMC literature also indicates positive learning outcomes such as enhanced motivation (Cabaroğlu & Roberts, 2007), increased learner autonomy (Schwienhorst, 2003; Kötter, 2003), reflective interaction (Lamy and Goodfellow, 1999), self-paced language instruction (Yang and Chen, 2006; Godwin-Jones, 2007), enhanced student-centeredness and collaboration (Warchauer, 1996) and consciousness of learning objectives (Yamada & Akahori, 2007). Also reported are positive effects for syntactic complexity (Tammelin (2004) and grammatical accuracy (Warchauer, 1996; Shang, 2007) and productive performance (Yamada & Akahori, *ibid.*). Payne and Whitney’s (2002) study indicated that participants in the experimental condition (synchronous computer-mediated communication) scored significantly higher in L2 oral proficiency assessments than the participants in the control condition.

CMC as a distinctive mode of communication

The extent to which CMC communication differs from face-to-face is under debate. Böhlke (2000), describing language produced in chat rooms and face-to-face discussion groups, asserts that the output produced in synchronous computer-mediated communication constitutes “a new type of orality, a hybrid between spoken and written discourse” (p.1) In contrast, Fischer (1992) claims that “basic social patterns are not easily altered by new technologies and that they are resilient even to widespread innovations” (p.260). Fischer (1997) further asserts that effects of technology for community are: “(a) modest; (b) different for different devices, so that one cannot make blanket statements about “technology”; and (c) complex, indirect and even contradictory” (p.113). This is supported by Weisband (1995) who found that status effects persist in both face-to-face and electronic groups and that status labels and impressions have a larger impact on participation and influence than communication mode.

CMC as an opportunity for intercultural contact

In contexts where teachers and learners of English as a foreign language have limited direct access to native speakers and target language and culture, as in many parts of Turkey, CMC can offer authentic opportunities for the acquisition of target language skills and intercultural awareness (Shulman, 2001; Chapelle, 2003; Hamzah, 2004). Egbert (2005:5) asserts that “computer tools, particularly Internet support for computer-mediated communication (CMC), give us different opportunities than afforded by other tools.” Meskill, (2005) and Levy (2007) argue that it provides support for effective acquisition.

Pauses, repetitions and recasts

In our preliminary small study we focus on conversational gaps to explore the effects of different interactional conditions. Conversational gaps can be either hesitation pauses, switching pauses or initiative time latencies. Following Kalman, et al. (2006) we define ‘hesitation pauses’ as within-turn pauses by the speaker and ‘switching pauses’ as silences followed by turn-taking. Initiative time latencies are the gaps left by a speaker to terminate his turn, and thus allowing the interlocutor to initiate his.

Repetitions are defined as a simple form of recasts, which entail an elaborated grammatical or lexical change (Gass, 2003). Recasts are defined by Gass (2003, p. 239) as “instances in which an interlocutor rephrases an incorrect utterance with a corrected version, while maintaining the integrity of the original meaning.” A number of studies have focused on recasts as implicit negative feedback by an interlocutor (e.g. Lyster & Ranta, 1997; Lyster, 1998). On the other hand, Doughty (2003) asserts that especially concentrated simple recasts, in other words ‘repetitions’, for which learners are developmentally ready, are beneficial to learners. In the present study, we take any repetition of words that involve partial or complete change as a recast. Here, the term “recast” does not mean corrections done by the instructor, but rather, it is taken to mean corrective or allegedly corrective rewording or, in some instances, paraphrasing strategy used by learners that participated in the communication tasks, despite the fact that the term is commonly used for the correction done by the interlocutor (e.g. Hauser, 2005).

Previous research has focused on pauses, repetitions and recasts as evidence for the learner to enhance either his comprehension or production of linguistic forms. This study takes another perspective. We focus on utilization of these elements by the learner himself/herself, excluding the role of these elements in turn-taking. We take them as possible indicators of fluency, of the emotional and interpersonal barriers a learner has to overcome during face-to-face and computer-mediated communication tasks when communicating with highly fluent and competent native-speaker and non-native speaker interlocutors. We therefore hypothesized that the relative frequency of such elements in computer-mediated and face-to-face communication tasks should improve our understanding of the effects of these conditions on participants’ performance, and of the social and emotional dynamics at work. The critical need to improve the training of undergraduate English teachers, which motivates the present study, is shown in the following section.

Context of the study: limited communication skills of English teachers in Turkey

The six undergraduate students in our study were embarking on a four-year teacher training program. In contemporary Turkey, where foreign language teacher training is quite problematic (Demirel, 1999; Toktar, 2000; Özyar, 2003), the employment of sufficient numbers of competent and proficient teachers of English is a critical issue for the Ministry of Education (Üstüner, 2004). Most English teaching vacancies are filled, but application rates are so low that university graduates do not have to compete for employment, and also The Ministry fills some vacancies with non-specialists (see Table 1). Additionally, the professional development of teachers is limited since the Ministry of Education does not have an effective control and inspection system and in-service training programs are scarce and ineffective (Karaata, 2007).

Table 1 English teachers’ field of study and the number of teachers graduated from each field

Field of Study	Number
English Language Teaching (Faculty of Education)	7654
British and/or American Literature, Translation, Linguistics, etc.	2788
Other Fields	23526
Total	33968

Source: English and Computer Literacy Report (ÖBBS, 2006), Turkish Ministry of Education.

Furthermore, the Ministry’s English and Computer Literacy Report (ÖBBS, 2006) on the self-perceived qualifications and proficiency level of 855 teachers of English working in randomly selected 492 state primary schools indicates that 36.4 % of those surveyed state that they do not understand what they read in English and

51.7 % accept that they do not understand what they hear in English. Also, 40.6 % of the participants say that they have serious problems in writing and 52.3 % of them believe that they are not proficient enough to speak English (Percentages were taken as the sum of replies for “none” and “very little” in Likert-type scale).

The report does not include an analysis of the relationship between English Teachers’ specialization and their perceived level of proficiency and the data in the report do not enable such an analysis. However, the problem seems to be common to teachers of English irrespective of the field of specialization (Işık, 2007). The observation that most students entering universities have a poor command of English indicates that foreign language teaching is not effective in state schools (Okan & Basaran, 2007; Kayaoğlu, 2007). We can speculate that English teaching majors come to University with deficits in their communication skills, and that currently many are not sufficiently improved by university training. This has motivated attempts by the author to enhance communication skill instruction (Cabaroglu and Roberts, forthcoming) and to explore the potential of CMC to do so.

Focus of the present study

Notwithstanding the fact that comparing the effects of the two distinct modes would probably provide certain insights as to whether or not CMC with native speakers of the target language could support face-to-face communication with non-native speakers, this study does not have such an objective. Here, the compared frequency of pauses, repetitions and recasts under the two conditions serves to explore the hypotheses that social patterns are not easily changed under different interactional circumstances and that similar social and emotional processes are at work during oral language production, no matter what the mode is. However, the study also provides data on learners’ perceptions about the overall impact of CMC experience and their ideas concerning usefulness of CMC and task design in computer-mediated and face-to-face communication.

Most studies have so far addressed the consequences of computer-mediated communication and not the process itself. Specifically, no research on emotional and interpersonal aspects of CMC and relative fluency evidenced by pauses, repetitions and recasts has been cited in literature. Thus, the purpose of this paper is to investigate whether or not the mode of communication has a direct effect on the frequency of pauses, repetitions and recasts and analyze possible factors that cause frequent occurrence of such elements. To be more precise, the study comprises both quantitative and qualitative analysis of pauses, repetitions and recasts in communication under face-to-face and computer-mediated conditions as two distinct modes. As the two conditions are different but the effects of this difference are under-researched, we chose to explore features we judge to be meaningful in communication: pauses, repetitions and recasts, and participants’ perceptions of possible reasons underlying frequent instances of such phenomena.

Preliminary analysis of transcripts showed that pauses, repetitions and recasts were frequent in participants’ face-to-face interaction. This finding, as well as some related assertions in the literature (e.g. Fischer, 1992; Weisband, 1995), led us to hypothesize that the communication mode cannot be taken as the decisive factor that affects the content and quality of talk. It also led us to predict that similar physiological and/or cognitive processes must be at work during talk under computer-mediated and face-to-face conditions. Thus the study addressed the following research questions:

1. Does the mode of communication have a distinctive effect on the selected features of interaction?
2. 2a. What reasons do participants perceive for the frequent occurrence of pauses, repetitions and recasts in computer-mediated and face-to-face tasks?
3. 2b. What social and psychological constructs can be inferred to influence communication under computer-mediated and face-to-face conditions?

METHOD

This small-scale exploratory study is based on quantitative and qualitative analysis of transcribed Skype-based interactions between six Turkish university students and a native speaker and face-to-face communication between the same students and their instructor. After coding and quantitative content analysis of transcripts, the students were interviewed about their feelings during the interactions and possible reasons for the frequent instances of pauses, hesitation and recasts. Exclusive attention to the measurable effects of an intervention precludes exploration of the dynamic factors at work in the process and in the classroom setting (House, 2002). Complementing analysis of quantitative data, qualitative analysis can serve as a “unique and valuable source of information that complements and informs theory, research and practice” (Marczyk, DeMatteo & Fesrtinger, 2005). Small-scale exploratory qualitative research does not attempt sample-to-population generalization, and the non-random and small-scale sampling strategy of the present study only allows us to report some enhanced insights, and to justify a larger-scale, more rigorously designed study.

Participants

Six first-year students at ELT department of a state university in Turkey participated in the study. Three of them (2 female and 1 male; aged 18-19 years old) were top students in the class and they were selected because of their higher performance in the listening and speaking class compared to other students. The other three participants (2 female and 1 male) were perceived by the instructor to be the poorest in listening comprehension and speaking. They all had similar backgrounds concerning the amount and type of language instruction they had earlier received. Therefore, on entry to the program they had a good grammatical knowledge and reading comprehension skill, whereas they were relatively inefficient in aural and oral language learning skills. None had prior experience of CMC-mediated spoken communication

Data collection tools

Data collection tools of the study included transcripts of computer-mediated voice chat and face-to-face talk structured by matched communication tasks and semi-structured interviews (Appendix A) with the participants. Semi-structured face-to-face interviews are powerful tools that serve as a medium to facilitate in-depth analysis of both processes and the themes that emerge during the processes (DeMarrais, 2004), and benefits from flexibility balanced by structure (Gillham, 2005:70). Instances of pauses, repetition and recasts were coded by two raters. Prior to the coding, one of the researchers and the raters met to negotiate and set the coding guidelines. Inter-rater reliability was tested for each of the elements that is, for pauses, repetitions and recasts separately. Pearson correlation was 0.989 for pauses, 0.912 for repetitions and 0.866 for recasts, which show an impressive rate of reliability. Quantitative analysis of the transcripts revealed that there were frequent instances of pauses, repetitions and recasts in both Skype-based voice chat and in face-to-face interaction. This observation led to further scrutiny of possible reasons behind such frequent elements in the data. A semi-structured interview was devised to enable the students to reflect on the data. Content analysis of student feedback helped develop an understanding of the context of and reasons behind highly frequent occurrence of pauses, repetitions and recasts in computer mediated synchronous voice interaction and face-to-face communication.

Tasks and procedures

Both online synchronous talk and face-to-face communication were based on semi-structured tasks set by the native speaker and the instructor and complemented with class work on communication skills and intercultural awareness. The Skype-task required each participant to talk about a teacher who had been influential for them and why. For the face-to-face task, participants were asked to describe an enjoyable event that they experienced when they were at school, saying what the event was, when it happened, what was good about it and explain why they particularly remember it. To acquire comparable data, a two-minute time limit was set for each of the tasks. Participants were briefed about the time limit and the aim of the tasks. They were allowed to go on when the time limit was over, but only the first two-minute part of tasks were transcribed for analysis.

RESULTS

We observed that pauses, repetitions and recasts were remarkably frequent. To compare modes of communication, (research q. 1) one-way analysis of variance (ANOVA) was carried out for comparative frequencies of pauses, repetitions and recasts. Analysis showed that there was no statistically significant difference between the two interaction types ($p > 0.05$) on frequencies of the three dependent variables. Table 2 shows the statistical values for the effect of interaction type, face-to-face vs. computer-mediated, on dependent variables.

Table 2 The effect of interaction type on pauses, repetitions and recasts

Dependent Variable	Source of variation	Statistical parameters				
		Degree of Freedom	Adjusted sum of square	Mean square	F	p-value
Pauses	Interaction type	1	120	120	1.09	0.320
	Error	10	1101	110.1	-	-
Repetitions	Interaction type	1	16.3	16.3	1.23	0.293
	Error	10	132	13.2	-	-
Recasts	Interaction type	1	10.1	10.1	0.57	0.468
	Error	10	176.8	17.68	-	-

As not only were the interaction modes but also the interlocutors different, the results were highly probable to be different for the two conditions. Finding no difference between the frequency of pauses, repetitions and recasts under CMC and face-to-face conditions can be interpreted to mean that the mode of communication did not have

a direct influence on the amount of frequency in this specific context of the study. This leaves us with the prediction that there must be other dynamics at work which can be explored by interview.

As mentioned earlier, the most striking feature to be observed in the transcripts of the communication tasks was the frequent use of pauses, repetitions and recasts as in the following extracts:

1. “And he was erm...so...erm...I could depend on...erm I could trust his information”
2. “they say that...our...my friends said you couldn’t do mathematic, you can...erm you can’t achieve”
3. “When I became a teacher I will erm...I will teach my students like our teacher”
4. “because in her lessons erm...you were...you are not boring”

Any repetition of words that involved partial or complete change as in the second extract (our...my friends) was taken as a recast. Although most of recasts in the data were corrective, the term “recast” does not mean corrections done by the native speaker or the instructor. Rather, it was taken here to mean corrective or allegedly corrective re-wording or, in some instances, paraphrasing strategy used by learners that participated in the communication tasks, notwithstanding the fact that the term is commonly used for the correction done by the interlocutor (e.g. Hauser, 2005).

As is observed in the data and illustrated in the extracts above, pauses were usually preceded and/or followed by repetitions or recasts. A characteristic common to all pauses, repetitions and recasts was that they entailed hesitation, which participants commonly attributed to anxiety and apprehension. This was quite understandable for the face-to-face condition, where learners reported to have felt nervous as if being examined by their instructor. Concerning the face-to-face communication with the instructor one participant said:

“Az önce söylediğim şeye gelecek, ama sınıf ortamı ile buradaki ortam farklı. Çünkü burada birebir görüştük. Sınıfta atmosfer daha farklı. Hem sesiniz kaydediliyor, bunu biliyorsunuz. Belki gizli bir şekilde yapılsaydı, etik olmaz belki ama, farklı olabilirdi. Hem birebir konuşma, hem ses kaydının olması belki bir tedirginlik oluşturmuş olabilir.”

“As I said earlier, the classroom atmosphere and the atmosphere here are different. As here [on this occasion] we talked one-to-one [with the instructor]. The atmosphere in the classroom is rather different. Moreover, your voice is recorded, you know this. If it [the recording] was done secretly, though it may not be ethical, it [the talk] could have been different. Both the one-to-one talk and the recording may have caused anxiety.”

The observation that pauses, repetitions and recasts were also frequent in the computer-mediated condition seemed to have plausible implications for the idea that similar social constructs and psychological processes are likely to be at work during oral language production. Although all participants reported to have benefited from CMC experience, factors such as age and status seem to have incited some sort of apprehension at least at earlier stages. One participant said that he was very nervous during the CMC occasion and that his nervousness gradually vanished. When asked about possible reasons for his nervousness, he admitted that talking to a native speaker in his 60s made him nervous. Another participant reported that she was not nervous before she learned that the native speaker she was talking to was an author. Table 3 presents a brief summary of participants’ perceptions about their feelings during the tasks under both conditions and possible reasons behind frequent pauses, repetitions and recasts.

Table 3 Participants’ Feelings during the Tasks and Possible Reasons for Pauses, Repetitions and Recasts		
Participants	Computer-Mediated Communication	Face-to-Face Communication
P1	nervous; poor-self confidence, culture	uncomfortable; recording, unnatural atmosphere
P2	restricted; time limit, thinking what to say	uneasy; difficult task
P3	nervous; native speaker (status), trying not to make mistakes	nervous; instructor (status), trying not to make mistakes
P4	nervous; learning that the native speaker is an author (status), theme (culture)	uneasy; instructor (status), task type,
P5	anxious; native speaker (status), new experience, age	relaxed; lack of practice
P6	nervous; native speaker (status), age, trying not to make mistakes	uneasy; instructor (status), poor command of English

Apparently, theme of the tasks, cultural issues and poor-self-confidence were among other factors that affected the spoken output in CMC. As for face-to-face communication, recording students' voice, talking to the instructor one-to-one –as if taking an exam– and the task type seem to have negative consequences for the face-to-face condition. Despite the fact that all learners claimed to have felt either nervous, uncomfortable or inhibited during CMC, they also said that they enjoyed the experience and that they thought CMC is a beneficial tool for improving their proficiency in speaking English. Participants also stated that their apprehension gradually vanished in subsequent CMC tasks as they got more acquainted with the native speaker.

Although the interviewer explained to the participants that the pauses, repetitions and recasts being studied could not be taken as mistakes and that he was interested in what they felt during the CMC and face-to-face interactions, they could not entirely overcome the sense that they were being questioned about mistakes. It is possible that “impression management” (the desire to present a positive face to the interviewee) led them to say that they were nervous or uncomfortable during the communication tasks under both conditions. Prompts during the interviews helped four participants to reveal that issues such as lack of practice, thinking about what to say and how to say it and trying not to make mistakes were the main reasons behind the high frequency of pauses, repetitions and recasts.

DISCUSSION

Quantitative analysis of communication task content exhibited no statistically significant difference between the frequency of pauses, repetitions and recasts in CMC and face-to-face communication. However, this finding does not mean that both communication modes are one and the same thing and that CMC has negative effects on the quality of oral production. Qualitative data suggest that in certain circumstances apprehension may prevail and that this may have had a negative impact on learner interactions with the native speaker, especially factors such as status and age. This supports the idea that computer-mediated communication can be taken as “an organic extension of traditional human communication, influenced by the constraints of technology, but ultimately shaped by human nature” (Kalman et al., 2006). Our findings also confirm Yang and Chen (2006) that there is a need for careful guidance and awareness and that new technology demands additional learning strategies. One of important implications of the study is that theme selection, planning and preparation are crucial in CMC tasks especially at earlier stages. Teachers' role in facilitating students' planning and preparation for the tasks is very important when the theme or subject of the task is related to cultural issues.

The frequency of pauses, repetitions and recasts in interactions under both conditions and the fact that participants reported to have searched for the right words and structures and tried not to make mistakes during the tasks suggest the relevance of procedural memory issues. In mother tongue, we use procedural memory automatically. We sometimes search for the right words, but we do not think about the rules or structures of the language. If students frequently pause, repeat and/or change the words they use during verbal interactions, this shows either that their knowledge of the target language has not become procedural or that they have been taught only the rules of the target language without sufficient practice opportunities (as is the case in most state schools in Turkey). Procedural memory is acquired through repeated realization of tasks (Schumann, et al., 2004). However, productive skills are related to working memory, which requires temporary storage of information that is being processed (Richardson, 1996) because of processing capacity constraints. Repetitions and rehearsals do not help declarative knowledge become procedural but help learners build and strengthen connections between declarative and non-declarative memory. Conversion of declarative knowledge into procedural knowledge during, say, oral production leads to a too-heavy cognitive load to be processed and hence the frequent occurrence of pauses, repetitions and recasts.

Finding no statistically significant difference between computer-mediated mode and face-to-face mode of communication seems to bear positive implications for the use of CMC in language acquisition. To put it more clearly, CMC can well be used to improve communicative skills of ELT students, which is one of the most important aspects of training proficient and efficient teachers of English in Turkey.

Limitations and future research

This study presents a small-scale exploratory analysis of pauses, repetitions and recasts in six students' talk under CMC and face-to-face conditions and a basis for further exploration. To find out whether or not the mode of communication had a distinctive effect on the frequency of elements students' oral production during CMC with a native speaker was compared with different interlocutors. Obviously this is a major limitation of the present study. Future research should look for an enhanced methodology and analyze the interaction with the same interlocutor under CMC and face-to-face conditions. A two-minute time limit was set for the completion of each communication task so as to obtain comparable data and each participant was told about the time limit at the beginning of the task, something they claimed as restrictive, an important weakness in the study. In future

research, the time limit should not be made known to the participants if time itself is not one of the variables. Another probable weakness of the study is the fact that it focused on data obtained in one of the earliest CMC tasks and that the interviews with the participants were conducted after the completion of some other communication tasks with the native speaker under computer-mediated and with the instructor under face-to-face conditions. Future research should explore the effects of different conditions over a longer period of time. Future studies that comprise content analysis of CMC should also look for more natural observation and data collection tools in order to eliminate their effect on the content. Moreover, the effect of cultural differences and learners' perception of the target culture on the affective and cognitive processes in CMC needs to be further investigated in the future.

CONCLUSION

In this study we analyzed synchronous oral CMC between six Turkish university students and a native speaker and face-to-face communication between the same students and their instructor, based on pre-structured tasks. One-way variance analysis of comparative frequency of pauses, repetitions and recasts showed that the difference was not statistically significant. Interviewees reported that factors such as relative status and age of the interlocutor, culture, task type, theme of the tasks and the time limit set for the tasks had negative effects on CMC experience and that they inhibited the potential benefits of computer-mediated communication mode in the short run. Participants' reports concerning their effort to find the right words and/or structures so as not to make mistakes and the need for more practice provided another possible answer as to what caused frequent occurrence of elements that reduced quality of CMC and face-to-face talk during pre-structured tasks.

REFERENCES

- Allwright, D. (1988). *Observation in the Language Classroom*. New York: Longman Inc.
- Arnold, N. (2007). Reducing foreign language communication apprehension with computer mediated communication: A preliminary study. *System*, 35, 469-486.
- Böhlke, O. E. (2000). A comparative discourse analysis of output produced by learners of German in a chat room and face-to-face discussion group, and its potential implications for foreign language instruction. Doctoral Dissertation, Michigan State University. UMI: 9971895.
- Cabaroglu, N. & Roberts, J. (2007). 'Turkiye calling!': Structured and independent language learning activities enabled by Skype-based exchanges with a native speaker: focus on student motivation. BAAL/Cambridge University Press Seminar Spoken Online Learning Events.
<http://stadium.open.ac.uk/stadia/preview.php?whichevent=1012&s=29&schedule=1161>
- Candlin, C. N. (1988). Preface. In D. Allwright, *Observation in the Language Classroom*. New York: Longman Inc.
- Chapelle C. (2003). *English Language Learning and Technology*, Philadelphia: John Benjamins Publishing Company.
- Crowell, S. E. (2004:101). The Neurobiology of Declarative Memory. In Schumann, J. H. et al. (2004). *The Neurobiology of Learning: Perspectives from Second Language Acquisition*. Lawrence Erlbaum Associates, Publishers: London.
- deMarrais, K. (2004). Qualitative interview studies: Learning through experience. In deMarrais, K. & Lapan, S. D. (Eds.). *Foundations for Research: Methods of Inquiry in Education and Social Sciences*. Lawrence Erlbaum Associates, Publishers, London.
- Demirel, Ö. (1999). *Yabancı Dil Öğretimi*. İstanbul: Milli Eğitim Bakanlığı Yayınları.
- Dietz-Uhler, B. & Bishop-Clark, C. (2001). The use of computer-mediated communication to enhance subsequent face-to-face discussions. *Computers in Human Behavior*, 17, 269-283.
- Doughty, C. (2003). Instructed SLA: constraints, compensation and enhancement. In C. Doughty & M. Long (Eds.), *The Handbook of Second Language Acquisition* (pp. 256-310). Massachusetts: Blackwell Publishers.
- Fischer, C. S. (1992). *America Calling, A Social History of the Telephone to 1940*. Berkeley: University of California Pres.
- Fischer, C. S. (1997). Technology and community: historical complexities. *Sociological Inquiry*, 67, 113-18.
- Gass, S. M. (2003). Input and Interaction. In C. Doughty & M. Long (Eds.), *The Handbook of Second Language Acquisition* (pp. 224-255). Massachusetts: Blackwell Publishers.
- Gillham, B. (2005). *Research Interviewing: The Range of Techniques*. Berkshire: Open University Press.
- Gilmore, A. (2007). Authentic materials and authenticity in foreign language learning. *Language Teaching*, 40, 97-118.
- Godwin-Jones, R. (2007). Emerging technologies tools and trends in self-paced language instruction. *Language Learning & Technology*, 11(2), 10-17.
- Hamzah, M. (2004). Facilitating second language acquisition (SLA) in a computer-mediated communication (CMC) learning environment. *Internet Journal of e-Language Learning & Teaching*, 1 (1), 15-30.

- Hauser, E. (2005). Coding 'Corrective Recasts': The maintenance of meaning and more fundamental problems. *Applied Linguistics*, 26 (3), 293-316.
- Hayes, R. (2005). Designing for dialogue in place of teacher talk and student silence. *Culture & Psychology*, 11(3), 339-357.
- Heins, B., Duensing, A., Stickler, U. & Batstone, C. (2007). Spoken interaction in online and face-to-face language tutorials. *Computer Assisted Language Learning*, [http://www.informaworld.com/smpp/title~content=t716100697~db=all~tab=issueslist~branches=20 - v2020\(3\)](http://www.informaworld.com/smpp/title~content=t716100697~db=all~tab=issueslist~branches=20-v2020(3)), 279 – 295.
- House, S. (2002). Who is in this classroom with me? In Johnson, K. E. & Golombek, P. R. (Eds.). *Teachers' Narrative Inquiry as Professional Development*. Cambridge University Press.
- Hu, Y. (2004). Friendship through IM: Examining the relationship between instant messaging and intimacy. *Journal of Computer Mediated Communication*, 10(1).
- Işık, A. (2007). Türkiye'deki yabancı dil eğitim sistemine eleştirel bir bakış. Türkiye'de Yabancı Dil Eğitimi Ulusal Kongresi. Gazi Üniversitesi Gazi Eğitim Fakültesi, Ankara.
- Johnson, E. (1998). *Electronic Discourse*. Lulea University of Technology. Retrieved January, 25, 2008 from <http://www.ludd.luth.se/~jonsson/D-essay/ElectronicDiscourse.html>
- Kalman, Y. M., Ravid, G., Raban, D. R., and Rafaeli, S. (2006). Pauses and response latencies: A chronemic analysis of asynchronous CMC. *Journal of Computer-Mediated Communication*, 12 (1), article 1. <http://jcmc.indiana.edu/vol12/issue1/kalman.html>
- Karaata, C. (2007). Milli Eğitim Bakanlığı okullarında çalışan İngilizce Öğretmenlerinin hizmet içi eğitimleri için öneriler. Türkiye'de Yabancı Dil Eğitimi Ulusal Kongresi. Gazi Üniversitesi Gazi Eğitim Fakültesi, Ankara.
- Kayaoglu, M. N. (2007). Zorunlu İngilizce hazırlık programları neden başarılı değil?. Türkiye'de Yabancı Dil Eğitimi Ulusal Kongresi. Gazi Üniversitesi Gazi Eğitim Fakültesi, Ankara.
- Keller-Lally, A. M. (2006). Effect of task type and group size on foreign language learner output in synchronous computer mediated communication. Doctoral Dissertation, The University of Texas at Austin. UMI: 3226972.
- Kötter, M. (2003). Negotiation of meaning and codeswitching in online tandems. *Language Learning & Technology*, 7(2), 145-172. Retrieved 23.01.2008, from <http://llt.msu.edu/vol7num2/kotter/>
- Lamy, M-N., & Goodfellow, R. (1999). "Reflective conversation" in the virtual language classroom." *Language Learning & Technology*, 2(2), 43-61. Retrieved 23.01.2008 from <http://polyglot.cal.msu.edu/llt/vol2num2/article2/index.html>.
- Lee, N. (2004:49). The Neurobiology of Procedural Memory. In Schumann, J. H. et al. (2004). *The Neurobiology of Learning: Perspectives from Second Language Acquisition*. Lawrence Erlbaum Associates, Publishers: London.
- Levy, M. (2007). Culture, culture learning and new technologies: Towards a pedagogical perspective. *Language Learning & Technology*, 11(2), 104-127.
- Lyster, R. 1998: Recasts, repetition, and ambiguity in L2 classroom discourse. *Studies in Second Language Acquisition*, 20, 51–81.
- Lyster, R. and Ranta, L. 1997: Corrective feedback and learner uptake: negotiation of form in communicative classrooms. *Studies in Second Language Acquisition*, 20, 37–66.
- Marczyk, G., DeMatteo, D. & Fesrtinger, D. (2005). *Essentials of Research Design and Methodology*. John Wiley & Sons, Inc.
- MEB. (2006). ÖBBS–2004 İngilizce ve Bilgisayar Okuryazarlığı Raporu. Milli Eğitim Basımevi: Ankara.
- Meskill, C. (2005). Metaphors that shape and guide CALL research. In Egbert, J.L. (ed.) *Call Research Perspectives*. Mahwah, NJ, USA: Lawrence Erlbaum Associates, 25-39.
- Okan, Z. & Basaran, S. (2007). Türkiye'nin İngilizce öğretmeni yetiştirme politikası, Türkiye'de Yabancı Dil Eğitimi Ulusal Kongresi. Gazi Üniversitesi Gazi Eğitim Fakültesi, Ankara.
- Özyar, A. (2003). Hizmet Öncesi ve Hizmet İçi Öğretmen Yetiştirme. Öğretmen Yetiştirme ve İstihdamı Sempozyumu. Eğitim-Sen Yayınları.
- Payne, J.S. & Whitney, P.J. (2002). Developing L2 oral proficiency through synchronous CMC: Output, working memory, and interlanguage development, *CALICO Journal*, 20(1), pp. 7–32.
- Preissle, J. & Grant L. (2004). Fieldwork traditions: ethnography and participant observation. In deMarrais, K. & Lapan, S. D. (Eds.). *Foundations for Research: Methods of Inquiry in Education and Social Sciences*. Lawrence Erlbaum Associates, Publishers, London.
- Richardson, J. T. E. (1996). Evolving Concepts of Working Memory. In Richardson, J. T. E. (Ed.) *Working Memory and Human Cognition*. Cary, NC, USA: Oxford University Press.
- Schumann, J. H. et al. (2004). *The Neurobiology of Learning: Perspectives from Second Language Acquisition*. Lawrence Erlbaum Associates, Publishers: London.

- Schwienhorst, K. (2003). Learner Autonomy and Tandem Learning: Putting Principles Into Practice in Synchronous and Asynchronous Telecommunications Environments. *Computer Assisted Language Learning*, [http://www.informaworld.com/smpp/title~content=t716100697~db=all~tab=issueslist~branches=16 - v1616](http://www.informaworld.com/smpp/title~content=t716100697~db=all~tab=issueslist~branches=16-v1616) (5), 427 – 443.
- Shang, H. (2007). An exploratory study of e-mail application on FL writing performance. *Computer Assisted Language Learning*, [http://www.informaworld.com/smpp/title~content=t716100697~db=all~tab=issueslist~branches=20 - v2020\(1\)](http://www.informaworld.com/smpp/title~content=t716100697~db=all~tab=issueslist~branches=20-v2020(1)), 79 – 96.
- Shulman, M. (2001). Developing Global Connections through Computer-Mediated Communication. *The Internet TESL Journal*, VII (6), 2001. Retrieved January 24, 2008, from <http://iteslj.org/Articles/Shulman-CMC.html>
- Takatalo, J., Nyman, G. & Laaksonen, L. (2008). Components of human experience in virtual environments. *Computers in Human Behaviour*, 24, 1-15.
- Tammelin, M. (2004). Introducing a collaborative network-based learning environment into foreign language and business communication teaching. University of Helsinki, Media Education Center.
- Toktar, E. (2000). Açık Öğretimde İngilizce Öğretmeni Yetiştirilecek. *Cumhuriyet Gazetesi*. (16.05.2000).
- Üstüner, M. (2004). Geçmişten Günümüze Türk Eğitim Sisteminde Öğretmen Yetiştirme ve Günümüz Sorunları. *İnönü Üniversitesi Eğitim Fakültesi Dergisi*. 5 (7).
- Warschauer, M. (1996). Comparing face-to-face and electronic communication in the second language classroom. *CALICO Journal*, 13, 7-26.
- Weinel, M. & Hu, C. (2007). Social presence and student perceptions in the blend of synchronous and asynchronous communication forms. Seventh IEEE International Conference on Advanced Learning Technologies (ICALT 2007).
- Weisband, S. P. (1995). Computer-Mediated Communication and Social Information: Status Salience and Status Differences. *Academy of Management Journal*, 38(4), 1124-1151.
- Yamada, Masanori & Akahori, Kanji (2007). Social presence in synchronous CMC-based language learning: How does it affect the productive performance and consciousness of learning objectives? *Computer Assisted Language Learning*, 20 (1), 37-65. Retrieved January 24, 2008, from <http://www.informaworld.com/10.1080/09588220601118503>
- Yang, S.C. & Chen, Y. (2007). Technology-enhanced language learning: A case study. *Computers in Human Behavior*, 23, 860-879.

Appendix: Semi-structured interview guidelines (translated from the original Turkish version)

We are conducting a study about the Skype-based voice chat with Mr.... and face-to-face talk with Mrs. you accomplished earlier. Our aim is to find out about your feelings during the computer-mediated and face-to-face interactions and possible reasons behind frequent pauses, repetitions and recasts in your talk under both conditions. This is not a study that investigates your mistakes and we do not take pauses, repetitions and recasts as mistakes. We would, also, like to learn about your beliefs and perceptions about the use of computer-mediated and face-to-face communication tasks for language learning.

A. Chat Mode and Anxiety:

1. Do you usually chat? (Frequency, anxiety, with whom...?)
2. Which one would you prefer? Video chat or audio chat? Why? (Anxiety?)
3. Which one is better for improving your English? Face-to-face talk or chat on Skype? Why? Do you think there is a difference between the two? (Feelings? similarities between the two modes?)
4. Do you find text-based online chat easier? (Feelings during text-based synchronous communication?)

B. CMC with Native Speaker and Face-to-Face Communication with the Instructor

5. How did you feel during the chat with Mr. ...? (Excited? why?)
6. Were you able to express your thoughts and feelings easily while chatting with Mr. ...? (Why? why not?)
7. Were you able to express your thoughts and feelings easily while talking to Mrs. ...? (Why? why not?)
8. Which one was more relaxing and enjoyable for you? Skype chat or face-to-face talk? (Why?)
9. Which one made you pay more attention to grammatical structures? Skype chat or face-to-face talk? (Why?)

C. Content: Pauses, Repetitions and Recasts

10. (Showing the transcripts) During the Skype chat with Mr. ... you sometimes hesitated, paused and repeated or changed your words? Do you remember your feelings during the chat? (Reasons?)
11. (Showing the transcripts) You sometimes hesitated, paused and repeated or changed your words during the face-to-face talk with Mrs. ... as well? Do you remember your feelings during the conversation? (Reasons?)
12. Anything you would like to add?

AN INVESTIGATION OF FACTORS AFFECTING STUDENT PARTICIPATION LEVEL IN AN ONLINE DISCUSSION FORUM

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ABSTRACT

This study analyzed the factors that affect student participation in discussion forum under the two main purposes. The first purpose was to examine the relationship between the students' individual demographics and categories of students' participation level (inactive, moderate, and active) in discussion forum of an online course. The second purpose was to examine the students' views about reasons for low level of interaction in discussion forum. A total of 196 students who attended computers systems and structures course of online certificate program were included in the study. The data was collected at the beginning and at the end of the course through online survey and semi-structured interviews. The descriptive and inferential statistical techniques were used to analyze the quantitative data. The content analysis method was used to analyze the qualitative data. The results of the study indicated that three student characteristics (achievement, gender and weekly hours of Internet use) showed a significant relationship with students' participation level in discussion forum of the online course. Also, the findings emphasized some of the critical issues that should be taken into account in designing online discussions, such as, students' workload and responsibilities, progress of interaction over the Internet taking more time, planned and structured instructional activities in discussion forum.

Keywords: Computer mediated communication, asynchronous discussion, online discussion forum, online learning

INTRODUCTION

Many public and private educational institutions have offered several courses by the use of Internet technologies, and these courses in online environments have become a common option for learners in higher education. The time and place flexibility provided by online courses and programs has conducted an increasing number of learners, especially adults who have several responsibilities, such as, jobs and families, to come back to education in the last years (Moore & Kearsley, 2005; Simonson et al., 2009).

Computer mediated communication (CMC) has great potential for designing these type of online courses. Interaction with learners and teachers through CMC seems to be one of the most influential features of online courses. Moore (1989) identified three types of interaction: (1) learner-instructor interaction, which provides feedback and dialog between student and instructor; and (3) learner-learner interaction, which facilitates the exchange of information, ideas and dialog among peers; (2) learner-content interaction, which enables students to obtain information from the material. In the literature, several studies are consisted with Moore's (1989) promotion of these three types of interaction that are essential in distance education (i.e. Swam, 2001; Vrasidas & McIsaac, 1999; Yukselturk & Yildirim, 2008).

Asynchronous and synchronous communication tools are used mainly for all types of interaction in online courses. Synchronous interaction requires simultaneous participation of all students and instructors. The advantage of synchronous mode is that interaction occurs in real time. On the other hand, asynchronous interaction does not require simultaneous participation of all students and instructors. Students and instructors can post the messages or respond to the messages at any time and at any where they prefer and view the messages many times after the messages have been posted. Also, it is an effective mode for reflection and critical analysis. In other words, asynchronous discussions facilitate critical analysis and reflection of thoughts and things learned in the courses by especially writing. Due to these advantages, the popularity of using asynchronous online discussion evolves over time in online learning (Hammond, 1999; Thomas, 2002; Wu & Hiltz, 2004).

One of the most widely used asynchronous communication tools in online courses is discussion forums in which students and teachers post to threaded asynchronous discussions. Currently, the asynchronous online discussion forums also are contemporary tools that can save, arrange and present the messages into various discussion threads. Participation in asynchronous discussions, such as discussion forums, can be identified as an indicator to evaluate the progress of interaction and collaboration in online courses (Hammond, 1999; Prinsen, Volman & Terwel, 2007).

RELATED LITERATURE

Learner participation has been discussed widely as a key part of online learning recently. It has been conceptualized differently in several studies. For example, Hrastinski (2008) mentioned six different ways of conceptualization: accessing e-learning environments, writing, quality writing, writing and reading, actual and perceived writing and taking part and joining in a dialogue. After analyzing several related studies in the literature, Hrastinski (2008, p. 1761) proposed following definition of online learner participation:

Online learner participation is a process of learning by taking part and maintaining relations with others. It is a complex process comprising doing, communicating, thinking, feeling and belonging, which occurs both online and offline.

Learner participation measuring interaction with peers and teachers in online environments can enhance learning outcomes. Researchers expressed that participation affects perceived positively learning, quality assessment of assignments, achievement, satisfaction and retention rates in the literature (Hrastinski, 2008). For example, Woods (2002) stated that both quality and quantity of interaction with the instructor and peers are much more crucial to the success of online courses and student satisfaction than to success and satisfaction in traditional courses. Davies and Graff (2005) examined the relationship between the level of online participation and student grades (i.e. high, medium, low, fail). They concluded that students achieving high or medium passing grades engaged more actively than students achieving low passing grades and also students achieving low passing grades were more active than students who failed in the several modules of courses even though greater online interaction did not lead to significantly higher performance. Another study was conducted to analyze discussions in courses delivered completely online by Picciano (2002) who found that students perceived greater quality and quantity of learning as a result of participating in the discussions.

In the literature, there are several studies that take an interest in factors affecting the participation in online asynchronous discussion. Cheung and Hew (2008) discussed factors that are fallen into three different categories: attributes of the asynchronous online discussion, role of the facilitator and design of discussion activities. Similarly, Vonderwell and Zachariah (2005) searched for factors that influence learner participation and they found that online learner participation are influenced by technology and interface characteristics, content area experience, student roles and instructional tasks, and information overload. In another study conducted by Vrasidas and McIsaac (1999) who examined the nature of interaction in an online course from both teacher and student perspectives and they concluded that the structure of course, class size, feedback, and prior knowledge of computer mediated communication all affected the interaction.

Moreover, there are other important aspects that influence student's participation and one of them is related to the differences in students' demographics and abilities in online courses. For example, Godwin, Thorpe and Richardson (2008) mentioned that students taking online courses with a high level of interaction tended to be different from the students taking the courses with a low level of interaction in regard to age, gender and previous qualifications. Although the results were not statistically significant, high interactive students were generally younger, male and having had higher educational qualifications. McLean and Morrison (2000) analyzed the relationships between learner participation and six socio demographic variables (i.e. sex, age, education level, occupation, residence in urban or rural areas, and region of residence) and they found two variables (holding a university degree and living in an urban area) to be the strongest predictors of participation. Another study by Prinsen, Volman, and Terwel (2007) examined the influence of learner characteristics on degree and type of participation in a CSCL environment. They stated that females send more messages to the discussions than males do and are more dependent on their computer skills. Students who are good at comprehensive reading also send more messages. Another variable that influences the degree of participation is popularity among classmates.

As a summary, the importance of participation and interaction in education especially in online learning is extensive in the literature. Caspi et al. (2006) mentioned that CMC media such as synchronous or asynchronous tools provided new opportunities for students to participate in online courses, but, participation in the web-based instructional environment tends to be lower while comparing to participation in the face-to-face courses. There are several factors affecting learner participation that was mentioned in online environments. There have still not been enough findings to answer general questions about these factors, especially impact of student characteristics in online discussion due to continuously variations in CMC applications, methods of study, instructions, roles of teachers and students (Prinsen, Volman & Terwel, 2007). As a result, the relationship between participation and interaction and learning outcomes is a complex phenomenon and we need more studies related to this phenomenon (Picciano, 2002).

METHOD

Research Questions

This study analyzed the factors that affect student participation in discussion forum under the two main purposes. The first purpose was to investigate the relationship between the students' demographics and intellectual abilities and categories of students' participation level in discussion forum of an online course. The second purpose was to examine the students' views about reasons for low level of interaction in discussion forum of an online course. The following two major research questions guided this study:

- Is there a relationship between students' participation level (inactive, moderate, and active) in discussion forum and students' demographics and intellectual abilities (gender, age, employment, education level, online course experience, domain knowledge, weekly hours of Internet use, achievement, and status after the course) in an online course?
- What are the students' views about reasons for low level of interaction in discussion forum in an online course?

Description of Online Certificate Program and an Online Course

Online Information Technologies Certificate Program (ITCP) is one of the first Internet Based Education Projects of the Middle East Technical University in Ankara, Turkey. It is based on synchronous and asynchronous communication methods over the Internet offered by cooperation of Computer Engineering Department and Continuing Education Center at Middle East Technical University. The online certificate program was started in May 1998, and it is still active (Isler, 1998).

This online certificate program offers online lecture notes, learning activities and visual aids to the participants in the courses. One instructor and two assistant are dealing with each course. Also, each course has an asynchronous (e.g. discussion forum) and synchronous (e.g. chat sessions) communication tools to provide interaction between instructors and students, and students and students. At the end of each semester, there are face-to-face sessions for each course. Computers Systems and Structures is one of the first semester courses in this online certificate program. The main aim of this course is to give an introductory level of knowledge on software, equipment and structure of computer systems. Central processing unit, memories, input/output principles, environmental tools, such as printers, operating systems, general application software, programming languages, and also files, file systems, data transfer are handled through out the course.

Variables

The dependent variable was the students' participation level in discussion forum of the online course (Computers Systems and Structures Course). There were three groups of students described in Table 1: inactives, moderates, and actives. The number of messages written or sent by the students in the discussion forum of the online course was 838 at the end of the semester. The average of number of messages per student (N=196) was 4.3. Active students in this course wrote five or more messages. Moderate participants wrote average of number of messages or less. Inactive participants in this study did not write any messages and they only read written messages in this online course.

Table 1. Description and Categories of Students' Participation Level

Participation level	Description	# of messages
Actives	writing at least five or more messages in the discussion forum	= > 5
Moderates	writing average of number of messages (4.3) or less in the discussion forum	= < 4
Inactives	not writing any messages, only reading others' messages	-

Students' demographics and intellectual abilities (gender, age, employment, education level, online course experience, domain knowledge, weekly hours of Internet use, achievement, and status after the course) were all independent variables. The list of independent variables, descriptions, and categories of these variables are presented in Table 2.

Table 2. Description and Categories of Independent Variables

Variables	Description	Categories
Gender	Sex of students	Male Female
Age	Age of students	24 and younger 25-30 31 and older
Education Level	Education level of students	Undergraduate/graduate Student Graduate
Employment	Indicates whether students are working at any job	Working Not working
Online Experience	Indicates whether students took online courses before	Yes No
Domain (subject-area) Knowledge	Students' perception of their own subject-area knowledge about the course topics	Low Intermediate High
Weekly Hours of Internet Use	How many hours per week on the Internet students spend time	14 and less hours 15-30 hours 31 and more hours
Student Achievement	Indicates whether students pass the course	Successful Unsuccessful
Student Status	Indicates whether students continue to attend the program after the course	Continuous Dropout

Subject of the Study

The subject of the study was selected from all participants who attended to the online Information Technologies Certificate Program in 2008-2009. A total of 196 students who registered computers systems and structures course of this online certificate program were included in the study. The percentages of inactive students were 34.7 %, moderate active students were 32.7 %, and active students were 33.2 %.

The number of male students (72.9 %) was greater than the number of female (27.1 %) students, and the students' ages ranged from 19 to 55 with an average of 27.1 years. 54% of the online program students were undergraduate or graduate students. More than half of the students (56.1 %) have full-time or part-time jobs. Only a few of them (12.8 %) have previously been in an online course. 38.5 % of the students did not have enough information about course content. Also, more than 60 % of students use Internet more than 15 hours weekly. Moreover, 41 % of the students did not pas the course and 26.5 % of the students left the program after the course. Table 3 presents the percentages of participants' demographic characteristics with regard to participation level (inactive, moderate, active).

Table 3. Percentage of Participants' Demographic Characteristics

	Inactive		Moderate		Active	
	N	%	N	%	N	%
Gender						
Male	48	33.6	54	37.8	41	28.70
Female	20	37.7	9	17.0	24	45.3
Age						
24 and younger	23	31.9	22	30.6	27	37.5
25-30	29	32.2	32	35.6	29	32.2
31 and older	16	47.1	9	26.5	9	26.5
Education Level						

Student (BS or MS student)	38	35.8	39	36.8	29	27.4
Graduate	30	33.3	24	26.7	36	40.0
Occupation						
Working	37	33.6	33	30.0	40	36.4
Not Working	31	36.0	30	34.9	25	29.1
Previous Online Course						
Yes	10	40.0	8	32.0	7	28.0
No	58	33.9	55	32.2	58	33.9
Domain Knowledge						
Low	33	44.6	21	28.4	20	27.0
Intermediate	25	29.4	27	31.8	33	38.8
High	9	27.3	14	42.4	10	30.3
Weekly Hours of Internet Use						
14 and less hours	23	35.4	17	26.2	25	38.5
15-30 hours	26	47.3	13	23.6	16	29.1
31 and more hours	14	24.6	24	43.5	18	31.9
Student Achievement						
Successful	25	21.9	38	33.3	51	44.7
Unsuccessful	43	52.4	25	30.5	14	17.1
Student Status						
Continuous	47	32.6	44	30.6	53	36.8
Dropout	21	40.4	19	36.5	12	23.1

Data Collection and Analysis

During the data collection of the study, demographic characteristics (e.g., age, gender, employment status) of the participants were obtained from the application forms they filled out while registering for the program. After the program started, the online survey was administered to collect students' prior knowledge, and preferences. Furthermore, student achievement (successful or unsuccessful) status was determined based on assignments and final examination at the end of the course. Also, students who quitted the program or continued to attend the program after the course were described as a student status in the study.

In addition, semi-structured interviews were conducted with six students to elicit additional information regarding factors related to student participation at the end of the course. The interview schedules were developed around the reasons for low level interaction in discussion forum. In order to represent variety among students, the interviewers were selected equally from inactive, moderate and active students. Before each interview starts, the students were informed about the purpose of the interview. Each interview took about 15 minutes, and was tape-recorded with the permission of the students.

During the data analysis of the study, each of the individual variables was coded into categories and then they were analyzed by descriptive and inferential statistical techniques including frequencies, percentages, and chi-square analyses. Two-way cross-tabulations analysis with chi-square testing was used to determine if relationships existed between the students' individual characteristics and their participation level in the discussion forum of the online course. Furthermore, the data from semi-structured interviews was examined based on qualitative analysis methods as explained by Yildirim and Simsek (2000). The frequent statements and the points sought in the interview were separated from the data to be grouped considering the predetermined framework of the study. The statements of the participants were translated from Turkish to English by the author and presented as a summarized way.

RESULTS

The results of the study will be reported in regard to two research questions separately.

The relationship between students' participation, demographics and intellectual abilities

In order to examine first research question, the following hypothesis can be stated: "there was no relationship between students' participation levels in discussion forum and students' demographics and abilities". It was tested by two-way contingency table analyses (chi-square for independence). Before testing this hypothesis, categories were combined to satisfy the test assumption that expected counts in all cells were greater than or equal to 5.

The chi-square test revealed that students' participation level in discussion forum was found to be significantly related with student achievement (Pearson χ^2 (df=2, N = 196) = 8.47, p = 0.014, Cramer's V=0.230), gender (Pearson χ^2 (df=2, N = 196) = 8.61, p = 0.014, Cramer's V=0.210) and weekly hours of Internet use (Pearson χ^2 (df=4, N = 189) = 10.12, p = 0.038, Cramer's V=0.164). Student achievement variable had the most effect on participation level for the online students (Cramer's V=0.230). Table 4 summarizes individual characteristics showing significant association with students' participation level in discussion forum.

Table 4: Individual Characteristics Showing Significant Association with Participation Level

Variables	P. Level		Success	Unsuccess	χ^2	p	Cramer's V	
Achievement	Inactive	C	25	18	8.47	0.014	0.230	
		E	30.6	12.4				
	Moderate	C	38	18				
		E	39.9	16.1				
	Active	C	51	10				
		E	43.5	17.5				
			Male	Female				
Gender	Inactive	C	48	20	8.607	0.014	0.210	
		E	49.6	18.4				
	Moderate	C	54	9				
		E	46.0	17.0				
	Active	C	41	24				
		E	47.4	17.6				
			1-14 h	15-30	30-h			
Weekly hours of Internet use	Inactive	C	23	26	17	10.121	0.038	0.164
		E	22.7	19.2	24.1			
	Moderate	C	17	13	30			
		E	20.6	17.5	21.9			
	Active	C	25	16	22			
		E	21.7	18.3	23			

Note. C = Counted, E = Expected

The results of the study also showed that there was no relationships between students' participation level in discussion forum and age (Pearson χ^2 (df=4, N = 196) = 3.42, p = 0.489, Cramer's V = 0.094), education level (Pearson χ^2 (df=2, N = 196) = 3.99, p = 0.136, Cramer's V = 0.143), employment (Pearson χ^2 (df=2, N = 196) = 1.213, p = 0.545, Cramer's V = 0.079), prior web-based learning experience (Pearson χ^2 (df=2, N = 196) = 4.63,

$p = 0.793$, Cramer's $V = 0.049$), domain knowledge (Pearson χ^2 ($df=4$, $N = 192$) = 6.44, $p = 0.169$, Cramer's $V = 0.129$), and status of student (Pearson χ^2 ($df=2$, $N = 196$) = 3.26, $p = 0.196$, Cramer's $V = 0.129$).

Participants' Views about Reasons for Low Level of Interaction

The interviews were conducted with six students to analyze factors affecting participation and interaction in the online course. According to the students, interaction in the online course, especially among the participants, was not enough in the discussion forum. They mentioned that there were several reasons for the low level interaction in course discussion. The first reason was as stated by four participants that almost all participants had different responsibilities, and had various occupations in their life. They stated that their background, previous knowledge levels, ages and occupation were different. This might influence the low level of interaction with others.

The second reason was due to the nature of the program that it was an online program. In these online programs, students were not at the same place physically and they generally attended course web sites asynchronously; therefore, they generally were alone during their learning process. They stated that the progress of interaction among the students over the Internet took more time compared to face-to-face interaction. One student stated that:

Interaction might be broken off due to the Internet-based education. It is difficult to increase the interaction among people when they can not be at the same place physically and they can not spend time together.

As the third reason, three students stated that there were not enough activities to have interaction among the participants in discussion forum, so they could not find common topics to talk to each other and they might not improve their interaction.

Fourth, they stated that not studying regularly and difficulty in learning the subject affected their participation adversely. Three students mentioned that if they did not study regularly, they could not interact successfully in the courses. One student indicated that some course topics were too difficult and they could not understand them timely. Therefore, they could not know what to ask or how to ask questions during the discussion.

Fifth, some students generally preferred to communicate with others who had common background or who knew each other before the program. For instance, one student stated that:

There are 4-5 participants who are students at the same university. Their communications among themselves are well and they generally prefer to talk to each other.

As a summary, according to interview results, the reasons for low level of interaction are itemized as five main items in the Table 5.

Table 5: Interview results related to the reasons for low level of interaction in the discussion

Five main reasons
<ul style="list-style-type: none"> • having different responsibilities and various occupations, • the nature of the program being online (i.e. attending course web sites asynchronously and progress of interaction over the Internet was taking more time), • not having enough interactive activities in the course, • not studying course topics regularly, • interacting only with participants with common background

DISCUSSION AND CONCLUSION

Communication and interaction has recently been accepted as a means to increase the quality of instruction (Thomas, 2002). In other words, one of the key components of good teaching is meaningful interaction with peers and teachers (Vrasidas & McIsaac, 1999). Students' participation is a prerequisite for supplying interaction and communication in online courses. There are number of factors affecting participation in asynchronous discussion that needs to be identified in online courses. The study examined factors affecting student participation and interaction in discussion forum of an online course. From nine characteristics of students examined, only three of them (achievement, gender and weekly hours of Internet use) showed a significant relationship with student participation level in discussion forum (i.e., inactive, moderate, and active). Also, students mentioned several other factors that might affect the participation, such as, having different responsibilities, not studying course topics regularly and not having enough interactive activities in the discussion.

According to the statistical results of the study, successful students in the online course were generally active participants in discussion forum. Similarly, in the literature, researchers have examined how participation in asynchronous discussions in online courses affects student performance. A correlation between the number of student discussion postings in online course and student performance is generally positive and researchers found that online active discussions contribute to learning positively even though some of them stated that the correlation is not statistically significant (Davies & Graff 2005; Godwin, Thorpe & Richardson, 2008; Picciano, 2002). Researchers found that students tended to obtain higher grades on the courses with high levels of interaction in the courses, but, there is no evidence that they would generalize beyond the courses in their study.

Another result of the study confirmed that there is a significant difference between the expected and counted number of inactive, moderate and active students regarding gender in discussion forum. The results showed that the active female students (45.3 %) were higher than males (28.6%), but, the moderate active female students (17 %) were lower than males (37.8 %) in discussion forum. In the literature, gender based differences in online education have been recognized as an important focus for research for a long time. When reviewing gender related studies, the effects of this variable are inconclusive. It means that some studies, like this study, reported differences between genders (i.e. Arbaugh, 2000; Prinsen, Volman, & Terwel, 2007) while others did not (i.e. Ory, Bullock & Burnaska, 1997). For example, Arbaugh (2000) mentioned that male students communicated via computer mediated communication in a competitive manner and also they tried to improve their own status in relation to their peers. However, female students viewed computer mediated communication as a medium to develop higher collaboration in online learning. They were more supportive of networks to increase learning and communication for the group. On the other hand, Ory, Bullock and Burnaska (1997) examined gender differences in the use of and attitudes about asynchronous communication about one year in a university setting and did not find any differences.

Moreover, Internet use is becoming more common in Turkey. A study carried out by State Statistics Institute (TUIK, 2008) shows that 24.5 % of the household have opportunities to access the Internet in Turkey. 76 % the household members use the Internet for reading online newspapers or magazines, 74 % for sending and getting e-mail, 69.7 % for sending instant message, 69.7 % for downloading music or listening music. Due to the increasing of use of Internet, the frequency of Internet use was also analyzed in this study and students' participation level was found to be significantly related with students' weekly hours of Internet use. The results showed that most of the active students (38.5 %) in the discussion forum preferred to use the Internet 14 and less hours in a week. Also, most of the inactive students (47.3 %) spent 15-30 hours online weekly. It might be expected that the students who spend more time online were active participants in online courses, but, this expectation was not supported in this study.

The results also demonstrated that participation in discussion forum was not strong enough in the online course. 34 % of the students did not write any message to the discussion forum and also 32.7 % of the student wrote only four or less messages during the online discussion. Likewise, the interview results showed that interaction among the students was weak in the course and they stated that there were number of reasons for low level interaction in discussion forum. These reasons included having different responsibilities and various occupations, not studying course topics regularly, interacting only with participants with common background, progress of interaction over the Internet was taking more time, and not having enough interactive activities in the course. These issues related to the reasons of low level interaction were also discussed by several researchers in the literature (Dennen, 2005; Vonderwell & Zachariah, 2005; Yukselturk & Yildirim, 2008).

As a summary, in this study it was supported that student participation to discussion forum was related to several students' demographics and abilities and also there were several factors affecting low level interaction in course discussion. This type of study results help designers and teachers who monitor how actively students participate in asynchronous discussion and can gain information from the low-participating students to find out why they are inactive. Therefore, they can decide on the proper interventions. For example, initially, social environments could be created for open communication in the course where participants feel comfortable posting questions or comments related to content, assignments, and projects. In order to promote interaction, discussions also should be planned and structured. Instructional activities, projects, and reports could be designed to perform collaborative learning. In other words, the courses might be designed with a required discussion groups as stated by the course expectations. Also, students should be encouraged to attend the discussions and also they should receive timely feedback by the instructors. (Dennen, 2005; Prinsen, Volman & Terwel, 2007; Vonderwell & Zachariah, 2005; Yukselturk & Yildirim, 2008).

As a recommendation for further studies, examining more than one course participation is recommended. In addition, verification of the study results with some other learners or samples might be worthy of consideration

in future studies. For the generalizability of the findings, the sample size might be increased. Also, in further studies, the posted messages in discussions also can be examined based on content analysis methods to describe the quality of messages that might affect learning outcomes.

REFERENCES

- Arbaugh, J. B. (2000). An exploratory study of the effects of gender on student learning and class participation in an Internet-based MBA course, *Management Learning*, 31(4), 503–519.
- Caspi, A., Chajut, E., Saporta, K., & Beyth-Marom, R. (2006). The influence of personality on social participation in learning environments, *Learning and Individual Differences*, 16(2), 129–144.
- Cheung, W.S. & Hew, K.F. (2008). Examining facilitators' habits of mind and learners' participation. *Proceeding of the 25th Int. Conf. Australasian Society for Computers in Learning in Tertiary Education 2008, ASCILITE 2008*, (pp. 170-176). Retrieved January 12, 2010 from <http://www.ascilite.org.au/conferences/melbourne08/procs/cheung.pdf>
- Davies, J. & Graff, M. (2005). Performance in e-learning: online participation and student grades, *British Journal of Educational Technology*, 36(4), 657–664.
- Dennen, V. P. (2005). From message posting to learning dialogues: Factors affecting learner participation in asynchronous discussion, *Distance Education*, 26(1), 127–148.
- Godwin, S. J., Thorpe M. S., & Richardson, J. T. E. (2008). The impact of computer-mediated interaction on distance learning, *British Journal of Educational Technology*, 39(1), 52–70.
- Hammond, M. (1999). Issues associated with participation in on-line forums - the case of the communicative learner, *Education and Information Technologies*, 4(4), 353–367.
- Hrastinski, S. (2008). What is online learner participation? A literature review, *Computers & Education*, 51 (4), 1755–1765.
- Isler, V (1998). Sanal Universite: Dusunceler ve Deneyimler. *Paper presented at Bilgi Teknolojileri Isiginda Egitim (BTIE), TBD and IEEE Turkiye Bolumu*, Ankara, Turkey.
- McLean, S., & Morrison, D. (2000). Sociodemographic characteristics of learners and participation in computer conferencing, *Journal of Distance Education*, 15(2), 17–36.
- Moore, M. (1989). Three types of interaction, *The American Journal of Distance Education*, 3(2), 1–6.
- Moore, M. G., & Kearsley, G. (2005). *Distance education: A systems view* (2nd ed). Belmont, CA: Wadsworth Publishing Company.
- Ory, J. C., Bullock, C., & Burnaska, K. (1997). Gender similarity in the use of and attitudes about ALN in a university setting, *Journal of Asynchronous Learning Networks*, 1 (1), 1–17.
- Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks*, 6(1), 2140.
- Prinsen, F., Volman, M. L. L., & Terwel, J. (2007). The influence of learner characteristics on degree and type of participation in a CSCL environment, *British Journal of Educational Technology*, 38(6), 1037–1055.
- Simonson, M., Smaldino, S. Albright, M. & Zvacek, S. (2009). *Teaching and Learning at a Distance: Foundations of distance education* (4th ed). Columbus, OH: Prentice-Hall.
- Swan, K. (2001). Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. *Distance Education*, 22 (2), 306–331.
- Thomas, M.J.W. (2002). Learning within incoherent structures: the space of online discussion forums, *Journal of Computer Assisted Learning*, 18(3), 351–366.
- TUIK (2008) Turkish Statistical Institute, Hanehalkı Bilişim Teknolojileri Kullanımı Araştırması, Retrieved January 12, 2010 from <http://www.tuik.gov.tr/PreHaberBultenleri.do?id=2055>
- Vrasidas, C., & McIsaac, M. (1999). Factors influencing interaction in an online course, *The American Journal of Distance Education*, 13(3), 22–36.
- Vonderwell, S., & Zachariah, S. (2005). Factors that influence participation in online learning, *Journal of Research on Technology in Education*, 38(2), 213–230.
- Woods, R.H.J. (2002). How much communication is enough in online courses? Exploring the relationship between frequency of instructor-initiated personal email and learners's perceptions of and participation in online learning, *International Journal of Instructional Media*, 29 (4), 377–394.
- Wu, D. & Hiltz, S.R. (2004). Predicting learning form asynchronous online discussions, *Journal of Asynchronous Learning Networks*, 8 (2), 139–152.
- Yildirim, A., & Simsek, H. (2000). *Sosyal Bilimlerde Nitel Arastirma Yontemleri* (2nd Ed.), Ankara: Seckin Publication.
- Yukselturk, E., & Yildirim, Z. (2008). Investigation of Interaction, Online Support, Course Structure and Flexibility as the Contributing Factors to Students' Satisfaction in an Online Certificate Program. *Educational Technology & Society*, 11 (4), 51–65.

APPLICATION OF ICTS IN TEACHING AND LEARNING AT UNIVERSITY LEVEL: THE CASE OF SHAHID BEHESHTI UNIVERSITY

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ABSTRACT

Information and communication technologies (ICTs) are a diverse set of technological tools and resources used for creating, storing, managing and communicating information. For educational purposes, ICTs can be used to support teaching and learning as well as research activities including collaborative learning and inquiring. One of the main applications of the ICTs in higher education is teaching and learning based on these new technologies. This research is concentrated on the obstacles, facilitators, and the risks of using these technologies in teaching and learning in higher education. The main purpose of this research is to answer the question: in which fields and to what extent there are obstacles, facilitators and the risks in using ICT in teaching and learning at university level? This research was conducted at the National University of Iran, the second largest university in the country. The research population consists of the university academics and students. A questionnaire has been administered for collecting the data. The main results are reported based on the following:

1. The possible domains of using ICT in curriculum decision-making in higher education
2. Obstacles of using ICT in curriculum development at university level
3. Facilitating factors and essential supports needed for application of ICT in curriculum development of higher education
4. Advantages and disadvantages of using ICT for curricular activities at university level.

Key words: ICT, Curriculum, Teaching and Learning, Higher Education

INTRODUCTION

ICT originally is applied to serve as a means of improving efficiency in the educational process (Jones and Knezek, 1993). Furthermore, it has been shown that the use of ICT in education can help improve memory retention, increase motivation and generally deepens understanding (Dede, 1998). ICT can also be used to promote collaborative learning, including role playing, group problem solving activities and articulated projects (Forcheri and Molfino, 2000). Generally, ICT is promoting new approaches to working and learning, and new ways of interacting (Balacheff, 1993). Majority of faculty members are major catalyst to promote the necessary changes (Whetston, 2001) and to equip students with the skills they are expected to have upon graduation (Brandi, Gunter, 2004).

In higher education systems, there has been a significant shift in enterprise training policy in recent years (Bruce, 1995, 2002; Edward, 2004, 2007; Kemp, 1999; Martin and Rader, 2002). In the other words, ICT learning and utilization is one of the most concerns of educational issues around the world and for a number of years there has been evidence in the training and development area (Edwards, et al, 2006). It is essential that the pedagogy of ICT becomes the main focus of staff development and this will have to build upon in a constructive manner in order to allow instructors to achieve the full benefits of using ICT in their daily tasks (McCarney, 2004).

It is generally understood that university teaching and learning refers to both the contents (skills, understandings and values) and the processes of teaching in higher education. In the case of an institution's internationalization efforts, this may apply to both the 'what' and the 'how' of teaching and learning, usually with reference to educational borrowing or lending from international sources. Iranian universities like other higher education institutes in the region are in the process of internationalizing their respective curricula.

STATEMENT OF THE PROBLEM

Decision on teaching and learning activities in higher education can be done in various levels, including academic members, departments, and faculties as well as university levels (Stark & Lattuca 1997, Barnnet & Coate, 2005). The main problem of this research is exploring different aspects and scopes of the using ICT in university teaching and learning at academics and departmental level. There are important matters in relation with this subject, which we are going to clear them. To find out solutions for an effective application of ICT, we should answer some critical questions related to use of ICT in teaching and learning in higher education settings.

The results of a number of empirical studies on achievements related to the use of ICT in education are well highlighted in the related literatures (Kousha& Abdoli, 2007, Fathivajargah & Azadmanesh 2007, Montazer 2004). Thus, it is timely that the Iran's National ICT Plans has been developed to support and enhance the educational processes in schools, universities and governmental organizations, known as Development of Human Resources and Education Program. The National ICT Agency (NICTA) called "TAKFA" (Persian name) was established and responsible for supervising and managing ICT. One of the priority missions of the NICTA in 2002-2003 was the Plan for promotion of ICT application in education – including schools and universities – and expansion of digital skills of Iran's manpower – including state organizations – and plan for expansion of ICT application in higher education, health, treatment and medical education (Kousha & Abdoli, 2004). Building up the necessary infrastructures for scientific centers and applying ICT towards expanding the academic and research activities in universities are top priorities for the Ministry of Science, Research and Technology (MSRT) in Iran.

The Iranian Management and Planning Organization launch the ICT application development plan (TAKFA), to support the objectives (Karimian & Hosseini, 2004). According to the Future Outlook of the Islamic Republic of Iran for the next two decades, Iran has planned to be knowledge-based society, and ICT literacy will be enhanced. These trends and developments as well as new responsibilities of higher education in Iran for internationalizing the campuses and disciplines by using ICT features in universities require to encourage higher education intuitions encourage integrating ICT in teaching and learning activities .

LITERATURE RIEVIEW

The recent century has been characterized with some new and outstanding technologies impacting human life, the most important of them is Information Technology. Researches conducted in both developed and developing countries prove that the educational authorities in these countries among their other activities have given the priority of "ICT Literacy" through developing various educational programs (Tapscott, 1998; Currier, 2001). In the other words, ICT learning and utilization is one of the most concerns of educational authorities around the world and for a number of years there has been evidence that a training and development area, which may be labeled information literacy is being formed (Edwards, et al., 2006). A variety of authors have surveyed the literature of educational technology in information skills teaching (e.g. Cox, 1997; Rader, 2000; Contain and Kaplowitz, 2000; Joint et al., 2001). Broadly speaking, the literature reveals the importance of using ICT in teaching and learning purposes (Ayers, et al., 2002).

There are reasons, today, necessitated the Iranian university professors to be equipped with new technologies, especially ICT applications in higher education (Villanueva, 1999; Meerts, 2003). Increased number of students in Iranian universities, greater demand for the use of the virtual materials within and outside of the university, an increase in the amount of educational activities being done by information and communication technology, changes in the nature of teaching and learning and becoming more and more web based (i.e. more use of CD-ROMs, electronic journals, on-line sources of materials, etc.), and the development of new and cheaper computers, are among the main reasons more attention is paid to ICT literacy of academics by Iranian authorities.

The roles and responsibilities of college and university faculty members are closely tied to the central functions of higher education. Broadly defined, faculty fulfills three primary functions at University: teaching, research, and service (Fairweather, 1996). The teaching role of faculty members reflects their centrality in addressing the primary educational mission among colleges and universities. Faculty members are expected to provide instruction and student advising as assigned by the departmental chairman. In brief the main aspects of teaching responsibilities of faculty members are classroom teaching, academic advisement, course development, academic program review and course duplication review, all of them can be categorized as curriculum development process. If ICT tools are to improve institutional effectiveness and efficiency, it is obvious that their application in support of teaching and learning should be seriously considered. However, investments in this area should always be carefully balanced against other ways in which teaching and learning may be improved and strengthened

Based on the research problem, the following research questions summarized:

1. What are possible domains of using ICT in curriculum decision-making in higher education?
2. What are the main barriers of ICT application in curriculum development of higher education?
3. Which kinds of essential supports are needed for application of ICT in curriculum development of higher education?
4. What are advantages and disadvantages of using ICT for curricular activities in higher education?

METHODOLOGY

The research has been conducted at the Shahid Beheshti University (SBU) (The National University of Iran), during the 2006-7 academic years. The SBU was established in 1959, started its academic life in 1960. It is located in Tehran, the capital city of Iran and also is one of the two best and largest universities of the country. As of 2008, the university offers 70 Masters and 30 PhD degrees. Since 1990, the university has placed more emphasis on postgraduate, in particular Ph.D., and research programs, while still aiming to enhance the quality of its well-established undergraduate courses. Students at the university are inspired by an outstanding and rewarding academic environment not only in Iran but also in the region.

The Research population consisted of the three major groups: University academics, curriculum planners and ICT's professionals. The population of university professors was 578 working at the 16 faculties and research centers. Because of large size of population as well as impossibility of conducting the survey with participation of all academic members of the university and also shortage of resources and time for the investigators, a sample selected using stratified sampling technique $n=231$. Because of small size of other sections of population (23 for curriculum planners and 18 for ICT's professionals) all of them have been requested to participate in the study.

The research employed a survey research method using a questionnaire designed through a documentary study on literature of ICT application in higher education. The first draft of a researcher-made questionnaire has been developed based on some outstanding works in literature (Villanueva, 1999; Mcknight, 1995; McNergney, 2000; Ayers et al., 2002; Baloh, 2003; Edwards et al., 2006; Trkman & Steinert et al., 2006; Fathi Vajargah and Azadmanesh, 2007; Ezziene, 2007; Fathi Vajargah, 2008) and designed in 4 sections with 40 items in Likert scale system. The first section with just one open ended question was about the possible applications of ICT in teaching and learning in higher education, second section with 15 items was about the barriers of ICT application in teaching and learning. In the third section 14 supporting factors were included 14 items in the instrument and finally in the last section, advantages and disadvantages of ICT application with 10 items were considered. Validity of the instrument reviewed by employing a specialist dominated focus group with participation of 10 experts and the questionnaire has been revised based on the session results. The questionnaire's reliability has been calculated through two methods: Alpha coefficient (0.90) and Split-half (0.91) and the results confirm the instrument reliability.

FINDINGS

For the first question on possible domains of using ICT in curriculum decision-making in higher education, the analysis of the answer to open ended question showed the following applications of ICT in Curriculum activities:

1. Using digital libraries and internet-based information for enrichment of curriculum content and process,
2. Sharing and exchanging leanings and experiences among university professors working inside and outside of the university,
3. Including students' interests and needs in curriculum decision-making through web based needs assessment,
4. Providing web-based presentation of curriculum before and during the semester,
5. Using email in teaching and learning activities,
6. Web-based diagnostic, formative and summative assessments,
7. Using supplementary soft wares for effective teaching and learning,
8. Designing a dynamic feedback system,
9. Producing digital unlimited leaning materials (e-books, handouts ...)

Concerning other three questions have been posed in the research, here are three tables, which are showing the means of each item for three mentioned groups (Tables 1, 2, and 3).

Table 1: The barriers of ICT Application in Teaching and Learning in Higher Education from the three mentioned groups' point of view

Barriers of ICT Application	Academics				Curriculum planners				ICT professionals			
	Mean	T Value	LS	Final Result	Mean	T value	LS	Final Result	Mean	T Value	LS	Final Result
1) Inadequate familiarity of professors with computers hardware and the supplementary equipments	2,56	12.632	0.00	+	2,74	6.554	0.00	+	2,22	1.07	0.297	-
2) The lack of orientation /training program on computer literacy or low rate of academic participation	2,59	13.433	0.00	+	2,64	4.437	0.00	+	2,33	1.844	0.083	-
3) The faculty members' increasing average of age and their reluctance to use computers in education	2,31	6.053	0.00	+	2,57	3.873	0.00	+	2,17	0.900	0.381	-
4) unfamiliarity of academics with	2,55	12.611	0.00	+	2,74	6.554	0.00	+	2,44	2.67	0.016	+

software which can be used in their teaching										5		
5) unfamiliarity of academics with world wide web environment and the way of using it	2,54	11.894	0.00	+	2,52	3.761	0.00	+	2,28	1.317	<u>0.205</u>	-
6) inadequate access of faculty members to personal computers (pc) in their homes or offices	2,52	11.132	0.00	+	2,52	4.219	0.00	+	2,50	3.431	0.003	+
7) inadequate access of academics to enough budget	2,59	12.874	0.00		<u>2,50</u>	<u>3.249</u>	0.00	+	2,39	2.715	0.015	+
8) This common beliefs of academic that new ICT's possibilities have no effect on improving of quality Of higher education	<u>2,31</u>	6.008	0.00	+	2,58	4.158	0.00	+	2,50	4.123	0.001	+
9) Missing of a proper working place and labs or equipped classes with PC's, video projectors and other equipments	2,56	11.683	0.00	+	2,77	8.450	0.00	+	2,67	5.831	0.000	+
10) The lack of budget in faculties to equip the classes and preparing equipments of hardware	2,77	21.116	0.00	+	2,77	8.450	0.00	+	2,78	6.018	0.000	+
11) The absence of moods, cooperative motivations and enough coordination in faculties staff for entering to new atmosphere	2,56	12.452	0.00	+	2,55	4.076	0.00	+	2,44	6.675	0.016	+
12) The absence of digitalized copy equipments like CD copiers in faculties	2,57	12.065	0.00	+	2,57	4.596	0.00	+	2,44	2.675	0.016	+
13) The budget weakness and the lack of financial possibility for students	2,61	13.483	0.00	+	2,59	4.695	0.00	+	2,44	2.675	0.016	+
14) The absence of students' access to personal computers (PC)	2,69	18.501	0.00	+	2,78	7.240	0.00	+	2,56	5.344	0.004	+
15) The students' illiteracy in computer knowledge	2,59	14.247	0.00	+	2,74	6.554	0.00	+	2,33	1.844	<u>0.083</u>	-

Table 2: The Supporting Factors in ICT Application in Teaching and Learning in Higher Education from the three mentioned groups' point of view

Supporting factors	Academics				Curriculum planners				ICT professionals			
	Mean	T value	LS	Result	Mean	T value	LS	Result	Mean	T value	LS	+
1) providing computer literacy training for university academics	2,71	17.90	0.00	+	2,76	6.478	0.00	+	2,47	2.704	0.016	+
2) The academics' familiarity with computer software that can help them in teaching and learning activities	2,74	20.146	0.00	+	2,81	7.249	0.00	+	2,56	3.576	0.003	+
3) The academic' familiarity with internet and the way of using it	2,74	19.683	0.00	+	2,89	12.369	0.00	+	2,38	2.423	0.029	+
4) The academics' access to personal computers in their homes or offices	2,76	21.792	0.00	+	2,62	4.240	0.00	+	2,65	3.801	0.002	+
5) Keeping academics informed on new and effective ICT's instruments and equipments	<u>2,63</u>	15.870	0.00	+	2,70	5.480	0.00	+	2,44	2.406	0.029	+
6) Improving academics beliefs and views on the potential positive impacts of ICT's features on improving the higher education	2,72	19.826	0.00	+	2,86	10.954	0.00	+	2,59	3.922	0.001	+
7) Availability of a well designed website or even an equipped class with PC's, video projectors and the other necessary equipments	2,71	19.337	0.00	+	2,60	5.339	0.00	+	2,65	5.416	0.000	+
8) The possibility of having enough budget in faculty to equip the classes and prepare necessary equipments	2,77	22.292	0.00	+	2,65	5.940	0.00	+	2,88	10.247	0.000	+
9) The presence of moods, cooperative motivations and enough coordination in faculties staff for entering to new atmosphere	2,72	19.273	0.00	+	2,89	12.369	0.00	+	2,50	3.162	0.006	+
10) supporting students on financial resources	2,66	16.353	0.00	+	2,81	7.249	0.00	+	2,50	2.739	0.015	+
11) Encouraging Students to attend and	<u>2,63</u>	16.322			2,71	5.839			2,50	2.739	0.015	

participate in workplaces and labs to use ICT features			0.00	+			0.00	+				+
12)Students' access to personal computers in their homes or dormitories	2,69	18.340	0.00	+	2,67	5.292	0.00	+	2,63	3.478	0.003	+
13. Improving students' abilities on computer literacy	2,71	18.901	0.00	+	2,86	8.216	0.00	+	2,56	3.093	0.007	+
14) Increasing students' interest in digital features like eBooks, Slides and electronic pamphlets	2,65	15.801	0.00	+	2,76	6.487	0.00	+	2,59	3.922	0.001	+

Table 3:The advantages/disadvantages of ICT's application in Teaching and Learning in Higher Education

Advantages/ Disadvantages	Academics				Curriculum planners				ICT professionals			
	Mean	T value	LS	Result	Mean	T value	LS	Result	Mean	T value	LS	Result
1)Viruses attacks to data and academic records	2,41	8.819	0.000	+	2,59	4.695	0.000	+	2,33	2.062	0.045	+
2)Sabotages, intended manipulations and information stealing	2,28	5.086	0.000	+	2,25	2.032	0.000	+	2,39	2.364	0.030	+
3)Computers' frauds in doing the examinations and exercises	2,42	8.406	0.000	+	2,48	3.627	0.000	+	2,44	2.688	0.002	+
4)The destructive effects of missing the culture of using ICT in education	2,43	9.507	0.000	+	2,45	4.183	0.000	+	2,06	0.293	0.773	-
5)The missing of technical substructures which are necessary for the education and evaluation based on ICT	2,64	16.699	0.000	+	2,75	7.550	0.000	+	2,76	7.211	0.000	+
6)The interruption of electricity and computers network in time of teaching, examinations or transmission of educational matters	2,36	7.350	0.000	+	2,55	4.819	0.000	+	2,22	1.458	0.163	-
7)Disappearing the all information of faculty, professors and the educational course at once	2,37	7.227	0.000	+	2,57	4.382	0.000	+	2,33	1.844	0.083	-
8)The missing of enough security in computer systems and weakness to control them	2,49	10.155	0.000	+	2,86	10.954	0.000	+	2,50	3.431	0.003	+
9)The absence of transmitting positive values and also teacher – student interaction	2,44	9.736	0.000	+	2,65	4.951	0.000	+	2,24	1.167	0.260	-
10)More attention to quantity and more speed in education instead of quality and training	2,34	6.533	0.000	+	2,67	4.641	0.000	+	2,31	1.775	0.096	-

The F ratio test was used for each of 39 items and therefore the consequences were: there were no significant differences between the views of three mentioned groups. Between 15 items of the first section (research question) of the research, just one item indicates the disagreement between three groups. Between 14 items in the second section, again just one item indicates the disagreement between three groups. And finally for the last section between 10 items of the risks of using ICT there was just one item that indicates the disagreement. Ranking Items for each section (The Priorities) Ranking and priority for the main subjects in questions can help university and the decision-makers to allocate sources on the basis of priorities to improve using ICT in curriculum development in H.E. The ranks of various items from the viewpoint of the three groups have both similarities and differences with each other. Since in this research we don't aim to prefer any view points for preventing any bias, so the investigators had to use Fridman test to specify the priorities of these groups. The most important and the least important priority for the first section/question (obstacles of using ICT), depends on the total viewpoints of three groups are as below: The most important item is:

"The lack of budget in faculties to equip the classes and the necessary possibilities of hardware".

And the least important one is:

"The professors' increasing average of age and their reluctance to use computers in education".

The first important priority for the second section/question (facilitators for using ICT) is:

"The possibility of having enough budget to equip the classes and the necessary possibilities of hardware".

And the less important one is:

"Professor's notice and follow of the new and effective ICT's instruments and equipments".

The most important item for the third section/question (the risks of using ICT) is:

"The missing of the technical substructures, which are necessary for the education and evaluation based on ICT".

And the least important one is:

"The destructive effects of missing the culture of using ICT in educational environments".

DISCUSSION

As it has been seen in research findings, it can be noted that there are several challenges pertaining to ICT application in Iran such as lack of National Policy for using ICT in Higher Education, lack of adequate investments, cultural obstacles, financial challenges, lack of continuity in ICT use, and lack of systematic training and development programs.

Regarding this challenges, it should be considered that the higher education system of Iran is centralized and, all general decisions are making at central level. Among different programs assigned to universities, ICT application is an important one. However, the scope and the rate of using ICT in higher education institutions are determinate by different bodies, which play major roles in this regard. There are many governmental entities, which are responsible for developing policies and strategies in ICT application. After Iran Revolution, High Council of Informatics established to systemize information technologies (IT) and ICT activities. Its primary role is to assess and to classify IT enterprises and supervise software development activities. Another entity is the National ICT Agency (NICTA), which is responsible for designing and managing the Application Plan of Information and Communication Technology (TAKFA), which is included ICT development plan for Iran (Sadeghnezhad, 2003). This situation reflects the limited authority of universities and MSRT in providing the financial and physical supports for ICT application.

However, findings related to unfamiliarity of academics with software, which can be used in their teaching, lack of culture of working in web environment, and faculty and student disability in using ICT in teaching and leaning refer to an important concept of "ICT competency" of faculty members in Iran. In the same way some important facilitating factors such as providing training programs, keeping academics informed on new developments in ICT, improving faculty members' belief on effectiveness of ICT and other factors imply on "ICT literacy" of academics in Iranian higher education community as a real and urgent need.

Regardless of the low rate of participation of faculty members in ICT workshops and training and development events, consequently most important prerequisites of ICT application in Iranian public universities are providing a basic set of ICT competencies that allow development of meaningful faculty members' development programs in order to integrate ICT into academics' teaching and learning to advance student learning and to improve other professional duties. As the data of the present research shows computer illiteracy of academics, especially experienced faculty members is one of the most important barriers and therefore, assessing ICT literacy of Iranian academics and planning the professional development for them will improve their performances on teaching and learning activities. In current situation, there is a training program called ICDL (International Computer Driving License) that is common for all university academics and non-faculty members. Regardless of their backgrounds on IT and assigned tasks in different universities, all staff is required to pass this common training program. Furthermore, according to MSRT, the total number of faculty members who participated in ICT workshops, which was conducted by MSRT from 2003 to 2007 was only 5399 (approximately 10% of the total of 43,134 faculty members working at the Iranian universities) (MSRHE, 2008). It seems there is a big discrepancy between current situations as official report says and ideal situation in which all academics equipped with required ICT competencies.

According to the new act of higher education about assigning curriculum development and change to major public university (2000), recently the universities have been given more authority on curriculum and training decision-making. Under such circumstances, with respect to importance of IT Literacy training in promoting internationalization of campus and doing different duties of university faculty members, assessing ICT literacy of academics and designing an specific program based on this assessment will be a real need for higher education community in Iran.

REFERENCES

- Ayers, C., et al. (2002). Integrating Instructional Technology: in the California Community Colleges. Available at: www.rpgroup.org/cssweb/
- Barnnet & Coate (2005). *Engaging Curriculum in Higher Education*. The Falmer Press I. S. Jacobs and C. P. Bean, "Fine particles, thin films and exchange anisotropy," in *Magnetism*, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, 271–350.

- Contini, J. & Kaplowitz, J. (2000). "Evaluating Computer-Aided Instruction: A Selected Bibliography"
Available at: <http://www.library.ucla.edu/libraries/biomed/people/caibib.html>.
- Cox, A. (1997). "Using the World Wide Web for library user education: A review article", *Journal of Librarianship and Information Science*, 29 (1), 39-43.
- Currier, S., Brown, S., & Ekmekioglu, F. C. (2001). Inspiral Project final report. Available at: <http://inspiral.cdli.strath.ac.uk/documents/documents.html>.
- Edwards, S. et al., (2006). The assignment that triggered change: Assessment and the relational learning model for generic capabilities. *Assessment & Evaluation in Higher Education*, 29 (2), 141-157.
- Ezziane, Z. (2007). Information Technology Literacy: Implications on Teaching and Learning. *Educational Technology & Society*, 10 (3), 175-191.
- Fairweather, R. (1996). *Literacy and popular culture in England 1750-1914*. Cambridge: Cambridge University Press, Cambridge
- Fathi Vajargah, K. (2008). Research Needs Assessment at Institutional Level: Focus on National university of Iran. Paper presented at the regional conference on Quality Insurance in Higher education, University of Malaya. 29&30 September, 2007. Kuala Lumpur.
- Fathi Vajargah, K. & Azadmanesh, N. (2007). The feasibility study of using computer in curriculum development in higher education. *Journal of research and planning in higher education*, 12 (3) 46-57.
- Kaplowitz, J. & Contini, J. (1998). "Computer-assisted instruction: is it an option for bibliographic instruction in large undergraduate survey classes?" *College & Research Libraries*, 59(1), 19-27.
- Kousha, K., Abdoli, M. (2004). Iran's National ICT Education Plan: an Overview of the Possibilities, Problems and the Programs, World Library and Information Congress. Paper presented at the 70th IFLA General Conference and Council, Buenos Aires, Argentina.
- McKnight, P. (1995). Managing Technological Change in Academies, Available at: www.educause.edu/ir/library/text.
- McNergney, R. F. (2000). *Why technology standards will not affect the use of technology in teacher education: Preparing teachers to meet the challenge of new standards with new technologies*. Washington, DC: Council of Chief State School Officers, 59-67.
- Meerts, J (2003). Why Information Technology Still Matters in Higher Education. *Harvard Business Review*, Nov.-Dec.
- Montazer, G. (2004). *Access to higher education in Iran: The ICT impacts*. Tehran: MSRHE.
- MSRT (2008). *IRPIHE annual performance report*. Tehran: IRPIHE publications.
- Rader, H. B. (2000). Library instruction and information literacy. *Reference Services Review*, 28 (4), 378-400.
- Stark, G. & Lattuca, M. (1997). *Shaping the College Curriculum*. Simon & Schuster.
- Steinert, Y., Mann, K., Centeno, A., Dolmans, D., Spencer, J., Gelula, M., & Prideaux, D. (2006). A systematic review of faculty development initiatives designed to improve teaching effectiveness in medical education. *BEME Guide*, No. 8. in *Medical Teacher*, 2006, 28 (6), 497-526.
- Villanueva C. (1999). Technology in Education: Meeting Future Challenges, UNESCO – ACEID. Paper presented at the International Conference on Education, Bangkok, Thailand
- Tapscott, D. (1998). *Growing up digital: the rise of the Net generation*. New York: McGraw Hill, p. 142.
- Tavakol, M. (2007). Higher Education for Development: Special Reference to the Case of Iran. Paper presented at the Regional Seminar on "Competition, Cooperation and Change in the Academic Profession: Shaping Higher Education's Contribution to Knowledge and Research", 18-19 September 2007, Hangzhou, China.
- Trkman, P. & Baloh, P. (2003). Use of a model for information technology education. *Journal of Information Technology Education*, 2(1), 379-392.

ASSISTIVE TECHNOLOGIES FOR STUDENTS WITH DISABILITIES: A SURVEY OF ACCESS AND USE IN TURKISH UNIVERSITIES

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ABSTRACT

This study examined the assistive technology needs of university students with disabilities and the availability of these technologies. It also explored the attitudes of the students with disabilities toward computers and the extent to which these are used by students with disabilities. Data was collected through a questionnaire, from 22 university students enrolled in one private and four public universities located in Ankara, Turkiye. The results of the study indicated that students with disabilities utilized assistive technology for different purposes, such as writing and conducting research, when the resources and support were available. Additionally, relationships between student knowledge, skills, attitudes, social norms, and beliefs were explored.

Keywords: Assistive Technologies, Special Education Technology, College Students, Students with Disabilities

There is a general lack of awareness in Turkey, concerning the needs and capabilities of individuals with disabilities. Some people are unconcerned and justify this lack of awareness by claiming that individuals living with a disability are rare and do not warrant much attention. Others may be concerned but feel incapable of assisting those individuals with disabilities, overwhelmed by the sheer size of the task. Due to this absence of people with disabilities who are active in everyday life in Turkey, the general public is desensitized to the issues surrounding disabilities. The recent 2000 population census in Turkey, was the first to mention disability. However, this census asked no details about individual disabilities. Therefore, the 2000 census did not significantly contribute to the bank of data on this issue. The joint lack of awareness is also experienced by the families of children with disabilities, leaving most without suitable knowledge and skills to carry out basic daily tasks or have social interaction with others. Thus, few children with special needs have been encouraged to participate in the society and strive for independence.

When considering the high percentage of individuals with disabilities in Turkey (12%), educational attainment for these individuals is extremely low (State Institute of Statistics [SIS], 2002). The percentage of primary school graduation is as low as 40%. The percentage decreases drastically as the grade level increases. Unfortunately, less than 3% of individuals with disabilities earn a high school diploma (SIS, 2002). This trend continues in higher education. According to data from the Student Selection and Placement Center (2003, 2008), of all students who take the university entrance exam, only 0.08% are disabled.

Special Education in Turkey

The history of special education in Turkey dates back to 1951, when the Ministry of National Education took responsibility for providing education for those children in need of special education (Organization for Economic Co-Operation and Development [OECD], 1995). In 1982, the Turkish Constitution outlawed any kind of discrimination, advocating equal rights for all citizens and clarifying that those individuals with disabilities should share the same statutory entitlement and curriculum (Sari, 2000). As a result, the Ministry of National Education provides free primary education and also supplements and aids private and corporate initiatives to meet the needs of all children. According to The Turkish State Planning Committee report ([SPO], 1992), the country's goal is to reach the status of developed countries, by building on ideas from other countries and generating a model suited for Turkey. However, new laws and directives from lawmakers mean little unless accompanied by implementation in the classrooms and homes of those living with disabilities. As an example of this disconnect between policy and practice, the last 40 years have seen a limited amount of specialized equipment being provided to special schools (SPO, 1992).

Unlike primary and secondary education, majority of students with disabilities did not receive official support from federal government for higher education until 2005 (Prime Minister Administration for Disabled People, 2005; Article 15). A new approved legislation requires that each university maintain a support unit for students

with special needs (Prime Minister Administration for Disabled People, 2005; Article 8). However, only a few universities have established such a unit to help those students with disabilities. Accordingly, some universities have established a system to support students in their academic endeavors. Although such initiatives assist students as they overcome many technical difficulties, it may also create an added social barrier; as these students would have limited opportunities to interact with students who do not have a disability (e.g., isolation). Furthermore a greater or lesser degree of dependence on the helper can develop (Mittler, 2000; Westwood, 1997).

Assistive Technologies

As part of these initiatives, assistive technologies have become important. Assistive technologies are defined as the technologies or applications (hardware or software) that are specifically developed to assist individuals with disabilities in overcoming barriers (Forgrave, 2002; Rose, 2001). Assistive technologies can help people with disabilities maximize potential and the ability to achieve individualized educational objectives (Ashton, 2002). In educational settings, these technologies help students to access and share information (Hofstetter, 2001; Seegers, 2001), complete school work independently (Seegers, 2001), provide an environment for socialization (Neumann & Uhlenkueken, 2001), and help students with disabilities become prepared for future work (Hofstetter, 2001). Unfortunately, most assistive technologies and internet resources are not accessible to individuals with disabilities, many who want to use these technologies (Ozel, Inan, & Sezer, 2004). Rose (2003) proposed that “We need to use the new technologies not only to overcome existing barriers to learning, but to design an environment for learning that have fewer barriers right from the start” (p. 65).

METHOD

The Purpose of the Study

The purpose of the current study was to investigate technological needs for university students with disabilities and examine how such assistive technology could help these students obtain equal opportunities in their pursuit of higher education. In addition, student attitudes toward computer technology were be assessed. The focus of the study centered around the following areas:

- The type and extent of technologies that are currently being used by students with disabilities
- The barriers that impair students with disabilities in utilizing this technology
- Available technologies and facilities for students with disabilities
- Perception and disposition of students with disabilities toward computer technology

Participants

The participants of this study were students pursuing higher education degrees (i.e., undergraduate, graduate) in Ankara, Turkey. A total of twenty-two students with disabilities from private and public universities in Ankara, Turkey, participated. The majority of students were female (N=17) and were pursuing undergraduate degrees (N=19). The ages of participants ranged from 18 years to 28 years. Most of the students (N=16) were members of several communities and associations that provide services for people with disabilities. The majority of participants were visually impaired.

Table 1 Participant by Demographic Characteristics

	N	%
Gender		
Female	17	77.3
Male	5	22.7
Age		
15-19	4	18.18
20-24	15	68.18
25-29	3	13.64
Education Level		
Undergraduate	19	86.4
Graduate	3	13.6
Types of Disabilities		
Vision	11	50.0
Hearing	4	18.0

Orthopedic/ Mobility	4	18.0
Others	2	9.0
Professional Memberships		
Yes	16	72.7
No	6	27.3

Data Collection and Instrument

An adapted version of the Technology for Students with Disabilities Survey ([TSDS], Ozel, Inan, & Sezer, 2004) was used for data collection. The TSDS consists of five main parts: (1) demographic characteristics, (2) technology status, (3) student perception and disposition toward computer technology (e.g. knowledge/skills, beliefs, attitudes, social norms, access), and (4) suggestions and recommendations. The first section of the TSDS consisted of 10 demographic questions (e.g., gender, age, and department). The second part included a total of 23 questions designed to gather information about student technology use and experiences. The third section was made up of 28 Likert-type items regarding student knowledge and abilities, belief, attitude, social norms, and availability and support for computer technology. The final section collected, participants' suggestions and recommendations for technology use in education.

Volunteer participants for this study, all students with disabilities, were recruited through email and telephone calls. The questionnaire was directly administrated to each of the participants by one of the researchers. The data obtained from this questionnaire was analyzed using various statistical techniques which included correlation, frequencies, percentages, means and standard deviations.

FINDINGS

University Facilities for Students with Disabilities

As demonstrated in Table 2, limited school facilities for disabled students are accompanied by a severe lack of necessary faculty orientation or training in regard to teaching students with disabilities. Additional facilities, when available, were ill-equipped to address student instructional needs. More critically, the schools had failed to provide equal opportunities to those students with special needs while taking course exams. Even so, it is promising that almost one-half of the students surveyed had the opportunity to use a computer reserved for special needs students.

Table 2 Availability of facilities for students with disabilities (N= 21)

Facilities and Activities	N	Availability (%)
Financial support available for students with disabilities	11	52.4
Computers reserved for students with disabilities	10	47.6
A special unit for students with disabilities	9	42.9
A professional adviser for students with disabilities	8	38.1
Exam locations, time and conditions are suited to your needs.	7	33.3
Equipment is available for loan to students with disabilities	7	33.3
The university or department provides suitable equipment during exams	5	23.8
Measures have been taken to facilitate access for individuals with disabilities	5	23.8
The university has prepared an orientation program for students with disabilities.	3	14.3
Faculties are informed about the educational needs of individuals with disabilities	3	14.3
Counseling and advice services are offered to students with disabilities	4	19.0

Access and Use of Technology

All of the students indicated they had access to a computer either at home, school, or both. Additionally, the majority of students (N=13) preferred to use computers at Internet Cafés, which had internet access and special software installed. The frequency and percentage of students who had access to various technologies are

presented in Table 3.

Table 3 Availability and types of technologies for students with disabilities

Technologies	Only School		Only Home		Both	
	N	%	N	%	N	%
Computer	10	47.6	2	9.5	9	42.9
Internet	10	47.6	2	9.5	6	28.6
Special software	4	19.0	1	4.8	2	9.5
Reading aid	3	14.3	1	4.8	0	0.0
Speaking watch	2	9.5	6	28.6	0	0.0
Wheel chair	1	4.8	2	9.5	1	4.8
Hearing aid	1	4.8	1	4.8	4	19.0
Tape player, DVD player	1	4.8	12	57.1	6	28.6

The majority of students indicated that they used computers frequently and benefited from the use of the internet for communication (e.g., email). Approximately one-half of the students attended a special course to learn how to utilize assistive technologies in both their daily and educational life (see Table 4). In regard to the frequency of computer use, about one-half of the students used the computer more than ten hours per week. However, internet use was relatively low compared to the total amount of computer use reported by the students. This finding may be a result from either the high cost of internet access or the lack of special software for web browsers (e.g., screen reader).

Table 4 Frequency of Computer and Internet Use

	Computer		Internet	
	N	%	N	%
Never	0	0	2	9.5
0-3 hours	5	22.7	4	19.0
3-6 hours	6	27.3	7	33.3
6-10 hours	2	9.1	2	9.5
10 hours or more	9	40.9	6	28.6

Students used computers for various purposes. Writing and research were the most frequently identified purposes for computer use. Other frequently reported purposes were internet surfing, email, and instant messaging. Table 5 shows the percentage of activities, for which university students with special needs used computers.

Table 5 Purposes of Computer Use

Activities	N	%
Writing	19	86
Doing research	19	86
Surfing on the Internet	17	77
Reading and writing e-mail	13	59
Instant Messaging	13	59
Listening to music	11	50
Access to electronic journals and books	10	45
Watching Films	8	36
Playing games	6	27
Designing product/work	4	18
Programming	2	9
Others	2	9

Student Perception and Disposition toward Technology

Students' beliefs and attitudes toward computer technology were high. Unfortunately, students scored low on knowledge of computer resources and support available to them. To find out whether any correlation existed among these variables, pearson correlation coefficients were computed. The relationship between students' knowledge/skills and attitudes ($r(20) = .533, p = .016$) and social norms and beliefs ($r(38) = .511, p = .021$) were found to be positive and statistically significant. The correlation coefficients, means, and standard deviations of students' perception in five different scales are presented in Table 6.

Table 6 Correlations, Means, and Standard Deviation

Variables	1.	2.	3	4	5
1. Knowledge/Skills	1				
2. Beliefs	-.005				
3. Attitudes	.533*	.180			
4. Resources/Support	.198	-.008	-.019		
5. Social Norms	.202	.511*	.332	.298	1
Mean	3.78	4.23	4.04	3.44	4.29
SD	.59	.44	.58	.48	.56

DISCUSSION

The current study indicated that students with disabilities utilized technology for different purposes, such as writing and conducting research, when the resources and support were available. This finding is supported by Fichten et al (2001) and Goodman, Tieene and Luft (2002) which found that disabled university students frequently used computers and the Internet in their daily lives and for educational purposes. Students in these studies reported similar beliefs in the ability of computers to help with writing, overcoming barriers caused by specific impairments, organizing and promoting personal growth and independence. Nevertheless, students need access and adaptations (e.g., screen magnification, dictation software, Braille, screen readers) to use the computers effectively (Fichten et al., 2001). For this reason, universities should provide the necessary environment and software/hardware to enhance student access and effective computer use.

An interesting finding was the relationship among social norms and student beliefs. This relationship indicated that when students with disabilities received support and encouragement from their peers, or witnessed the utilization of technology by others, their beliefs about what they could do with technology increased. Informing students with disabilities about computer technologies and/or allowing them to observe computer use by their peers might lead to an increase in their belief in their own ability to utilize technology. Goodman, et al. (2002) found the presence or lack of environmental support was an important factor in influencing a student's decision to adopt or reject a technology. Furthermore, Michaels, Prezant and Jackson (2002) emphasized that knowledge and awareness of assistive technologies among students with disabilities is a vital component in facilitating assistive technology use. The other relationship between student knowledge/skills and their attitudes suggested that when students have higher computer knowledge and skill, their attitude toward computer use increases. Therefore, training opportunities for students with disabilities on how to use computer technology would increase the students' attitudes. It might be ventured that when student belief and attitude increases, the likelihood of technology use increases.

CONCLUSION

The purpose of this study was to examine the needs and availability of assistive technologies for university students with disabilities. The study also explored student attitudes toward computers and the extent to which computers are utilized by students with disabilities. The findings indicated that, in academic settings, facilities for students with disabilities are limited. Although Turkey recognizes the rights of children with disabilities to receive a suitable (comparatively equal) education, the right to special education has not been upheld in practice as required by law (Sari, 2000). Unfortunately, most higher education institutions are not familiar with available technologies, nor the many ways these technologies can be applied (Ozel et al., 2004). So that accessible education is available to students with disabilities, several factors should be addressed, including: Trained staff to provide services for disabled students, knowledge and awareness of assistive technologies among students with disabilities, and support in the form of availability of these technologies from university administration (Michaels et al. , 2002). Unfortunately, the lack of knowledge and skills which are required to ensure the accessibility of electronic course materials for students with disabilities is a common issue amongst university

professors (Fichten et al., 2001). Therefore, in addition to accessibility, university faculty should be trained to meet the academic needs of students with disabilities (Senel, 1998).

REFERENCES

- Ashton, T. M. (2002). The assistive technology assessment: An instrument for team use. *Journal of Special Education Technology*, 17(1), 39-46.
- Fichten, C.S., Asuncion, J.V., Barile, M., Génereux, C., Fossey, M., Judd, D., Robillard, C., De Simone, C. & Wells, D. (2001). Technology integration for students with disabilities: Empirically based recommendations for faculty. *Educational Research and Evaluation*, 7(2), 185-221.
- Forgrave, K. E. (2002). Assistive technology: Empowering students with disabilities. *The Clearing House*, 75(3), 122-126.
- Goodman, G., Tiene, E. & Luft, P. (2002). Adoption of assistive technology for computer access among college students with disabilities. *Disability and Rehabilitation*, 24, 80-92.
- Hofstetter, F. T. (2001). The future's future: Implications of emerging technology for special education program planning. *Journal of Special Education Technology*, 16(4), 7-13.
- Michaels, C.A., Prezant, F.P., & Jackson, K. (2002). Assistive instructional technology for college students with disabilities: A national snapshot of postsecondary service providers. *Journal of Special Education Technology*, 17(1), 5-14.
- Mittler, P. J. (2000). *Working towards inclusive education: Social contexts*. London: D. Fulton Publishers.
- Neumann, P., & Uhlenkueken, C. (2001). Assistive technology and the barrier-free city: A case study from Germany. *Urban Studies*, 38(2), 367-376.
- Organization for Economic Co-Operation and Development. (1995). *Integrating students with special needs into mainstream schools*. Washington, DC: OECD Publications and Information Centre.
- Ozel, C. T., Inan, F. A., & Sezer, C. (2004). *What are the technological needs of disabled university students in Turkey?* Paper presented at the Annual Convention of the Association for Educational Communications and Technology.
- Prime Minister Administration for Disabled People (2005). *Turkish Disability Act*. Retrieved March 15, 2007, from <http://www.ozida.gov.tr/english/index.htm>
- Rose, D. (2001). Universal design for learning. *Journal of Special Education Technology*, 16(4), 64-67.
- Sari, H. (2000). *Development of special education provision in Turkey: From the inclusive perspective*. Paper presented at the International Special Education Congress Manchester, UK.
- Seegers, M. (2001). Special technological possibilities for students with special needs. *Learning & Leading with Technology*, 29(3), 32-39.
- Senel, H. G. (1998). Special education in Turkey. *European Journal of Special Needs Education*, 13(3), 254-261.
- State Institute of Statistics. (2002). *Turkey disability survey*. Ankara, Turkey: Author.
- State Planning Organization. (1992). *Engelliler için eğitim modelleri geliştirme projesi*. Ankara, Turkey: Author.
- Student Selection and Placement Center. (2003). *Selection and placement of students in higher education Institutions: 2008 Student Selection Examination*. Retrieved September 15, 2007, from <http://www.osym.gov.tr/BelgeGoster.aspx?DIL=1>
- Student Selection and Placement Center. (2008). *Selection and placement of students in higher education Institutions: 2008 Student Selection Examination*. Retrieved March 5, 2009, from <http://www.osym.gov.tr>
- Westwood, P. (1997). *Commonsense methods for children with special needs: Strategies for the regular classroom*. New York: Routledge.

ATTITUDES OF PRE-SERVICE TEACHERS FROM THE DEPARTMENT OF ELEMENTARY EDUCATION TOWARDS THE EFFECTS OF MATERIALS USE ON LEARNING

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ABSTRACT

In line with the fast advance seen in technology, the use of technological resources in education has come to play an important role in terms of drawing students' attention to the subjects studied in the classroom so that success increases and the knowledge is better internalized.

This study was carried out to determine the attitudes of the pre-service teachers from the department of elementary education towards the effects of use of teaching materials; overhead projector and projector; on learning. The study was carried out with 184 senior pre-service teachers, 32 of whom are from the department of science teaching, 70 are from the department of classroom teaching, 46 are from the department of pre-school teaching and 36 are from the department of social studies teaching. The data obtained from the questionnaire used in the study were analyzed through SPSS program package. Independent t-test was used to test whether there is a significant correlation between the pre-service teachers' responses and gender and their background. In addition, One-Way ANOVA was used to test whether there is a significant correlation between student teacher' responses and their departments and some differences are detected with regards to the effects of using overhead projector and projector on learning.

According to the findings of the study, the students are found to believe that the use of overhead projector and projector brings some kind of change and variety to the teaching, saves teaching from being monotonous, and contribute to establishing lively, colorful and smooth setting for teaching and learning.

Key Words: Teaching Technologies, Use of Material, Overhead Projector and Projector, Student Attitudes, T-Test, One-Way ANOVA

INTRODUCTION

We are living in an era where rapid changes are experienced in information exchange and technology at a global scale, information is multiplied, a novel technology appears in every passing day, and there is a challenging environment of competition among countries (MEB, 2000). The most important issue of this century is education and technological advancements. Rapidly developing information and educational technologies¹ have affected education in general and become the indispensable part of any educational endeavors. The use of radio, TV, video and overhead projector for educational purposes date back to third quarter of 20th century and in today's world, the most important advancement affecting the development and quality of education institutions is the computer, internet, and associated technologies. (Middlehurst, 1999; 307; cited in : İspir et al., 2007). Rıza (1999) emphasizes that educational technologies make great contributions to the creativity together with special objectives, text books, methods, tools and equipment, and evaluation and assessment. As a result of technological developments in today's world, new possibilities have been integrated into educational practices and thus the methods and settings have been enhanced (Koşar and Çiğdem, 2003). Existing research indicates that when used appropriately, technology can enhance the learning environment and students' motivation and also may improve their retention, problem solving and critical thinking skills (Yıldırım, 2000).

For students to better understand what they are taught, it is of great importance to use more educational tools in the classroom setting. In today's classroom setting, visual and audio materials are viewed to be very important. For visual and audio materials to be used effectively, there is a need to know the properties of these materials. These properties may seem to be very simple but have a great impact on the quality of the lesson (Küçükahmet, 1999). Some studies reported that the appropriate and conscious use of these materials such as overhead projector and projector may have very positive impacts on learning (Ayvaci et al., 2007). In this respect, creating teaching settings where various visual and audio teaching materials addressing as many senses as possible is of great importance for long-lasting learning to occur (Dursun, 2006; cited in: Fidan, 2008). In this way, the

¹ Educational technology is a complex and an integrated process dealing with people, procedures, methods, opinions, tools and organizations to analyze learning-related problems, find solutions, manage the solution, implement the solution and evaluate the outcomes.

students can achieve the determined objectives more easily with the help of effective learning teaching environment.

Research concerning the application of different dimensions of educational technologies for teaching has revealed that such applications have multi-dimensional positive impacts on students' achievement. In this respect, various teaching materials (game, anthology, sample situation, experiment, model) (Aktamış et. al., 2002), teaching through modeling (Şahin et. al., 2001), and computer-assisted materials (Akdeniz & Yigit, 2001; Kibos, 2002; Yumuşak & Aycan, 2002) were found to enhance students' achievement.

Teaching tools can provide real experiences that can not be easily provided by other methods. Thus, these tools can enhance the quality of learning and internalization and can bring variety (Özkütük & Orgun, 2001). Students' having positive or negative attitudes towards educational tools and devices is an important variable affecting the use of technology in class. Hence, it is important to determine students' attitudes towards technological materials because this will help to develop better educational policies and strategies for the use of such materials. Therefore, there is a need for studies aiming to determine students' attitudes towards technological materials. In recent years, more importance has been attached to this issue and various studies have been carried out.

Akpınar et. al., (2005) investigated the students' attitudes towards the use of technology in science course in elementary education and the extent to which the teachers use technological materials in science courses. The results they obtained revealed significant differences between state and private schools and that there are significant differences depending on the school type among the students' attitudes towards the extent to which technology is used.

Frantom et. al., (2002) investigated the children's attitudes towards technology and they obtained two-factor scale including interest, talent and alternative properties. In these two sub-scales, when the scores of elementary and secondary school students were compared, significant difference was found. Moreover, they reported that attitude varies depending on gender.

Dalton & Hannafin (1986) investigated the effects of video, computer-assisted teaching, and interactive video applications on learning performance and attitude and they found that the computer-assisted teaching is the most effective teaching system and there is no need for additional interactive videos. Moreover, when interactive video teaching was compared with computer-assisted teaching and video, it was found that it significantly affects the attitudes of students with low level of competency (cited in: Yavuz and Coşkun, 2008).

Gunter, Gunter & Wiens (1998) investigated the effects of working with computer in the technology education course of a university in Florida on pre-service teachers' attitudes towards learning. They reported that after they completed their course studies, the students had more positive attitudes towards technology and felt more confident about the use of technology.

Yılmaz (2005) evaluated the effects of technology use on students' achievement and attitudes in a thesis work, and found that technological materials have positive impacts on achievement and attitudes.

A similar study was carried out by Sevindik (2006), who investigated the effects of the use of smart classes on students' academic achievement and attitudes at higher education.

Asan (2002) investigated the attitudes of the pre-service teachers having science and social studies teacher training towards the computer. The findings of the study in general revealed that the students have positive attitudes towards the computer and they felt comfortable while using computer. While the attitudes of the students from the department of science teaching who did not have computer education have more positive attitudes than the students from the department of social studies teaching towards the computer, no significant department-based difference was found between the students having computer courses. No significant impact of gender on attitudes was observed. The results revealed that computer-related experiences have positive impacts on attitude scores.

It is believed that determination of students' attitudes who are in the center of learning and teaching process towards teaching technologies² and putting emphasis on the importance of this issue will have contributions to education in general. Using different technological possibilities besides classical ways of teaching in teaching

² Teaching technology is a unity of academic systems to enhance the effective design of teaching and learning process, to solve the problems encountered in teaching and learning process and improve the quality and retention of the information presented (İşman, 2002).

process will have consolidating impacts. With the use of teaching technologies, students are believed to be more attentive to their lessons and willing to actively participate in them. According to many researchers, teaching technologies used effectively have a potential to improve education system (Jonassen & Reeves, 1996; Means, 1994). The present study aims to determine the attitudes of pre-service teachers from the department of elementary education towards the effects of two educational materials, overhead projector and projector, on learning. Answers to the following sub-research questions are sought by the present study:

- Is there a significant difference between the attitudes of male and female pre-service teachers towards the effects of using overhead projector and projector on learning?
- Is there a department-based significant difference among the attitudes of the pre-service teachers towards the effects of using overhead projector and projector on learning?
- Is there a significant difference among the attitudes of the pre-service teachers towards the effects of use of overhead projector and projector on learning depending the environment they were brought up?

METHOD

In the present study, survey method was employed. Survey method is a method used to describe and explain what events, objects, institutions, groups and various fields are.

Sample

The study was carried out among 184 last year pre-service teachers from the departments of science teaching, classroom teacher education, pre-school teacher education, and social studies teaching of the education faculty of Muğla University in 2004-2005 spring term.

Data Collection

As a data collection instrument, 5-point Likert Type scale aiming to solicit the pre-service teachers' attitudes towards the effects of using overhead projector and projector on learning and a personal information form developed by the researcher to solicit the demographic features of the participants were used. The reliability of the scale was calculated with Cronbach Alpha coefficient formula in SPSS 10.0 program package and was found to be .93. This proves that the scale is reliable and administrable. For the validity of the scale, expert opinions were sought to confirm that the items in the scale measure the target attitudes. The scale consists of 16 items to solicit the students' attitudes towards the effects of using overhead projector and projector on learning. There are five points in this scale representing "Strongly agree", "Agree", "Undecided", "Disagree", and "Strongly Disagree" options. As all the items in the scale are positive, scoring is performed from 5 to 1.

Data Analysis

The data obtained were analyzed through SPSS 10.0 program package. Independent t-test was used to test whether the attitudes significantly vary depending on gender and their background. In addition, One-Way ANOVA was used to test whether there is a significant difference among pre-service teachers' attitudes depending on the department variable.

FINDINGS AND DISCUSSIONS

Findings are presented according to above-given order of the research questions.

Findings Concerning the First Sub-question

The first sub-question of the study is "Is there a significant difference between the attitudes of male and female pre-service teachers towards the effects of using overhead projector and projector on learning?" To present the answer to this question, first, frequencies and percentages of the distribution of the students according to their gender and their attitudes towards the effects of using overhead projector and projector on learning according to gender are given.

Table 1: Distribution of the Pre-service Teachers According to Gender

Gender	Frequency	Percentage
Female	107	58.2
Male	77	41.8
Total	184	100.0

58.2% of the participants are female and 41.8% are male thus majority of the sampling consists of females.

Table 2: Distribution of Pre-service Teachers' Responses to the Scale Items According to Gender

Item	Strongly Agree				Agree				Undecided				Disagree				Strongly Disagree			
	Female		Male		Female		Male		Female		Male		Female		Male		Female		Male	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
1	58	54.2	41	53.2	45	42.1	31	40.3	2	1.9	3	3.9	1	.9	2	2.6	1	.9	-	-
2	48	44.9	34	44.2	52	48.6	33	42.9	5	4.7	6	7.8	2	1.9	4	5.2	-	-	-	-
3	42	39.3	35	45.5	56	52.3	31	40.3	8	7.5	6	7.8	1	.9	5	6.5	-	-	-	-
4	36	33.6	21	27.3	56	52.3	44	57.1	10	9.3	9	11.7	4	3.7	3	3.9	1	.9	-	-
5	35	32.7	28	36.4	59	55.1	37	48.1	10	9.3	9	11.7	3	2.8	3	3.9	-	-	-	-
6	30	28.0	23	29.9	54	50.5	34	44.2	18	16.8	15	19.5	5	4.7	5	6.5	-	-	-	-
7	52	48.6	34	44.2	51	47.7	35	45.5	1	.9	4	5.2	2	1.9	3	3.9	1	.9	1	1.3
8	33	30.8	27	35.1	54	50.5	39	50.6	14	13.1	9	11.7	6	5.6	2	2.6	-	-	-	-
9	30	28.0	22	28.6	51	47.7	40	51.9	18	16.8	6	7.8	8	7.5	9	11.7	-	-	-	-
10	48	44.9	29	37.7	36	33.6	22	28.6	6	5.6	10	13.0	9	8.4	10	13.0	8	7.5	6	7.8
11	34	31.8	23	29.9	56	52.3	41	53.2	5	4.7	5	6.5	-	-	2	2.6	-	-	-	-
12	39	36.4	29	37.7	63	58.9	41	53.2	5	4.7	5	6.5	-	-	2	2.6	-	-	-	-
13	43	40.2	33	42.9	59	55.1	34	44.2	2	1.9	6	7.8	2	1.9	4	5.2	1	.9	-	-
14	44	41.1	35	45.5	56	52.3	33	42.9	6	5.6	5	6.5	1	.9	4	5.2	-	-	-	-
15	34	31.8	24	31.2	58	54.2	34	44.2	10	9.3	9	11.7	3	2.8	9	11.7	2	1.9	1	1.3
16	39	36.4	29	37.7	49	45.8	36	46.8	13	12.1	7	9.1	5	4.7	5	6.5	1	.9	-	-

Statements given in Table 2 with numbers are presented below:

1. Using overhead projector and projector in class draws my attention.
2. Lessons taught with overhead projector and projector arouse my interest and curiosity.
3. In lessons presented with overhead projector and projector, I can better understand difficult and abstract topics and concepts and visualize them in my mind.
4. In lessons presented with overhead projector and projector, learning takes place in a shorter time span.
5. Using overhead projector and projector in lessons makes it easier to encode the information in my mind.
6. When overhead projector and projector are used in lessons, light, color, movement and sound features help me to constantly focus my attention on the information presented.
7. Using overhead projector and projectors in lessons makes teaching more lively and clear by bringing variety and change.
8. Using overhead projector and projector in lessons enables me to physically and cognitively participate in learning process.
9. Using overhead projector and projector in lessons allows me to be exposed to enriched information.
10. I prefer lessons to be taught with overhead projector and projector to lessons taught with traditional chalk and black board.
11. Using overhead projector and projector in lessons helps me to retain the information longer.
12. Using overhead projector and projector in lessons makes learning more effective and efficient.
13. Using overhead projector and projector in lessons allows me to observe the objects, phenomenon and events which are impossible to bring to classroom environment.
14. Using overhead projector and projector in lessons eliminates the monotony in class and provides colorful, lively and interesting learning-teaching environment.
15. Using overhead projector and projector in lessons makes me willing to learn.

16. Using overhead projector and projector in lessons helps me to feel motivated and maintain this motivation throughout the lesson.

When Table 2 is examined, it is seen that both the male students and female students believe that using overhead projector and projector in lessons has positive impacts on learning processes. The most positive attitude is revealed by the students towards item 12 (58.9%) (*Using overhead projector and projector in lessons makes learning more effective and efficient*). This is followed by items 4 (*In lessons presented with overhead projector and projector, learning takes place in a shorter time span*), 5 (*Using overhead projector and projector in lessons makes it easier to encode the information in my mind*) and 13 (*Using overhead projector and projector in lessons allows me to observe the objects, phenomenon and events which are impossible to bring to classroom environment*).

The use of technological devices such as computer, overhead projector, projector, television, DVD, VCD, microscope, and tape recorder which are popular to use in the classroom for educational purposes have been found to have many positive effects on teaching and learning process. In the present study, technological materials were found to make lessons more effective and efficient, and more interesting, help students to encode the information more easily in their minds and allow students to observe the objects, phenomenon and events which are impossible to bring to classroom environment. In addition, these technological devices should be used properly and appropriately, they are important to support visual learning and save time. These findings of the study concur with the findings reported in the literature (Gunter, Gunter & Wiens, 1998; Yılmaz, 2005; Sevindik, 2006; Pala, 2006).

T-test was used to determine whether there are significant differences between the attitudes of female students and those of the male students towards the effects of using overhead projector and projector on learning and findings are presented in Table 3.

Table 3: T-Test Results Concerning the Distribution of Scale Scores According to Gender

Gender	f	\bar{X}	S	df	t	p
Female	107	67.26	8.11	182	.70	.49
Male	77	66.31	10.29			

The results presented in Table 3 show that there is no significant difference between the attitude scores of the female students and those of the male students [$t_{(182)} = .70, p > .05$]. Yet, the attitudes of female students ($\bar{X} = 67.26$) were found to be more positive than those of the male students ($\bar{X} = 66.31$). Moreover, attitude scores obtained for each scale item were also analyzed to determine whether they individually exhibit significant differences according to gender and no significant difference was observed. These findings comply with the findings of (İspir et. al., (2007) and Yavuz and Coşkun (2008).

Findings Concerning the Second Sub-question

The second question of the study is “Is there a department-based significant difference among the attitudes of the pre-service teachers towards the effects of using overhead projector and projector on learning?” First, the distribution of the students according to subject area is presented in Table 4 and then one-way ANOVA was used to test whether there are significant differences among the students’ attitudes towards the effects of using overhead projector and projector on learning according to the department they attend and the findings are presented in Table 5 and Table 6.

Table 4: Distribution of the Pre-service Teachers According to Department

Department	Frequency	Percentage
Science teacher education	32	17.4
Classroom teacher education	70	38.0
Pre-school teacher education	46	25.0
Social sciences teacher education	36	19.6
Total	184	100.0

The data presented in Table 5 show that 17.4% of the students are from the department of science teaching, 38.0% of them from the department of classroom teacher education, 25.0% are from the department of pre-school teacher education and 19.6% are from the department of social studies teaching.

Table 5: Arithmetic Means and Standard Deviations of the Students According to Department

Department	N	\bar{X}	S
Science teacher education	32	4.43	.51
Classroom teacher education	70	4.11	.49
Pre-school teacher education	46	4.26	.54
Social sciences teacher education	36	3.98	.70
Total	184	4.18	.57

Table 6: ANOVA Results Concerning the Distribution of Attitude Scores According to Department

Source of the variance	Total Square	df	Mean squares	F	p
Inter-groups	4.05	3	1.35	4.44	.00*
Intra-groups	54.80	180	.30		
Total	58.86	183			

p< .05 * A significant difference exists

In table 5, it is seen that there are differences among the arithmetic means. Results of ANOVA test conducted to determine whether these differences are statistically significant are presented in Table 6 and they indicate that there are significant differences among the students' attitudes according to their departments [$F_{(3-180)} = 4.44$, $p < .05$]. That is, the attitudes of pre-service teachers significantly vary depending on the department attended. In order to find out between which departments this significant difference occurs, Scheffé test was conducted. Scheffé test results revealed that scale scores of the pre-service teachers from the department of science teaching ($\bar{X} = 4.43$) are more positive than those of the pre-service teachers from the department of social studies teaching ($\bar{X} = 3.98$). This finding concurs with the findings of Asan (2002). Moreover, whether attitude scores significantly vary for each item in the scale according to the department was also tested, and significant department-based differences were found for the items 3, 4, 6, 10, 11, 12, 13, 14 and 15 ($p < .05$). This difference being in favor of the students from the department of science teaching leads us to think that during their elementary and secondary education, they became more acquainted with such technological devices.

Findings Concerning the Third Sub-question

The third sub-question of the present study is "Is there a significant difference among the attitudes of the pre-service teachers towards the effects of use of overhead projector and projector on learning depending on the environment they were brought up?" First the distribution of the pre-service teachers according to the environment they were brought up is given (Table 7), then the results of the t-test administered to determine whether the students' attitudes towards the effects of using overhead projector and projector vary significantly depending on the environment where they were brought up are presented in Table 8.

Table 7: Distribution of the Pre-Service Teachers According to the Environment Where They Were Brought up

Environment	Frequency	Percentage
Rural area	67	36.4
Urban area	117	63.6
Total	184	100.0

36.4% of the pre-service teachers come from rural areas and 63.6% from urban areas. As the number of the pre-service teachers coming from the urban areas is higher than that of those coming from the rural areas, this may have had a positive influence on the attitudes of the sampling towards the use of technological materials in education because the people living in urban areas can find more opportunities to engage in technology.

Table 8: T-test Results Concerning the Scale Scores of the Pre-Service Teachers According to the Environment Where They Were Brought Up

Environment	f	\bar{X}	S	df	t	p
Rural area	67	67.90	7.96	182	1.17	.25
Urban area	117	66.27	9.64			

The t-test results presented in Table 8 show that the pre-service teachers' attitudes towards the effects of using overhead projector and projector on learning do not significantly vary depending on the environment where they were brought up [$t_{(182)} = 1.17, p > .05$]. Hence, it can be argued that there is no significant relation between the attitudes towards technology and the environment where they were brought up. Moreover, whether there is a significant difference between the attitudes and the environment for each scale item was tested and only for item 12 "*Using overhead projector and projector in lessons makes learning more effective and efficient*" significant difference was observed. The attitudes of the students from the rural areas have more positive attitudes ($\bar{X} = 4.42$) towards this item than the students from the urban areas ($\bar{X} = 4.22$). This may be because the students from the rural areas did not find many opportunities to engage in technological devices and therefore, they find such materials more interesting and more motivating.

RESULTS

In today's world of technology and information, it is of great importance for students to gain skills required to have access to information and solve problems. Therefore, there is a need to put greater emphasis on the use of educational technologies in learning and teaching process. In the design of learning settings and in diversifying the teaching materials, the use of educational technologies have an important role to play. It is clear that when educational technologies are used properly, they contribute to increasing success. The present study deals with the use of two technological materials, overhead projector and projector, and aims to determine the attitudes of the pre-service teachers towards the effects of using these materials on learning.

In the present study, it was found that the lessons presented with overhead projector and projector draw the students' attention and arouse their curiosity. It was also found that these educational materials are thought to bring variety and changes to the learning and teaching process, help to eliminate the monotony in class, make the lessons more effective and efficient by making them more colorful and lively, help learning to occur in a shorter time span and allow students to observe the objects that can not normally be brought to class.

It was found that the attitudes do not significantly vary depending on the gender variable. Yet, the attitudes of the female participants were found to be more positive than those of the male participants

It was found that there are significant differences among the attitudes towards some items in the scale in relation to department attended and this is in favor of the pre-service teachers from the department of science teaching. These items are: "In lessons presented with overhead projector and projector, I can better understand difficult and abstract topics and concepts and visualize them in my mind", "In lessons presented with overhead projector and projector, learning takes place in a shorter time span", "When overhead projector and projector are used in lessons, light, color, movement and sound features help me to constantly focus my attention on the information presented", "I prefer lessons to be taught with overhead projector and projector to lessons taught with traditional chalk and black board", "Using overhead projector and projector in lessons helps me to retain the information longer", "Using overhead projector and projector in lessons makes learning more effective and efficient", "Using overhead projector and projector in lessons allows me to observe the objects, phenomenon and events which are impossible to bring to classroom environment", "Using overhead projector and projector in lessons eliminates the monotony in class and provides colorful, lively and interesting learning-teaching environment", "Using overhead projector and projector in lessons makes me willing to learn."

While no significant relation was found between the students' attitudes and the environment where they were brought up, a significant relation was found for the item "Using overhead projector and projector in lessons makes learning more effective and efficient." And in this respect, the attitudes of the students coming from the rural areas were found to be more positive than those of the students coming from the urban areas.

Research indicates that when used properly, technology enhances the learning and teaching process and improves students' motivation, problem solving skills, and critical thinking skills, (Yıldırım, 2000).

Before making generalizations in light of the findings of the present study, there is a need to point out the limitations of the study. First, the study is limited to the sampling used for the present study. Hence, further research conducted among the pre-service teachers from the different departments may result in the emergence of different dimensions.

It is clear that with the effective use of educational technologies, success in learning and teaching process improves. But while using educational technologies, students' learning level, their readiness, learning styles, motivation and expectations should be taken into consideration. In this way, both students are encouraged to fully participate in lesson and develop positive attitudes towards teaching materials.

REFERENCES

- Akdeniz, A.R. & Yiğit, N. (2001). *Fen Bilimleri Öğretiminde Bilgisayar Destekli Materyallerin Öğrenci Başarısı Üzerine Etkisi*. Yeni Bin yılın Başında Türkiye’de Fen Bilimleri Eğitimi Sempozyumu Bildirileri, Maltepe Üniversitesi, s:229-234, İstanbul.
- Akpınar, E., Aktamış, H. ve Ergin, Ö. (2005). Fen Bilgisi Dersinde Eğitim Teknolojisi Kullanılmasına İlişkin Öğrenci Görüşleri. *The Turkish Online Journal of Educational Technology – TOJET*, 4, 1, Article 12.
- Aktamış, H., Akpınar, E. & Ergin, Ö. (2002). *Yapısalcı Kurama Örnek Bir Uygulama*. V. Ulusal Fen Bilimleri ve Matematik Eğitim Kongresi’nde bildiriler olarak sunulmuştur, Orta Doğu Teknik Üniversitesi, 6-8 Eylül, Ankara.
- Asan, A. (2002). Fen ve Sosyal Alanlarda Öğrenim Gören Öğretmen Adaylarının Bilgisayara Yönelik Tutumları. *Eğitim Araştırmaları*, Sayı:7
- Ayvaci, H.Ş., Nas, S.E., Şenel, T. & Nas, H. (2007). *Öğretmen Adaylarının Öğretim Teknolojilerini Kullanmaya Yönelik Düşünceleri ve Bu Teknolojileri Kullanma Yeterlilikleri*. The Proceedings of International Educational Technology Conference, 3-5 May, Near East University, North Cyprus.
- Dalton, D. W. & Hannafin, M. J. (1986). *The Effects of Video-Only, CAI Only and Interactive Video Instructional Systems on Learner Performance and Attitude: An Exploratory Study*, U.S., Indiana, 1986-01-00.
- Dursun, F. (2006). Öğretim Sürecinde Araç Kullanımı. *İlköğretmen Dergisi*, Sayı 1. s.:8-9.
- Fidan, N. K. (2008). İlköğretimde Araç Gereç Kullanımına İlişkin Öğretmen Görüşleri. *Kuramsal Eğitimbilim*, 1 (1), 48-61.
- Frantom, C. G., Green, K. E. & Hoffman, E. R. (2002). Measure Development: The Children’s Attitudes Toward Technology Scale (CATS). *Journal of Educational Computing Research*, 26, 3, 249-263.
- Gunter, G., Gunter, R. E. & Wiens, G. A. (1998). *Teaching pre-service teachers technology: An innovative approach*. Paper presented at the SITE 98: Society for Information Technology and Teacher Education International Conference, 9th, DC, March 10-14, 6p, Washington.
- İspir, E., Furkan H. & Çitil, M. (2007). Lise Fen Grubu Öğretmenlerinin Teknolojiye İlişkin Tutumları- Kahramanmaraş Örneği. *Erzincan Eğitim Fakültesi Dergisi*, Cilt-Sayı: 9-1.
- İşman, A. (2002). Sakarya İli Öğretmenlerinin Eğitim Teknolojileri Yönündeki Yeterlilikleri. *The Turkish Online of Educational Techonology*, vol. 1, no. 1.
- Jonassen, D., ve Reeves, T. (1996). *Learning with Techonology: Using Computers as Cognitive Tools*. In D.H. Jonassen (Ed.), *Handbook of Research on Educational Communications and Techonology*. (pp. 693-719).
- Kibos, K. J. (2002). Impact of A Computer-Based Physics Instruction Program on Pupils’ Understanding of Measurement Concepts and Methods Associated with School Science. *Journal of Science Education and Technology*, 11(2), 193-198.
- Koşar, E. & Çiğdem, H. (2003). *Eğitim Ortamı Tasarımı, Araç-Gereç ve Materyal Özellikleri*. Öğretim Teknolojileri ve Materyal Geliştirme, Pegem A Yayıncılık, Ankara.
- Küçükahmet, L. (1999). *Öğretimde Plânlama ve Değerlendirme*. 10. Baskı, Alkım Yayınevi, İstanbul.
- M.E.B (2000). *İlköğretim Okulu Fen Bilgisi Dersi (4,5,6,7, 8. sınıf) Öğretim Programı*. MEB Tebliğler Dergisi, 63, 2518, Kasım 2000.
- Means, B. (1994). *Using Techonology to Advance Educational Goals*. In B. Means (Ed.), *Techonology and Education Reform: The Reality Behind the Promise*, (pp. 1-22). San Fransisco: Jossey-Bass Publishers.
- Middlehurst, R. (1999). New Realities for Leadership and Governance in Higher Education?. *Tertiary Education and Management*, Vol.5, pp. 307-329.
- Özkütük, N. & Orgun, F. (2001). Eğitim Teknolojisini Doğru Kullanabiliyor Muyuz?. Sakarya Üniversitesi, I. Uluslar arası Eğitim Teknolojileri Sempozyumu, Sakarya.
- Pala, A. (2006). İlköğretim Birinci Kademe Öğretmenlerin Eğitim Teknolojilerine Yönelik Tutumları. *Sosyal Bilimler Dergisi*, Sayı: 16, 177-188.
- Rıza, E.T. (1999). Yaratıcılığı Geliştirme Teknikleri. *Journal of Technology*, Cilt: 29, Sayı:1, İzmir.
- Sevindik, T. (2006). *Akıllı Sınıfların Yüksek Öğretim Öğrencilerinin Akademik Başarı ve Tutumlarına Etkisi*. Fırat Üniversitesi, Sosyal Bilimler Enstitüsü, Yayınlanmamış Doktora Tezi, Elazığ.
- Şahin, F., Öztuna, A. & Sağlamer, B. (2001). İlköğretim II. Kademe Fen Bilgisi Dersinde 'Sinir Hücresi'nin Model Yoluyla Öğretiminin Başarıya Etkisi. Yeni Bin yılın Başında Türkiye’de Fen Bilimleri Eğitimi Sempozyumu Bildirileri, Maltepe Üniversitesi, İstanbul.
- Yavuz, S. & Coşkun, A. E. (2008). Sınıf Öğretmenliği Öğrencilerinin Eğitimde Teknoloji Kullanımına İlişkin Tutum ve Düşünceleri. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi (H. U. Journal of Education)*, 34: 276-286.
- Yıldırım, S. (2000). *Kaçınılmaz Bir Eğitim Aracı*. Information Week Türkiye, 111, 45-46.
- Yılmaz, M. (2005). *İlköğretim 7. Sınıflarda Simetri Konusunun Öğretimde Eğitim Teknolojilerinin Başarı ve Tutuma Etkisi*. Marmara Üniversitesi, Eğitim Bilimleri Enstitüsü, Yayınlanmamış Yüksek Lisans Tezi, İstanbul.

Yumuşak, A. & Aycan, Ş. (2002). *Fen Bilgisi Eğitiminde Bilgisayar Destekli Çalışmanın Faydaları*. Uluslar Arası Katılımlı 2000'li Yıllarda 1. Öğrenme ve Öğretme Sempozyumu, Bildiri Özetleri Kitabı, Marmara Üniversitesi Atatürk Eğitim Fakültesi, İstanbul.

COMPARATIVE USEFULNESS OF ONLINE AND TRADITIONAL VOCABULARY LEARNING

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ABSTRACT

Acquiring vocabulary in L2 is rather a difficult and demanding process and most of the language learners wish to know which vocabulary learning method and/or activity is more beneficial or even the best one; however, the responses to this question vary and there is no clear-cut answer though there are some various suggestions and conclusions drawn from the studies related to vocabulary acquisition such as keeping a notebook, regularly reviewing and using vocabulary items in context. This study compares the usefulness of online vocabulary teaching and the traditional methods used in upper-intermediate Academic English class. The control group students practiced vocabulary items in ten reading passages through vocabulary notebooks and cards. The learners in the experimental group practiced the same vocabulary items in the passages through *WordChamp*. Furthermore, with both groups, the vocabulary items were regularly reviewed. The usefulness of the two methods was evaluated via the post-test. The study showed that the learners in the experimental group outperformed the learners in the control group and that the experimental group students better remember the words studied online, evidenced by a follow-up post-test given 3 months later.

INTRODUCTION

"I do not fear computers. I fear the lack of them."
Isaac Asimov

Vocabulary teaching and learning is a very challenging and demanding process while learning any foreign language. As such, learners try to find out which vocabulary learning method is more beneficial or even the best one. However, not surprisingly, their first approach is to try to memorize every word that they do not know. According to the studies, beginners prefer learning words separately, that is, using a list of words to memorize, whereas advanced students, although there are some exceptions, try to learn words in context (Ellis, 1994, p. 553). Likewise, vocabulary teaching is generally restricted on presenting new items as they appear in any activity without preparing the learners through activation of prior knowledge or helping them regularly revise the previously learned vocabulary items until they are thoroughly learnt. In order to overcome this restriction and provide learners and teachers with better opportunities and a variety of activities, computers and the Internet have been put into use in the foreign language instruction and the positive effect of computer-assisted instruction on developing reading comprehension skills and vocabulary acquisition has been reported in numerous studies. Computer-assisted vocabulary acquisition can have its different instantiations, ranging from Web-based reading tasks with glossing support, through dedicated vocabulary learning software to online personal vocabulary learning systems like *WordChamp*. Due to the fact that computer-assisted vocabulary instruction undertaken in the present study had a wide range of components, various approaches to vocabulary learning with computers need to be reviewed at this point.

LITERATURE REVIEW

Web-based reading comprehension and vocabulary instruction

Levine et al. (2000), when investigating the issue of the development of EFL critical reading skills in a computer-networked environment, reported that the computerized learning environment contributed to the

development of EFL critical literacy skills much more than the conventional learning environment. The computer environment influenced the teacher-student relationship, changing the nature of the EFL teacher's as well as the EFL student's role in the academic reading class. At the same time, Levine et al. (2000) claim the computer-networked environment is particularly effective when it combines the security and support of the language learning classroom and exposure to authentic reading material. The computerized environment enabled teachers to provide assistance only when appropriate and necessary, without interfering with the students' choice of materials and pace of work. This empowerment of learners in the reading instruction leads to independence in using computerized resources in reading also beyond the language learning classroom (Peterson, 1997).

Johnson and Heffernan (2006) draw attention to the need to lead students from the exposure to graded materials to authentic ones, which was undertaken in the online reading environment of the Short Readings Project, a new online activity used in conjunction with English Trailers (www.english-trailers.com). The authors claim that building an enjoyable, confidence-building experience is essentially created by using relatively short but complete segments of materials, providing students with multiple contacts with the necessary vocabulary, and arming them with appropriate strategies.

The issue of joining multiple resources into the online hypertext environment facilitating reading and vocabulary learning has been amply addressed by researchers. To start with, Dreyer and Nel (2003) integrated the features of printed interactive study guide, contact sessions with the lecturer and the added value of a custom-made Varsite online environment to create a computerized learning context. The findings suggested that students benefit from strategic reading instruction offered in a technology-enhanced learning environment, developing reading comprehension and reading strategy use. Horst et al. (2005) reported the use of concordancing, dictionary and online quizzes in the process of familiarizing students with a variety of research-based strategies for learning and retaining new vocabulary. The activities of examining concordance examples, consulting an on-line dictionary, reading hypertext, using the quiz feature of the on-line Word Bank, and entering texts into the cloze-passage maker were integrated with reading passages to reinforce reading comprehension and vocabulary retention. Similarly, Web-based vocabulary activities of various types (multiple-choice, fill-in, cloze passages), when combined with reading passages, automatic scoring, e-mail feedback and randomization, were reported to succeed in improving developing a memory connection between the form and meaning of the word (Nelson, 1998), successfully addressing placing new words in a meaningful context and using mechanical techniques to help memorize new words.

Vocabulary practice software

Effective design of computer-assisted vocabulary learning software, which would succeed in presenting, practicing and testing vocabulary in a self-study mode, has received on-going attention of researchers. Multimedia vocabulary learning environments would attempt to help learners construct connections between the verbal and visual representational systems (Mayer and Sims, 1994), resulting in an increase in vocabulary knowledge and exercising a positive effect on reading comprehension and the rate of speed for frequent word recognition (Tozcu & Coady, 2004).

Such multimedia vocabulary learning environments may take different shapes, depending on the teaching context and learners' needs. In their study, Chun and Plass (1996) combined video as a visual organizer to the reading text with annotation of individual vocabulary items consisting of both visual and verbal information. Following the Tutorial CALL pattern with the study, practice and review approaches, Tozcu and Coady (2004) aimed at enabling individualized vocabulary practice by allowing students to add words to an individualized list for further study or setting reminders to help words by synonyms, antonyms, translation or paraphrase. When authoring a vocabulary learning environment geared at young learners, Sun and Dong (2004) showed the importance of appealing framework for vocabulary study (a popular Disney cartoon), however, pointing out to the fact that without providing proper learning support (e.g., in the form of sentence-level translation and target warming-up) the appeal of the learning environment will not guarantee more effective L2 vocabulary learning. Also Chun and Plass (1997) warn that multimedia-assisted reading comprehension and vocabulary learning may meet with a lower amount of invested mental effort than the use of static pictures, and, as a result, students who used the text and picture annotations scored higher on the follow-up vocabulary test than students who used text and video annotations (Chun and Plass, 1996).

The investigation of the usefulness of CALL vocabulary software in teaching and learning collocations has led Nesselhauf and Tschichold (2002) to formulate general guidelines for English vocabulary environments used independently of a specific (school) book or dictionary:

- better specification of the proficiency level the program aims at (and/or a division into different levels of difficulty);
- consistent context-embedding of the items learned;
- more flexibility of feedback (at least so that alternative correct answers are not rejected);
- at least some variety in the exercises;
- an inclusion of sections that teach besides sections that test.

Groot (2000) adds to the list the importance of constructing computer-assisted vocabulary learning environments in accordance with the widely accepted notions of how words are acquired, so that the words learnt are stronger embedded in the memory needed for long term retention. This has led to the development of a computer assisted word acquisition programme which intends to encompass noticing various properties of the new word (morphological and phonological, syntactic, semantic, stylistic, collocational); storage in the internal lexicon in networks of relationships and consolidation of the storage by means of further exposure to the word in a variety of contexts which illustrate its various properties. Moreover, according to Ma and Kelly (2006), the design of computer-assisted vocabulary learning software should enable both explicit and implicit vocabulary learning, training learners to become good vocabulary learners, among others, by being instructed in useful learning strategies. A visual advanced organizer contextualizing the topic (Chun & Plass, 1996) and vocabulary presentation in a mini-dictionary with glosses including meanings, collocations, example sentences and usage are followed by reading to practise and rehearse selected vocabulary in context. The learner training component can include, as was the case with Ma and Kelly (2006), introduction of vocabulary learning strategies relating to verbal association, imagery, rhyming or alliteration and tips on how to memorize the word (with the option to display the L1 translation).

Hypertext-based glossing in foreign language learning

Vocabulary look-up in the computer-assisted reading process is significantly facilitated by hypertext-based glossing, or the practice of providing brief definitions for unfamiliar words somewhere in the text (Rott, Williams and Cameron, 2002), either devised by teachers for selected words or enabled for all the words in the text in a dictionary look-up system like *WordChamp* Web Reader.

As Koren (1999: 6) stresses it, “hypertext technology enables a quicker and more convenient access to the meanings, as well as other visual and interactive advantages”, thus creating a more interesting and efficient environment for working on foreign language vocabulary. The use of glossing has been researched in numerous studies, most specifically multiple-choice glosses to increase the likelihood of retention (Rott et al., 2002); multimedia links with the target word’s printed textual definition, pronunciation, and meaning demonstrated via a still picture or video (Lomicka, 1998; Al-Seghayer, 2001); text-only, picture-only, and a combination of the two (Yoshi, Flaitz, 2002; Yoshi, 2006); also employing the learner’s mother tongue in glosses (Taylor, 2006).

When comparing the usefulness of highlighted glosses and unhighlighted links, de Ridder (2000; 2002) found that the invisible links enhanced L2 reading, perhaps because of the additionally thoughtful choices that learners needed to make, which is an argument for using vocabulary hypertext programs like *WordChamp* Web Reader to provide support to all words in the text. Roby (1999) makes an important point claiming that the design of a computer-assisted environment should encompass learners to gloss for their own benefit, enabling them to annotate electronic hypertext on their own, mark words and automatically compile them into printable lists. This feature of selected online vocabulary management systems including *WordChamp* is in line with the current emphasis on learner autonomy and cooperative learning.

When giving the rationale for the use of glossed texts, Taylor (2006) reviews the results of meta-analytic experimental research conducted on the effects of native-language (L1) glosses on second-language (L2) reading comprehension, which have revealed a significant difference between groups of studies with traditional and computer-assisted L1 glosses. Learners provided with L1 computer glosses comprehended significantly more text than learners with traditional, paper-based L1 glossing aids. Lomicka (1998) points out that while comparing participants who read the text under one of three conditions: full glossing, limited glossing, or no glossing, it was observed that the number of causal inferences generated for students who had access to full glossing increased. Thus, computerized reading with full glossing may promote a deeper level of text comprehension.

However, arguments have also been voiced against glossing, most notably that glossing may discourage guessing from context, while inferred meanings are said to be more memorable than meanings provided by glosses (Koren, 1999; Rott et al., 2002). Moreover, as is claimed by de Ridder (2002), vocabulary support

software should prevent the reader from excessive clicking (called "click happy behavior" by Roby, 1999, p. 98) which could lead to a more superficial, short-term learning. To solve the problem, Hulstijn (1992) proposed to combine the advantages of inferring and glosses into multiple-choice glossing, arguing that such an approach reduces the difficulties presented by insufficient context as well as the possibility of incorrect inferences.

Online vocabulary learning systems

A growing tendency to use the Internet as a means of delivering computer-assisted vocabulary acquisition has led to the shift of focus onto the design and implementation of online vocabulary-oriented learning management systems. Intentional study of vocabulary, based on learner-made word lists supported by accompanying interactive vocabulary exercises, all create appropriate conditions for learners to improve their language skills in the target language (Spiri, 2007).

As Chun (2001) demonstrated, reading and vocabulary learning in a Web-based environment can be facilitated by a program-internal glossary, an online bilingual dictionary and an audio narration of the text. An important feature exploited by Chun in the research was tracking the use of online multimedia support resources to provide more individualised study support. In the mobile-assisted learning context, analysing learner access logs to the vocabulary activities led to the formulation of a personal learner profile in terms of the vocabulary that they had difficulty with, so that these items could be presented to the learners more frequently than items that were less likely to cause learners problems (Stockwell, 2007).

Dreyer and Nel (2003) describe an even more elaborate vocabulary environment, termed Varsite (i.e., a Learning Content Management System), a multiuser environment where lecturers can create, store, reuse, manage, and deliver digital learning content from a central object repository, equipped with the features of dynamic delivery interface, an automated authoring system, track and report progress tools and the learning object repository.

A more open character of an online vocabulary learning system was emphasized by Ariew (2006), who describes the design and use of a software template to generate hypermedia texts for use by foreign and second language students, with the aim of generating teaching materials and providing an easy way to display target or native language annotations of all kinds, including text, graphics, audio recordings and video as needed to illustrate the meaning of the text.

Horst et al. (2005) advocate building a set of online tools for vocabulary learning in an ESL course, encompassing concordance, dictionary, cloze-builder, hypertext, and a database with interactive self-quizzing feature (all freely available at www.lex tutor.ca). It is assumed that the tools would aid retention by engaging learners in deep processing, offering them more to study than words and definitions only.

As Zapata and Sagarra (2007) stress it, online workbooks promote the acquisition of L2 grammatical and vocabulary knowledge by allowing learners to proceed in a self-paced manner with the material, thus meeting their individual needs and allowing them to "manufacture rather than receive knowledge" (Collentine, 2000, p. 44; after Zapata and Sagarra, 2007, p. 154). In addition, online workbooks help learners create and test hypotheses about the target language by providing immediate feedback and allowing multiple access attempts. When putting such an example online vocabulary management system (termed A New Global Environment for Learning – ANGEL), Zapata and Sagarra (2007) found no significant differences between the online and the paper workbook groups after one semester of instructional treatment, but the online workbook group proved better than the paper workbook group in the second semester.

In a preliminary study, Spiri (2008) checked the effectiveness and viability of the application of the *WordChamp* vocabulary management system study in university English Communication courses, comparing *WordChamp* drilling with paper study of frequency word vocabulary. While both methods of intentional study of vocabulary, *WordChamp* and paper study, are effective for acquiring vocabulary, the former is more effective than paper.

The use of *Wordchamp* vocabulary management system has also been the focus of the research by Loucky (nd.), who examined several online programs available to help learners reach higher levels of vocabulary and reading proficiency as rapidly as possible. Loucky advocates the use of *WordChamp* for improving vocabulary learning and comprehension of any online reading, by using it for pre-reading or after-reading vocabulary development exercises or to obtain and save bilingual glosses while reading any document online. The integration of quick corpus analysis, making online flashcards, quizzes and collaborative conversations, according to Loucky (nd.), are most effective in acquiring more difficult vocabulary.

Training vocabulary learners – vocabulary strategies instruction

Out of a whole array of language learning strategies on the metacognitive, cognitive and socio-affective level (O'Malley, Chamot, 1990; Hedge, 1993), vocabulary learning strategies facilitate the acquisition of new lexis in the second/foreign language as they aid in discovering the meaning of a new word and consolidating a word once it has been encountered (Schmitt, 1997). Research shows that most learners actually do, even if they might not be aware of it, use specific strategies for vocabulary learning (Schmitt, 1997). As Nassaji (2003) found, different strategies contribute differently to learners' success so it is necessary to adapt strategies to each learner's needs. Additionally, it has been found that students who apply multiple learning strategies are more successful in learning (Chamot, 2004; after Johnson and Heffernan, 2006).

A number of attempts have been undertaken to propose a comprehensive taxonomy of vocabulary learning strategies. Schmitt (1997) distinguishes the five groupings of determination, social, memory, cognitive and metacognitive, with the total of 58 different operations facilitating the acquisition of new vocabulary. Loucky (2006) distinguishes 40 vocabulary learning strategies mapped onto an eight-fold scale of major cognitive phases (assessing, accessing, archiving, analyzing, anchoring, associating, activating, anticipating, reassessing, and relearning/remeeting new terms). Examples of learning strategies applicable in a reading context include dictionary use, also accessed via hyperlinked texts, utilization of contextual clues in the surrounding text, note taking, rehearsal, and encoding (Gu, 2003). Above all, the strategy of 'expanded rehearsal' (Horst et al., 2005) supported by computerized activities can be taught as a pre-requisite to more effective reading comprehension and vocabulary instruction.

It is assumed that successful learners intentionally select, consciously monitor and evaluate the strategy they use for the fulfillment of their aim. The unsuccessful learners, on the other hand, employ learning behaviors similar to their peers without being conscious but also without having an aim (Gu, 2003). However, as Dreyer and Nel (2003) stress, many students are unprepared for the reading demands that are placed upon them in higher education, and under the pressure of the reading task, they often select ineffective and inefficient strategies with little strategic intent (Dreyer, Nel, 2003), due to low level of reading strategy knowledge and lack of metacognitive control.

Strategy instruction for vocabulary acquisition in the computer-assisted environment helps learners become more effective learners, by individualizing the language learning experience and raising the awareness of strategies which they can use to learn on their own after they leave the language classroom (Atay & Ozbulgan, 2007). This self-direction is essential in active development of learners' abilities (Cohen, 1996; Oxford, 1990), empowering EFL learners with a wide range of strategies and making conditions for fostering their autonomy in learning vocabulary. Nunan (1997) reports the study which aimed at investigating the effect of strategy training on such key aspects of the learning process as motivation, knowledge of strategies, the perceived utility of strategies, and the actual deployment of strategies by students, with the results indicating that the experimental groups significantly outperformed the control groups in terms of motivation, knowledge, and perceived utility, while there was no significant difference in the area of deployment.

When considering strategy instruction procedure, Atay and Ozbulgan (2007) propose the following stages: discovering the meaning of a word through different contexts, recalling it via different memory strategies, focusing on the whole array of strategies, letting students choose the most effective one(s) for them. Winograd and Hare (1988; after Carrell, 1998), on the other hand, put forward the following five elements as constituting complete teacher explanation of the strategy:

- (1) what the strategy is,
- (2) why a strategy should be learned,
- (3) how to use the strategy,
- (4) when and where the strategy should be used,
- (5) and (5) how to evaluate use of the strategy.

In general, teachers should show students how to evaluate their successful/unsuccessful use of the strategy, including suggestions for fix-up strategies to resolve remaining problems.

METHODOLOGY

Purpose

The purpose of the study was to find out whether online vocabulary teaching would be more effective than the traditional instruction.

Research Questions

The research questions addressed in the study are as follows:

1. Is online vocabulary learning more effective than the traditional instruction as measured by the learners' post-test results?
2. Is online vocabulary learning more effective than the traditional instruction as measured by the participants' follow-up post-test results?

Participants

The participants were 38 students from different departments in a private university in Ankara, Turkey, studying English in order to pass the proficiency exam conducted by their own university. They were aged between 17 and 19. None of the participants had had any experience of participating in this kind of experiments.

Data Collection Instruments

Pre and posttests were used in the study developed using the questions that were asked in previous proficiency examinations. The tests consisted of 10 academic reading passages and 5 multiple choice questions assessing the vocabulary items in those passages. Scores for both the pre and post test were defined looking at the number of correct items. A correct answer were be rated 1 and an incorrect answer 0.

Variables in the study

The independent variables for the study were the teaching methods (online vocabulary learning and the traditional instruction). The dependent variables are the post and follow-up post-test results.

Data Collection Procedure

On the first day of class, an Informed Consent Form was presented and participants were briefly informed about the aim of the study. After students signed the form and agreed to participate in the study, the instructors administered the pre-test. With the results obtained from the test, and by means of an independent sample T-test, it was possible to establish whether or not there were significant differences between two groups of participants at the 0.05 alpha level (see Table 1 & 2).

Table 1. Group Statistics (Pre-test)

	Group	N	Mean	Std. Deviation	Std. Error Mean
pretest	control	20	16,7000	3,68639	,82430
	experimental	18	16,1111	4,25495	1,00290

Table 2. Pre-test results

	Group	N	M	SD	SEM	F	t	df	Sig.
pretest	control	20	16,70	3,68	,824	2,057	,457	36	,160
	experimental	18	16,11	4,25	1,002				

According to the pre-test results, the significance level was higher than 0.05 ($t=,457$; $df=36$; $p=0.160$), which lead to the conclusion that there were no significant differences between the two groups before the implementation of the study. At there were no significant differences, the study was carried out with these two groups. During the five weeks, One class (control group) practiced vocabulary items in ten reading passages through traditional instruction using vocabulary notebooks, cards and paper dictionary, while another class (experimental group) practiced the same vocabulary items in the passages through *WordChamp*. Furthermore, with both groups, the vocabulary items were regularly reviewed. The sample consisted of 20 participants in control group and 18 participants in the experimental group. The training lasted for 5 weeks and the same instructor met the groups three hours each week. On the last day of class, the instructor administered the post-test to both groups. The scores obtained by pre and post tests were statistically analyzed to see whether there was a statistically significant difference between these two groups.

DATA ANALYSIS AND RESULTS

To test the relevance of the null hypothesis – There will be no difference between the scores of the learners in the experimental and control group- the t-test was run to compare the post-test scores of the two groups. The post-test scores obtained by experimental and control groups were analyzed using the SPSS software package using the independent sample T-test to establish whether there were significant differences between two groups of participants at the 0.05 alpha level (see Table 3&4).

Table 3. Group Statistics (post-test)

	group	N	Mean	Std. Deviation	Std. Error Mean
posttest	control	20	32,7500	4,92977	1,10233
	experimental	18	38,3889	6,21326	1,46448

Table 4. Post-test results

	Group	N	M	SD	SEM	F	t	df	Sig.
pretest	control	20	32,75	4,92	1,10	1,167	-3,114	36	0,004*
	experimental	18	38,38	6,21	1,46				

*p<0.01

Considering the analysis used to address the first research question (Is online vocabulary teaching more effective than the traditional instruction as measured by the learners' post-test results?), the significance level was lower than 0.05 ($t=-3,114$; $df=36$; $p=0.004$), which led to the conclusion that there was a statistically significant difference between the two groups. In other words, the participants in the experimental group using *WordChamp* while studying vocabulary items performed significantly better than the participants in the control group who practiced traditional vocabulary learning activities.

The follow-up post-test scores obtained by experimental and control groups were analyzed using the independent sample T-test to establish whether there were significant differences between two groups of participants at the 0.05 alpha level (see Table 5&6).

Table 5. Group Statistics (Follow-up Post-test)

	group	N	Mean	Std. Deviation	Std. Error Mean
followup	control	20	29,3500	5,21410	1,16591
	experimental	18	36,1111	6,13465	1,44595

Table 6. Follow-up Post-test results

	Group	N	M	SD	SEM	F	t	df	Sig.
pretest	control	20	29,35	5,21	1,16	,620	-3,672	36	0,001*
	experimental	18	36,11	6,13	1,44				

*p<0.01

As for the analysis used to address the second research question (Is online vocabulary teaching more effective than the traditional instruction as measured by the participants' follow-up post-test results?), the significance level was lower than 0.05 ($t=-3,672$; $df=36$; $p=0.001$), which led to the conclusion that there was a statistically significant difference between the two groups even after the follow-up post-test was given two months later.

DISCUSSION

The post-test results showed that the participants in the experimental group using *WordChamp* while studying vocabulary items performed significantly better than the participants in the control group who practiced traditional vocabulary learning activities. This result of the study is in alignment with Nelson (1998), Horst et al. (2005), Spiri (2008) and Loucky (nd.), in that various vocabulary activities help improve developing a memory connection between form and meaning of the word. Moreover, the participants had the opportunity to review and benefit from different activities and strategies while acquiring vocabulary items, rather than limiting themselves to just paper related activities. Online vocabulary teaching can further individualize the language learning experience and raising the awareness of strategies which they can use to learn on their own after they leave the language classroom as suggested by Atay and Ozbulgan, (2007).

The follow-up post-test showed that as in the previous post-test results, there was a statistically significant difference between the two groups even after the follow-up post-test was given two months later. This result was not in alignment with the arguments against glossing (Koren, 1999; Rott et al., 2002) claiming that glossing may discourage guessing from context, causing meanings provided by glosses to be less memorable. However, in this study, the participants benefiting from glossing provided by *WordChamp* reader remembered more words. It is

worthy to note that all the participants were guided while using *WordChamp* or the traditional paper-based activities. They were encouraged to benefit from different strategies such as guessing meaning from the context. The participants in the experimental group did really enjoy the glossing feature in *WordChamp*; however, this did not lead them to ‘click happy behavior’ (Roby, 1999) or a superficial, short-term learning compared to other participants.

CONCLUSION

This study has attempted to prove that an online glossing tool, *WordChamp* helped learners to acquire vocabulary items in academic reading passages when compared to other traditional or paper-based strategies or activities. In addition to helping vocabulary learning, *WordChamp* seems to be effective in enhancing learners’ autonomy, and motivation. More importantly, as research shows that most learners use specific strategies and different strategies contribute differently to learners’ success, this study should be seen as further evidence to the idea that learners should be provided with a whole array of strategies, letting students choose the most effective one(s) for them, rather than limiting them to the strategies that are thought to be working for all without considering the individual differences.

REFERENCES

- Al-Seghayer, K. (2001). The effect of multimedia annotation modes on L2 vocabulary acquisition: a comparative study. *Language Learning & Technology*, 5(1), 202-232.
- Ariew, R. (2006). A template to generate hypertext and hypermedia reading materials: its design and associated research findings. *The Reading Matrix*, 6(3), 195-209.
- Atay, D., & Ozbulgan, C. (2007). Memory strategy instruction, contextual learning and ESP vocabulary recall. *English for Specific Purposes*, 26, 39-51.
- Carrell, P.L. (1998). Can reading strategies be successfully taught? *The Language Teacher*, 22 (2). Retrieved March 29, 2009, from <http://www.jalt-publications.org/tlt/files/98/mar/carrell.html>.
- Chun, D.M. (2001). L2 reading on the Web: Strategies for accessing information in hypermedia. *Computer-Assisted Language Learning*, 14(5), 367-403.
- Chun, D., & Plass, J.L. (1997). Research on text comprehension in multimedia environments. *Language Learning & Technology*, 1(1), 60-81.
- Chun, D.M., & Plass, J.L. (1996). Facilitating reading comprehension with multimedia. *System*, 24(4), 503-519.
- De Ridder, I. (2000). Are we conditioned to follow links? Highlights in CALL materials and their impact on the reading process. *Computer-Assisted Language Learning* 13(2), 183-95.
- De Ridder, I. (2002). Visible or invisible links: does the highlighting of hyperlinks affect incidental vocabulary learning, text comprehension and the reading process? *Language Learning & Technology*, 6(1), 123-146.
- Dreyer, C., & Nel, C. (2003). Teaching reading strategies and reading comprehension within a technology-enhanced learning environment. *System*, 31, 349-365.
- Ellis, R. (1994). *The study of second language acquisition*. OUP.
- Groot, P.J.M. (2000). Computer-assisted second language vocabulary acquisition. *Language Learning & Technology*, 4(1), 60-81.
- Gu, P. (2003). Vocabulary learning in a second language: person, task, context and strategies. *TESL-EJ*, 7(2). Retrieved March 8, 2005, from <http://www-writing.berkeley.edu/TESL-EJ/ej26/a4.html>.
- Hedge, T. (1993). Learner strategies. *ELT Journal*, 47(1), 93.
- Horst, M., Cobb, T., & Nicolae, I. (2005). Expanding academic vocabulary with an interactive on-line database. *Language Learning & Technology*, 9(2), 90-110.
- Hulstijn, J. (1992). Retention of inferred and given word meanings: experiments in incidental vocabulary learning. In P. Arnaud, and H. Béjoint (Eds.), *Vocabulary and applied linguistics* (pp. 113-25). London: Macmillan.
- Johnson, A., & Heffernan, N. (2006). The Short Readings Project: A CALL reading activity utilizing vocabulary recycling. *Computer-Assisted Language Learning*, 19(1), 63-77.
- Koren, S. (1999). Vocabulary instruction through hypertext: Are there advantages over conventional methods of teaching? *TESL-EJ*, 4(1), 1-18. Retrieved March 29, 2009, from <http://tesl-ej.org/ej13/a2.html>.
- Levine, A., Ferenz, O., Reves, T. (2000). EFL academic reading and modern technology: How can we turn our students into independent critical readers? *TESL-EJ*, 4(4), 1-9. Retrieved March 29, 2009, from <http://tesl-ej.org/ej16/a1.html>.
- Lomicka, L. (1998). “To gloss or not to gloss”: An investigation of reading comprehension online. *Language Learning & Technology*, 1(2), 41-50.
- Loucky J.P. (2006). Maximizing vocabulary development by systematically using a depth of lexical processing taxonomy, CALL resources, and effective strategies. *CALICO Journal*, 23(2), 363-399.

- Loucky, J.P. (nd.). Improving online reading and vocabulary development. *KASELE Kiyo* 35, 181-187.
Retrieved March 1, 2009, from <http://www.call4all.us/misc/docs/KASELE-35-FINAL-from-pdf.docx>.
- Ma, Q., & Kelly, P. (2006). Computer assisted vocabulary learning: Design and evaluation. *Computer-Assisted Language Learning*, 19(1), 15-45.
- Mayer, R.E., & Sims, V.K. (1994). For whom is a picture worth a thousand words? Extensions of a dual-coding theory of multimedia learning. *Journal of Educational Psychology*, 86(3), 389-401.
- Nassaji, H. (2003). L2 vocabulary learning from context: strategies, knowledge sources, and their relationship with success in L2 lexical inferencing. *TESOL Quarterly*, 37(4), 645-670.
- Nelson, B. (1998). Web-based vocabulary activities: pedagogy and practice. *Computer-Assisted Language Learning*, 11(4), 427-435.
- Nesselhauf, N., & Tschichold, C. (2002). Collocations in CALL: an investigation of vocabulary-building software for EFL. *Computer-Assisted Language Learning*, 15(3), 251-279.
- Nunan, D. (1997). Strategy training in the language classroom: an empirical investigation. *RELC Journal*, 28(2), 56-81.
- O'Malley, J. M., & Chamot, A. U. (1990). *Learning strategies in second language acquisition*. Cambridge: Cambridge University Press.
- Peterson, M. (1997). Language teaching and networking. *System*, 25(1), 29-37.
- Roby, W.B. (1999). "What's in a gloss?" A commentary on Lara L. Lomicka's "To gloss or not to gloss": An investigation of reading comprehension online. *Language Learning & Technology*, 2(2), 94-101.
- Rott, S., Williams, J., & Cameron, R. (2002). The effect of multiple-choice L1 glosses and input-output cycle on lexical acquisition and retention. *Language Teaching Research*, 6(3), 183-222.
- Schmitt, N. (1997). Vocabulary learning strategies. In R. Carter & M. McCarthy (Eds.), *Vocabulary and language teaching* (pp. 198-218). New York: Longman.
- Spiri, J. (2008). Online study of frequency list vocabulary with the WordChamp website. *Reflections on English Language Teaching*, 7(1), 21-36.
- Spiri, J. (2007). Systemic online study of frequency list vocabulary. In M. Singhal & J. Lontas (Eds.), *Proceedings of the Third International Online Conference on Second and Foreign Language Teaching and Research-March 2-4, 2007 - Coming Together: The Shrinking Global Village*, 27-31. Retrieved March 29, 2009, from <http://www.readingmatrix.com/conference/pp/proceedings2007/spiri.pdf>.
- Stockwell, G. (2007). Vocabulary on the Move: Investigating an intelligent mobile phone-based vocabulary tutor. *Computer-Assisted Language Learning*, 20(4), 365-383.
- Sun, Y., & Dong, Q. (2004). An experiment on supporting children's English vocabulary learning in multimedia context. *Computer-Assisted Language Learning*, 17(2), 131-147.
- Taylor, A. (2006). The effects of CALL versus traditional L1 glosses on L2 reading comprehension. *CALICO Journal*, 23(2), 309-318.
- Tozcu, A., & Coady, J. (2004). Successful learning of frequent vocabulary through CALL also benefits reading comprehension and speed. *Computer-Assisted Language Learning*, 17(5), 473-495.
- Winograd, P., & Hare, V. C. (1988). Direct instruction of reading comprehension strategies: The nature of teacher explanation. In C. E. Weinstein, E. T. Goetz, & P. A. Alexander (Eds.), *Learning and study strategies: Issues in assessment instruction and evaluation* (pp. 121-139). San Diego: Academic Press.
- Yoshi, M. (2006). L1 and L2 glosses: their effect on incidental vocabulary learning. *Language Learning & Technology*, 10(3), 85-101.
- Yoshi, M., & Flaitz, J. (2002). Second Language incidental vocabulary retention: The effect of text and picture annotation types. *CALICO Journal*, 20(1), 33-58.
- Zapata, G., & Sagarra, N. (2007). CALL on Hold: The delayed benefits of an online workbook on L2 vocabulary learning. *Computer-Assisted Language Learning*, 20(2), 153-171.

ENHANCING NEGOTIATION OF MEANING THROUGH TASK FAMILIARITY USING SUBTITLED VIDEOS IN AN ONLINE TBLL ENVIRONMENT

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ABSTRACT

This study examines the effects of task familiarity through the use of subtitled videos on negotiation of meaning in an online task-based language learning (TBLL) environment. It explores the amount of negotiation of meaning produced by non-native speakers (NNSs) aimed at improving input comprehension to enhance second language acquisition. Ten NNS-NNS dyads collaboratively completed 4 communicative tasks using an online TBLL environment specifically designed for this study and a chat tool in WebCT-Vista. Five dyads were provided with subtitled videos prior to task completion; the remaining 5 dyads completed tasks without seeing the videos. The amount of negotiation of meaning was calculated via the negotiation of meaning sequences model developed by Gass and Varonis (1985) and revised for online communication by Smith (2003). The data from the chat-scripts showed that NNSs who were familiarized with tasks engaged in more negotiation of meaning as compared to their peers who were not.

INTRODUCTION

Online TBLL and Negotiation of Meaning

In recent years, research has shown Task-based Language Learning (TBLL) to be an effective approach in second language acquisition (Doughty & Pica, 1986; Ellis, 2001; Ellis & He, 1999; Ellis, Tanaka, & Yamazaki, 1994; Mackey, 1999; Pica, Young, & Doughty, 1987; Rulon & McCreary, 1986; Skehan, 1996; Willis, 1996; Willis, 2000). In TBLL, students focus on task completion, not on the study of a de-contextualized linguistic structure or a list of vocabulary items (Doughty & Long, 2003). The emphasis in TBLL is not on learning the language or form per se, but on engagement in the authentic, pragmatic, contextualized, and functional use of language.

As TBLL has gained respect, researchers have attempted to incorporate this approach into online classes, hoping to bring the strengths of TBLL to distance learners. Some of these benefits were found to be that it forced students to be active and involved in the task completion process promoting a fertile learning environment in addition to be fun, helpful, and/or conducive to improving learners' communication skills (Blake, 2000), that it offered more equal interactions without turn taking competition (Kitade, 2000), that students were able to scroll back and re-think what was discussed and re-formulate their own utterances before sending them (Kitade, 2000), that the web was making each individual much more accountable because all the evidence of participation was there (Sengupta, 2001), that students externalized their thinking through chat tools by means of writing, drawing, sketching, and sharing the artifacts with their peers and/or tutor (Zähner, Fauverge, & Wang, 2000), that task-based synchronous online communication could foster the negotiation of meaning (Pellettieri, 2000), that students were able to construct multiple perspectives on an issue and talk about critical subjects, such as alcohol, race, class, and gender, without any problem, and comfortably through online discussions (Müller-Hartmann, 2000), that the quantity of participation in online discussion increased as compared to face to face discussions (Müller-Hartmann, 2000), that it increased students' memorization of the abstract words (Tsou, Wang, & Li, 2002), and that students did not feel stressed during online communication (Beuvois, 1996; Chen, Belkada, Okamoto, 2004; Warshawer, 1995-96; Strambi & Bouvet, 2003).

As with all communicative language learning approaches, input comprehension during TBLL is essential to effective learning. Students must understand each other in order to complete the task posed in TBLL, overcoming the confusion caused by a lack of adequate vocabulary, usage errors, grammatical mistakes, and deficiency of cues and clues (through gestures, facial expressions, time, body language, and objects) in the online environment (Sengupta, 2001).

In order to achieve input comprehension, students must negotiate meaning; that is, they must modify their input until shared comprehension is achieved (Ellis, 1985; Long, 1996; Long & Porter, 1985). A rich body of research shows that increased negotiation of meaning results in improvements in input comprehension (Chaudron 1983; Long, 1985; Pica, 1987; Pica & Doughty, 1985; Pica, Young, & Doughty, 1987; Rulon & McCreary, 1986) and there is considerable evidence for a causal relationship between comprehensible input and second language acquisition (Ellis, 1985; Gass & Madden, 1985; Krashen, 1985; Long, 1981; Long, 1983).

There have been numerous efforts to examine the effect of task familiarity on negotiation of meaning. However, this research has been less than promising. Robinson (2001) compared negotiated interaction between a map task which students had prior knowledge of and another map task which students did not have prior knowledge of. For both tasks, one of the students was asked to give directions from point A to point B on the maps, and the other student was asked to listen and draw the routes described by the other student on the same maps with only point A marked on. Robinson reported that students provided with unfamiliar map got involved in more negotiated interaction (more confirmation checks as a measure of negotiated interactions used in the study) than did students given familiar map. Hardy and Moore (2004) found that students who were *not* given content support to familiarize them to the task generated significantly more negotiation of meaning sequences during task completion than students who were. These researchers have suggested that task familiarity may reduce the need for negotiation of meaning. Gass and Varonis (1985, p. 150) argued that “when interlocutors share a common background and language, the turn-taking sequence was likely to proceed smoothly without enough negotiation exchanges.” Robinson (2001) argued that unfamiliar tasks are more cognitively demanding than familiar tasks, resulting in an increased need for negotiation of meaning. However, the research on task familiarity shows some inconsistency, with Yule, Powers and McDonald (1992) reporting no significant difference between groups in a study in which the experimental group had access to sample transcripts of similar tasks and the control group did not. Given the limited research and inconclusive results on this topic, additional studies are needed to investigate the effect of task-familiarity in the pre-task phase of TBLL.

Subtitled Videos

In this study, we attempted to increase students’ task-familiarity through the use of subtitled videos. Task familiarity through observing subtitled videos helps students enhance task-familiarity by improving their memory as it relates to the knowledge of the assigned tasks. “Our memories change dynamically in the way they store information by abstracting significant generalizations from our experiences and storing the exceptions to those generalizations” (Schank, 1999, p. 2) and as we have more experiences, our memory structures are modified based on the new experiences by adding them to a general structure if there is a related one, otherwise, by creating a new general structure from the new experiences. By observing similar tasks, students fill gaps in their linguistic resources by attaching representations of experiences of native speakers that students have not had into their own memory. As students enhance their linguistic resource to draw on available prior knowledge about the assigned tasks, they will not spend much effort to retrieve information from their memory; consequently, more attentional and memory resources during task completion will be allocated to formulate language needed in order to express their ideas, development feature of the tasks, and negotiation of meaning (Ellis, 2003; Robinson, 2005; Skehan, 1998; Willis, 2000). Observing authentic subtitled videos allowed students to see a model of successful interaction, to be exposed to useful vocabulary and sentence structures within the context of an authentic situation while maintaining the need for them to generate their own original dialog. Swain (2000) stated that students who watch native speakers completing a similar task to their assigned tasks will be motivated to pay attention to form so as to produce language like native speakers. Also, observing similar tasks helps students reduce cognitive processing load, facilitate conversational development, and make things less threatening (Skehan, 1996; Skehan, 1998; Willis, 2000).

Each subtitled video segment presents a short dialog between two people engaged in a task similar to the one that students will address during the TBLL activity. These videos were embedded in the software and were available before students began the activity. Students could play the videos as many times as they wanted, pausing and reviewing at will and studying both the oral pronunciation and subtitles as long as they wished. In this way, we sought to take advantage of the affordances of the online environment, namely that it offers access to and learner control over rich media resources. We chose to show people engaged in similar tasks rather than the same tasks that students would address in the TBLL activity in order to maintain the cognitive complexity of the task. Using the same tasks in these videos might have encouraged students simply to replicate the dialog in their own discussion of the task.

Purpose of the Study

In this study, we used subtitled videos to enhance students' familiarity with the task they would address in an online TBLL activity. Our goal was to increase their task-familiarity with the vocabulary and sentence structures that would be immediately useful to them, but to do so in a way that did not reduce the cognitive complexity of the task so that they would be involved in more negotiation of meaning during task completion. The research question we addressed was therefore

Do non-native speakers with access to subtitled videos produce more negotiation of meaning than non-native speakers without access to subtitled videos in an online TBLL?

METHODS

Participants

Participants in this study were 20 non-native intermediate-level students in an English language institute in the southern United States. They were recruited from two sections of an intermediate level composition course, and had been taking other intermediate-level English courses for the previous three months. They represented a variety of first language backgrounds, including Korean, Mandarin, Arabic, Spanish, and Japanese. They ranged in age from 18 to 29 with the majority in their early twenties.

Participants were placed in the intermediate level composition course by the institute at the beginning of the semester based on a combination of their scores on TOEFL (Test of English Foreign Language), ELPE (English Language Proficiency Exam administered by Texas A&M University), and two in-house assessments: an interview with the director and a composition test (K. Clark, personal communication, November 7, 2006).

Online TBLL Environment

An online TBLL environment was developed for this research study (See Figure 1). The environment was designed to present four tasks for students to complete in dyads. The control button labeled "Your Task" was available to all dyads, and was used to display the instructions for each task. Subtitled videos in the environment were available only to the experimental group through the "Similar Tasks" button. The environment did not have an embedded chat tool; therefore, dyads used the chat tool provided by WebCT-Vista to complete the assigned tasks.



Figure 1. Main framework of the online TBLL environment and similar tasks.

Tasks. Four tasks, “Compare the Maps”, “Christmas Break Trip”, “Gifts for a Family”, and “Garage Sale”, were designed using the topology by Pica, Kanagy, & Falodun (1993) because it is considered one of the most informative typologies within the interactionist framework (Smith, 2003). In “Compare the Maps,” (see Figure 2) both students in a dyad were provided with the same map containing 15 buildings, six of which are clickable, along with trees, roads, and vehicles. Upon clicking one of the six clickable buildings, one activity in each building is displayed. Three of the displayed activities are the same for both members of the dyad, and three of them are different. Descriptions of the same activities are (1) a person repairing his TV, (2) a lady studying, and (3) a child feeding her dog. Descriptions of different activities are (1) a child playing with two different toys in two different ways, (2) a lady shopping for clothes versus another lady shopping for notebooks, (3) two teams playing basketball versus three people running. Dyads were asked to identify the similarities and differences between the activities occurring in the six buildings. Therefore, partners must exchange information in order to complete the task.

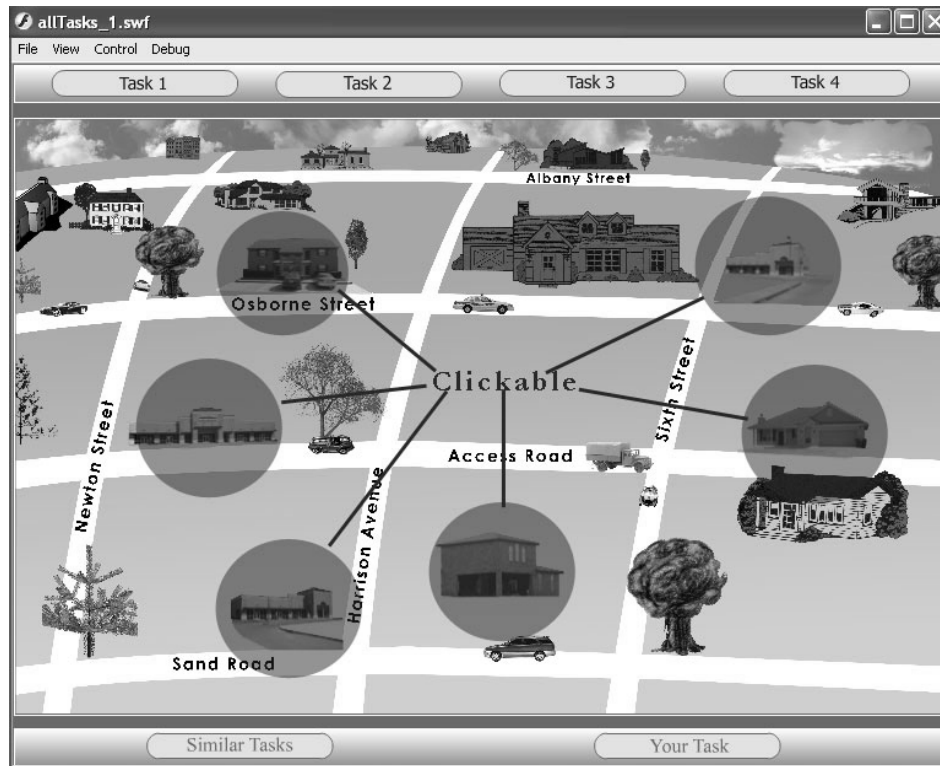


Figure 2. Compare the maps task.

In “Christmas Break Trip,” (see Figure 3) dyads were asked to imagine that they have decided to take a trip together during Christmas break. Each member of a dyad was provided with information about attractions, hotels, activities, and flights to three different cities (see Figure 4 and 5). Dyads were asked to exchange information and decide which city to visit during Christmas break.



Figure 3. Christmas break trip task.



Figure 4. Buttons used to learn about attractions, hotels, activities, and flights to three different cities in the “Christmas Break Trip” task.

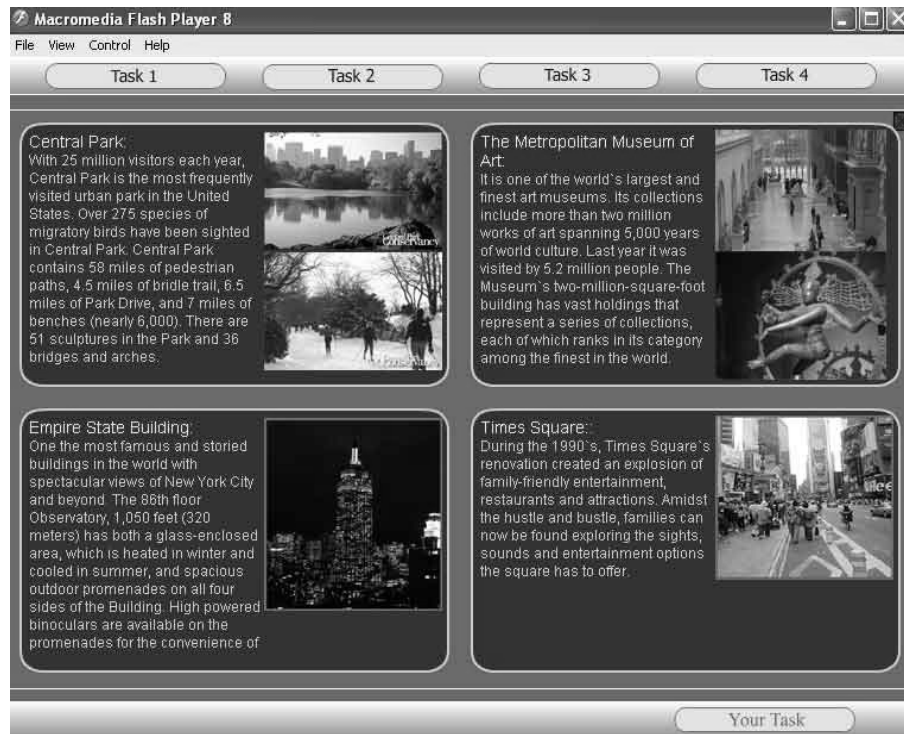


Figure 5. Attractions of the city of New York in the “Christmas Break Trip” task.

In the “Gifts for a Family,” (see Figure 6) students in the dyads were asked to decide on gifts for each member of a family of four people with whom they would be staying in the U.S. When students clicked on the house image marked with an arrow, a picture for each family member and their hobbies were displayed in the middle main content area, which was the same image for both members of the dyads. Students were then asked to decide on the amount of money to spend for each gift and what to buy for each family member based on his/her hobbies.



Figure 6. Gifts for a Family Task.



Figure 7. Garage Sale Task.

In the “Garage Sale,” (see Figure 7) students in the dyads were asked to imagine that they were dormitory roommates. Dyads are presented with their room and items in the room (see Figure 7). Both members of the dyads had the same image of a dormitory room with the same information on it. When students click on the items in the room, the items were zoomed in and additional information is given in the middle main content area. Students were asked to donate four items in their dorm room to be sold at a garage sale in order to help their class raise money for a trip to Niagara Falls. The dyads were asked to decide on the four items after talking about usefulness, value, condition, and transportation of the items, and discussing how they would convince people to buy them.

Treatment Conditions

One section of the course was randomly assigned to the experimental condition and the other section was assigned to the control condition. Because intact groups were utilized (each student was not randomly assigned to experimental and control groups but one group of students was randomly assigned to the experimental and the other group of students was randomly assigned to the control group), this study should be characterized as a quasi-experiment rather than a strict experiment. As explained above, participants were all drawn from an intermediate level class, but as a safeguard against outliers or unbalanced groups, the director of the institute reviewed group membership and determined the groups to be roughly equivalent in terms of English fluency.

After randomly assigning the two sections to experimental and control conditions, students in each group were randomly paired to form dyads. There were 10 dyads in the study, five in each of the two treatment conditions. Both groups were provided with the online TBLL environment; however, the experimental group had access to subtitled videos within the environment that they could watch before task completion.

Description of Subtitled Videos. Each subtitled video presents a short dialog between two native speakers engaged in a task similar to – but not the same as – the one students are about to complete. The videos were recorded in natural and authentic environments, and subtitles were provided below the video. The videos were recorded in real-life settings. Language used by the native speakers in the videos were not prescribed and prepared prior to the recordings. Native speakers were asked to complete tasks using language as if in real-life situations. The primary function of the subtitled video is not to illustrate and exemplify the workings of language and not to teach linguistic structure, but rather communicative, to share experiences of native speakers in similar task situations with the ones the students were expected to complete (Breen, 1985). Students were provided with

control buttons to be able to rewind, fast forward, play, stop, pause, or re-play each video at their will, and study the subtitles as long as they wished. See Table 1 for a brief description of the subtitled videos.

Table 1: *Description of Subtitled Videos*

Assigned tasks	Quantity	Topics of the subtitled videos
Compare the Maps	6	These focus on demonstrating and modeling an activity that is currently happening. These activities include playing a guitar, studying for an exam, making an omelet, getting ready to go home on a bike, and asking directions.
Gifts for a Family	2	Two native speakers play a couple who are deciding on gifts for their relatives, whom they are planning to visit.
Christmas Break Trip	3	Two native speakers play a couple who are making travel plans for a Thanksgiving trip.
Garage Sale	6	Speakers discuss items in their house in order to decide which to sell at a yard sale to raise money to save an endangered animal species. They talk about the value of each item, the condition of each item, the use of each item, and reasons customers might buy them.

Procedures

All dyads met twice during regularly scheduled class meetings, each of which lasted about 2 hours. Two computer labs were used for the study. To ensure that none of the dyads worked face-to-face, one member of each dyad was assigned to work in each computer lab. Dyads completed two tasks in each session for a total of four tasks. Before beginning the experiment for each task, all students were given 10 minutes of instruction on how to use the online TBLL environment and WebCT Vista. After the training, each student was sent to the computer lab to which he or she was randomly assigned. Students were given 50 minutes to complete each task.

Data Source

The chat tool that students used to complete the assigned tasks created a transcript of their interaction. Because dyads had no other means of communication, this transcript captured all of the language they produced in the course of their interaction. The transcripts of each of the 10 dyads were analyzed for comparison by treatment condition.

The dependent variable in this study is the ratio of negotiated turns to total number of turns. A turn is considered to occur whenever there is a transfer of the floor from one student to another. Negotiated turns are those turns that occur in negotiation of meaning sequences, which is the most widely used model of negotiation (Smith 2003, p. 39). The total number of negotiated turns in a negotiation of meaning sequence shows the amount of negotiation of meaning occurred in that negotiation of meaning sequence. For example, there are 7 negotiated turns in Excerpt 1 while there are only 2 negotiated turns in Excerpt 2. Although both of them are negotiation of meaning sequences, more negotiation of meaning occurs in Excerpt 1 as compared to negotiation of meaning in Excerpt 2.

Excerpt 1

H.Y.: i see that he repair the t.v.	
A.Q.: he fix the TV or what	Turn 1
H.Y.: mend,repair	Turn 2
A.Q.: what is mean	Turn 3
H.Y.: put in order	Turn 4
H.Y.: reform	
A.Q.: the TV has prablom and he wanted to fix or what	Turn 5
H.Y.: correct	Turn 6
H.Y.: improve	
H.Y.: antena correct	
H.Y.: i don't know	
A.Q.: good it is defferend too	Turn 7

Excerpt 2

B.K.: Whenever you can see the runner on the third floor	
B.K.: It's good	
J.K.: sorry I couldn't undersand your saying.	Turn 1
B.K.: That;s ok	Turn 2

The ratio of negotiated turns to total turns was used as a dependent variable because a direct comparison of the number of negotiation of meaning sequences across groups may be sensitive to the amount of talk produced by the dyads in each group. That is, dyads in the experimental group may produce more negotiation of meaning sequences not because they are involved in a higher rate of negotiation of meaning, but because they produce more talk. It has been reported previously that students provided with subtitled videos produced more talk than students who were not provided with them (Arslanyilmaz, 2007). In order to remove the effect of the amount of talk from the amount of negotiation of meaning produced by dyads, a ratio was calculated for each dyad.

Data Coding

In order to calculate the ratio of negotiated turns to total turns, it was first necessary to code the data and count the number of negotiation of meaning sequences, the number of turns within these sequences (negotiated turns), and the total number of turns.

All negotiation of meaning sequences were identified using the model developed by Varonis and Gass (1985) and revised by Smith (2003). As defined in the model, negotiation of meaning sequences consist of two parts: trigger and resolution. The trigger <T> is the utterance or portion of an utterance on the part of the speaker that results in some indication of non-understanding on the part of the listener (Varonis & Gass, 1985, p. 74) as shown in Excerpt 3. Many types of triggers have been reported in the literature including lexical, syntactic, content, task related triggers (Smith, 2003); discourse, phonetic, language complexity, task complexity by Doughty (as cited in Gonzalez-Lloret, 2003), and any aspect of the discourse including as a question and as neither a question nor an answer (Varonis & Gass, 1985).

Five types of triggers were found in this study: *lexical* as shown in Excerpt 3, where the listener did not understand one of the lexical items in the speaker's utterance; *content* as shown in Excerpt 4, where the entire content of the previous message was somewhat problematic or vague; *syntactic* as shown in Excerpt 5, where the structure or grammar of the speaker's message was not understood by the listener; *task complexity* as shown in Excerpt 6, where non-understanding occurred because of a difficult aspect of the task; and *discourse* as shown in Excerpt 7, where communication problems arose because of the general incoherence of the conversation caused an inability to reference a pronoun correctly or differing opinions of the listener and speaker.

The resolution part of a negotiation of meaning sequence consists of an indicator, and perhaps a response, the reaction to the response, a confirmation, and a reconfirmation (Smith, 2003; Varonis & Gass, 1985). Indicators, the written communication where the listener signals that there is a non-understanding, were coded <I>. Responses, where the original speaker attempted to clear up the non-understanding, were coded <R>. Reactions to the response in which the listener signaled a degree of understanding were coded <RR+> and those that indicated continued difficulty with the speaker's response were coded <RR->. Confirmations, which indicate a positive reaction to the response <RR+>, that is, that some degree of understanding was achieved by the listener, were coded <C>. Reconfirmations, where even a minimal response to the respondent's confirmation occurred were coded <RC>.

Excerpt 3

Lexical Item Trigger

H.Y.: shall we but it?	<T>
A.Q.A: what shall	
A.Q.A.: what is shall	<I>
H.Y.: shall we go to buy it?	<R>

Excerpt 4

Content Trigger

A.H.: I was looking for the attractions and that just make me be excited	<T>
L.Y.: What kind of attractions? Could you tell me?	<I>
A.H.: There we can visit Walt Disney World, Discovery Cove,Epcot Center and the Universal Studios	
A.H.: it could be fun	<R>
L.Y.: Yes, that sounds very good. How about the prices?	<RR+>Implicit<TAR>

Excerpt 5

Syntactic Trigger

A.Q.A.: what do you thing about Brushed that machian do	
damage the papers	<T>
H.Y.: whats mean?	<I>
A.Q.A.: machian do damage the papers	<R>
H.Y.: what damage?	<RR->
A.Q.A.: it is next the referajrater	<R2>
H.Y.: ok	<RR+>

Excerpt 6

Task Complexity Trigger

S.K.: In book store building, a woman is looking around the shop,	
She has an aggi T- shirt.	<T>
C.D.: In my picture she has a black coat	
C.D.: Has she a back bag?	<I>
S.K.: No, she wears yellow coat.	
S.K.: She does not have any bag.	<R>
C.D.: Ok. They are different.	<RR+>Explicit
S.K.: OK.	<C>

Excerpt 7

Discourse Trigger

I.J.: do you know tori?	<T>
K.K.: tori	<I>
I.J.: she is in the video	<R>
K.K.: tori is a couch of Newyork Yankees	
K.K.: coach	<RR->Implicit<TD>

Negotiation of meaning sequences produced by each dyad and consisting of a T-I-R, a T-I-R-RR, a T-I-R-RR-C, or a T-I-R-RR-C-RC were identified and counted. The negotiation of meaning sequences consisting of only a T-I were not included in the data analysis. After identifying the negotiation of meaning sequences, the total number of turns and negotiated turns as seen in Excerpts 1 and 2 were counted for each dyad. Finally, a ratio of negotiated turns to total turns was calculated.

Reliability

A random selection of 10% of the language produced by dyads in each of the two treatment conditions were coded by an independent rater to identify negotiation of meaning sequences using the same procedures as described in this study. The agreement for the ratings of the negotiated turns in the negotiation of meaning sequences was 85% for the experimental group and 90% for control group.

Data Analysis Technique

This study used only one 2-tailed independent group t-test. The set of dependent variables is made up of the ratio of negotiated turns to total turns in each group. Therefore, there is one dependent variable in the 2-tailed t-test for both experimental and control groups. 2-tailed independent group t-test is used to compare the two groups of dependent variables, namely ratio of negotiated turns to total turns produced by students in the experimental group and ratio of negotiated turns to total turns ratio produced by students in the control group. These two groups of dependent variables are not related to each other in any way because the negotiated and total turns in the two groups are produced by different students in two different groups.

RESULTS AND DISCUSSION

Table 2 shows the number of negotiation of meaning sequences, total turns, negotiated turns, and ratio of negotiated turns to total turns produced by all dyads across the experimental and control groups (see Table 3 for range of negotiation of meaning sequences, total turns, negotiated turns, and negotiated turns to total turns ratios). Table 2 shows that negotiation of meaning sequences accounted for about 17% of the total turns generated by control group dyads. In contrast, negotiation of meaning sequences accounted for about 30% of the total turns generated by dyads in the experimental group. This result suggests that when provided with subtitled videos, students engage in negotiated interaction in about one-fourth of their total interaction while when students are not provided with subtitled videos, they engage in negotiated interaction in about one-sixth of their total interaction. These figures also suggests that students with subtitled videos in an online TBLL environment

produce about three times more negotiation of meaning sequences, about two times more turns, and about three times more negotiated turns than do students without subtitled videos.

Table 2: *Total Negotiation of Meaning Sequences, Total Turns, Negotiated Turns*

Groups	Negotiation of meaning sequences	Negotiated turns	Total turns	Ratio of negotiated turns to total turns
Control Group	32	128	765	0.17
Experimental Group	94	393	1374	0.30

Table 3: *Range of Negotiation of Meaning Sequences, Total Turns, Negotiated Turns, and Ratio of Negotiated Turns to Total Turns*

Range				
Groups	Negotiation of meaning sequences	Negotiated turns	Total turns	Negotiated turns to total turns ratio
Control Group	5-9	15-36	169-401	0.10-0.22
Experimental Group	16-23	57-90	107-192	0.24-0.34

Table 4 shows the results of an independent samples *t* test with the percentage of turns negotiated as the dependent variable and groups as the independent variable. This table shows that dyads provided with subtitled videos produced a significantly higher percentage of negotiated turns than dyads that were not provided with subtitled videos. One of the reasons for the significant result with a small number of participants is the low within group variance, variance between students prior to the experiment. This was undoubtedly partly a result of the sample selection procedure in that participants were chosen from a homogenous group of English language students. Another reason for the significant result is high between group variance, mean differences between the ratios of negotiated turns to total turns for students who were provided with the subtitled videos and for students who were not provided with the subtitled videos. This high between variance is obtained because students were exposed to the treatment for an extended period of time, which increased the effect size ($d = 2.82$). That is, students completed each task in 50 minutes for a total of four tasks in 200 minutes. During this time period, students in the experimental group observed subtitled videos as many times as they wanted.

The answer for our research question appears to be that non-native speakers with access to subtitled videos produce more negotiation of meaning than non-native speakers without access to subtitled videos in an online TBLL.

Table 4: *Comparison of Mean Percentage of Negotiated Turns to Total Turns across Groups*

Group	N (Dyads)	M	SD	T	df	Sig. (2 tailed)	99% Conf. Int.	
							Lower	Upper
Control Group	5	.17	.046	-4.48	8	.002*	-.23	-.033
Experimental Group	5	.30	.046					

* $p < .01$

CONCLUSION

Results from this study indicate that using subtitled videos to enhance students' familiarity with the tasks increases the amount of negotiation of meaning students engage in during TBLL. These results stand in contrast to the limited existing research on this topic that found either no benefit for interventions aimed at increasing task familiarity (Yule et al., 1992) or higher performance for a control group not receiving the intervention (Hardy & Moore, 2004; Robinson, 2001). On the other hand, these results are consistent with a growing body of research suggesting that the use of videos in language instruction can be successful for a variety of goals (Borras & Lafayette, 1994; Garza, 1991; Gass et al., 1999; Neuman & Koshinen, 1992; Révész & Han, 2006; Taylor, 2005).

Enhanced negotiation of meaning shows that task familiarity through subtitled videos freed up attentional and memory resources of students from language form and meaning, which resulted in paying more attention to

negotiation of meaning and formulating language needed to express ideas during task completion. This result is congruent with suggestions by Ellis (2003), Robinson (2005), Robinson (2001), Skehan (1996, 1998), and Willis (2000).

These results challenge the role that pre-task interventions can play in enhancing the effectiveness of TBLL. In particular, previous researchers have questioned whether interventions designed to enhance learners' familiarity with the task actually make tasks less cognitively demanding, reducing the need for learners to negotiate meaning and perhaps undermining other learning outcomes. Our findings suggest that the greater task familiarity achieved through subtitled videos may influence not only the amount of language produced but the willingness of students to pursue understanding through negotiation of meaning. Whether increasing task familiarity enhances students' confidence level so that they become more engaged or undermines the challenge of TBLL to the point where students have no need to negotiate meaning may depend on the nature of the task or type of learners. Additional research is needed to understand better the potential of interventions designed to increase task familiarity during TBLL for different types of tasks and learners.

Additional research is also needed to understand the best conditions for the use of subtitled videos in TBLL. The subtitled videos used in the study focused on similar tasks rather than demonstrating native speakers engaged in the same task as students. This decision was based on an assumption that the use of similar rather than the same tasks would help to maintain the complexity of TBLL; this assumption should, however, be tested empirically.

In the past, producing videos and teaching a second language through videos were cumbersome tasks. However, with the recent advances in technology, preparing videos and embedding them in online courses can be accomplished by any second language teacher and can easily be a component of any professionally developed language learning materials. A greater understanding of how to use this medium effectively within online language learning environments may help us to enhance learning from promising approaches such as TBLL.

REFERENCES

- Arslanyilmaz, A. (2007). *Using similar tasks to increase negotiation of meaning and language production in an online second language learning environment*. Unpublished doctoral dissertation, Texas A&M University, College Station.
- Blake, R. (2000). Computer mediated communication: A window on L2 Spanish interlanguage. *Language Learning and Technology*, 4(1), 120-136.
- Borras, I., & Lafayette, R. C. (1994). Effects of multimedia courseware subtitling on the speaking performance of college students of French. *The Modern Language Journal*, 78 (1), 61-75.
- Breen, M. (1985). Authenticity in the language classroom. *Applied Linguistics*, 6/1, 60-70.
- Chaudron, C. (1983). Simplification of input: Topic reinstatements and their effects on L2 learners' recognition and recall. *TESOL Quarterly*, 17(3): 437-458.
- Chen, J., Belkade, S., & Okamoto, T. (2004). How a web-based course facilitates for acquisition of language for academic purposes. *Language Learning and Technology*, 8(2), 33-49.
- Doughty, C., & Long, M. (2003). Optimal psycholinguistic environments for distance foreign language learning. *Language Learning & Technology*, 7(3), 50-80.
- Doughty, C., & Pica, T. (1986). "Information gap" tasks: Do they facilitate second language acquisition? *TESOL Quarterly* 20: 305-25.
- Ellis, R. (1985). Teacher pupil interaction in second language development. In S. Gass and C. Madden (Eds.), *Input in second language acquisition* (pp. 69 – 85). Rowley, MA: Newbury House.
- Ellis, R. (2001) Non-reciprocal tasks, comprehension and second language acquisition. In M. Bygate, P. Skehan and M. Swain (eds). *Researching Pedagogic Tasks*. London: Longman.
- Ellis, R. (2003). *Task-based language learning and teaching*. Chapter 1: Tasks in SLA and language pedagogy. (pp. 1-36). Oxford: Oxford University Press
- Ellis, R., & He, X. (1999). The roles of modified input and output in the incidental acquisition of word meanings. *Studies in Second Language Acquisition*, 21, 285-301.
- Ellis, R., Tanaka, Y., & Yamazaki, A. (1994). Classroom interaction, comprehension, and the acquisition of L2 word meanings. *Language Learning*, 44, 449-491.
- Garza, T.J. (1991). Evaluating the use of captioned video materials in advanced foreign language learning. *Foreign Language Annals*, 24(3), 239 – 258.
- Gass, S., Mackey, A., Fernandez, M., & Alvarez-Torres, M. (1999). The effects of task repetition on linguistic output. *Language Learning*, 49, 157-94.
- Gass, S., & Madden, C. (Eds.). (1985). *Input in second language acquisition*. Rowley, MA: Newbury House.

- Gass, S., & Varonis, E.M. (1985). Task variation and nonnative/nonnative negotiation of meaning. In S. Gass and C. Madden (Eds.), *Input in second language acquisition* (pp. 149-161). Rowley, MA: Newbury House.
- Hardy, I. M., & Moore, J. L. (2004). Foreign language students' conversational negotiations in different task environments. *Applied Linguistics*, 25(3), 340-370.
- Kitade, K. (2000). L2 learners' discourse and SLA theories in CMC: Collaborative interaction in internet chat. *Computer Assisted Language Learning*, 13(2), 143-166.
- Krashen, S. (1985). *The input hypothesis*. London: Longman.
- Long, M. (1981). Input, interaction and second language acquisition. In H. Winitz (Ed.), *Native language and foreign language acquisition* (p. 379). New York. Annals of the New York Academy of Sciences.
- Long, M. (1983). Native speaker/nonnative speaker conversation in the second language classroom. In M. A. Clarke and J. Handscombe (Eds.), *On TOSEL '82* (pp. 207-225). Washington, DC: TESOL.
- Long, M. H. (1985). Input and second language acquisition theory. In S. Gass and C. Madden (Eds.), *Input in second language acquisition* (pp. 377 – 393). Rowley, MA: Newbury House.
- Long, M. (1996). The role of linguistic environment in second language acquisition. In W. C. Ritchie & T. K. Bhatia (Eds.), *Handbook of second language acquisition* (pp. 413-468). New York: Academic Press.
- Long, M. H., & Porter, P. A. (1985). Group work, interlanguage talk, and second language acquisition. *TESOL Quarterly*, 19(2), 207-28.
- Mackey, A. (1999). Input, interaction, and second language development: An empirical study of question formation in ESL. *Studies in Second Language Acquisition*, 21, 557-589.
- Müller-Hartmann, A. (2000). The role of tasks in promoting intercultural learning in electronic learning networks. *Language Learning & Technology*, 4(2), 129-147.
- Neuman, S., & Koshinen, P. (1992). Captioned television as comprehensible input: Effect of incidental word learning from context for language minority students. *Reading Research Quarterly*, 27 (1), 95-106.
- Pellettieri, J. (2000). Negotiation in cyberspace. The role of chatting in the development of grammatical competence. In M. Warschauer, & R. Kern (Eds.), *Network-based language teaching: Concepts and practice* (pp. 59-86). Cambridge, England: Cambridge University Press.
- Pica, T. (1987). The impact of interaction on comprehension. *TESOL Quarterly* 21(4), 737-58.
- Pica, T., & Doughty, C. (1985). The role of group work in classroom second language acquisition. *SSLA (Studies in second language acquisition)*, 7, 233-248.
- Pica, T., Kanagy, R., & Falodun, J. (1993). Choosing and using communication tasks for second language instruction. In G. Crookes & S. Gass (Eds.), *Tasks and language learning: Integrating theory and practice*. Vol 1. (pp. 9-34). Clevedon, England: Multilingual Matters.
- Pica, T., Young, R., & Doughty, C. (1987). The impact of interaction on comprehension. *TESOL Quarterly*, 21(4), 737-58.
- Porter, P. A. (1986). How learners talk to each other: Input and interaction in task-centered discussions. In R. R. Day (Ed.), *Talking to learn: Conversation in second language acquisition* (pp. 200-222). Cambridge, MA: Newbury House.
- Robinson, P. (2001). Task complexity, task difficulty, and task production: Exploring interactions in a componential framework. *Applied Linguistics*, 22: 27-57.
- Robinson, P. (2005). Cognitive complexity and task sequencing: Studies in a Componential framework for second language task design. *IRAL*, 43, 1-32.
- Rulon, K. A., & McCreary, J. (1986). Negotiation of content: Teacher-fronted and small group interaction. In R. R. Day (Ed.), *Talking to learn: Conversation in second language acquisition* (pp. 182-189). Cambridge, MA: Newbury House.
- Schank, R. C. (1999). *Dynamic memory revisited* (2nd ed.). Cambridge: Cambridge University Press.
- Sengupta, S. (2001). Exchanging ideas with peers in network-based classrooms: An aid or a pain? *Language Learning and Technology*, 5(1), 103-134.
- Skehan, P. (1996). Second language acquisition research and task-based instruction. In J. Willis and D. Willis, *Challenge and Change in Language Teaching*. (pp. 52-62). Oxford: Heinemann.
- Skehan, P. (1998). *A Cognitive Approach to Language Learning*. Oxford: Oxford University Press.
- Smith, B. (2003). Computer-mediated negotiated interaction: An expanded model. *The Modern Language Journal*, 87, 38-58.
- Strambi, A., & Bouvet, E. (2003). Flexibility and interaction at a distance: A mixed-mode environment for language learning. *Language Learning & Technology*, 7(3).
- Swain, M. (2000). The output hypothesis and beyond: Mediating acquisition through collaborative dialogue. In J. P. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 97-114). Oxford: Oxford University Press.

- Taylor, G. (2005). Perceived processing strategies of students watching captioned video. *Foreign Language Annals*, 38 (3), 422-427.
- Tsou, W., Wang, W., Li, H. (2002). How computers facilitate English foreign language learners acquire English abstract words. *Computers & Education*, 39, 415-428.
- Varonis, E. M., & Gass, S. (1985). Non-native/non-native conversations: A model for negotiation of meaning. *Applied Linguistics*, 6 (1), 71-90.
- Warschauer, M. (1995-1996). Comparing face-to-face and electronic discussion in the second language classroom. *Calico Journal*, 13(2-3), 7-26.
- Willis, J. (1996). A flexible framework for task-based learning. In J. Willis and D. Willis, *Challenge and Change in Language Teaching*.(pp. 52-62). Oxford: Heinemann.
- Willis, J. (2000). *A framework for task-based learning*. London: Longman
- Yule, G., Powers, M., & McDonald, D. (1992). The variable effects of some task-based learning procedures on L2 communicative effectiveness. *Language Learning*, 42, 249-277.
- Zähner, C., Fauverge, A. & Wong, J. (2000). Task-based language learning via audiovisual networks. In Warschauer, M. & Kern, R.(Eds.), *Network-based Language Teaching: Concepts and Practice*, 186-203, Cambridge University Press, Cambridge, UK.

ETHICS IN E-LEARNING¹

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ABSTRACT

e- Learning environments require policies balancing different expectations of participants and considering how the users perceive ethics during online learning. As in the case of face-to-face classes; learners must show respect and tolerance among each other, and conduct civil relations and interaction based on pre-determined rules.

Starting with a literature review, the purpose of this study is to analyze the opinions of the instructors and 3rd - 4th year students of a distance education program about ethical conduct and interaction. The research methodology is case- oriented. Learner diversity, behavioral and legal regulations in the online environment are the parameters chosen for surveying the instructors and learners. Following the analysis of results, the opinions of the students and those of the instructors are explained and discussed.

Keywords: Ethics, e- Learning, ethics in e- Learning, distance education.

INTRODUCTION

To begin with, in general terms, ethics is about ‘what people should do’. Ethical questions arise, when different interests of individuals conflict and thus there is need for a higher level of principles that are fair to the rights of all concerned (Schultz, 2005). These principles are fair in the sense that all members of the society accept them as binding, in order to solve the conflict of interests. So the principles are shared by the community, for every one’s well being. A learning environment is no exception to this mentality. There is a social contract about norms and expectations for all interactions. In this connection, ethical principles mean cooperative and rational norms that have higher priority when compared with self-interests of the participants. This is why ethics in a learning environment denotes sensitivity to multicultural understanding, tolerance and civility (Schultz). Ethical considerations in e- Learning are derived from both communication ethics and instructional ethics.

Contrary to the understanding that there must be some norms, there are academicians that assert; using codified solutions, rigid rules does not lead to the real solution of the ethical problems at higher education institutions. Macfarlane argues that an understanding of ethics depending on detailed codes of rules and regulations is very restrictive and takes professionals’ autonomy away also limiting their critical thinking about their own practice (Haughey, 2007). However problems arise when there are no red lines. At the very beginning, the institution must determine what is expected from the instructors and the students.

On the other hand, collaboration of different professionals may ease solving the ethical issues, since the combination of different experiences can lead to some constructive decisions (Loui, 1999) as guide to be followed by users of learning environments. Such an approach if supported with the feedback of the users, and reviewed via both internal and external evaluation, can be a better way of bringing general acceptability to the relativism inherent to the concept of “ethics”.

In this study, learner diversity, behavioral and legal regulations for conduct at online courses are the parameters chosen for surveying the participants of an online learning environment. The case oriented, explanatory study focuses on the opinions of the students and instructors.

Theoretical Background

In the last two decades, online education has become very popular. Due to the increase in it use, special interest has grown about ethical issues of online learning. Besides emphasis on instructional ethics, instructors are faced with different issues of concern encountered at online spaces (Zembylas & Vrasidas, 2005). Since the Internet erases the boundaries and limitations to educational opportunities, there are new challenges to be managed by distance educators.

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According to Lengel, online ethics emanates from computer ethics and the ethical implications of technology (2004). In order to understand online ethics, Lengel drives attention to the Code of Ethics developed by Association for Computing Machinery (ACM) as the world's largest educational and scientific computing society. ACM has 92.000 members from over 100 different nations (<http://www.acm.org/membership/acm-at-a-glance>). The Code of Ethics lists the general moral imperatives as (1) contributing to society and human well-being (2) avoiding harm to others (3) being honest and trustworthy (4) being fair and taking action not to discriminate (5) honoring the property rights such as copyrights and patents (6) giving proper credit for intellectual property (7) respecting the privacy of others (8) honoring confidentiality (<http://www.acm.org/about/code-of-ethics>). This list provides a general framework for online learning environments with its emphasis on civility of communication and using/sharing information. This framework can lead institutions to develop their own guidelines for users.

Gearhart compares online interaction with face-to-face interaction when studying ethics. She informs that netiquette (Internet ethics) issues are mainly related with the psychological distance. According to her, this emanates from the fact that during face-to-face interaction, one can see the results of inappropriate and unethical behaviors immediately. However, online interaction feels less personal since the other person in the exchange is not generally seen or heard. This is especially why online communication is more demanding and necessitates more care. Gearhart proposes that this situation can be managed by institutions in two ways: (1) by setting a policy that provides a model for students to follow and (2) involving technology ethics issues in the curriculum (Gearhart, 2001). As part of the legal issues in ethics for e- Learning, research ethics must be a responsibility of the users however monitored by the related institution.

Academic fraud is another important issue with distance education in general. It may be more problematic than the conventional on-campus classes, since it is more difficult to ascertain whether the distance student is doing the work and the assignment is indeed done by the student enrolled or not. Gearhart reminds that it is the educational institution that should inform the students on collegiate ethics and academic honesty (2005). She complains that students coming from high schools do not understand these issues. This must be a universal problem that each higher education institution faces. Providing this academic vision to students is vital for both traditional and distance programs. However developing a guide for distance students must be more content rich as Gearhart has listed: (1) Ethics of examinations (2) use of sources on papers and projects (3) writing assistance and other tutoring (4) collecting and reporting data (5) use of academic resources (6) respecting the work of others (7) computer ethics (8) giving assistance to others (9) adherence to academic regulations (2005). It is important to keep in mind that in distance education, the student population is more diverse.

Researchers have suggested different approaches to prevent academic dishonesty. Hinman (2000), has suggested three approaches. The first one seeks to develop students who do not want to cheat. Secondly, the prevention approach seeks to eliminate or reduce opportunities for students to cheat. The third one is the police approach that seeks to catch and punish those who cheat (Isa, Samah ve Jusoff, 2008). The policies have to be made accessible to students, notifying the users, both instructors and students regularly.

Online interaction is important for instructors as well. Successful online interaction (a/synchronous) is important for facilitation purposes (Hawkes, 2006). Hawkes classifies course interactions in two groups:

1. between instructor and learner in the form of motivational messages
2. between learners,
 - a. on the content and protocol of the course itself
 - b. on social exchange.

When the quality of the interaction and thus its success is taken into consideration, the ethical nature is important as well. Hawkes suggests that linguistic strategies may be used to compare and understand the nature of the interaction. Both qualitative and quantitative analyses can be utilized. Qualitative, text based analysis seems to offer more when compared with quantitative analysis, such as taking number and length of posted messages into consideration. Besides, the interaction as a requirement of the online course is vital, making social exchange an important ingredient of e- Learning. Forums are the venue where learners socialize, however this experience also can be an opportunity when carried out according to specific rules that protect the rights of all users.

McMahon, on the other hand drives attention to the ethical problems that may arise on the side of the instructors, facilitators and designers when preparing an online course (2007). He argues that the course integrity problem which he explains as course approval and revision process is needed for quality control. The misrepresentation problem that may arise in case information on the web does not match the catalog information about the course,

intellectual property problems (whether the content belongs to the institution or the instructor) and the succession planning problem (deciding who is to monitor the course with its online interpretation) are the important issues to be managed. These hard core issues are organically linked with the valorization and accreditation of courses and programs as well. Under the light of regular evaluation and tracking by institutions; academicians and practitioners may collaborate in a systematic approach.

Instructional ethics requires granting educational opportunities to anyone on an equal basis; disregarding nationality, gender, ideological differences or mental/physical disabilities. Through this perspective, online learning environments have an important potential, owing to the nature of the learning environment, to reach large audiences. Ethics in e- Learning, considering the number and diversity of students in these environments necessitate policies balancing different expectations and studying how the users perceive proper conduct. It is mainly the responsibility of the higher education institutions to prepare the related frameworks and monitoring them. This is crucial for both the successful functioning of the system and meeting the expectations of the users.

Rationale of the Case- Study

The main aim of this study is to examine the opinions of a distance English language teacher training program's instructors and students, as regards ethics in online learning environments.

In this respect, the present study addressed the following questions:

- What are the opinions of the instructors and students with regard to the learner diversity within the online courses?
- What are the opinions of the instructors and students with regard to the behavioral and legal regulations within the online courses?

METHODOLOGY AND RESEARCH DESIGN

The Program under spectacles is a four-year undergraduate program offered via utilizing distance education techniques. The aim of the program is to meet the demand for English teachers in the primary and secondary schools. What is unique about the program is that the first two years' courses are offered face-to-face and the last two years' courses are supported with online learning. However the online courses are a supportive material, not the core learning material. There is no obligation for the students to participate.

As regards the behavioral and legal codes of the e-Learning pillar, general instructions for the use of the online environment are given at the entrance page of the site. These are named under the heading "orientation" to the program. Ethical codes and legal regulations for proper communication at the discussion board are listed at the entry page to the forum.

The study has an explanatory case oriented research design. A survey research was conducted to collect data and examine the opinions of the users of an online learning environment. The descriptive analysis of the opinions sheds light for decision makers. For developing the questionnaires, Badrul H. Khan's "Ethical Checklist" has been referenced and adapted to 5 point Likert type scales, responses ranging from (1) strongly disagree, (2) disagree, (3) undecided, (4) agree and (5) strongly agree. The two measuring instruments adapted from Khan's checklists for students and instructors were translated to Turkish and the back translation was completed with relatively high consistency.

Khan has classified the ethical considerations in e- Learning as: (1) Social and political influence (2) cultural diversity (3) bias (4) geographical diversity (5) learner diversity (6) digital divide (7) etiquette (8) legal issues (2005). In this study, learner diversity, legal and behavioral regulations are the parameters examined. As regards learner diversity, an e-Learning environment should respond to different learning styles. Besides individual differences, special needs of the learners such as disabilities need to be taken into consideration (Khan, 2005). Bearing in mind that diverse learners have different learning needs; the instructor, course designer and discussion moderators must be sensitive and innovative about involving them in the e-Learning environments.

The interest towards the environment and identification with the learning community necessitates behavioral codes. They also motivate learners to be cooperative. Khan defines *etiquette* as the framework for the civility of interactions, via providing standards of considerate behavior. For example during both a/synchronous communications, participants should be prevented from challenging each other personally. This can be achieved via predetermined rules for forums. There is an institutional responsibility arising here for developing e-Learning guides and rules based on preventive measures. Khan reminds that institutions should also "inform" the students about the rules of conduct, such as prohibitions about using others' personal information, not forwarding private

e-mails to third parties without permission. Plagiarism and copyright are two other sensitive areas about which instructors and students must be informed and warned about. They must be encouraged for academic research, however referencing previous scholarly works and being sensitive about the intellectual property rights of the learning materials must be highlighted.

Data Collection

The research was carried out during the 2006-2007 academic year with a population of 2767 3rd year students and 3461 4th year students, enrolled at the language program. The population of the instructors was 31. Among these students, living in each province of Turkey, 10 % of the total number of students was determined as the sample population. As regards the instructors, the whole population was addressed for surveying.

The student questionnaire was uploaded to the program website and was answered by 250 students. The instructor questionnaire was sent to 31 instructors' e-mail addresses and 23 of the questionnaires were answered and sent back. Both questionnaires were composed of two sections on (1) learner diversity (2) behavioral and legal regulations. The items related to these headings were given on 5 point Likert scales.

Data Analysis

For the descriptive analysis of the survey data, the frequencies of the student and instructor opinions have been presented, comparing the ideas and expectations of these two groups of online learning environment users.

RESULTS

Opinion by students and instructors with regard to learner diversity

As tabulated in Table 1, opinions of students and instructors are similar about conducting surveys related with learning style, hardware ownership, physical disabilities of students. More than 90% of the students and instructors mention that the jargon, idioms, humor and acronyms must be explained in the course content to make it more understandable and facilitating. All instructors (100%) state that links to the resource site(s)/glossaries, where interpretations of jargon and terminology are available, should be used within online courses to facilitate the student comprehension.

Table 1. Opinions of Students and Instructors on Learner Diversity

LEARNER DIVERSITY	Student (n=250)										Instructor (n=23)										
	SD		D		UD		A		SA		SD		D		UD		A		SA		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Surveys to assess the learning styles of target population should be done.	5	2.0	19	7.6	17	6.8	96	38.	4	113	2	1	4.3	2	8.7	0	.0	12	52.	8	34.
Surveys to assess the hardware ownership of target population should be done.	7	2.8	22	8.8	22	8.8	77	30.	8	122	8	1	4.3	0	.0	3	13.	8	34.	1	47.
Surveys to assess the physical disabilities of target population should be done.	9	3.6	23	9.2	31	12.	88	35.	2	99	6	0	.0	0	.0	5	21.	10	43.	5	34.
Hardware ownership of the students should be taken into consideration during the design process of online courses.	6	2.4	13	5.2	14	5.6	78	31.	2	139	6	0	.0	1	4.3	3	13.	12	52.	7	30.
Only the essential multimedia elements should be used in the course to reduce bandwidth problem.	13	5.2	26	10.	42	16.	74	29.	6	95	0	3	13.	5	21.	6	26.	7	30.	2	8.7
The course should allow students to remain anonymous during online discussions.	53	21.	47	18.	34	13.	57	22.	8	59	6	1	47.	7	30.	0	.0	4	17.	4	14.3
The interpretations of jargon and terminology should be explained within the online courses to facilitate the student understanding.	4	1.6	3	1.2	6	2.4	71	28.	4	166	4	0	.0	1	4.3	1	4.3	14	60.	9	30.
The courses should have links to resource site(s), a glossary, where interpretations of jargon and terminology are available.	4	1.6	6	2.4	8	3.2	85	34.	0	147	8	0	.0	0	.0	0	.0	16	69.	6	30.
The courses should be designed to accommodate the needs of visually impaired.	8	3.2	9	3.6	15	6.0	80	32.	0	138	2	0	.0	0	.0	6	26.	8	34.	9	39.
Multimedia elements (graphics, audio,	7	2.8	6	2.4	11	4.4	89	35.	137	54.	0	0	.0	0	.0	4	17.	9	39.	1	43.

video) should be accompanied by text equivalents to be accessible by people with disabilities.								6		8						4		1	0	5
The courses should offer equal opportunity of access to interaction among students and with instructors.	3	1.2	3	1.2	2	.8	52	20.8	190	76.0	0	.0	1	4.3	1	4.3	10	43.5	11	47.8
The synchronous counseling schedules should be determined taking the students' working hour into consideration.	5	2.0	13	5.2	9	3.6	89	35.6	134	53.6	0	.0	4	17.4	6	26.1	10	43.5	3	13.0
The synchronous counseling schedules should be determined taking the students' opinions into consideration	5	2.0	8	3.2	10	4.0	91	36.4	136	54.4	0	.0	3	13.0	7	30.4	12	52.2	1	4.3

Although 67,6% of the students indicate that only the essential multimedia elements should be used in the course in order to reduce the bandwidth problem; 39,1% of the instructors agree with this assertion. The higher percentage of students can be related with their concerns about the technological opportunities they do/do not have. Students can experience bandwidth problems if their technical infrastructure is insufficient. This is why, students think multimedia elements used in online courses and the problems about their use should have priority, while determining the online course media in the design process. However, instructors first consider the content related instructional issues and the advantages multimedia elements offer them; so their priority is not technical problems like the bandwidth concern.

Almost 90% of the students point out that the synchronous counseling schedules should be determined with an eye to the students' working hours and preferences, while the percentage of instructors supporting this assertion is 56,5%. This result indicates that the instructors do not attach sufficient importance to the students' working hours and preferences, at least not to the extent demanded by the students themselves. On the other hand, when the large number of students enrolled at the distance education programs is taken into consideration, it is easily seen that the students have the majority in this system. It is worth and vital taking their considerations and feedback into account. Another subject the students and instructors do not share the same opinion about is the use of anonymous names during online discussions. Although 46,4% of the students prefer that student names remain anonymous during online discussions; 21,7% of the instructors express that names should not remain anonymous.

Opinions by students and instructors with regard to the behavioral and legal issues

According to the data tabulated in Table 2, almost 93% of the students indicate that they must be clearly informed about the behavioral issues (superior communication and interaction issues) and about their responsibilities (exams, assessments, practices) within the online courses. As would be expected, all instructors (100%) share the same idea with the students.

Table 2. Opinions of Students and Instructors on Behavioral and Legal Issues

	Student (n=250)										Instructor (n=23)									
	SD		D		UD		A		SA		SD		D		UD		A		SA	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
BEHAVIORAL AND LEGAL ISSUES																				
Students should be clearly informed about the behavioral issues (superior communication and interaction issues) in the online courses.	5	2.0	9	3.6	3	1.2	91	36.4	142	56.8	0	.0	0	.0	0	.0	5	21.7	1	78.3
The course should clearly inform students about their responsibilities within the online courses.	4	1.6	4	1.6	8	3.2	81	32.4	153	61.2	0	.0	0	.0	0	.0	7	30.4	1	69.6
If a student fails to follow the etiquette of the course more than one time, he/she should get warning and punishment.	20	8.0	1	4	54	21.6	76	30.4	69	27.6	2	8.7	1	4.3	2	8.7	5	21.7	1	56.5
If a student fails to follow the etiquette of the course more than one time, he/she should be put on probation.	16	6.4	8	11.2	49	19.6	106	42.4	51	20.4	2	8.7	2	8.7	8	34.8	6	26.1	5	21.7
If a student fails to follow the etiquette of the course more than one time, he/she should be penalized by lowering grades or	14	56.2	4	17.6	12	12.30	0	4.8	22	8.8	4	17.4	4	17.4	10	43.5	4	17.4	1	4.3

[illegible]

related to the online courses should be taken into consideration							4	6		0						0	4	9		4
Surveys should be carried out about the extent the students obey the ethical rules in online courses.	6	2.4	6	2.4	21	8.4	11	47.		39.							1	52.	1	43.
							8	2	99	6	0	.0	0	.0	1	4.3	2	2	0	5

Results tabulated in Table 2 reveal that the opinions of students and instructors differentiate about the sanctions to be applied when the students fail to follow the etiquette of the course more than once. Although 78,2% of the instructors mention that punishments are required for the students who fail to follow the etiquette; only 52% of the students support the idea of application of punishments. With the same token, these findings demonstrate that students expect a flexible approach from their instructors when they fail to follow the rules. Accordingly, 62,8% of the students mention that they should be put on probation while only 47,8% of the instructors support giving probation to the students. These data can be explained by the instructors' assertion that students do not pay enough attention to their online courses if they do not get dissuasive punishments.

It is interesting that almost half of the instructors (43,5%) are fair-minded about lowering students' grades and only 21,7% of the instructors support the idea of lowering grades. On the other hand, 13,6% of the students approve this preventive measure. One of the most preferred punishment method for both students and instructors is removing students from the discussion forum with 46% approval by students and 65,2% by instructors.

Students' and instructors' opinions are compared via the survey, as regards taking students' participation to the online courses as a criterion during the assessment stage or not. 55,2% of the students prefer that students' attendances are not taken into consideration while determining the students' grades. Only 34,7% of the instructors agree with the students in this case.

When the items related with "getting permission from students about the use of their personal data" are examined in Table 2, it is seen that most of the students and instructors share the idea that students' permissions should be taken before sharing their projects (73,2% by students and 82,6% by instructors), web documents (78,8% by students and 86,9% by instructors), e-mails (87,2% by students and 78,3% by instructors), telephone numbers (90,4% by students and 91,3% by instructors) and posting addresses (89,2% by students and 86,9% by instructors). Also 66,4% of the students emphasize that their permission should be required before using their online discussions, postings or any other data that belong to them and 82,6% of the instructors approve this assertion.

Table 2 also reveals students' and instructors' opinions about the consequences of any forms of plagiarism. It is expressed that, although 47,8% of the instructors support the idea that cheating/ plagiarism interferences of the students should be punished by assigning a failing grade in the course; only 29,6% of the students share this idea. Students prefer to be punished by getting a failing grade on that particular paper with 38,4%. The percentage of instructors preferring to punish students in this way is 78,2%. The lowest percentage of students (14,4%) and instructors (13%) are behind the idea of punishing students by dismissal from the university. This is one of the most intensive methods of punishment for cheating or plagiarism interferences. In this connection, it can be evaluated that both students and instructors are against such intensive punishment means. Another punishment for cheating/plagiarism is showing up the students' names on the list of cheaters at the University. Only 29,6% of the students and 47,8% of the instructors approve this measure. Finally 34,4% of the students and 43,5% of the instructors indicate that cheating/ plagiarism interferences of the students should be punished by sharing the student's cheating record with the other academic institutions.

The last items given in Table 2 are about the copyright laws and ethical rules concerning online courses. All instructors (100%) agree with the item expressing that appropriate information about copyright laws should be given in online courses and 85,2% of the students agree with this. The opinions of students (89,6%) and instructors (78,3%) are positive about the importance of students' feedback on ethical rules. On the other hand, both groups mention that further research should be conducted about the extent students obey to the ethical rules of online courses.

CONCLUSIONS AND DISCUSSIONS

Brown asserts, it should be acknowledged that the basic intent of e-Learning is a moral good. Since e-Learning attempts to provide educational opportunities for high number of people and in many cases to people deprived of education, he is right to consider it an ethical task. However there are vulnerabilities that the users need to be aware of. Institutions need to be on alert and publish clear definition of academic fraud in online learning and set

policy providing codes for students and instructors to follow. It would be an important step forward for institutions to give ethical issues in the curriculum of online/blended programs (Brown, 2008).

According to this study, the responses to the first research question reveal that, most of the students and instructors believe surveys should be conducted related with learning styles, hardware ownership, physical disabilities of students. As Khan (2005) has stated, learners have their own styles for meaningfully gathering and organizing information for their learning purposes, and have different learning needs due to their different educational and social backgrounds. This is why instructors, course designers and discussion moderators must be sensitive about the students' characteristics and should be innovative about involving diverse learners in e-Learning environments. Another dimension is that hardware ownership and physical disabilities of students must be determinant on the design processes of the online courses. In the face of digital divide, it is important to use educational media that can be operated with most of the computers. Among these technological issues there is also the bandwidth problem that students face. To reduce the effect of this problem, students explain that only the essential multimedia elements should be used in the courses. To design more effective courses, detailed research on hardware ownership and learning styles of the students can be realized by institutions.

Contrarily, instructors do not agree with the idea of using only the essential multimedia elements within the online courses. Instructors consider the instructional quality and the advantages of the media first; e.g. their priority is not the bandwidth problem. They prefer to use the new technologies that offer better instructional opportunities; but it is a fact that all the students may not have the required technologies. This is related with the digital divide that underlines the importance of information accessibility in e-Learning environments. Khan (2005) defines digital divide as the gap between those who have access to the Internet and other information technologies and those who do not. The reasons may be economic, cultural, physical or geographical. Related to the economic problems, institution may support students to have better computers and technologies. Some campaigns in collaboration with technology firms that provide computers more economically can be utilized. In this way, the students will have better technological opportunities.

By the same token, some courses that introduce the basic characteristics of the Internet and computer literacy can be organized for students; so technological and digital culture of the students can be improved via these courses. Physical disabilities are also effective on the digital divide. Students with disabilities cannot make proper use of some educational media as the other students.

The responses to the second research question are related with the behavioral and legal regulations, where students and instructors have some different opinions about assessing students' behaviors. Findings reveal that students expect flexible approach by instructors like having probation or removing students from discussion forum instead of lowering their grades or points, when they fail to follow the behavioral etiquette more than once. On the other hand, instructors think that students do not attach the required importance to the online courses if they don't get dissuasive punishments. Related with this subject, the behavioral regulations that are applied when the students fail to follow the behavioral etiquette more than once must be determined and announced to the students before they take the courses.

All the above findings and literature direct the discussion to the point that institutions should have e-Learning policies, guides on especially legal issues like preventive privacy, plagiarism and copyright. In this sense, there need to be some regulations about cheating /plagiarism attempted by the students. The students' and instructors' opinions are different about the regulations for cheating/plagiarism. As mentioned in the methodology, online courses are not the core material of the program in case-study; students are not obliged to attend to these online courses. Because of this flexibility, students do not think they can be punished when they fail to follow the etiquette rules and/or cheat. However it is a fact that developing online courses requires certain amount of time, money and effort. The instructors mention that some obligations are necessary for more effective and efficient use of online courses. However, instructors also state that students' participation to the online courses should not be taken into consideration in student assessment.

The final subject among the legal issues is related with getting students' permission when using and sharing students' personal data. The institutions should inform students beforehand about whether they intend to share students' personal data, text dialogs or not. Private e-mails should not be forwarded to third parties, without permission. Both students and instructors agree with this assertion.

As final words, feedback by all the users of the online courses is vital for the design processes; not limited with the ethical issues only. This study has been realized to evaluate the opinions of students and instructors about the learner diversity and behavioral/legal regulations related with ethical issues of e- Learning. In this connection,

further surveys can be structured about cultural diversity, bias, geographical diversity, social and political influences etc. based on different dimensions of individual differences.

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REFERENCES

- Brown, T. (2008) Ethics in e-Learning, iBiZ2008 Workshop for Net Business Ethics, Feb. 10-11, 2008. Retrieved on Feb. 17, 2010 from <http://www.gsim.aoyama.ac.jp/ORC/iBiZ2008/papers/Brown.pdf>
- Gearhart, D. (2005) The ethical use of technology and the Internet in research and learning, paper presented at Dakota State University, Center of Excellence in Computer Information Systems, 2005 Spring Symposium. Retrieved on April 15, 2007 from <http://www.homepages.dsu.edu/gearhard/CEX%20Ethics%20Paper.doc>
- Gearhart, D. (2001) Ethics in distance education: developing ethical policies, *Online Journal of Distance Learning Administration*, 4 (1). Retrieved on Aug. 03, 2007 from <http://www.westga.edu/~distance/ojdla/spring41/gearhart41.html>
- Haughey, D. J. (2007) Ethical relationships between instructor, learner and institution, *Open Learning*, 22 (2), pp.139-147.
- Hawkes, M. (2006) Linguistic discourse variables as indicators of reflective online interaction, *American Journal of Distance Education*, 20 (4), pp. 231-244.
- Isa, P. M & S. Siti Akmar Abu and K. Jusoff (2008) Inculcating Values and Ethics in Higher Education e-Learning Drive: UiTM i-Learn User Policy, *International Journal of Human and Social Sciences*, 2 (2), pp. 113-117. Available: <http://www.akademik.unsri.ac.id/download/journal/files/waset/v2-2-19-1.pdf>
- Khan, B. (2005) *Managing e-learning strategies: design, delivery, implementation and evaluation* (USA, Hershey PA).
- Lengel, L. (2004) *Computer mediated communication: social interaction and the Internet*, (London, Sage Publications).
- Loui, M. C. (1999) Fieldwork and cooperative learning in professional ethics. *OEC International Conference on Ethics in Engineering and Computer Science*. Retrieved on Aug. 16, 2007 from <http://www.onlineethics.org/CMS/edu/instructessays/loui.aspx>
- McMahon, J. D. (2007) Ethical issues in web-based learning, in: Badrul H. Khan (ed.) *Flexible Learning in an Information Society* (USA: Information Science Publishing).
- Michalinos Z. and C. Vrasidas. (2005) Levinas and the "inter-face": The ethical challenge of online education, *Educational Theory*, 55 (1), pp. 61-78.
- Schultz, R. A. (2005) *Contemporary issues in ethics and information technology* (USA, IRM Pres).

EVALUATION OF AN INTERNATIONAL BLENDED LEARNING COOPERATION PROJECT IN BIOLOGY TEACHER EDUCATION

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ABSTRACT

At the beginning of the 21st century, virtual learning was thought to have the potential to revolutionize learning arrangements. This enthusiastic notion has given way to a kind of disillusionment, which has, however, led to a more realistic assessment of the potential of e-learning, the development of new conceptions, new methodical approaches, and opportunities for cooperation and collaboration. The didactic value of these emerging concepts is now under scrutiny.

The project presented in this article included the development, implementation and evaluation of a cross-national blended learning seminar on the didactics of biology. The class included three focus topics dealing with different aspects of biology education. The sample comprised students training to be biology teachers at the University of Technology Dortmund and Hacettepe University in Ankara. All students attended a class called “Teaching Biology” during the winter term 2008/09. The open source e-learning platform Claroline (www.claroline.net) was chosen as the learning environment. Participants had the opportunity to exchange ideas and information, to reflect on the learning process and to complete assignments in international teams. After completing the class, the students evaluated the concept based on their experience. In-class sessions, individual learning, exercises and application ranked higher than online phases, group work, discussions and information exchange. Items evaluating the overall concept received relatively high ratings. Despite the cautious ratings some items received, the positive overall results support efforts to further develop such international teaching concepts.

KEYWORDS: Blended-Learning, Biology Education, Biology Education Students, Evaluation,

INTRODUCTION

Over the past few years, developments in university education have been characterized by a growing trend towards internationalization. Course grades are being converted to a standardized credit point system (European Credit Transfer System) and many countries have switched to a common system of Bachelor’s and Master’s degrees. European exchange programmes (e.g. ERASMUS, Leonardo da Vinci) offer transborder mobility, where students are given the opportunity to spend one or two semesters at a foreign university, or to complete an internship abroad. However, the internationalization of the education system is not limited to such developments, but also encompasses information and communication technologies, which have great potential. They offer educational opportunities which seemed unimaginable only a few years ago. Take, for example, international MBA programmes (Master of Business Administration), which are transnational courses that pose an alternative to traditional university education (Schenker, Wicki & Demont, 2006).

According to the e-learning action plan, information and communication technologies provide a virtual extension of the students’ geographic mobility (Kommission der europäischen Gemeinschaften, 2001). Their integration into university curricula will be a political priority over the next few years (Knierzinger & Weigner, 2008).

The internationalization of the education system raises expectations of increasing student mobility. Nevertheless, many students will not be able to benefit from this development, due to high student numbers and limited financial resources. Thus, information technology is expected to play a key role in internationalizing the education system. It may not be able to replace geographic mobility, but it can create a tight network among cooperating universities and enable virtual cooperation among students and teachers at different universities, both nationally and internationally.

From E-learning to Blended Learning

The term e-learning can be applied to all those forms of teaching and learning based on the use of information and communication technology (Clark & Mayer, 2003). Computer-Based Training, Web-Based Training, online learning, distance learning, tele-tutoring, distributed learning – these are just a few examples from a broad

variety of e-learning offerings. E-learning is often used as a generic term for all such forms of learning (Reinmann-Rothmeier, 2002).

Today, e-learning has become immensely popular at many national and international educational facilities and is turning into a common method of teaching. It is present at different levels of education, from schools to universities and vocational training. As technology is quickly improving, a growing number of e-learning concepts are finding their way into the education system. Compared to traditional forms of learning, e-learning offers numerous advantages: increased flexibility during the learning process, self-organized learning, different formats and ways of coding, and virtual communication. But in spite of its benefits and its increasing presence in the education system, e-learning has some disadvantages as well. Frequent points of criticism include: content cannot be directly imparted, social aspects are lacking, and the learners' needs cannot be catered to individually. Given that these problems can usually be avoided during in-class sessions, a new learning concept called Blended Learning was developed (Allen & Seaman, 2003; Gallenstein, 2001; Sauter, Sauter & Bender, 2002).

Blended learning is a hybrid learning concept integrating traditional in-class sessions and e-learning elements (Reay, 2001; Rooney, 2003) in an attempt to combine the benefits of both learning forms. Elements from e-learning or in-class sessions should not be included arbitrarily, nor should one form of learning simply accompany the other. There is no rule of thumb determining the percentage of online and in-class phases in the concept (Reimer, 2004). Some fields are better suited for in-class methods, others clearly benefit from the use of the new media (Lang, 2002). The emphasis placed on each phase depends on the learning goals, content, learning group, available online resources and didactical design (Ostguthorpe & Graham 2003). The decisive factor in developing blended learning concepts is to combine the methods of in-class learning and e-learning in a way that is appropriate to both pedagogy and current concepts of learning (Lang, 2002).

As opposed to classic e-learning concepts, in-class sessions offer opportunities for social communication. However, students can still benefit from the advantages of e-learning: learners can easily access material used during in-class sessions in a virtual learning environment. The instructors can quickly implement content changes and additions without additional costs, e.g. for photocopying. In this way, learning materials are always of the highest quality, but can also easily be adapted to changes in the learning/teaching scenario. Instructors thus have the ability to flexibly respond to the learning situation and the learners' needs by modifying content or teaching methods. Learners are given the opportunity to undertake research and communicate according to their personal preferences, irrespective of time and location (Cunningham & Billingsley, 2003; Reinmann, 2005). In theory, there are many possible combinations of different methods such as individual work, group work, discussions, project work, etc. These different assignments are completed using an online learning platform, which facilitates cooperative work by offering different tools, such as chat, email, whiteboard, forums and wikis.

Today, rapid developments in society, the economy and technology are changing educational goals. Currently, education policies are directed towards greater compatibility in university programmes, an increased internationalization of education, and more national and international cooperative activities. In addition to the advantages mentioned above, the blended learning approach has the potential to contribute to current educational goals, especially the internationalization of educational programmes. For example, universities in different countries might offer joint blended learning classes including local in-class sessions and an e-learning platform for communication and cooperation among students and lecturers.

These high hopes and expectations give rise to many questions, which must be answered by empirical research: how exactly will blended learning be implemented at universities? How will the aforementioned characteristics and advantages play out in real life situations? How well can these learning concepts be implemented through international cooperation? How will students and teachers evaluate their experience with this learning concept? Even though blended learning is a relatively new concept, it has already received attention from researchers in many different fields of study. Most research in this field was published by experts in media didactics (Akkoyunlu & Yilmaz-Soylu, 2008; Derntl & Motschnig-Pitrik, 2005; So & Brush, 2008; Kerres & De Witt 2003), business disciplines (see Godfrey, Johnson, Pollack, Niendorf & Wresch, 2009) and foreign language didactics (Harker & Koutsantoni 2005; Kupetz und Ziegenmayer 2005, Sharma & Barrett, 2007), but there are also publications from other disciplines (Barnard, Lan, To, Paton & Lai, 2009; Bauer & Graf, 2003; Ginns & Ellis, 2007). However, much remains to be done. Most of the research was conducted on a national scale. So far, the internationalisation of lectures and the evaluation of such classes has not been the focus of empirical research. The publication at hand aims to contribute to this specific field of research.

The blended learning class provided the opportunity to have student teachers from two different countries (Germany and Turkey), with different cultural backgrounds and different ideas about teaching, undertake a joint project and share both thoughts and information. For this purpose, we developed, implemented and evaluated a cross-national blended learning seminar on the didactics of biology. This article presents the students' evaluation of the concept.

METHOD

Sample

The study sample comprised students training to be biology teachers at the University of Technology Dortmund and Hacettepe University in Ankara. All students attended a class called "Teaching Biology" during the winter term 2008/09.

Class design: The class dealt with current topics of biology education and generally outlined the field of didactics. For international cooperation, three focus topics were chosen: 'What is Biology Didactics?', 'Epistemological Aspects' and 'Objectives of Biology Education'. The class was held in German. This was possible because Hacettepe University features a biology programme with German as the second language of instruction.

The open source e-learning platform Claroline (www.claroline.net) was chosen as the learning environment. At the University of Technology Dortmund, the learning platform had already proven to be a valuable tool. It stands out due to its easy installation process, its speed and its ability to adapt to user requirements. Claroline offers a broad range of tools which can be upgraded by using extensions: class description, calendar management, documents/files uploaded by lecturers, exams for participants, upload area for students, forums, participant groups, users, chat, wiki, and access statistics for instructors. The instructors can activate or deactivate any feature according to their current requirements. This avoids confusion due to unutilized features.

As a typical blended learning scenario, the course included phases of both online work and class attendance. During in-class sessions, lecturers in Dortmund and Ankara gave basic factual information on the topic. All content was closely coordinated beforehand. The content discussed during class sessions was also made available online. Using the learning platform, participants were given the opportunity to broaden their knowledge on certain topics, as well as communicate and cooperate with classmates. For these purposes, the learning platform provided the following features:

- Fixed dates/events: Special events were posted
- Announcements: Assignments and news were posted
- Documents/files: The content discussed during class time was made available online to the participants as PowerPoint presentations, Word and PDF files, as well as specifically edited videos featuring the didactic material used in class. This gave participants who did not attend class the opportunity to catch up online.
- Upload area: Everyone involved in the class could upload their own files to share information with the other participants. This feature also facilitated group activities.
- Email: Participants had the opportunity to get in touch with instructors and classmates via email.
- Forums: The forum gave participants the opportunity to share news with everyone.
- Groups: This space was reserved for groups formed for class activities. Information could be shared among group members only, making it invisible to members of other groups.
- Users: Contained a list of participants including their email addresses.

Over the duration of the class, students were given three assignments which they were to complete both individually and in international group work. The assignments were to be completed outside class time.

The first assignment was to be done individually. The task was to evaluate statements. Each participant had to choose five statements, assess whether these statements were scientific or not, and give a detailed explanation of his or her assessment. Students were expected to work with the information given during the lecture, but also include their own considerations. By using the learning platform, students had the opportunity to learn about the other participants' opinions and comment on them, which would have been impossible during class time, mostly due to time constraints. The participants were given one week to complete the assignment.

The second assignment was to be completed in international groups. The task was to undertake an empirical study to answer the following research question: does smoking in teenagers affect body height? The groups were

put together by the instructors. Group allocation was randomized; however, each group had to contain students from both countries. Each group had 6 to 7 members. The participants' task was to derive hypotheses from the research question and draw up a research design to test them. Each group was expected to survey at least a hundred people in each of their cities. After analyzing the results, the group was to write a short research paper (approx. 2 pages). These papers were accessible to all participants on the learning platform. Students were given three weeks to complete the assignment.

The third assignment targeted learning objectives. For this, a new forum with 39 sub-forums was set up. Their respective titles provided a broad learning objective or a skill to be acquired. The participants' task was to derive testable, highly specific learning objectives from three broad objectives they had picked out themselves. The participants were given one week to complete the assignment.

Class procedure: During the summer term of 2008, a pilot study was conducted, assessing how students dealt with the learning platform and whether technical problems would arise. As no problems occurred, the platform was used in the "Teaching Biology" class during the 2008/09 winter term. Since lecture periods were different for Turkey and Germany, the class content was restricted to three focus topics, and the duration of the class was limited to two months.

The first two topics were discussed in two successive two-hour seminars, which required attendance and were held on a weekly basis. After the second seminar, students were presented with the first assignment. The following week, the results were discussed in class in each country. After the discussion, the second assignment was set, and the participants were asked to submit it in three weeks' time. The third focus topic was discussed in week 7. This was when participants were given their third assignment. During the final seminar, the results for both assignments were discussed.

Evaluation: Since the participants' previous knowledge about computer use and teaching methods was important to complete the class successfully, a pre-class questionnaire was handed out assessing computer access, frequency and reasons for computer and internet use, as well as previous experience with certain methods of teaching.

To help develop high-quality blended learning activities in the future, the learning environment was subjected to a summative evaluation at the end of the class. This was also done using a questionnaire. The survey contained items regarding personal information and the assessment of online material (Reinhardt, 2008a), online tools (Reinhardt, 2008b), the overall concept (Reinhardt, 2008c), work periods and the international group activities from a participant's perspective. For evaluation, a five-point Likert scale was used (depending on the question - 5: strongly agree / very satisfied / very useful; 1: strongly disagree / very dissatisfied / not useful at all).

RESULTS

Personal information

99 students participated in the survey, with 41.4% (n=41) being from Dortmund and 58.6 (n=56) being from Ankara. All of the Turkish participants were training to be biology teachers; students from Germany were also training to be teachers, with biology as either their major or minor. In our sample, women were over-represented: 83.2% of the students were female, while only 16.8% were male. Age ranged from 20 to 32 years (M=22.6, SD=2.04).

Computer access and computer/internet use

The majority of participants (77.9%) own either a desktop PC or a notebook. 65.3% of the participants said they use a computer at home, 35.8% use it at university. None of the participants had no computer access at all.

87.3%/85.5% use the computer/the internet on a daily or almost daily basis. 10.7%/12.2% use the computer/the internet several times a week. Only 2% of the participants said they use their computer/the internet only sporadically. There were no participants who never use the computer or the internet.

The computer is often used for internet access (83.2%), word processing (55%), listening to music (52.6%), electronic reference works (42.1%), and watching videos or looking at photos (48.4%). However, 72.5% never do programming, and 45.2% never use drawing or graphical programmes.

Frequency of experiencing certain teaching methods

Table 1 shows that all participants regularly experience classroom lectures. 89.9% do group activities, 52.5% have project classes and 33.3% practice e-learning on a regular basis. 69.7% have never experienced blended

learning, 30.3% have only experienced it once. Since some of the participants were involved in the pilot class, most of those choosing “once” probably had their first experience of blended learning during this very class.

Table 1. Frequency of experiencing certain methods of teaching

methods of teaching	Frequently / occasionally		once		never	
	n	%	n	%	n	%
Classroom lectures	99	100	-	-	-	-
Distance learning	13	13.1	26	26.3	60	60.6
E-learning	33	33.3	28	28.3	38	38.4
Project classes	52	52.5	29	29.3	18	18.2
Group activities	89	89.9	10	10.1	-	-
Blended learning	-	-	30	30.3	69	69.7

3.4 Evaluation of class phases and working methods

Table 2 summarizes the mean values and standard deviations for student satisfaction with class stages and teaching methods. The mean values are around the middle of the scale. However, there are notable differences. In-class phases scored the highest, followed by exercises and application, individual learning (using online material) and online phases. Discussions and exchange of information scored a 3.1. Compared to other phases and work methods, group activities achieved a relatively low score of 2.8.

Table 2. Evaluation of class phases and working methods

	Mean	SD
In-class phases	3.7	.87
Online phases	3.3	.95
Individual learning (using online material and assignments)	3.6	1.11
Group activities	2.8	1.17
Exercise and application	3.5	.91
Discussion and exchange of information	3.14	1.06

3.5 Evaluation of available online material

Table 3 summarizes the results of the online class material evaluation. Two different scales were used for this evaluation. For the first 3 items, the scale ranged from “very useful” (5) to “not useful at all” (1), for the following 3 items the scale ranged from “strongly agree” to “strongly disagree” (1).

The table shows that the participants gave the online class material a relatively high rating. All values ranged around 4. The video material ($x = 3.8$) and the lecture notes ($x = 3.9$) were regarded as less useful. However, these ratings are just slightly below 4. It is also important to note that participants mostly reported no technical difficulties downloading the materials.

Table 3. Evaluation of online class material

	Mean	SD
The online learning material (lecture notes etc.) available for this class was...	3.90	.76
The PowerPoint slides available for this class were...	4.06	.76
The video material available for this class was...	3.78	1.03
Overall, I found it very useful that the teaching and learning material used during this class was available online.	4.13	.88
I would like future classes of this kind to make stronger use of digital teaching and learning material.	4.05	.91
No problems occurred when downloading and/or opening the files containing digital teaching and learning material.	4.10	1.08

3.6 Evaluation of online communication tools

Table 4 shows that participants tended to agree that the use of online communication tools in class was linked to clear tasks and objectives ($x = 3.94$), and that tasks to be completed using online communication tools were suited for this medium ($x = 3.8$). However, participants only partially agreed that the use of online

communication tools in class helped them keep in touch with their classmates ($x = 2.96$) and that the overall learning gain was improved by using online communication tools ($x = 3.2$).

Table 4. Evaluation of online communication tools during this class

	Mean	SD
The use of online communication tools (email, forums) in this class was linked to clear tasks and objectives.	3.94	.74
The assignments completed with the support of online communication tools were suited for this medium.	3.88	.75
Overall, the use of online communication tools in this class improved mentoring by lecturers.	3.38	.94
Overall, the use of online communication tools improved relations with my classmates.	2.96	1.05
Overall, I learnt more in this class due to the use of online communication tools.	3.02	.94
Overall, the effort required for using online communication tools was appropriate in relation to the learning gain achieved during this class.	3.43	.95
I would like future classes of this kind to make stronger use of online communication tools.	3.36	1.07

3.7 Evaluation of group activities

Table 5 shows the evaluation of communication and teamwork from the participants' point of view.

Communication concerning personal matters scored the lowest. Participants usually did not talk about private matters ($x = 1.98$). Communication with the lecturer ranked highest. The participants agreed that it was easy for them to communicate with their lecturers via the learning platform. All other statements scored around the middle of the scale, which means that the participants expressed only partial agreement.

Table 5. Evaluation of communication and group activities during class

	Mean	SD
We not only discussed the class assignments but also talked about private matters.	1.98	.94
It was easy for me to communicate with lecturers and class assistants via the e-learning platform.	3.65	.99
My group and I discussed intensively the work done on our assignment.	2.97	.97
We developed strategies to complete the assignments together.	3.24	.96
I received responses to my messages.	3.31	.98
Over time, my online communication skills improved.	3.07	1.07
We developed questions and ideas concerning the assignment as a group.	3.03	.97
Over time, cooperation with my classmates improved.	3.01	.96
I feel that I benefited from the use of online elements.	3.17	1.00
I had the impression that my classmates participated actively.	3.08	1.03
For the completion of the assignments, we set common goals and succeeded in realizing them.	3.05	.98
I compared the results of our assignments to others' and evaluated my own work.	3.14	1.13

Evaluation of the overall concept

Table 6 represents the evaluation of the overall concept. All values are in the positive range. The participants tend to agree that, for example, the instructors did a good job explaining the class concept and that the online activities were linked to clear tasks and objectives. The assignments given in class score between 3.6 and 3.8 regarding their organization, their content and their suitability for online completion. However, with a mean value of 3.1, the learning gain achieved by combining in-class lectures and online activities scored the lowest.

Table 6. Evaluation of the overall concept

	Mean	SD
The lecturer did a good job explaining the overall concept before the start of the class.	4.13	.78
The organization of online assignments was sufficiently prepared.	3.60	.92
The content of the online assignments was sufficiently prepared.	3.73	.91
The online activities in this class were linked to clear tasks and objectives.	3.82	.92

The class assignments were suited for online media use.	3.79	.82
While doing online activities, I felt well mentored.	3.67	1.09
Overall, I learnt more through the combination of in-class lectures and online activities.	3.13	.97
I would like future classes of this kind to focus more strongly on complementing in-class lectures with online activities.	3.52	.91

4. DISCUSSION AND OUTLOOK

Globalization is increasingly affecting the internationalization of university research and education. Partner universities cooperate on a national and international scale to conduct projects in virtual classrooms (Lenz & Machado, 2006). The blended learning concepts which are currently being developed have great potential to contribute to modern teaching scenarios. Since most research has so far been conducted on a national scale, internationalization requires some adjustments to the concept. In the scope of this study, an international blended learning concept was developed and evaluated. Two universities located in Turkey and Germany cooperated on the project. The class was designed for students training to be teachers at the University of Technology Dortmund and Hacettepe University in Ankara. Participants were given the opportunity to exchange ideas and information, to reflect on the learning process, and to complete assignments in international teams. After completing the class, the students evaluated the concept based on their experience.

As computer skills are an important asset for successful participation in a blended learning class, the participants' experience was evaluated prior to the start of a class using a questionnaire. Results showed that more than 85% use a computer/the internet on a daily or almost daily basis. For them, the computer represents an everyday study tool. Most participants said they use the computer for word processing, and they use the internet to check their email, research information, and communicate. Given these results, it is safe to assume that participants have sufficient computer skills to complete the class without encountering technical difficulties. Similarly, a lack of computer skills will not affect the evaluation of the class.

Concerning "class phases and methods", students rated in-class sessions, individual learning and practice and application the highest. Online phases, discussions and information exchange received moderate ratings. Before discussing the above results in detail, however, it seems reasonable to elaborate on the participants' experience with teaching methods. Unsurprisingly, all participants have considerable experience with in-class sessions. However, few had participated in e-learning (33.7%) or distance learning (13.7%) on a regular basis. The percentages for blended learning are even lower. Just 32.6% had participated in blended learning beforehand. Lower ratings for online phases might thus be due to learning habits formed by in-class 'chalk and talk' teaching. Presumably, students prefer teaching methods catering to the learning habits they have developed over the years, and these preferences will in turn affect the evaluation of new learning methods. This might also apply to the results for individual learning, discussion, and exchange of information. As most participants have little e-learning experience, they will be unfamiliar with discussion and information exchange via learning platforms; individual learning, however, should be a familiar process. According to Da Rinn (2005), the integration of new forms of learning has proven to be a slow, almost cumbersome process, as learning habits change over long periods of time.

On the other hand, research shows that new methods, material and work routines integrated into the teaching process are highly popular with the students ("novelty effect", Clark & Sugrue, 1988) and positively affect motivation, interest, evaluation, learning gains, etc. (Blömeke, 2003; Kerres, 2001). Why did this effect not kick in during the online phases of this study? Considering some oral statements students gave during class, one possible explanation might be that despite the advantages of the concept, changes to the learning routine cause an additional workload (see Kroop & Magler 2005). This strain might have affected the students' rating.

Online group work scored the lowest of all "class phases and methods". Students were asked to undertake their own empirical research in international groups, and to write up a joint research report. Even though 90% of the participants regularly work in groups, virtual teamwork via learning platform constituted a way of working students had never before experienced, either in school or at university. Cultural differences and language barriers might also be confounding variables. In particular, during the planning stages and the preparation of the research report, the virtual group work required a high degree of communication among the group members. Some authors point out that a lack of informal signals such as gestures, facial expressions and intonation might hamper virtual communication and cooperation (Hinds & Bailey, 2003; Weinkauff & Woywode, 2004). Furthermore, international cooperation lacks one feature of blended learning: meeting one's classmates in person. Comparing the evaluation of group work as a "class phase and method" to the set of items dealing with

“communication and group work”, which included more detailed questions, it becomes evident that more specific items received better ratings than group work in general. Students most liked communicating with their lecturers via the learning platform. Other features that received positive ratings were developing joint group strategies to complete assignments, getting feedback on messages, and being able to compare their own assignments to the work of other groups (thus facilitating self-evaluation). A qualitative data analysis will supply the exact reasons for the low group work ratings.

The students approved of online access to the class material via the learning platform. All items in this field scored values around four on a five-point scale. Items related to available online communication tools also received positive ratings, with just one exception. For example, students tended to agree that the use of online communication tools during the class was related to clearly defined tasks and objectives, and that tasks to be completed with the help of online communication tools were suited to this medium. However, students only partially agreed that they learned more due to the use of online communication tools.

Items concerning the evaluation of the overall concept generally scored positively. Concerning learning gains, the results parallel the evaluation of online communication tools. Students only partially agree that they learned more due to the combination of in-class sessions and online activities. Even though higher learning efficiencies are worth striving for, this result is by no means a setback. The focus of this study was on international cooperation and information exchange rather than on maximizing learning gains. All other items in this set of questions scored between 3.5 and 4. Despite the cautious ratings some items received, the positive overall results support efforts to further develop such international teaching concepts.

When interpreting the ambiguous ratings some items received, one should always keep in mind that the students had to deal with two completely new experiences: a novel learning concept and international cooperation. Also, the limited duration of the project might have had negative effects.

Organizers are likely to encounter lot of obstacles when developing such concepts. However, many of those obstacles can be overcome by the commitment and dedication of the lecturers involved in the cooperating countries. Difficulties include differences in public holiday schedules and examination regulations, cultural and organizational obstacles, inexperienced participants, and curricular differences and obligations.

The present study has yielded many insights concerning current difficulties and problem areas, but also opportunities and the potential for cross-border online projects. Based on these results, further research is needed to optimize concepts, improve evaluation tools and facilitate a systematic development of these learning concepts.

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REFERENCES

- Akkoyunlu, B. & Yilmaz-Soylu, M. (2008). A Study of Student's Perceptions in a Blended Learning Environment Based on Different Learning Styles. *Educational Technology & Society*, 11(1), 183-193.
- Allen, E. I., & Seaman, J. (2003). Sizing the opportunity: The quality and extent of online education in the United States, 2002 and 2003. Retrieved June 25, 2008, from http://www.aln.org/resources/sizing_opportunity.pdf.
- Arbaugh, J. B., Godfrey, M. R., Johnson, M., Pollack, B. L., Niendorf, B. & Wresch, W. (2009). Research in online and blended learning in the business disciplines: Key findings and possible future directions. *Internet and Higher Education*, doi:10.1016/j.iheduc.2009.06.006
- Barnard, L., Lan, W. Y., To, Y. M., Paton, V. O., & Lai, S.-L. (2009). Measuring self-regulation in online and blended learning environment. *Internet and Higher Education*, 12, 1-6.
- Bauer, A. & Graf, D. (2003). Biology-education Moves Online. Retrieved January 9, 2008, from <http://www.bionews.net/B/5/i41cd774-001.htm!ArcEntryInfo=0004.70.I41CD774>
- Blömeke, S. (2003). Lehren und Lernen mit neuen Medien Forschungsstand und Forschungsperspektiven. *Unterrichtswissenschaft*, 31(1), 57-82.
- Clark, R. E. & Sugrue, B. M. (1988). Research on instructional media, 1878–1988. In D. P. Ely, B. Broadbent & R. K. Wood (Ed.), *Educational Media and Technology Yearbook*, Vol. 14. (pp. 19–36). Englewood CO: Libraries Unlimited, Inc.
- Clark, R. T. & Mayer, R. E. (2003). *E-Learning and the Science of Instruction*. San Francisco: Preiffer.

- Cunningham, C. A., & Billingsley, M. (2003). *Curriculum Webs: A practical guide to weaving the Web into teaching and learning*. Boston: Allyn and Bacon.
- Da Rin, Denise (2005): Vom E-Learning zum Blended Learning. Eine empirische Untersuchung zum computergestützten Lernen in der betrieblichen Aus- und Weiterbildung unter besonderer Berücksichtigung der Nutzerperspektive und der Akzeptanzfrage. Dissertation Universität Luzern. Retrieved June 5, 2007, from http://edoc.zhbluzern.ch/unilu/ediss/unilu_diss_2005_001_darin_fulltext.pdf.
- Derntl, M. & Motschnig-Pitrik, R. (2005). The Role of structure, patterns, and people in blended learning. *Internet and Higher Education*, 8, 111-130.
- Gallenstein, C. (2001): From Brick to Click: Blended learning für die Integration von E-Learning und Classroom Training. In W. Kraemer & M. Müller (Hg.), *Corporate Universities und E-Learning*. (pp. 259-285). Wiesbaden: Gabler.
- Ginns, P & Ellis, R. (2007). Quality in blended learning: Exploring the relationships between on-line and face-to-face teaching and learning. *Internet and Higher Education*, 10, 53-64.
- Harker, M. & Koutsantoni, D. (2005). Can It Be as Effective? Distance versus Blended Learning in a Web-based EAP Programme. *ReCALL* 17(2), 197-216.
- Hinds, P. J. & Bailey, D. E. (2003): Out of sight, Out of Sync: Understanding Conflict in Distributed Teams. *Organization Sciences*, 14(6), 615-632.
- Kerres, M. & De Witt, C. (2003). A Didactical Framework for the Design of Blended Learning Arrangements. *Journal of Educational Media* 28 (2-3), 101-113.
- Kerres, M. (2001): *Multimediale und telemediale Lernumgebungen. Konzeption und Entwicklung*. München: Oldenbourg.
- Knierzinger, A. & Weigner, C. (2008). Breitbandangebote und ihre neuen Möglichkeiten für e-Learning. In B. Batinic, A. Koller & H. Sikora (Hg). *E-Learning, digitale Medien und lebenslanges Lernen*. (pp. 157-160). Linz: Trauner Verlag
- Kommission der europäischen Gemeinschaften (2001). Aktionsplan eLearning. Gedanken zur Bildung von morgen. Retrieved November 25, 2008, from http://ec.europa.eu/education/archive/elearning/annex_de.pdf
- Kroop, S. & Magler, J. (2005). eLearning Projekt "Verständlich Schreiben". In Tagungsband Forschung zu Blended eLearning: österreichische F&E Projekte und EU-Beteiligungen (pp. 53-70). Verlag Forum Neue Medien: Wien. Retrieved April, 2008 from <http://www.fnm-austria.at/tagung/FileStorage/view/11-fnma-tagung/tagungsband-11bm.pdf>
- Kupetz, R. & Ziegenmayer, B. (2005). Blended Learning in a Teacher Training Course: Integrated Interactive E-Learning and Contact Learning, *ReCALL* 17(2), 179- 196.
- Lang, N. (2002). Lernen in der Informationsgesellschaft. Mediengestütztes Lernen im Zentrum einer neuen Lernkultur. In: Ute Scheffer/Friedrich W. Hesse (Hg): *E-Learning. Die Revolution des Lernens gewinnbringend einsetzen* (pp. 23 – 42). Stuttgart 2002.
- Lenz, R. & Machado, C. (2006). Virtual Teamwork: A Product of Globalization Implications for University Education. Retrieved May 20, 2008, from <http://ssrn.com/abstract=942267>
- Ostguthorpe, R. T. & Graham, C. R. (2003). Blended learning environments: Definitions and directions. *The Quarterly Review of Distance Education*, 4 (3), 227-233.
- Reay, J. (2001). Blended learning - a fusion for the future. *Knowledge Management Review*, 4(3): 6.
- Reimer, R. (2004). Blended Learning – veränderte Formen der Interaktion in der Erwachsenenbildung. *Report: Zeitschrift für Weiterbildungsforschung*, 27, 265-271.
- Reinhardt, J. (2008a). E-Learning-Evaluation: Fragebogen „Digitale Lehr- und Lernmaterialien“. Retrieved February 18, 2008, from http://www.e-learning.fu-berlin.de/werkzeuge/fragebogen/fragebogen/evaluation_lehrmaterialien_pdf.pdf
- Reinhardt, J. (2008b). E-Learning-Evaluation: Fragebogen „Online-Kommunikation per E-Mail, Forum, Chat“. Retrieved February 18, 2008, from http://www.e-learning.fu-berlin.de/werkzeuge/fragebogen/fragebogen/evaluation_kommunikation_pdf.pdf
- Reinhardt, J. (2008c). E-Learning-Evaluation: Fragebogen “Blended Learning”. Retrieved February 18, 2008, from http://www.e-learning.fu-berlin.de/werkzeuge/fragebogen/fragebogen/evaluation_blendedlearning_pdf.pdf
- Reinmann, G. (2005). *Blended Learning in Lehrerbildung. Grundlagen für die Konzeption innovativer Lernumgebungen*. Pabst: Lengerich.
- Reinmann-Rothmeier, G. (2002): Virtuelles Lernen zwischen Mensch und Technik. *Personal. Zeitschrift für Human Resource Management*, 54(1), 722-727.
- Rooney, J. E. (2003). Blended learning opportunities to enhance educational programming and meetings. *Association Management*, 55(5), 26-32.

- Sauter, W., Sauter, A. M. & Bender, H. (2002): *Blended Learning. Effiziente Integration von E-Learning und Präsenztraining*. Neuwied: Luchterhand.
- Schenker-Wicki, A. & Demont, M. (2006): Business-Modelle von MBA-Programmen. *Die Zeitschrift für Erwachsenenbildung*, 2, 32–34.
- Sharma, P. & Barrett, B. (2007). *Blended learning: using technology in and beyond the language classroom*. Oxford: Macmillan.
- So, H.-J. & Brush, T. A (2008). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors. *Computers & Education*, 51, 318-336.
- Weinkauff, K. & Woywode, M. (2004): Erfolgsfaktoren von virtuellen Teams – Ergebnisse einer aktuellen Studie. *Zeitschrift für betriebswirtschaftliche Forschung*, 56, 393-492.

FACTORS IMPACTING ADULT LEARNER ACHIEVEMENT IN A TECHNOLOGY CERTIFICATE PROGRAM ON COMPUTER NETWORKS

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ABSTRACT

This study investigates the factors impacting the achievement of adult learners in a technology certificate program on computer networks. We studied 2442 participants in 256 institutions. The participants were older than age 18 and were enrolled in the Cisco Certified Network Associate (CCNA) technology training program as ‘non-degree’ or ‘certificate’ students. Using a multilevel analysis, factors impacting adult learners’ achievement were identified. The results of Hierarchical Linear Model (HLM) analysis demonstrated that work status, degree orientation, motivation, age, gender, and computer technical ability of the participants at the beginning of the program had impact on adult learner achievement. On the contrary to the past research, the analysis showed that adult learners with full-time jobs achieve more than adult learners with no full-time jobs. Additionally, the institutional level factors did not have any impact on achievement. Findings of this study provide important information for developing a framework that can guide research and practice in technology certificate programs.

Keywords: Adult learning; lifelong learning; distributed learning environments

INTRODUCTION

Technology certificate programs provide inexpensive and concentrated venue both for learners who wish to develop new skills and for working professionals who wish to upgrade their skills. Available technology certificate programs in the United States are populated primarily by adult learners (Meares & Sargent, 2003). The majority of these certification programs utilize performance-based evaluation systems to measure student achievement in which students must attain a certain level of competency (Adelman, 2000). We examined selected participant level and institutional level factors impacting the achievement of adult learners in the Cisco Certified Network Associate (CCNA) program. The program consists of four separate courses taken in sequence and accepts participants from all ages and backgrounds and is offered through high schools, colleges, universities, and non-traditional educational settings.

There are four key components to the Cisco Networking Academy environment: 1) a centralized curriculum distributed over the Internet; 2) standards-based testing distributed over the Internet; 3) locally managed and designed instruction; and 4) a system for ongoing training, support, and certification of instructors. These types of learning environments where different media are integrated into classroom instruction are referred as “hybrid

instruction” or “blended learning” (Delialioglu & Yildirim, 2007). The idea behind integrating these types of learning environments is to maximize the strengths of both face-to-face and online modes of instruction.

All curriculum materials are distributed via the Internet. Based on task analyses of what computer network engineers need to know to work effectively in organizations, the curriculum is updated on a regular basis. Instructors and participants may access materials from any computer with a Web browser using a proprietary course management system. The curriculum includes online interactive learning materials, as well as a series of lab exercises to be conducted in a laboratory with networking equipment.

The Cisco Networking Academy has a hierarchical organizational structure. At the top of this hierarchy, there are Cisco Academy Training Centers (CATCs) managing 5-50 Regional Training Centers (RTCs). RTCs reside at the second level. Each RTC offers classes to participants and manages 10-50 Local Academies (LAs). There are approximately 625 RTCs and 4500 LAs in the U.S. Cisco works directly only with the CATCs, leaving them to work with the RTCs to train the LAs to implement the program.

Learner Achievement in Technology Certificate Programs

The focus of this study is on the factors impacting achievement of adult learners in a technology certificate program that provides the four key features: centralized curriculum, standards-based testing, local implementation, and instructional support. Current literature suggests that three sets of characteristics affect student achievement: participant characteristics, curriculum characteristics, and institutional characteristics (Lee, 2000; Walberg, 1984). Because the CCNA program utilizes a standardized curriculum and standardized testing, curriculum characteristics were omitted from analysis, therefore, this study focuses on participant and institutional characteristics that may have impact on learner achievement in technology certificate programs.

Participant level factors

Three classes of participant level variables were examined in this study: demographics, computer skills, and motivation. Participant demographics are important to collect and analyze to understand the differences between student groups (Schreiber, 2002). Especially in computer related technology courses, males typically have a greater ability and interest in the content than do females (Crombie & Abarbanel, 2000; Green, 2000).

Two demographic factors are age and job status. Age is an important factor that may influence an adult learner's achievement. Due to cognitive development and the amount of academic and life experience at different ages (Justice & Dornan, 2001), older learners are expected to perform better than younger learners. A participant's employment status might be also expected to influence their achievement in technology certificate programs. At the college level, prior research suggests that students with full-time jobs academically achieve less than students with a part-time job or no job (King & Bannon, 2002; Paul, 1982).

Computer skills, the second participant level factor, are important abilities that could enable participants to learn more effectively in computer courses. The more general knowledge of computers that the participants of the program have, the more likely they will be able to master the new networking knowledge (Cashion & Palmieri, 2002; Kennedy, 2000; Thompson & McGrath, 1999).

Motivation is the third set of participant level factors that were considered. An individual's beliefs, goals, and expectations are directly related to being engaged or disengaged in learning. Many studies have linked motivation and engagement to individual achievement (Eccles & Wigfield, 2002). Individuals who place a greater value on learning the material and have greater expectancy to be successful in a course are more likely to achieve at higher levels (Wigfield & Eccles, 2000).

Long-term goals are also important. A participant's career goal is one example of a long-term-goal. Those who have selected a career closely related to an educational program tend to perform better than those who are indecisive about their goals (Alpern, 2000; Haislett & Hafer, 1990).

A participant's desire for lifelong learning may also influence motivation and academic achievement. Adult learners with a more positive attitude towards lifelong learning tend to be more persistent, more self-directed, and more self-confident (de la Harpe & Radloff, 2000). They efficiently use cognitive strategies to maximize their learning (Zimmerman & Martinez-Pons, 1992).

Institutional level factors

The CCNA program is taught in institutions at very different academic levels such as high schools, community colleges, and universities, as well as non-traditional education locations such as career centers and homeless shelters. Adult learners who wish to take the CCNA courses can register for courses in any of these educational

institutions. Although institutions need to meet minimum predetermined standards in order to offer the CCNA courses, the differences in terms of technical and instructional resources between these diverse ranges of institutions are inevitable and thus may have an impact on learner achievement.

The geographical location of an institution, whether urban, suburban, small town, or rural, is expected to have an impact on success due to the differences in organizational and social environments and the resources available (Barker, 1985; Hannaway & Talbert, 1993; Lee & McIntire, 1999). Although the patterns are not clear, the educational inequities in urban area institutions suggest that large achievement gaps could exist between participants in these institutions and their peers in suburban and rural institutions (Everson & Millsap, 2004; Kozol, 1991; Lee, 2001).

Research has found that one of the most influential factors in learner achievement is the participant's socioeconomic status (Bracey, 1995; Verstegen & King, 1998; Walberg, 1984). Being in a financially disadvantaged region or not could be used as a proxy to socioeconomic status. Traditional learners in financially disadvantaged regions such as empowerment zones and enterprise communities are expected to perform at a lower level than their peers in relatively developed regions (Tajalli & Opheim, 2005). It might be expected that students who took courses from institutions located in economically disadvantaged regions will achieve less than their peers in other regions.

The Cisco Networking Academy (CNA) manages the delivery of programs through the hierarchical structure of Cisco Academy Training Centers (CATC), Regional Training Centers (RTC), and Local Academies (LA). LAs are further from the source of the program, having little direct contact with Cisco Learning Institute or its CATCs. RTCs, on the other hand, are selected for their abilities and have direct contact with CATCs. It is expected that the higher the position of an institution in the CNA hierarchy, the higher the overall participant achievement would be because of the availability of physical, educational, and human resources.

Based on research findings in literature, a summary of factors affecting learner achievement and directions of their impact are presented in Table 1. In the literature there were no results on two institutional factors included in this study, namely type of institution and academy type.

Table 1- A summary of factors impacting learner achievement

Factors Investigated	Past Research Results (Achievement in favor of)
Learner Level Factors	
Gender	Males
Age	Mature or older learners
Job status	Learners with part-time or no full-time jobs
Computer technical ability	Learners with high technical ability
Motivation	Learners with high motivation
Career goal	Course related career goals
Lifelong learning	Learners with high value of life long learning
Institutional Level Factors	
Geographical location	Suburban locations
Economic development regions	Non-economic development regions
Type of Institution	No past research results
Academy type	No past research results

The purpose of this research study is to examine participant and institutional factors related to achievement of adult learners who participate in a technology certificate program. The results of this study are expected to enhance our understanding of the factors that impact adult learners' achievement in technology certificate programs. This may help researchers build an empirical framework that can guide research and practice in these programs. The research questions guiding the study are:

1. Which participant level factors have an impact on adult learner achievement in a technology certification program on computer networks?
2. Which institutional level factors have an impact on adult learner achievement in a technology certification program on computer networks?

METHOD

We used a multilevel data analysis approach to analyze data drawn from five separate sources including an online survey, class registration data, test achievement scores, and two public databases maintained by the U.S. government agencies. Data from these sources were organized as student level (Level 1) and institution level (Level 2). Participants were adult learners older than 18 years of age who were enrolled in CCNA certification programs with the goal of receiving either certification or no degree. A two-level hierarchical analysis procedure was run to calculate the impact of selected variables on student achievement.

Context

The Cisco Networking Academy was established in order to provide networking education to participants around the world. The Academy currently serves more than 400 000 participants at more than 10 000 high schools, community colleges, universities, and non-traditional settings in 149 countries. The Academy offers several programs, the most popular of which is the CCNA program. The CCNA program consists of four separate courses taken in sequence. The study's context is the first course of the CCNA program, which focuses on basic computer networking knowledge and skills.

The CCNA program provides a unique learning environment to instructors and students, which combines face-to-face and online course delivery modes. In face-to-face component, instructors have complete freedom in deciding how their courses will be taught and how the content may be modified to fit their students' needs. Some instructors use traditional lectures, some use small group discussion, and others use chapter tests to guide class discussion. Students and instructors access online course material using a propriety course management system. All student achievement is judged by the same final exam.

Participants

This study uses data from a large scale educational evaluation project conducted in the United States between August 2004 and May 2005 on the CCNA program from a population of 65 000 participants, approximately 20 000 surveys were completed, which provided a return rate of approximately 30%. As a subset of the collected data, the participants of this study were adult learners who completed the survey administered at the beginning of CCNA1 course. Two of the questions in the survey asked participants about their age and currently pursued degree by attending the CCNA program. Answers to these two questions were used as the selection criteria to identify adult learners as the participants of this study. We identified 2442 participants from 256 institutions who were older than age 18 and who identified their pursued degree as 'certificate' or 'non-degree'. The latter criterion was used to make sure that the adult learners attend the CCNA program solely for 'technology certification' or 'improving their skill base' rather than a requirement of their formal degree program. Detailed descriptive information about the participants is presented in Table 2, Table 3, and Table 4.

Data Sources and Measures

Using multilevel analysis methods, we analyzed five separate sources of data drawn from participants enrolled in the CCNA1 course: 1) A survey completed by participants at the start of the course and administered through the Academy course management system, 2) Demographic data provided to the Academy by participants upon enrolling in the program, 3) Final exam achievement from the online exam administered by the Academy to measure the knowledge gained from the program by participants, 4) Academy location from a U.S. Department of Education database, and 5) Financial development level of institutions' regions as determined by the Department of Housing and Urban Development database. Then data are organized in two levels: first, participant level factors; and second, institutional level factors.

Level 1: Participant level factors

The factors at this level are related to individual learners and are collected from participants.

Gender: Participant gender was obtained from class registration data.

Employment status: A participant's employment status was obtained by asking participants whether or not they were employed full-time.

Age: Participants' ages were determined by a question on our survey that asked their age using numbers between 15 and 65 with one year increments.

Adult learners' technical ability: We used self-reported computer skills as technical ability factors. These skills were measured on the survey via four items with 7-point Likert scales that asked participants to report the frequency of behaviors over the past year such as installing an operating system, dealing with computer hardware, and providing technical advice to others. Cronbach's alpha was .88 for the scale, indicating adequate reliability.

Motivation: We measured learner motivation using a scale drawn from Eccles and Wigfield (2002). The scale was developed based on value and expectancy theory. The scale had seven items with 5-point Likert scales,

which measured the placed value and expected success in the CCNA course. Cronbach's alpha for the scale was .86, indicating adequate reliability.

Career goal: The participants' career goals were measured by a single multiple choice question on the survey. If a participant has reported having a career goal as a networking specialist, or as an IT professional, the career goal was set to one; otherwise, it was set to zero.

Reasons to take the course: The participants were asked why they took the CCNA1 course. The seven options were related to career, education, and advisor or friend recommendation. For the purpose of analysis, we created a variable that grouped career and education related reasons into one category and other reasons into another category. If a participant has stated career or educational related reasons for taking the course, the variable was set to one; otherwise, it was set to zero.

Lifelong learning: The desire for life-long learning was measured on the survey via a series of nine 5-point Likert scales drawn from Oddi, Ellis, and Roberson (1990), a continuing learning scale, and learning skills and styles inventory. Cronbach's alpha was .85, indicating adequate reliability for the scale.

Course achievement score: The dependent variable was the participant's course achievement score in the first CCNA course, i.e., the percent of test items answered correctly on final exam produced by the online testing system. The final examination tests for all CCNA courses are developed by the Cisco Learning Institute based on established standards.

Level 2: Institutional level factors

The factors at this level are related to the institutions where adult learners took the CCNA courses. The factors we examined are closely related to an institutions' ability to provide resources for education.

Academy type: All institutions offering the CCNA courses are classified as Regional Training Center (RTC) or Local Academy (LA) in this management structure, which we coded using an indicator variable in this study.

Economic development communities: In some financially depressed regions, the U.S. government may provide some economic advantages for the businesses and individuals in the regions. These regions are labeled as Empowerment Zones or Enterprise Communities. It is a good indicator of economic developmental level of a region and its community. Seven percent of academies in our sample are situated in communities that are classified as being economic development communities using the U.S. government's definition of Empowerment Zones and Enterprise Communities; these institutions were coded using an indicator variable.

Location type: We classified each institution's location by matching its ZIP code to corresponding locale definition code, 1 through 8, in National Center for Education Statistics (NCES) database. Institutions located in regions classified as 1 or 2 (central city) were coded as urban. Institutions classified as 3 or 4 (urban fringe) were coded as suburban. Institutions located in regions classified as 5 or 6 (town) were coded as town, and institutions classified as 7 or 8 (rural) were coded as rural. We used a set of three indicator variables (urban, town, rural), with suburban as the base case in the analysis.

Institution type: When institutions join the CCNA program, they register as high schools, community colleges (2- or 3-year post-secondary institutions), universities (4 or more year post-secondary institutions), or career centers (e.g., employment centers and corrections facilities). We used a set of three indicator variables (high school, university, career center), with community college as the base case in the analysis.

ANALYSIS

Since individuals nested within schools in our data, we used a multilevel analysis method, specifically the Hierarchical Linear Modeling (HLM) for the analysis. Traditional regression techniques were not well suited to our data (Raundebush & Bryk, 2002). With traditional regression, there is a problem with the unit of analysis. If the data are analyzed at the lowest level, in our case participant level, then the impact of the institution must be omitted. It is likely that there is a significant correlation among the factors affecting individuals. This can erroneously inflate the significance and cause type 1 errors. HLM is utilized to analyze data collected in this type of multi-level research design (Hofmann, 1997; Raundebush & Bryk, 2002; Snijders & Bosker, 1999). In the current study, a two-level model was used: the lowest level (level 1) was the participant; the second level (level 2) was the institution. Because there were two levels, we could calculate an R-squared at each level to identify the relative contribution of participant and institutional factors to the overall achievement (Snijders & Bosker, 1999).

RESULTS

Table 2 and Table 3 present the descriptive statistics of the participant level factors. All categorical factors were converted into dummy variables before they were entered into the multilevel analysis.

Table 2-Descriptive Statistics for Individual Level Categorical Factors

Factor name	Percent
Female	14%
Employment status - Full time working	51%
Career and education related reasons to take	75%
Degree	
Certification participants	54%
Non-degree participants	46%
Career goal	
IT related careers	79%
Other	21%
Age groups	
18-24	17%
25-35	33%
36 and More	48%

Table 3-Descriptive Statistics for Continuous Factors

Variable name	N	Mean	SD	Min.	Max.
Achievement scores	2442	76.34	16.87	0.00	100.00
Motivation	2442	4.43	0.51	1.00	5.00
Life long learning	2442	4.41	0.51	1.00	5.00
Technical ability	2442	4.22	1.91	0.00	6.00

Table 4 presents descriptive statistics for institution level variables. We used 256 academies in the multilevel analysis. Community colleges (as opposed to non-traditional institutions) represented the majority of academies (84%). Academies were evenly distributed among urban and suburban locations. Sixty-five percent of the academies in this study were classified as local academies (LA) while 35% of them were classified as Regional Training Centers (RTC).

Table 4-Descriptive Statistics for Institutional Level Factors

Factor name	Percent
Institution type	
High School	4%
Community College	79%
4-year university	4%
Non-traditional	13%
Location type	
Urban	52%
Suburban	35%
Town	8%
Rural	6%
Academy type	
RTC	36%
Local	65%
Economic development community	7%

Table 5 presents the result of HLM analysis. The analysis was run in two steps. At each step, new variables were introduced to the equation and the improvement in R-squared at both levels was noted. At step one, only participants' demographic, ability, and motivational factors were entered into the analysis. Participants' demographics, ability, and motivational factors could explain 11.5% of variation of scores within the academies and 19.3% of variation of scores between the academies. In step two, institutional factors along with the participants' demographics, ability, and motivational factors were entered. The variables in step two could explain 11.8% of variation in participants' scores at level one and 19.6% of variation between academies at level two. As shown in Table 5, none of the institutional level factors contributed significantly to the model.

Table 5-Result of Multilevel Analysis

	Step 1: Participant Factors		Step 2: Participant and Institutional Factors	
	Beta	p	Beta	p
Individual Learner Factors				
Gender (Female)	-17.35	.019	-17.61	.018
Degree orientation				
Non-Degree	3.24	.000	5.37	.000
Certification	Baseline		Baseline	
Employment status - Full time working	4.52	.000	4.52	.000
Age				
18-24	Baseline		Baseline	
25-35	3.56	.002	3.56	.002
36 and More	5.52	.002	5.56	.000
Technical ability	.69	.003	.69	.003
Motivation	2.99	.003	2.97	.003
Career goals				
IT related careers	-.17	ns	-.17	ns
Other	Baseline		Baseline	
Lifelong learning	1.23	ns	1.21	ns
Career and education reasons to take course	.60	ns	.60	ns
Factor interactions				
Gender and Motivation	3.65	.031	3.72	.029
Gender and Technical ability	-0.27	ns	-.30	ns
Institutional Factors				
Regional Training Center			1.32	ns
Economic development community			-1.51	ns
Institution location type				
Urban			.51	ns
Suburban			Baseline	
Town			1.06	ns
Rural			1.35	ns
Institution type				
High School			-2.48	ns
2-year College			Baseline	
4-year University			1.60	ns
Non-Traditional			1.88	ns
Level 1 R-Squared	.115		.118	
Level 2 R-Squared	.193		.196	

Table 5 indicates whether the variables were significant to explain the achievement of adult learners in the CCNA program. However, the beta coefficients did not indicate the relative importance of each variable on participants' achievement scores. We needed to convert these beta coefficients to standardized beta coefficients. Table 6 shows the relative importance order and the standardized beta of each factor on participants' achievement in the CCNA program.

Table 6-Relative Importance of Factors on Adult Learner Achievement

Importance	Factor	Standardized Beta
1	Gender (in favor of males)	0.360
2	Gender and motivation (in favor of females)	0.333
3	Age 36 and more	0.164
4	Full time working	0.134
5	Age 25-35	0.099
6	Non-certificate	0.096
7	Motivation	0.090
8	Technical ability	0.078

DISCUSSION

The multilevel analysis indicated that many factors affect learners' achievement in this technology certification program. Gender, age, work status, degree status, motivation, and technical ability played important roles in learner achievement at the learner level. At the institutional level, the analysis did not indicate any important factors that impacted learner achievement. Regardless of the type of institution offering the CCNA courses, adult learners performed equally well. Contrary to past research findings with traditional students in public schools (Hofmann, 1997; Lee & McIntire, 1999), our results indicated that adult learners in urban and rural settings performed as well as adult learners in the suburban settings.

The mean beta coefficients in Table 5 enabled us to draw some conclusions about factors influencing adult learner achievement in the CCNA program. Assuming that all ability and motivational factors were similar, some personal demographics had an important impact on adult learner achievement. To understand the impact of these factors, we can contrast two typical participants of the program using the coefficients in Table 5. In this case, a full-time working non-degree seeking male learner over age 36 scores approximately 27.7 percentage points higher than a female learner who is 18-24 years old without a full-time job. However, it should be noted that this is a hypothetical combination of personal attributes that may or may not occur in real life.

Table 6 with standardized beta coefficients ranks the relative importance of each factor. As listed in Table 6, male learners do better than female learners, learners with full-time jobs do better than learners who do not work full-time, older learners do better than younger learners, and learners with no degree orientation achieve more than certificate seeking learners. Level of learner motivation and level of technical ability at the beginning of the program contributes to the learner achievement. Additionally, interaction between gender and entry motivation level has significant impact on female learner achievement.

Among the main effects for the factors that were investigated in this study, our model indicated that the most important predictor of learner achievement was gender. The achievement difference between males and females significantly favors male adult learners even after accounting for technical ability, motivation, and other demographic and institutional level factors. There is some evidence that females do not do as well as males in math, science, and technology courses (Kennedy, 2000; Schreiber, 2002). The student body in the CCNA program consists of 85% male students. This might lead to significantly lower achievement of females.

Age was the second most important factor impacting learners' achievement in the CCNA program. When compared to the participants aged 18-24, both older learner groups (25-35 and 36 and older) achieve more in the CCNA1 course. This result is in line with previous research findings (Justice & Dornan, 2001). A possible explanation of this result might be the differences between younger and older learners in terms of cognitive development, life experiences, and acquired academic skills.

The direction of impact for full-time employment on learner achievement was unexpected. Contrary to literature and common understanding, participants who had full-time jobs achieved 4.52 percentage points more than the learners who did not work full-time. The interactions of employment factor with demographic, ability, and motivation factors did not yield a meaningful result that we can explain with the current data. However, it is possible that working participants could have better study skills and time management skills than their non-working counterparts, or that the content of the CCNA courses was more relevant to those in full-time positions. Another interesting finding from this analysis was that adult learners who were non-degree seeking learners achieved 3.26 percentage points more than learners who were in a certificate program. Non-degree seeking learners pursue the CCNA program for skill set increase rather than obtaining a degree. Contrary to the general stream of literature, learners without any degree aim achieved more than the learners with a certificate aim in the program. Interactions of other factors with this factor did not yield meaningful results, therefore requiring further investigation.

The motivational factor measured as the value of the program and expectancy from the program also had an impact on adult learner achievement in the CCNA program. As expected, the learners who highly valued the program achieved more in the program. Previous studies have shown similar results in the past with non-traditional undergraduate students (Allen, 1999; Eppler & Harju, 1997).

Learner ability has long been considered an important factor that influences achievement (Stinson, 2004). The analysis indicated that it is also important in the CCNA program for adult learners. Learners with high computer related technical ability at the beginning of the program performed better in the CCNA1 course than learners without these skills. However, no significant interaction of technical ability with other factors was detected.

The other participant level factors, such as career goals, desire for lifelong learning, and reasons to take the CCNA1 course, did not have an impact on achievement in the course. Although these factors have been considered as predictors of participation to lifelong learning and continuous learning activities (Creighton & Hudson, 2002; de la Harpe & Radloff, 2000; Livneh & Livneh, 1999), they did not have an effect on achievement in the CCNA1 course.

Finally, contrary to the literature, the analysis indicated no significant differences in adult learner achievement between Regional Training Centers and Local Academies, between financially disadvantaged and regular regions, and between different geographical locations. Achievement differences between geographical regions and different economic regions are well-documented in the literature. Students attending institutions in urban or rural areas, and institutions placed in economically disadvantaged regions show lower achievement than their peers in suburban or economically well developed regions (Kozol, 1991; Lee & McIntire, 1999; Lippman, Burns, & McArthur, 1996; Walberg, 1984; Young, 1998). However, our analysis indicated that differences between regions do not impact student achievement in the course.

CONCLUSION

This study can have important implications for educational practice to improve design, development and utilization phases of technology certificate programs on computers offered to adult learners. Based on the findings, several recommendations can be made that might impact learner achievement in hybrid or blended learning environments similar to the examined CCNA program. Gender is an important factor for learner achievement in any technology related program. Our findings confirm mainstream literature indicating that males perform better than females. Instructors and program designers for technology programs need to find and develop strategies that better support female learners in order to help them achieve as well as males in these types of programs.

The level of individual motivation is a factor that impacts all learners' achievement in the CCNA program. However, this factor affects females more than males. Interaction between gender and motivation reveals that females with more motivation achieve more than females with less motivation. This implies that, in order to increase their perceived value and success expectations about the programs, female participants should be well informed about the value of technology programs to their life before they begin.

One of the interesting findings in this study is the achievement of participants who work full-time. Contrary to findings from previous studies, full-time working participants in the CCNA1 course achieved more than participants without full-time jobs. With the current data, no explanation can be generated for this finding.

Another interesting finding is that there were no differences in achievement between participants in different geographical locations and institutions. The structure and the organization of the CCNA program provide equal opportunity and a learning environment for adult learners to succeed and to reach their own potential. This situation is most likely the result of using standardized curriculum and testing delivered over the Internet. Learners from all academies and regions have access to the same teaching/learning resources. The online delivery system takes the burden of class, material preparations, and student feedback tasks from instructors' shoulders and allows them to focus on more in-class activities and interactions with their students. This finding indicates that the technology certificate program provides a consistent quality of educational experience to all participants regardless of the institution and location where the program is offered, which could be considered as a contribution of the hybrid instruction or blended learning environments to education.

As in any large scale research study, the current study had certain limitations. First, since the data were collected using online methods, this study has the inherent limitations of survey research. The results reflect the learners who chose to complete the survey. There were no means to check the representativeness of our sample. Additionally, the survey items are self-reported (e.g., computer skills, program value), which may introduce social desirability bias.

In light of the findings, this study can have important implications for future research. First, our model indicated that the factors we studied may explain 11.8% of adult achievement at the learner level and 19.6% at the institution level in the CCNA1 course. There is still a large unexplained variance in the achievement scores. Future research should examine other learner and institutional factors that influence adult learners' program achievement such as instructor, instruction, and student engagement. Second, it is expected that learners with full-time jobs would do equal to or worse than learners without full-time jobs. However, our research found that learners with full-time jobs do better than learners without full-time jobs. Future research should explore time

management and study skills, and prior work and academic experiences of learners with full-time employment versus no full-time employment. Future research should investigate learner involvement with the program such as time on task, active learning strategies, and their relationship to student achievement. Third, it is likely that by studying local instruction, it would be possible to identify best practices. There may be some instructional practices applied locally that enhance achievement. Identifying these practices may assist in finding ways to further encourage and support participants in all types of technology certification programs. Finally, there are no achievement differences between different geographical, socioeconomic regions and institutions in this program. The current research shed light on important factors that impact adult learner achievement in technology certificate programs. Further research needs be conducted to understand this phenomenon by including other factors like the teaching resources, instructional quality, and teacher-student satisfaction from the program in these institutions.

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REFERENCES

- Adelman, C. (2000). *A Parallel Postsecondary Universe: The Certification System in Information Technology*. Washington D.C.: Office of Educational Research and Improvement.
- Allen, D. (1999). Desire to finish college: An empirical link between motivation and persistence. *Research in Higher Education*, 40(4), 461-485.
- Alpern, B. E. (2000). *Factors That Influence Community College Transfer Students' Satisfaction with Their Baccalaureate Institutions* (No. ED449854). Michigan.
- Barker, B. (1985). Curricular offerings in small and large high schools: How broad is the disparity? *Research in Rural Education*, 3(1), 35-38.
- Bracey, G. W. (1995). Debunking the myths about money for schools. *Educational Leadership*, 53(3), 65-69.
- Cashion, J., & Palmieri, P. (2002). *The Secret is the Teacher: The Learners View of Online Learning* (No. 1740961021). Adelaide, South Australia: The National Centre for Vocational Education Research.
- Creighton, S., & Hudson, L. (2002). *Participation Trends and Patterns in Adult Education: 1991-1999. Statistical Analysis Report*. Washington D. C.: National Center for Education Statistics.
- Crombie, G., & Abarbanel, T. (2000). Bridging the gender gap in high-technology education. *NASSP Bulletin*, 84(618), 64-73.
- de la Harpe, B., & Radloff, A. (2000). Informed teachers and learners: The importance of assessing the characteristics needed for lifelong learning. *Studies in Continuing Education*, 22(2), 169-182.
- Delialioglu, O., & Yildirim Z. (2007). Students' perceptions on effective dimensions of interactive learning in a blended learning environment, *Journal of Educational Technology & Society*, 10(2) 133-146.
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, 53(1), 109-132.
- Eppler, M. A., & Harju, B. L. (1997). Achievement motivation goals in relation to academic performance in traditional and nontraditional college students. *Research in Higher Education*, 38(5), 557-573.
- Everson, H. T., & Millsap, R. E. (2004). Beyond individual differences: Exploring school effects on SAT scores. *Educational Psychologist*, 39(3), 157-172.
- Green, M. Y. (2000). Why aren't girls more tech savvy? *NEA Today*, 19(3), 31.
- Haislett, J., & Hafer, A. A. (1990). Predicting success of engineering students during the freshman year. *Career Development Quarterly*, 39(1), 86-95.
- Hannaway, J., & Talbert, J. E. (1993). Bringing context into effective school research: Urban-suburban differences. *Educational Administration Quarterly*, 29(2), 164-186.
- Hofmann, D. A. (1997). An overview of the logic and rationale of hierarchical linear models. *Journal of Management*, 23(6), 723-744.
- Justice, E. M., & Dornan, T. M. (2001). Metacognitive differences between traditional-age and nontraditional-age college students. *Adult Education Quarterly*, 51(3), 236-249.
- Kennedy, C. A. (2000). *Measuring Student Variables Useful in the Study of Performance in an Online Learning Environment* (No. ED466237). California.
- King, T., & Bannon, E. (2002). *At What Cost? The Price That Working Students Pay for a College Education*. Washington, D.C.: United States Public Interest Research Group.
- Kozol, J. (1991). *Savage Inequalities: Children in America's Schools*. New York: Crown Publishers.
- Lee, J. (2001). *Interstate Variations in Rural Student Achievement and Schooling Conditions*. ERIC Digest (ERIC Digests). Charleston, WV.

- Lee, J., & McIntire, W. G. (1999). *Understanding Rural Student Achievement: Identifying Instructional and Organizational Differences between Rural and Nonrural Schools*. Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Quebec, Canada.
- Lee, V. E. (2000). Using hierarchical linear modeling to study social contexts: The case of school effects. *Educational Psychologist*, 35(2), 125-141.
- Lippman, L., Burns, S., & McArthur, E. (1996). *Urban Schools: The Challenge of Location and Poverty*. Washington, DC: National Center for Education Statistics.
- Meares, C. A., & Sargent, J. F. (2003). *Education and Training for the Information Technology Workforce*. Washington D.C.: U.S. Department of Commerce.
- Oddi, L. F., Ellis, A. J., & Roberson, J. A. (1990). Construct validation of the Oddi Continuing Learning Inventory. *Adult Education Quarterly*, 40(3), 139-145.
- Paul, H. (1982). The impact of outside employment on student achievement in macroeconomic principles. *Journal of Economic Education*, 13(2), 51-56.
- Raundebush, S. W., & Bryk, A. S. (2002). *Hierarchical Linear Models: Application and Data Analysis Methods*. Thousand Oaks, CA: Sage Publications.
- Schreiber, J. B. (2002). Institutional and student factors and their influence on advanced mathematics achievement. *Journal of Educational Research*, 95(5), 247-259.
- Snijders, T. A. B., & Bosker, R. J. (1999). *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. Thousand Oaks CA: Sage Publications.
- Stinson, J. (2004). A Continuing Learning Community for Graduates of an MBA Program: The Experiment at Ohio University. In T. M. Duffy & J. Kirkley (Eds.), *Designing Environments for Distributed Learning: Learning theory and practice*. Mahwah, NJ: Lawrence Erlbaum.
- Tajalli, H., & Opheim, C. (2005). Strategies for closing the gap: Predicting student performance in economically disadvantaged schools. *Educational Research Quarterly*, 28(4), 44-54.
- Thompson, M. M., & McGrath, J. W. (1999). Using ALNs to support a complete educational experience. *Journal of Asynchronous Learning Networks*, 3(2).
- Verstegen, D. A., & King, R. A. (1998). The relationship between school spending and student achievement: A review and analysis of 35 years of production function research. *Journal of Education Finance*, 24(2), 243-262.
- Walberg, H. J. (1984). Improving the productivity of America's schools. *Educational Leadership*, 41(8), 19-27.
- Wigfield, A., & Eccles, J. (2000). Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology*, 25, 68-81.
- Young, D. J. (1998). Rural and urban differences in student achievement in science and mathematics: A multilevel analysis. *School Effectiveness & School Improvement*, 9(4), 386-418.
- Zimmerman, B. J., & Martinez-Pons, M. (1992). Perceptions of efficacy and strategy use in the self-regulation of learning. In D. H. Schunk & J. L. Meece (Eds.), *Student perceptions in the classroom* (pp. 185-207). Hillsdale, NJ: Lawrence Erlbaum.

IMPACTS OF LEARNING STYLES AND COMPUTER SKILLS ON ADULT STUDENTS' LEARNING ONLINE

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ABSTRACT

This study investigated the influences of learning styles/preferences, prior computer skills and experience with online courses on adult learners' knowledge acquisition in a web-based special education course. Forty-six adult learners who enrolled in a web-based special education course participated in the study. The results of the study showed that (a) learning styles/preferences had significant effects on adult students' knowledge acquisition, and (b) there is a moderate positive correlation between computer skills and students' success. Data analysis also showed that there is no relationship between prior experiences with online courses and success in a web-based course.

Keywords: Web-based learning, learning styles, computer skills, adult learners

INTRODUCTION

Providing valuable and effective professional development opportunities to in-service teachers is a long-lasting challenge for the field of education (Blackhurst, Hales, & Lahm, 1998). The growth of knowledge, practices, and technology especially in the field of special education and particularly in the area of autism has been rapid. Many teachers and other related service providers often find that their knowledge, skills and practices are not compatible with the current research-supported, evidence based practices and in need of professional development (Ludlow, Foshay, Brannan, Duff, & Dennison, 2002). However, many professionals, especially the ones living in rural areas, have little opportunity to travel to higher education institutions to take courses to upgrade their knowledge, skills and practices. One answer to this challenge is the design and implementation of web-based education and training programs related to special education (Blackhurst et al., 1998). Web based instruction is convenient and flexible, and as such, ideally suited for in-service teachers without access to higher education institutions. It also makes the teaching and learning possible any time and in any place (Steinweg, Davis, & Thomson, 2005; O'Neal, Jones, Miller, Campbell, & Pierce, 2007). Although web-based courses and programs have opened new avenues for many professionals to update their knowledge, in order to be effective, this type of course delivery requires a careful planning in terms of instructional design, learning activities and materials.

Much of the research in special education investigating the effectiveness of web-based courses has focused on either learners' satisfaction and perceptions (Beard & Harper, 2002; Ludlow et al., 2002; Spooner, Jordan, Algozzine, & Spooner, 1999) or the comparison of web-based courses with traditional face-to-face courses based on grade, satisfaction, and instructor evaluation (Caywood & Duckett, 2003; Pindiprolu, Paterson, Rule, & Lignugaris/Kraft, 2003; Steinweg et al., 2005; O'Neal et al., 2007). The findings of the research investigating the outcomes of web-based instruction in the area of special education are positive and suggest that participants of web-based courses like the course format. The studies comparing on-campus and distance education found no difference between two methods in terms of student achievement, satisfaction and instructor evaluation. Although many researchers and educators have long acknowledged and supported the concept that personal differences play an important role in learning and academic achievement (Kim & Michael, 1995; Moallem, 2007; Zhang, 2002), the research addressing web-based courses and their effectiveness in special education has not paid much attention to these differences. These individual differences, in the case of online learning, include but not limited to differences on learning styles/preferences, prior experience with online courses, self-regulation, and computer literacy (Miller & Miller, 2000).

Purpose of the Study

The main purpose of the current research, therefore, was to investigate the influences of individual learning styles/preferences and prior computer skills on adult learners' knowledge acquisition in an online text-based special education course. The research questions for this study were as follows:

1. How do individual learning styles/preferences influence adult learners' knowledge acquisition in a web-based special education course?
2. What is the relationship between adult learners' computer skills and learning in a web-based special education course?
3. Is there any difference on student success based on prior experience with web-based courses?

Learning Styles

There has been a growing body of research investigating web-based instruction and its various aspects. However, the characteristics of learners who enroll in online programs have not been investigated extensively (Kelly & Schorger, 2002; Liu, 2007; Saba, 2000). Moreover, the relationship between web-based learning and learning styles of individuals who enroll in online courses has received little attention in the literature (Harris, Dwyer, & Leeming, 2003). However, many researchers stated that in order to provide appropriate learning opportunities to students, improve their motivation and maximize their learning in web-based courses, it is important to identify their learning styles and adapt teaching methods that meet the diverse needs of learners (Drennan, Kennedy, & Pisarki, 2005; Hawk & Shah, 2007; Johnson, 2004; Wehrwein, Lujan, & DiCarlo, 2007). Research investigating the learning styles has mainly focused on comparing learning preferences of students who enrolled to online and traditional courses and their academic achievement (Aragon, Johnson, & Shaik, 2000; Buerk, Malmstrom, & Peppers, 2003; Downing & Chim, 2004; Garland, 2003; Halsne & Gatta, 2002; Liu, 2007; Manochehri & Young, 2006). The result of these studies is non-conclusive. Only in two studies, the researchers examined the relationship between learning styles and academic performance. Bozionelos (1997) reported that students with a particular learning style (i.e., active experimentation model) performed better than their classmates with other learning preferences in an online course. Harris et al. (2003) found that individual learning styles did not influence students' mean test scores. However, participants of these studies were either undergraduate or graduate students and there is no study found in the literature that focused on examining the relationship between adult students' learning preferences and academic achievement in online courses.

Many different learning styles/preferences and definitions of learning styles exist in the literature. Keefe (1979) defines learning styles as typical psychological, cognitive and affective behaviors that serve as reasonably stable indicators of how individuals perceive, respond to and interact with learning environments. Reid (1995) characterizes learning style as favored ways of taking in, processing and maintaining new information and skills. Fleming (2001) defines learning style as "an individual's preferred ways of gathering, organizing, and thinking about information (p.1). As parallel with variation on its definition, there are many different methods for assessing learners learning styles. One of the commonly used learning style/preference inventory, the VARK Questionnaire (Fleming, 2001), is used in the current study. VARK stands for visual (V), aural (A), read/write (R) and kinesthetic (K) learning preferences. Learners with visual learning preference learn best by observing, watching and seeing. Aural learners learn through listening, discussing and talking. Read/Write type learners learn best by interacting with textual materials. Learners with kinesthetic learning preference learn best by doing. Table 1 provides the learning activities offered by Fleming (2001) to support each learning style. Additional information about the VARK Questionnaire is provided in the Methods section.

Table 1: Learning activities to support each VARK learning style

Visual	Aural	Read/Write	Kinesthetic
Pictures	Discussions with	Textbook	Hands-on experiences
Posters	teacher/ peer	Readings/ Articles	Modeling
Slides	Debates	Handouts/ Notes	Role play
Videos	Arguments	Written feedback	Physical activities
Flow charts	Audio	Manuals	Guest lecturers
Different color/font	Video	Essays	Real-life experiences
Textbooks with	Music	Bibliographies	Demonstrations
diagrams/pictures	Seminars	Dictionaries	
Graphs		Glossaries	

Source: www.vark-learn.com

Computer Skills

Computer skills and comfort with different technological applications are considered essential components of student success when the courses are offered online (Erich, Erlich-Philip, & Gal-Ezer, 2005; Jameson & McDonnell, 2007; Martz & Reddy, 2005; Shih, Munoz, & Sanchez, 2006; Summers, Waigandt, & Whittaker, 2005). However, several researchers have claimed that computer skills have little or no impact on student success and participation (McIsaac, Blocker, Mahes, & Vrasidas, 1999; Rumrappid, 1999). Since the results of these researchers is not convincing, there is a need for further investigation of this relationship. In addition, these studies have been conducted with either college or graduate student and no previous research examining the relationship between adult learners' computer skills and knowledge acquisition is identified in the literature.

Course Format

The Department of Special Education in a southeastern university has been offering a series of courses that upon completion will allow special education teachers to obtain the Autism Endorsement through the state's teacher certification office. The series consists of 4 web-based courses. Teachers who participate in the project complete online program in one year.

The present study was conducted in their first semester in the program when students took a course focusing on intervention techniques to support communication and social development of students with autism in the Summer 2008 semester. This course was designed to prepare educators to understand the communication and social skills of individuals with autism. The focus of the course was on the classroom-based strategies for promoting effective communication through the use of assistive technology and augmentative and alternative communication. The course was delivered asynchronously and utilized a text-based format.

The course consisted of six modules. One topic in each module was introduced and covered each week. The objectives of the module, an introduction and a power point presentation were provided at the beginning of each module. Students were assigned readings, given a quiz and an assignment in each module. The assignments provided students with the opportunities to apply the knowledge they acquired through readings, class presentations and discussions. The students also participated in threaded discussions related to the module. Threaded discussions were asynchronous and available 24 hours per day during the module periods. These discussions provided students with opportunities to interact with each other and the instructor. The instructor developed at least one activity or course material to address different needs of each learner. The course model and delivery of instruction is illustrated in Figure 1.

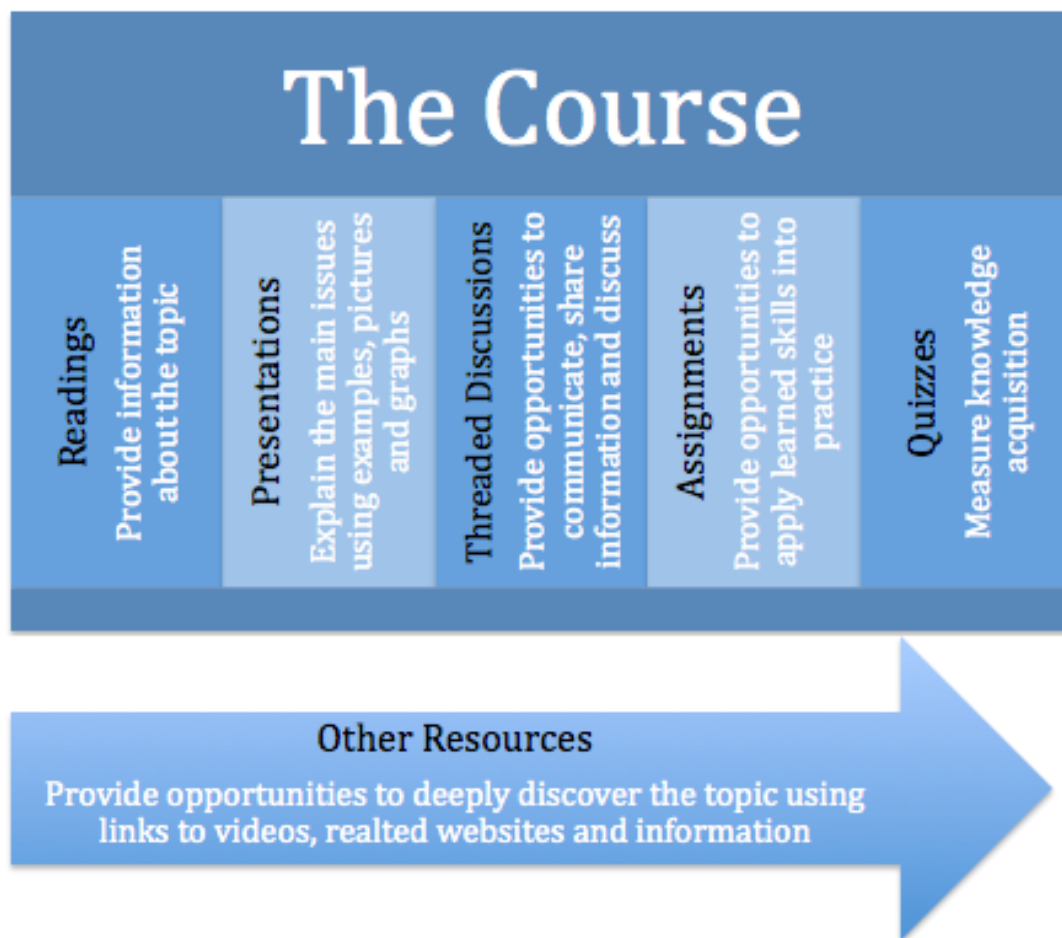


Figure 1. The course model and delivery of instruction

METHODS

Participants

Following their acceptance into the program, registered students were asked to complete consent forms and a background information form if they agreed to participate in the current study. As a result, a total of 46 students agreed to participate in this study. Participants' demographic information and information regarding their computer skills is presented in Table 2.

Table 2: Demographic Characteristics of Participants

Demographic Variables	n	%	Demographic Variables	n	%
Learning Styles			Computer Skills		
Visual	2	4.3	None	4	8.6
Aural	11	24.0	Some	8	17.4
Read/Write	15	32.6	Average	13	28.3
Kinesthetic	12	26.1	Good	10	21.7
Multimodal	6	13.0	Advanced	11	24.0
Online Course Experience			Gender		
No prior course	20	43.5	Male	2	4.3
Prior course taken	26	56.5	Female	44	95.7
Age			Ethnicity		
20-30	9	19.6	African American	2	4.3
31-40	13	28.3	Caucasian	38	82.7
40-50	14	30.4	Hispanic	6	13.0
50+	10	21.7			
Total for each Variable	46	100	Total for each Variable	46	100

Instruments

Instruments used in this study include a background information survey, the VARK questionnaire, and Self-Evaluation of Technology Use survey.

Evaluation of learning styles: The VARK learning preference questionnaire was selected to evaluate learning preference of adult students because it is very easy and quick to complete and available online. The VARK includes 13 multiple-choice questions to examine four different modalities (i.e., Visual, Aural, Read/Write, and Kinesthetic). In each question, respondents are placed in a real life learning situation, offered four options and asked to choose option(s) which best characterizes their way of learning. Respondents are allowed to choose more than one option if necessary or omit a question if no responses apply. As a result of evaluation of an individual's responses to the questionnaire, a person might have a single learning preference known as uni-modal, or more than one learning preference known as multimodal (see Figure 2 for conceptual model). Subcategories of multimodal learning preference include bi-modal (having two learning preference) tri-modal (having three learning preference) or quad-modal (having four learning preference).

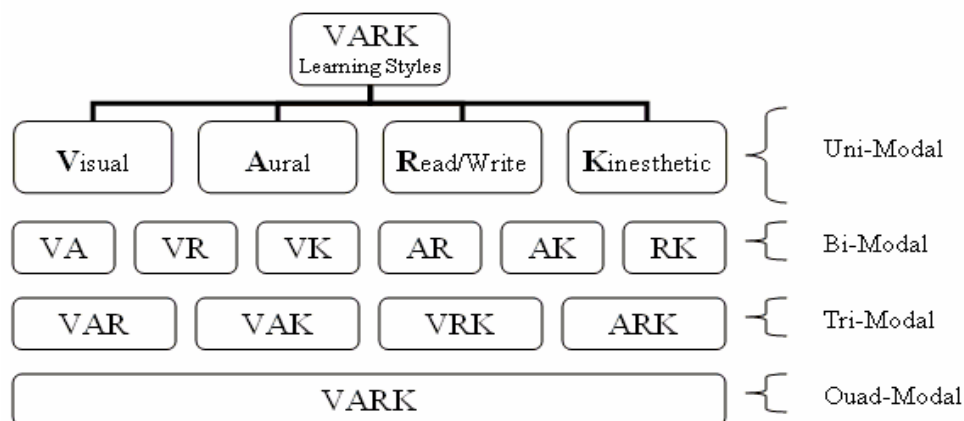


Figure 2. Conceptual Model

Evaluation of computer use, knowledge and skills. Self-Evaluation of Technology Use survey is used to measure participants' computer use, knowledge and skills prior to the course. In this survey, participants were asked to evaluate their skills on some technology tools (e.g. internet search, word processing, e-mail, electronic library etc.) and asked about their prior experience on distance education and web-based courses.

Evaluation of student learning. Students' knowledge acquisition was evaluated using the results of six quizzes that they took throughout the semester. Students were allowed to retake the quizzes if they want to improve their grades. In this study, each student's initial quiz scores were used.

Procedures

Following their acceptance into the program, a consent form along with the background information form was sent to the students. Students who returned a signed consent form to the researcher received a survey package one week before the semester began. This package included the VARK Learning Style Questionnaire and Self-Evaluation of Technology Use. Participants were given one week to complete and return the survey package to the researcher. Quiz scores of participants were obtained from the course instructor.

Analysis and Results

The Statistical Package for the Social Science (SPSS) version 15.0 is used to enter, store and analyze the data. First, data were analyzed at descriptive level. Second, group means for independent variables (i.e., learning styles, computer skill and prior online course experience) are calculated using student success (i.e., sum of quiz scores) as dependent variable (see Table 3 for details). Third, a series of t-test and one-way analysis of variance (ANOVA) test is conducted to investigate if the differences between the group means are statistically significant. For the ANOVA test that calculated a significant difference between the group means, the Post Hoc Tukey HSD analysis, a follow-up procedure, is conducted to determine where the statistically significant differences are. Finally, a correlation analysis is conducted to examine the relationship between students' computer skill and success. In the next section, the results of the analyses are presented by each research question.

Table 3: Mean Quiz Scores and Standard Deviations for Each Independent Variable

Learning Style	N	Mean	Std. D.
Visual	2	53.000	4.242
Aural	11	48.454	7.339
Read/Write	15	55.133	6.151
Kinesthetic	12	42.250	6.224
Multimodal	6	53.333	3.614
Perceived Computer Skills			
None	4	43.500	7.724
Some	8	46.875	8.741
Average	13	49.153	7.057
Good	10	49.200	8.377
Advanced	11	55.727	4.880

Prior Online Course Experience			
No prior course	20	48.800	8.088
Prior course taken	26	50.653	7.802
Total	46	49.847	7.893

Research Question 1

The first research question investigated influences of learning styles on students' success. Findings revealed that students with read/write learning preference showed the highest level of performance in the quizzes ($M=55.133$, $SD=6.151$) while students with kinesthetic learning preference had the lowest performance ($M=42.250$, $SD=6.224$). Students with visual, aural and multimodal learning preferences scored in between ($Ms=53.000$, 48.454 , 53.333 , $SDs=4.242$, 7.339 , 3.614 respectively; see Table 3 for more information). A one-way ANOVA was conducted to investigate whether any difference in mean values exists with the factor being learning styles and the dependent variable being student success. Results revealed that the effect of learning style on student success was significant ($F(4,41)=7.963$, $p=0.00$). Post hoc analyses using Tukey post hoc criterion for significance indicated that quiz scores of students with read/write learning preference is significantly higher than those with kinesthetic learning preference.

Research Question 2

Research question 2 examined the relationship between students' computer skill and their success in a web-based course. Simple comparison of the means showed that students with advanced computer skills had a higher mean score ($M=55.727$, $SD=4.880$) than students with less advanced computer skills (i.e., good; $M=49.200$, $SD=8.377$, average; $M=49.153$, $SD=7.057$, some; $M=46.875$, $SD=8.741$; and no computer skills; $M=43.500$, $SD=7.72$). See Table 3 for more information. A Spearman rank correlation was conducted to investigate the relationship between perceived computer skills (independent variable) and the student success (dependent variable). The result of the correlation analysis was statistically significant with $r=.462$, $p=0.01$, $df=44$. The correlation between two variables seems to be a moderate positive correlation.

Research Question 3

Research question 3 investigated the influences of prior experience with web-based course on student success. Students with prior web-based course experience performed slightly better ($M=50.653$, $SD=7.802$) students who had no prior experience with web-based learning. However, the result of independent sample t-test analysis showed that the mean difference between two variables is not statistically significant ($F=-.786$, $p=.436$, $df=44$).
Discussion

This study aimed to investigate the impacts of learning styles, computer skills and prior experience with online courses on student success in a web-based special education course. The current study has two important findings. First, the results of the data analysis demonstrated a significant effect of learning style on adult students' knowledge gain. Although the instructor of the course developed activities to support learning of students with different learning styles (e.g., discussion, hands-on assignments, presentations etc.), students with read/write learning preference outperformed students with other type of learning styles (i.e., visual, aural, and kinesthetic) in terms of academic success. Students with kinesthetic learning preference scored notably lower than classmates with other learning styles in the quizzes. This finding is consistent with earlier research findings (Bozionelos, 1997; Manochehri & Young, 2006). Second, there was found a positive correlation between students' computer skills and knowledge gain. That means that when students' computer skills increase, their success in web-based courses increase. In other words, students with more advanced computer skills score higher on the quizzes than students with less advanced computer skills. This finding also supports findings of previous research reporting the significance of computer skill and comfort with computer use (Erlach, Erlich-Philip, & Gal-Ezer, 2005; Jameson & McDonnell, 2007; Summers, Waigandt, & Whittaker, 2005). In addition, it was also found that prior experience with web-based courses and distance learning has no effect on student success. That means that students who have no prior experience with web-based courses are equally successful as their peers with prior experience are.

Implications for Practice

The results of this study showed that students knowledge gain changes as a function of learning styles. Therefore, instructors teaching online courses may need to become familiar with learning styles and comfortable with a variety of teaching strategies to address needs of individuals with different learning preferences. Using videos, chat rooms, discussion boards, and creating group assignments may increase students' interaction with each other and enhance their learning. In addition, the instructor may use a variety of different assessment strategies to evaluate student learning. Instead of using only quiz and exam scores to determine academic

success, an instructor may use some other alternative ways of evaluation such as projects, assignments, participation in the discussion and chat rooms, and portfolios. Additionally, for students with low computer skills, a tutorial or a user manual explaining how to use various functions of the course website might be placed in the main page. Instructor may also provide information about how to get technological help when needed (e.g. contact information of technology support staff).

Limitations

Despite the important findings of this study, it is important to consider its limitations while using these findings. There are at least two limitations of the current study. First, academic achievement and student success is measured using quiz scores alone. That might provide an advantage for students who learn better through reading textbooks and other written materials, since questions for the quizzes were derived from these assigned written materials. The second limitation of this investigation is that some independent variable groups (e.g. visual learning preference and students with no computer skills) had only a few participants. Therefore, the calculated statistics for these groups may not represent individuals with the similar characteristics.

CONCLUSIONS

The World Wide Web continues to be a practical medium for delivering trainings, in-service education programs and undergraduate and graduate level courses, and learning. The findings of current research further support the necessity of identifying individual differences (e.g., learning styles and computer skills) of online course participants in order to optimize instructional design and strategies, maximize learning opportunities for students enrolling in online programs and courses, and address their diverse needs for learning.

REFERENCES

- Aragon, S. R., Johnson, S. D., & Shaik, N. (2000, November). *The influence of learning style preferences on student success in online vs. face-to-face environments*. Paper presented at the World Conference on the WWW and Internet. San Antonio, TX.
- Beard, L.A., & Harper, C. (2002). Student perceptions of online versus campus instruction. *Education*, 122, 658-663.
- Blackhurst, A. E., Hales, R.M., & Lahm, E.A. (1998). Using an education server software system to deliver special education coursework via World Wide Web. *Journal of Special Education Technology*, 13, 78-98.
- Bozionelos, N. (1997). Psychology of computer use: XLIV: Computer anxiety and learning style. *Perception and Motor Skills*, 84, 753-754.
- Buerk, J. P., Malmstrom, T., & Peppers, E. (2003). Learning environments and learning styles: Non-traditional student enrollment and success in an Internet-based versus a lecture-based computer science course. *Learning Environments Research*, 6, 137-155.
- Caywood, K.D., & Duckett, J. (2003). Online vs. on-campus learning in teacher education. *Teacher Education and Special Education*, 26, 98-105.
- Downing, K., & Chim, T. M. (2004). Reflectors as online extraverts? *Educational Studies*, 30, 265-276.
- Drennan, J., Kennedy, J., & Pisarki, A. (2005). Factors affecting student attitudes toward flexible online learning in management education. *The Journal of Educational Research*, 98, 331-338.
- Erlich, Z., Erlich-Philip, I., & Gal-Ezer, J. (2005). Skills required for participating in CMC courses: An empirical study. *Computers & Education*, 44, 477-487.
- Fleming, N. (2001). *Teaching and learning styles: VARK strategies*. Christchurch, New Zealand.
- Garland, D. K. (2003). Learning style characteristics of the online student: A study of learning styles, learner engagement, and gender. *Dissertation Abstracts International Section A: Humanities and Social Sciences*, 63(12-A), 4282.
- Halsne, A. M., & Gatta, L. A. (2002, Spring). Online versus traditionally-delivered instruction: A descriptive study of learner characteristics in a community college. *Online Journal of Distance Learning Administration*, 5(1), Retrieved September 19, 2008 from <http://www.westga.edu/%7Edistance/ojdl/index.php>.
- Harris, R.N., Dwyer, W.O., & Leeming, F.C. (2003). Are learning styles relevant in Web-based instruction? *Journal of Educational Computing Research*, 29, 13-38.
- Hawk, T. F., & Shah, A. J. (2007). Using learning style instruments to enhance student learning. *Decision Sciences Journal of Innovative Education*, 5, 1-19.
- Jameson, J.M., & McDonnell, J. (2007). Going the distance to train teachers for students with severe disabilities: The University of Utah Distance Teacher Education Program. *Rural Special Education Quarterly*, 26, 26-32.
- Johnson, L.R. (2004). Research-based online course development for special education teacher preparation. *Teacher Education and Special Education*, 27, 207-223.

- Keefe, J.W. (1979). Learning style: An overview. In J. W. Keefe (Ed.), *Student learning styles: Diagnosing and prescribing programs* (pp. 1-17). Reston, VA: National Association of Secondary School Principals.
- Kelly, K.L., & Schorger, J. (2002). *Online learning: Personalities, preferences and perceptions*. (ERIC Reproduction Service Number ED 470 663).
- Kim, J., & Michael, W.B. (1995). The relationship of creativity measures to school achievement and preferred leaning and thinking style in a sample of Korean high school students. *Educational and Psychological Measurement*, 55, 60-71.
- Liu, Y. (2007). A comparative study of learning styles between online and traditional students. *Journal of Educational Computing Research*, 37, 41-63.
- Ludlow, B.L., Foshay, J.D., Brannan, S.A., Duff, M.C., & Dennison, K.E. (2002). Updating knowledge and skills of practitioners in rural areas: web based model. *Rural Special Education Quarterly*, 21, 33-44.
- Manochehri, N., & Young, J.I. (2006). The impact of student learning styles with web-based learning or instructor-based learning on student knowledge and satisfaction. *The Quarterly Review of Distance Education*, 7, 313-316.
- Martz, W.M., & Reddy, V.K. (2005). Success in distance education. In C. Howard, J. Boettcher, L. Justice, K. Schenk, P.L. Rogers, & G.A. Berg (Eds.), *Encyclopedia of distance education* (Vol. 3, pp. 1440-1445). Hershey, PA: Idea Group Reference.
- Mclsaac, M., Blocher, J., Mahes, V., & Vrasidas, C. (1999). Student and teacher perceptions of interaction in online computer-mediated communication. *Educational Media International*, 36, 121-131.
- Miller, S.M., & Miller, K.L. (2000). Theoretical and practical considerations in the design of web-based instruction (156-177). In B. Abbey (Ed.), *Instructional and cognitive impacts of web-based education*. Hershey, PA: Idea Group Publishing.
- Moallem, M. (2007). Accommodating individual differences in the design of online learning environments: A comparative study. *Journal of Research on Technology in Education*, 40, 217-245.
- O'Neal, K., Jones, W.P., Miller, S.P., Campbell, P., & Pierce, T. (2007). Comparing web-based to traditional instruction for teaching special education content. *Teacher Education and Special Education*, 30, 34-41.
- Pindiprolu, S.S., Peterson, S.M., Rule, S., & Lignugaris-Kraft, B. (2003). Using web-mediated experiential case-based instruction to teach functional behavioral assessment skills. *Teacher Education and Special Education*, 26, 1-16.
- Reid, J. (1995). *Learning styles in the ESL/EFL classroom*. New York: Heinle & Heinle.
- Rumrapid, C. (1999). An evaluation of the effect of user interface elements and user learning styles on user performance, confidence, and satisfaction on the World Wide Web. *Dissertation Abstracts International*, 60, 10A. (ERIC Document Reproduction Service No. ADG 9918516).
- Saba, F. (2000). Research in distance education: A status report. *International Review of Research in Open and Distance Learning(Online)*, 1(1), 1-9. Retrieved September 19, 2008, from <http://www.irrodl.org/index.php/irrodl/article/view/4/24>.
- Shih, P., Munoz, D., & Sanchez, F. (2006). The effect of previous experience with information and communication technologies on performance in a Web-based learning program. *Computers in Human Behavior*, 22, 962-970.
- Spooner, F., Jordan, L., Algozzine, B., & Spooner, M. (1999). Student rating of instruction in distance learning and on-campus classes. *The Journal of Educational Research*, 92, 132-140.
- Steinweg, S.B., Davis, M.L., & Thomson, W.S. (2005). A comparison of traditional and online instruction in an introduction to special education course. *Teacher Education and Special Education*, 28, 62-73.
- Summers, J.J., Waigandt, A., & Whittaker, T.A. (2005). A comparison of student achievement and satisfaction in an online versus a traditional face-to-face statistics class. *Innovative Higher Education*, 29, 233-250.
- VARK. (2008). *A guide to learning styles*. Retrieved September 1, 2008 from <http://www.vark-learn.com/english/index.asp>
- Wehrwein, E.A., Lujan, H.L., & DiCarlo, S.E. (2007). Gender differences in learning styles preferences among undergraduate physiology student. *Advanced Physiology Education*, 31, 153-157.
- Zhang, L.F. (2002). Thinking styles: Their relationships with modes of thinking and academic performance. *Educational Psychology*, 22, 331-348.

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) USAGE AND ACHIEVEMENT OF TURKISH STUDENTS IN PISA 2006

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ABSTRACT

The purpose of this study is to examine the ICT usage and academic achievement of Turkish students in PISA 2006 data. The sample of the study included 4942 students from 160 schools. Frequencies, independent samples t-tests, ANOVAs, pearson correlation coefficients, exploratory factor analysis, and regression analysis were used. A high percentage of students reported that they had access to computers. From the exploratory factor analysis, two factors were emerged: Computer usage for software purposes and computer usage for entertainment and internet purposes. The factors found to be reliable. There was no significant relationship was found between students ICT skills and academic achievement. The Turkish students were found to be similar in the general PISA findings. SES and gender differences were found.

Keywords: Computers, ICT, software usage, entertainment, SES and gender differences, Turkish students.

The purpose of this study is to investigate the relationship of Internet and Communication Technologies (ICT) usage and academic achievement of Turkish students in PISA 2006. Studies on educational efficiency have been on the rise in the past decade. Since, investments in education pays back in the long run, this leads countries to evaluate educational systems with their functions based on student achievement.

ICT is crucial for all governments in the world towards promoting equity. ICT has been considered a low cost opportunity towards equalizing educational systems. There are four pillars of education through ICT: hardware and software, access to internet, competencies and skills, and content of the material (Magyar, 2004).

The general purpose of Programme for International Student Assessment (PISA) is to assess, by focusing on basic skills in mathematics and science, to what extent students possess the knowledge and skills they are supposed to develop at the end of their compulsory schooling. PISA is organized by Organization for Economic Cooperation and Development (OECD). PISA Project is also aims at measuring to what extent students are able to use their knowledge to make decisions and apply them both in school and in-real life situations.

PISA aims at evaluating how 15 year-old students might respond to real-life conditions, their knowledge and skills with a combination of various types of questions in a three-year period. It helps to determine to track how student achievement changes over time. Additionally, it helps evaluating students, teachers, schools, and educational systems.

PISA focuses on how young people overcome the difficulties they may face in their daily life. Concurrent studies that have been conducted in the respective countries confirm the results of PISA and this indicates the value and convenience of knowledge and skills PISA measures. In addition to student achievement, PISA 2006 investigated student attitudes toward ICT, math and science courses as well as their interests and tendencies to these subjects. An additional survey focusing on how students approach toward learning and how they perceive the learning environment has been also administered.

PISA ICT literacy assessment measures students' ICT literacy by measuring possessed skills and different activities. Students complete an introductory questionnaire and required to complete the basic ICT technical literacy. Student performance on their ability level and how they complete the internet applications, graphic utilization and 21st century skills were included in PISA (OECD, 2005).

ICT connects information, products, people, ideas, individuals as well as communities globally at a low cost. All countries, including OECD members, stress the importance of preparation of young generations with ICT skills in their education policy documents. ICT brings new structures in learning. Moreover, ICT skills are required in today's world. In PISA 2003 survey, students were asked about their familiarity with ICT, mainly with computers. In 2003, almost all 15-year old students reported that they were familiar with using computers, although the length of computer usage differs across the countries surveyed. Students usually had access to computers in schools. However, access to computers at home varied greatly among students. Students use computers for various purposes in addition to playing games. A small group of students reported that they often

used specific educational software. Half of the students reported that they frequently used internet and word processors. A great majority reported that they were confident with basic ICT skills (opening, deleting, saving files and accessing to internet) without getting help (OECD, 2005).

Raising the level of low achievers is critical for all countries if they aim at raising all students' educational achievement since the potential gains are greater for these students in any educational system (Sweet & Meates, 2004). The widespread access to ICT in the past decade increased hopes for improving student learning (OECD, 2001).

Previous studies that examine the relationship between ICT usage and mathematics problem-solving (Aşkar and Olkun, 2005) found that the Turkish students' Access to computers in schools was quite low when compared to OECD countries. Moreover, when students have access to computers at home, they had better achievement scores. Similarly, students who had been using computers longer had higher scores while students who had medium level access to computers and internet in school had higher scores than the others. Aşkar and Olkun (2005) suggested that on the one hand computer ownership and access to computers in school should be increased while usage should be more functional and computers should be integrated into courses.

Previous studies found in international comparative studies such as TIMSS that a number of factors that might have been influencing Turkish students' performance in these comparative examinations. These factors were: Very little use of computers, calculators and other instructional technology less, use lecturing and not-taking in classrooms, loading students too much information in the curriculum, and problems associated with measurement and evaluations (Ozgun-koca & Şen, 2002). Although, some of these problems might have been overcome by the 2005 curriculum reform, the integration of computers and other instructional technologies in classrooms might have been continuing.

METHODOLOGY

The sample includes 4942 students from 160 schools in PISA 2006 data. The sample consisted of 46,3 % female and 53,7 % male students. Frequencies, independent samples t-tests, ANOVAs, pearson correlation coefficients, exploratory factor analysis, and regression analysis were used in the study.

Exploratory factor analysis indicated there were two factors. The KMO result indicated that the sampling was quite adequate. The KMO was .92. Bartlett's test was significant. The Varimax rotation was used. The scree plot and eigenvalues revealed that there were two factors over 1. The two factors explained 58 % of the total variance. Cronbach Alpha reliabilities for both factors were over .80. The factor 1 included the following skills:

This factor named as educational software usage and this factor includes the following items:

Use spreadsheets (IC4e)
Graphics programs (IC4g)
Write documents (IC4c)
Educational software (IC4h)
Write programs (IC4g)

The second factor was named as internet usage and this factor included the following items:

E-mail and chat rooms (IC4j)
Download music (IC4i)
Download software (IC4f)
Browse internet (IC4a)
Collaborate on the internet (IC4d)
Play games (IC4b)

FINDINGS AND INTERPRETATIONS

Descriptive statistics. In this section of the paper, descriptive statistics for some of the variables were presented.

Table 1. Descriptive statistics for gender.

	Mean (\bar{X})	Standard Deviation	Median	Mod
Used computer IC 1	1,54	0,499	2	2
Use Computer at home IC3a	1,07	0,248	1	1
Use Computer at School IC3b	3,18	1,49	2	2
Use Computer Other Places IC3c	2,69	1,301	2	2

The descriptive statistics for the Turkish students who took part in PISA was as follows. While 93 % of the students had access to computers, only 7 % of them did not have an access to computers. This ratio was 96 % for male students and 91 % for female students. A quite high percentage of students indicated that they had access to computers.

60 % of the students indicated that they did not have personal computers. 60 % of the males did not have computers at home while 36 % of them had one, 3 % had two, and less than 1 % had three or more computers at home. 60 % of the female students did not have computers at home, 37 % had one, 2,7 % had two, and only 0,2 % had more than three computers at home. Thus, the results indicated that there was not much difference in terms of percentages between male and female students on the computer possession.

Student responses to how long they have been using computers were as follows: Almost 17 % of males used computers for one year or less, 25 % of them one to three years, and 25 % were three to five years, and 34 % of the males used computers for more than five years. 27 % of the female students were used computers for one year or less while 31 % of them were using one to three years, and 22 % were using computers three to five years, and 20 % of them were using computers more than five years. The results pointed out that female students' computer usage in this sample had increased.

When the question "how often students use computers at home" item was analyzed, the following results were found: 39 % of students in the sample use computers at home almost every day while 41 % never use a computer at home. 37 % of female students use computers at home almost every day while 17 % of them use computers once or twice a week and 6 % use computers a few times in a month or less and 29 % do not use computers at home at all. The percentages for computer use for male students 41 % every day, 13 % once or twice a week, 4 % o few times or less, and 41 % do not use computers at home at all. While every day usage was almost the same for both male and female students, the ratio of female students on the computer usage was higher than that of male students on once a week, once a month and never use computers at home options.

Almost 8 % of students were able to use computers in school almost every day, 36 % never had an opportunity to use computers in school almost every day. Only 8 % of the students were able to use computers in school almost every day while 36 % were never be able to use computers in school. For female students, this ratio was 9 % every day, 45 % once or twice a week, 11 % used a couple times or less in a month. 36 % of female students never used computers in school. 8 % of male students use computers almost every day, 42 % once or twice a week, 15 % were able to use computers a couple times or less in a month. The ratio of male students who were never able to use computers was 36 %. The use of computers in school did not differ much between male and female students. Sweet and Meates (2004) based on PISA 2000 data found that, although computers were available to students at home, their access to computers might have been more limited than high achieving students in PISA sample.

Did students use computers in other places than school and home? Student use of computers in some other places other than school and home was as follows: 19 % were able to use computers in some other places while 15 % were not able to use computers in other places. This ratio for female students was 10 % and 26 % were not able to use computers in other places. 26 % of female students used computers once or twice in a week, 22 % a couple times in a month, and 16 % use only once in a month in other places than at home and in school. One-fourth of male students were able to use computers almost every day, 42% once or twice in a week, 28 % used a couple of times or less in a month in other places. 6 % of female students did not use computers at all. The results indicated that male students had higher opportunities to access computers in other places except school and home than the female students in the sample. Sweet and Meates (2004) found a strong relationship between student achievement levels and their access to computers at home.

Table 2 presents information on students' access to internet alone or with some help. Based on the Table 2 results, 73 % of students indicated that they were confident that they could search the internet while only 17 % could do with some help, 68 % of the students were able to chat with others while 16 % could perform the same task with some help, 65 % of the students responded that they were able to download music from the internet while only 23 % could download with some help, and 60 % of the students were able to download files from the internet when only 17 %, 53 % of the students indicated that they were able to write and send e-mails while 23 % could perform this task with some help. Only 43 % of the students said that they were able to send a file via e-mail when 34 % of the students need some help to do the same task. The majority of students indicated that they were confident with searching the internet, downloading music and files, using chat, and write and send e-mails.

Only sending a file via e-mail was less than 50 %. Sweet and Meates (2004) found a strong relationship between internet access at home and student achievement levels.

Table 2. Student Confidence Levels on the Internet Usage.

	I can do myself	I can do with some help
Search internet	% 72,9	% 16,5
Write and send e-mail	% 52,9	% 28,2
Download file from the internet	% 60,1	% 25,4
send a file via e-mail	% 43,8	% 33,8
Download music	% 65	% 22,9
Chat	% 68,1	% 16,7

According to the Table 2 and Table 3, it is clear that the Turkish students who attended PISA 2006 study had high self-confidence levels on the computer use in the internet. In PISA 2000, there was no difference in terms of confidence levels on using internet between high and low achieving students (Sweet & Meates, 2004).

Table 3. Presents Information on Student Confidence Levels on the Use of Computers.

	I can do by myself		I can do with some help	
	Males (%)	Females (%)	Males (%)	Females (%)
Being able to use software to find and erase viruses	35,7	16,2	34,6	42,2
Creating presentations in a multi-media environment (sound, video, graphics)	52	35,7	30,5	41
Creating Web pages	33,7	25	40,4	45,9
Being able to use a spreadsheet	39,5	31,9	36,4	72,5
Being able to use a database	30,8	23,3	36	37,2
Re-organizing pictures (making changes on them)	48,5	35,3	29,3	35,7
Being able to copy and move files	74,5	68,8	15,3	19,6
Being able to write data into a CD	66,5	54,5	20,5	27,8
Being able to use a word-processor	57,0	54,9	26,3	27,1

SES differences. Taking the influence of socio-economic status as a background variable is important for educational research. This section deals with the SES differences in the sample. Whether parental educational level (fathers and mother) makes any difference regarding ICT skills is investigated in this section.

Table 4. Presents ANOVA results on students' ICT usage for software purposes based on mothers educational level (ISCED classification).

Table 4. ANOVA results on students ICT usage for software purposes based on mother educational level (ISCED Classification).

Source	SS	df	MS	F	p
Between	86.066	6	14,344	13.853	.000
Within	4384.031	4234	1.035		
Total	4470.097	4240			

The results indicated that there were significant differences among students on ICT usage for software purposes (being able to use word-processor, creating web pages, spreadsheets) [$F_{(6-4234)}=13.853$, $p<0.05$]. A Sheffee post-hoc comparison test was conducted to see which groups differ. Thus, the mean of computer usage for software of students whose mothers did not have an ISCED1 level was ($\bar{X}=3,2$) higher than students whose mothers educational level as ISCED2 ($\bar{X}=2,7$), students whose mothers' educational level was ISCED3A and ISCED4 ($\bar{X}=2,9$) computer usage for software purposes were higher than that of students whose mothers had an educational level of ISCED5B ($\bar{X}=2,7$),

Moreover, students whose mother's educational level is ISCED1 ($\bar{X}=3,05$), ICT usage for software is higher than those students whose mother's educational level ISCED2 ($\bar{X}=2,8$), ISCED 3A and ISCED4 ($\bar{X}=2,9$). Thus, as students mothers' educational level goes down, their interest towards computer might be increasing.

Table 5. One-Way ANOVA results for students' usage of ICT for entertainment and internet purposes based on mothers' educational level (ISCED classification).

Source	SS	df	MS	F	p
Between	189.856	6	31.643	28.932	.000
Within	4724.676	4320	1.094		
Total	4914.532	4326			

There were significant differences on the ICT usage for entertainment and internet (playing games, downloading music, surfing the internet, etc.) [$F_{(6-4320)}=28.932$, $p<0.05$]. Sheffee post hoc test was performed to find out which groups differ. When students whose mothers' did not have ISCED1 level of education, the mean of ICT usage for entertainment and internet ($\bar{X}=3,0$) was found to be higher than the students whose mother's educational level ISCED1 ($\bar{X}=2,7$), ISCED2 ($\bar{X}=2,5$), ISCED3A and ISCED4 ($\bar{X}=2,37$), ISCED5B ($\bar{X}=2,23$), and ISCED6 ($\bar{X}=2,2$).

Moreover, the mean of computer usage for entertainment and interned for students whose mothers' did not have ISCED1 educational level ($\bar{X}=2,71$) was higher than that of students whose mothers' educational level ISCED2 (($\bar{X}=2,47$), ISCED3A, ISCED 4 ($\bar{X}=2,37$), ISCED5A, and ISCED6A ($\bar{X}=2,21$). These results indicated that as the mothers' educational level goes down, students' interest in ICT might be increasing.

Table 6. One-Way ANOVA Results for Students' Usage of ICT for Entertainment and Internet Purposes based on Fathers' Educational Level (ISCED classification).

Source	SS	df	MS	F	p
Between	34.639	6	5.773	5.510	.000
Within	4463.406	4260	1.048		
Total	4498.044	4266			

There were significant differences among students on software usage (usage of word processor, constructing web pages, usage of tabulation programs, etc.) based on father educational levels [$F_{(6-4260)}=5.773$, $p<0.05$]. A Sheffee test was conducted to determine which groups differ. The Sheffee test indicated that the mean of students whose fathers did not completed ISCED1 usage of computers for software purposes ($\bar{X}=3,11$) was higher than the mean of students whose fathers' educational level was ISCED5B ($\bar{X}=2,73$). Similarly, the mean of students whose fathers' educational level was ISCED1 ($\bar{X}=3,07$) was higher than that of students whose fathers' educational level ISCED2 ($\bar{X}=2,91$) and ISCED5B ($\bar{X}=2,73$). These results might indicate that the lower the students fathers' educational level, the higher their interest and desire towards computer usage for software purposes. Fathers' educational level has been found important for student achievement in PISA 2006 data for Turkish students.

Table 7. One-Way ANOVA results for student use of ICT for entertainment and internet purposes based on fathers' educational level.

Source	SS	df	MS	F	p
Between	120.100	6	20.017	18.005	.000
Within	4830.455	4345	1.112		
Total	4950.555	4351			

Table 7 presents students usage of ICT for entertainment and internet purposes based on fathers' educational level. Significant differences were found among students use of computers for entertainment and internet purposes (playing games, downloading music, surfing the internet) based on their fathers' educational level [$F_{(6-4351)}=20.017$, $p<0.05$]. A Scheffee test was conducted to determine which groups differ. The mean of students whose fathers did not completed ISCED1 use of computers ($\bar{X}=3,0$) was higher than that of students whose fathers' educational level was ISCED2 ($\bar{X}=2,61$), ISCED3A, ISCED4 ($\bar{X}=2,53$), ISCED 5B ($\bar{X}=2,38$) and ISCED 5A and ISCED6 ($\bar{X}=2,32$). Along the same lines, the mean of students whose fathers' educational level was ISCED1 use of computers for entertainment and interned ($\bar{X}=2,78$) was higher than the students use

of computers for the same purposes for students whose fathers' educational level was ISCED2 ($\bar{X}=2,61$), ISCED3A, ISCED4 ($\bar{X}=2,53$), ISCED 5B ($\bar{X}=2,38$), and ISCED 5A and ISCED6 ($\bar{X}=2,32$). Based on these results, it might be concluded that the lower the students fathers' educational level, the higher their use of computers for entertainment and internet purposes. High achievers in PISA use internet more than the low achievers (Sweet & Meates, 2004). When all students were taken into account, PISA 2006 data revealed that students most often use computers to communicate. Students also use computers to do research in the internet. In terms of entertainment, students most often download music using internet (Shewbridge, 2007).

Gender Differences on Computer Usage. This section presents t-tests results for students' use of computer for software purposes, for entertainment and internet use, and how well students' confidence levels on using computers.

Table 8. The mean comparisons between males and females on ICT usage.

ICT Usage	Gender	N	\bar{X}	Standard Deviation
Software	Female	1946	3,20	1,01
	Male	2364	2,81	1,00
Entertainment	Female	1981	3,00	1,07
	Male	2413	2,31	0,95
How Well	Female	2026	1,84	0,65
	Male	2476	1,69	0,64

A t-test was conducted to see whether there were significant differences on computer usage for software purposes ($t_{(4308)}=12,701$, $p<.05$) (See Table 8). The mean of male students ($\bar{X}=3,20$) was significantly higher

than that of female students ($\bar{X}=2,81$). This result might indicate that there is a relationship between being male and computer usage for software purposes. Sweet and Meates (2004) found that high achievers use word processors more frequently than the low achievers. However, in contrast, low achievers use spreadsheets more often than the high achievers in PISA 2000. Among the OECD countries only in five countries males were found to be more often communicating on computers including Turkey and Greece. In seven OECD countries no gender differences were found. These countries were: Japan, Portugal, Germany, Czech Republic, Spain, Belgium and Sweden. Females were found to be more often using computers in Iceland, Ireland, New Zealand, Australia, and Denmark (Shewbridge, 2007).

Table 9. t-test results of ICT usage for software purposes based on gender.

Gender	N	\bar{X}	S	df	t	p
Female	1946	3,20	1,01	4308	12,714	,000
Male	2364	2,81	1,00			

A second t-test was conducted to see whether there were significant differences on computer usage for entertainment and internet purposes ($t_{(4392)}=22,367$, $p<.05$) (See Table 9). The mean of male students ($\bar{X}=3,00$) was significantly higher than the computer usage for entertainment and internet purposes of female students ($\bar{X}=2,31$). This result might indicate that there is a relationship between being male and computer usage for entertainment and internet purposes. Males more frequently download software than females in PISA 2006 data (Shewbridge, 2007). An interesting finding was reported by Sweet and Meates (2004). Low achievers used computers more frequently for programming than high achievers.

Table 10. t-test results of ICT usage for entertainment purposes based on gender.

Gender	N	\bar{X}	S	df	t	p
Female	1981	3,00	1,07	4308	22,367	,000
Male	2413	2,31	0,95			

A third t-test was conducted to see whether there were significant differences on how well students think they were confident with computers ($t_{(4500)}=7,766$, $p<.05$) (See Table 11). The mean of male students ($\bar{X}=1,84$) on how confident they were with computers was significantly higher than the computer usage for entertainment and

internet purposes of female students ($\bar{X}=1,69$). This result might indicate that there is a relationship between student confidence levels. Males more often download music from the internet than female students in PISA 2006 data. Sweet and Meates (2004) reported that low achieving students use more often computers for playing games in PISA 2000.

Table 11. t-test results on how well students use computers based on gender.

Gender	N	\bar{X}	S	Df	t	p
Female	2026	1,84	0,65	4500	7,776	,000
Male	2476	1,69	0,64			

When 2006 PISA data examined, males reported that they used computers more often than females. They felt also more confident in more demanding computing tasks. In mathematics, female students were less confident learning mathematics and feel more anxious about learning mathematics. Moderate gender difference was found overall. In science, no significant gender differences were found. However, in reading females outperform males (Shewbridge, 2007).

Correlations. This section of the paper presents correlation coefficients among the study variables. There was a small negative correlation between how long students used computers and their usage for software purposes ($r=-.27$). There was a significant medium relationship between how long students used computers and their use of computers for entertainment and internet purposes ($r=-.36$). A medium negative correlation was found between how long students used of computers and how well they think they were able to use computers ($r=-.41$). A high positive correlation was found between students use of computers for entertainment and internet and their use of computers for software purposes ($r=.70$). There was also a medium positive correlation between how well students think they use computers and their use of computers for software purposes ($r=.56$) and their use of computers for entertainment and internet ($r=.53$). Sweet and Meates (2004) did not report any significant relationship that low achieving students were less interested in using computers. However, their confidence and ability levels were lower.

Table 12. Correlations among the study variables.

	How long used Computer IC2	Software	Entertainment	How well
How long used Computer IC2	1			
Software	-0,276*	1		
Entertainment	-0,358*	0,698*	1	
How Well	-0,412*	0,562*	0,553*	1

An OLS regression was conducted using students' mathematics achievement as the dependent variable in PISA 2006. However, no significant relationship was found between the dependent variable (math achievement) and the independent variables such as how well students use computers, students' use of computers for software purposes as well as use of computers for entertainment and internet. A dummy variable was constructed to assess whether gender was significantly related in this model. Gender was also turned out to be non-significant in the regression model. In another study, a negative relationship was found between computer and OHP usage and academic achievement of Turkish students in science classes (Aypay, Erdogan, & Sozer, 2007). Şahinkayaşı (2008) found small differences between Turkish students and students from EU member countries on overall ICT usage, confidence on performing routine computer tasks, attitudes towards computers. Moreover, Şahinkayaşı found that excluding self-confidence in routine tasks and internet, a small negative relationship between ICT usage and academic achievement in PISA 2003. Olkun and Altun (2003) found that students learn geometry better.

CONCLUSION

The data on the Turkish student sample regarding their use of computers on a number of variables and their academic achievement was investigated. The results indicated that there is no significant relationship between their use of ICT and academic achievement. The descriptive statistics revealed that a quite high percentage of students had access to computers. The results indicated that there was not a high difference in terms of percentages between male and female students on computer possession at home. Moreover, the results pointed out that female students' computer usage in this sample had increased. While every day usage was similar for both male and female students, the ratio of female students on the computer usage was higher than that of male students once a week, once a month and never use computers at home variables. The use of computers in school

did not differ much between male and female students. As expected, the results indicated that male students had higher opportunities to access computers in other places except school and home than the female students in the sample. Finally, the majority of students indicated that they were confident with searching the internet, downloading music and files, using chat, and write and send e-mails. Only sending a file via e-mail was less than half of the students. Very frequent use of ICT did not necessarily improve student performance in PISA nor very little use. The PISA results showed that a moderate use of computers was associated with higher student achievement.

When SES differences were examined, an interesting picture emerged. As the mothers' and fathers' educational level goes down, the use of computers for software purposes increases. A similar finding emerged when computer usage for entertainment and internet purposes. Thus, there was a negative relationship between mothers' and fathers' educational level and the computer usage. This is an interesting finding that needs to be further investigated. This finding should be interpreted with the fact that the ICT usage does not have a significant correlation with mathematics, science and reading achievement in PISA 2006.

Male students used computers for software purposes more often than female students. This finding indicates that there is a relationship between being male and computer usage for software purposes. The results of the study indicated that there were significant differences based on gender. There were significant differences on computer usage for entertainment, internet purposes, and how confident the students were with computers. Male students used ICT more than the female students. As the student confidence levels with computers increases, their use of computers for software purposes was lower while their attention was drawn towards entertainment and internet. As the longevity of student involvement with computers increased, they felt less confident with computers and they used computers for software purposes more often.

Turkey joined all the PISA studies and this has been important to track changes in student achievement and to detect the way the curriculum has been implemented. Turkey revised its curriculum and it has started using a constructivist approach as of 2004 and it would be interesting to observe how the changes in the curriculum might be reflected in student achievement in PISA results in the future. Although somewhat the performance of Turkish students has improved when compared to past PISA scores, the performance of Turkey did not improved much. One reason for that might be, the implementation of reforms takes a long time and teacher behaviors in classroom and the teaching methods might not change in a short period of time.

Implications. Turkey first needs to lower the differences among schools. Turkey also needs to improve the use of ICT in educational system by adapting the technology in the content of the courses. As the data suggested, students had access to computers but their access was limited. The number of students per computer should be improved. In PISA 2003, while countries with academically higher performing students had five or fewer student per computer, Turkey had ten or more students per computer. Especially, low SES student engagement with ICT should be increased. Moreover, the content of the courses in schools might need to be revised. An interesting finding of this study was non- significant relationship between the use of ICT and academic achievement. This might be pointing out to problems related to the integration of ICT within the content of the courses. Although the curriculum had been revised, the measurement and evaluation system did not change much. Finally, students should neither be prevented nor should be encouraged too much to use computers. They should be encouraged on a moderate level. The quality of their involvement might be making the difference.

REFERENCES

- Aypay, A., Erdogan, M. & Sozer, M. A. (2007). Variation Among Schools on Classroom Practices in Science Based on TIMSS-1999 in Turkey. *Journal of Research in Science Teaching*, 44, 10, pp. 1417-1435.
- Aşkar, P. and Olkun, S. (2005). The use of ICT in schools based on PISA 2003 Data. *Eurasian Journal of Educational Research*, 19,15-34.
- Magyar, B. (2004). Real Walls Down, Virtual Walls Up? In A. Karpati (Ed.), *Promoting Equity through ICT in Education: Project, Problems, Prospects*. Budapest, Hungary: OECD and Hungarian Ministry of Education.
- OECD. (2001). *Learning to Change: ICT in Schools*. Paris: Author.
- OECD. (2005). *Are Students Ready for a Technology-Rich World? What PISA Studies Tell US*. Paris: Author.
- Olkun, S. & Altun, A. (2003). İlköğretim Öğrencilerinin Bilgisayar Deneyimleri ile Uzamsal Düşünme ve Geometri Başarıları Arasındaki İlişki. *The Turkish Journal of Educational Technology (TOJET)*, 2,4,13.
- Ozgun-Koca, A. & Şen, A. İ. (2002). Evaluation of the Results of the Third International Mathematics and Science Study for Turkey. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 43, pp. 145-154.

- Shewbridge, C. (2007). Gender difference at age 15 - evidence from PISA on performance attitude and ICT usage Claire Shewbridge, OECD-CERI Conference 'Return to Gender: Gender, ICT and Education', Oslo, Norway, 2-3 June 2008. Retrieved on June 14, 2009 from http://www.oecd.org/document/20/0,3343,fr_2649_39263301_40830228_1_1_1_1,00.html
- Sweet, R. and Meates, A. (2004). ICT and Low Achievers: What Does PISA Tell Us? In A. Karpati (Ed.), *Promoting Equity through ICT in Education: Project, Problems, Prospects*. Budapest, Hungary: OECD and Hungarian Ministry of Education.
- Şahinkaya, Y. (2008). Modeling the ICT Related Factors with the Mathematical Literacy and Problem Solving Skills of the Students in the PISA 2003. Paper Presented at the International Educational Technology Congress, May 6, 2008, Anadolu University, Eskişehir, Turkey. Retrieved on June 13, 2009 from <http://ietc2008.home.anadolu.edu.tr/ietc2008.html>.
- Wilhelm, A.G. (2004). Everyone Should Know the Basics: Equalizing Opportunities and Outcomes for Disadvantaged Youths through ICT in Education. ? In A. Karpati (Ed.), *Promoting Equity through ICT in Education: Project, Problems, Prospects*. Budapest, Hungary: OECD and Hungarian Ministry of Education.

INSTRUCTIONAL STRATEGY IN THE TEACHING OF COMPUTER PROGRAMMING: A NEED ASSESSMENT ANALYSES

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ABSTRACT

The process of Instructional Design deals with the production of an effective, efficient and appealing instructional material under different condition, method and outcome. Computer programming is part and parcel of computer education. Research done in western countries has shown that programming requires problem solving and analytical thinking skill; unfortunately these skills are found to be deficient among many students pursuing computer programming courses. A needs assessment was done to identify whether such a problem exists amongst Malaysian students pursuing computer programming courses in a Malaysian university. Among others, the aim of the needs assessment is to identify the instructional problems pertaining to the current strategies used for the teaching of programming. This paper reports and discusses the findings collected from the interviews with five computer science lecturers from the faculty of computer science in a local university. The result shows that there are deficiencies in knowledge, understanding and application of computer programming among computer science students. Recommendations are given for further investigation into a more effective strategy as an alternative in the teaching of computer programming courses.

Keywords: Computer Programming, Computer Education, Needs Assessment, Instructional Strategies, Instructional Design

INTRODUCTION

Computer programming is part and parcel of the computer science education. It is an essential skill that must be mastered by anyone interested in studying computer science. Normally, in teaching computer programming, students will first be introduced to the concept of programming and data structure where they are taught on how to analyze problems, use specific techniques to represent the problem solution and validate the solution. Next the learners are required to convert the problem solution into a program using a specific programming language. They are then required to test their program to verify for syntactical or logical errors to ensure that the output is correct according to the problem requirement. Maintenance is the last process in implementation phase and it is based on user requirement needs. Maintenance is required when there are changes in user requirements or important components. The whole process of computer programming is shown in Figure 1.

Experience in teaching university level computer programming has proven to be a challenge to the first author. Many students found programming to be difficult and disheartening. Since programming is the basic skill required of computer programmers, the negative impact of these basic introductory courses may have harmful consequences in the learners' attitude towards the field.

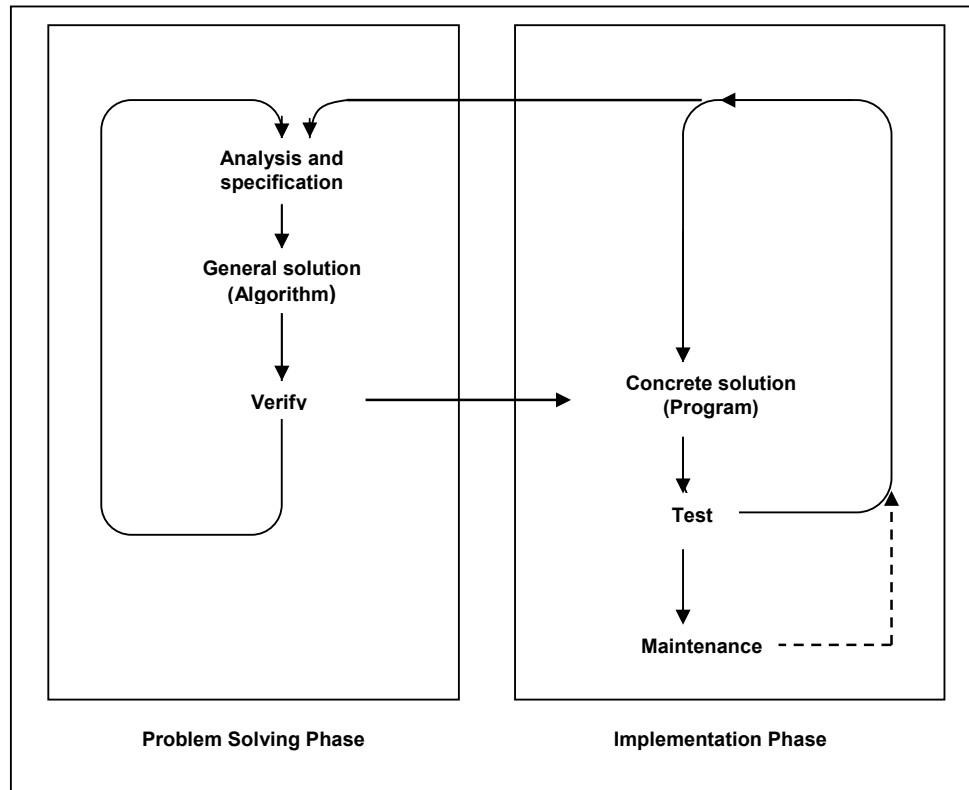


Figure 1: Programming Process (Dale, Weems & Headington, 1996)

PROBLEM STATEMENT

Learners' difficulty with computer programming is not unique to the Malaysian audience. Research done in western countries has shown problems with regard to computer programming. The skills that have been identified with the ability to do programming are problem solving and analytical skills (Riley, 1981; Henderson, 1986; Maheshwari, 1997b; Bonar & Soloway, 1989; Linn & Clancy, 1992). However, according to Riley (1981), many students entering college have problem-solving skills that are "woefully inadequate". Henderson (1986) notes that problem solving and analytical thinking skills are students' major weaknesses in a computer science course and that a major theme of a computer science course should be emphasized on these skills. Programming is said to be a study of clear thinking and problem solving in providing the students the practice of building representations and working in a methodical manner (Maheshwari, 1997b). Maheshwari also argues that programming fosters problem solving through a top-down approach, whereby large problems are separated into manageable components to be solved individually and then assembled into the correct solution to the problem. Programming encourages learners to evaluate their solutions and thinking process; this cognitive process allows them to transfer newly acquired problem solving skills to novel problem situations. Whatever approach to problem solving is adopted, it is recognized that it is an essential part and the first step taken in the development of software.

In addition to problem solving and analytical skills, difficulty in programming is also attributed to the prior knowledge and practices; errors also occur in trying to transfer a step-by-step problem-solving solution directly from a natural language into a program (Bonar & Soloway, 1989). The differences between the natural language and a programming language can easily cause problems. For example, some novices have understood that the condition in a "while" loop needs to apply continuously rather than tested once per iteration. Linn & Clancy (1992) found that "for programmers to develop competency, they need to have good problem solving skills and a thoroughly organized knowledge of a programming language". In problem solving phase, a solution or design is generated to solve the problem and in the implementation phase the proposed solution is translated into a programming language. According to Rist (1996), the main source of difficulty does not seem to be only on the syntax or understanding of concepts, but rather on the program planning. A student can learn to explain and understand a programming concept, e.g., what does a pointer mean, but still fails to use it appropriately in a program. Winslow (in Soloway & Spohrer, 1989) noticed that students may know the syntax and semantics of

individual statements, but they do not know how to combine these features into valid programs. Even when they know how to solve the problem manually, they have trouble translating it into an equivalent computer program.

Most of the introductory text books on computer programming emphasize on the study of a programming language; the pre-programming topics such as introduction to algorithmic (pre-coding), and the running of programs on a computer are eliminated. According to Gal-Ezer (1996), even if a lecturer has introduction to algorithmic in mind, the emphasis in practice is always on the technicalities of a programming language, coding and running programs on a computer. Linn and Clancy (1992) claimed that most introductory programming language textbooks reinforce the emphasis on syntax and on the learning of individual examples rather than encouraging students to recognize and reuse more complex patterns. McGill and Volet (1997) found that most of the introductory computer programming courses and text books only emphasize on lower level knowledge or known as declarative knowledge and procedural knowledge that emphasize on “know that” and “know how” that are related to programming concepts and syntax. As a result, students fail to understand and are not able to explain semantics actions in a program. The emphasis on low level knowledge will cause students not to understand and master the programming syntax and constructs. Thus, learners are not able to apply correct rules of syntax during programming and are not able to use semantic knowledge of programming in writing program to solve novel problems.

Most programming courses are taught using the traditional approaches including a blend of lectures, reading and practical sessions (Gray, Boyle & Smith, 1998). The environments for these types of approaches will only produce students who are passive information receivers, allow minimal interaction between teacher and students especially when a large group of students is involved. Gage and Berliner (1992) also argued that this type of lecturing is not appropriate if specific goals and objectives need to be addressed, need long period of information retention, the learning materials are complex and abstracts, students participation in class are essential to achieve learning objectives and higher level of cognitive objectives (analysis, synthesis and evaluation) are the purpose of the instruction.

Dalton and Goodrum (1991) have suggested that computer programming and problem solving strategy instruction, when used together may provide an effective means of teaching transferable problem solving skills. Maheshwari (1997a) also suggested that programming lessons should employ systematically designed direct instruction activities, rich in feedback and practice opportunities. Programming activities should be designed to encourage the application of problem solving strategies such as planning, simplification and modeling. She also stated that lessons should quickly develop a rudimentary mastery of language syntax and move quickly to produce application and problem solving. In other words, teaching programming should be interesting, motivating and stimulating for both students and lecturers.

The first author's experience as a lecturer in computer science field has shown that students need to acquire reasoning, analytical thinking and problem solving skills for analyzing problem before they learn how to use and apply problem representation tools and computer programming languages. The students need to understand how to interpret the given problem before they can represent the correct solution and effectively use specific tools or techniques. The later skills can be acquired by doing a lot of practices in problem solving that involved planning, logical thinking and reasoning strategies. However, mastery in the reasoning and problem solving skills does not necessary mean that students are able to write good computer program as writing programming languages requires the mastering of the syntax and functions of the specific programming languages. Mastering of these elements require the students to be actively engaged in practical exercises in writing program by using correct syntax and constructs.

Students usually react passively during lecturing and tutorial session and this makes assessment of student's mental understanding difficult. At the same time, they believe that computer programming skill is complex and difficult to be acquired and this could hinder them from asking questions for clarification. Usually, students who are able to acquire the programming skill are those who are highly motivated and interested in exploring the programming problems. They are usually actively involved in class and always seek help and discuss any problems relating to computer programming with their lecturers and colleagues. Table 1 shows the problems identified in the literature concerning problems in computer programming.

Table 1: Problems in computer programming as identified in the literature

Problem Solving Phase		Implementation Phase
Analysis	General Solution	Detail Solution
<ul style="list-style-type: none"> • Lack of problem-solving skills • Lack of analytical thinking skills • Lack of logical and reasoning skills • Lack of programming planning • Lack of programming conceptual understanding • Lack of algorithmic skills 	<ul style="list-style-type: none"> • Inefficient tools used in representing problem solution • Do not understand and unable to explain semantics actions in a program • Ineffective design and testing problem solution 	<ul style="list-style-type: none"> • Do not understand and master the programming syntax and functions • Unable to apply correct rules of syntax when programming • Unable to use semantic knowledge of programming to write program • Ineffective code and testing program to solve novel problem

OBJECTIVE

The main aim of this research is to identify the problems in computer programming education in Malaysia. A need assessment was conducted to identify problems relating to teaching and learning programming and finding possible solutions to this problem. The paper will present the result of this need assessment.

METHODOLOGY

Participants

The needs assessment was done by collecting data from interviews with five expert lecturers in computer science field at a local university. An interview protocol to elicit information on the problem under discussion was created and used as a guideline during the interview sessions. The participation was voluntary in nature and each interview session was around an hour to two hours.

Five university lecturers participated in the study. The selection of the participants is based on year of experience in teaching computer science programming courses. Two of them are doctorate and the others are master degree holders. Four of the participants have been teaching for more than ten years; meanwhile, the other one has seven years of teaching programming with vast experiences in software engineering, managing a software development company involved in developing commercial computer application systems. The lecturers are experienced in teaching various types of programming languages and paradigms such as C language for structured programming, C++ for object-oriented programming and Prolog and LISP for logic and artificial intelligence programming language at both the undergraduate and graduate levels. Two of the participants are supervising doctoral students at the university. They are also actively involved in research projects and consultations regarding software engineering, artificial intelligence, parallel processing et cetera.

Interview Protocol

An interview protocol was developed to elicit information concerning the lecturers' perception on the importance of students' understanding of programming concepts, problems and causes of problems in learning programming. In addition to identifying the problems faced by students in computer programming courses, the expert participants were also asked to talk about the solutions, methods and strategies they used as suggestions to their students and used by them in overcoming some of the problems identified.

FINDINGS AND DISCUSSION

In this section, the findings from the needs assessment are discussed. Basically, the four main problems were identified by the expert participants. A summary of the problems is shown in Table 2 and the following discussion will be based on these four main problems, solutions to some of the problems identified by the experts and recommendation by authors on some research possibilities as the solutions for some of these problems.

Problem Type I: Lack of Skills in Analyzing Problems

All the five experts interviewed agree that students' understanding of problem solving concepts in a programming course is essential for them to learn programming languages. They said that the lack of understanding of the programming concepts at most basic problem solving level will cause difficulty in the students' further understanding of programming syntax and functions. The experts believe that most students take the skills in problem solving for granted and fail to identify their programming weaknesses at this level. However, the experts disagree on the reasons behind the lack of these skills in this area.

Table 2: Problems identified in the needs assessment process

Problem	Type
I.	Lack of skills in analyzing problems
II.	Ineffective use of problem representation techniques for problem solving
III.	Ineffective use of teaching strategies for problem solving and coding
IV.	Do not understand and master the programming syntax and constructs

One expert believes that the students should be introduced to a course in discrete mathematics and logic before taking any course in programming. In other words, the students do not have the prerequisite skills to take programming courses. Three of the experts said that the students were not actually taught and exposed to proper algorithm solution as the goals for most programming courses are for the students to be able to write programs. Understanding the programming concepts and semantics behind the program were assumed to be acquired by doing the programming exercises.

Suggestions by the experts to solve the problems at this phase of programming include the need for the students to acquire problem solving, planning, discrete mathematics, logic, and creative thinking skills before they learn programming concepts.

Problem Type II: Ineffective Use of Problem Representation Techniques for Problem Solving

According to the expert participants, at the basic level of programming (problem solving phase), two-way discussion approach is used to discuss the definition statement of programming problem. After defining the problem statement, problem solution are usually designed using algorithm representation techniques. Techniques such as pseudo code and flow chart are used to present the algorithm during problem solving phase. Both techniques are the accepted standard or conventional techniques and are used to explain the concept of programming in most Malaysian universities. The same techniques are also being used in the computer programming books written by the authors from western countries. Both techniques are based on structured problem solving method whereby a problem is presented in a form of procedural statements similar to the actual programming code (pseudo code) and presented in a form of control flow or data flow process (flow chart). At this phase, the problem appears to be similar to the type of programming codes that are being taught to the students.

All expert participants agreed that the conventional techniques used to represent the algorithm have created some problems for the students, especially for those doing object-oriented programming. According to them, these conventional techniques are more suitable for structured programming approach and can cause the students to be confused and unable to translate the algorithm into the correct programming coding. They also agreed that the concept of programming that is based on object oriented approach should be introduced to the students in semester two, that is after they have already grasp the foundation on structured approach. Also, according to them, the object oriented approach is best used to explain a problem in a form of program entity. Furthermore, at the basic level, most of the experts interviewed agreed that concept programming that uses structured approach is much easier to understand by the students since this is the approach human use in thinking.

Some of the solutions suggested by the experts include the use of different problem representation tools for different types of programming. This is to say that structured programming approach should use a different problem representation tools than object oriented approach. The instruction should also be supported by using visualization approach that would enable the students to have a mental representation of the problem. Lastly, the time spent for the teaching of concepts of programming should also be made longer to about 3 or 4 weeks. Currently, the time spent for teaching the concepts of programming is only about 2 weeks.

Problem Type III: Ineffective Use of Teaching Strategies for Problem Solving and Coding

Three of the expert participants claimed that the difficulty in understanding the concept of programming and coding is because of the ineffective teaching strategies used during problem solving and coding. These experiences will undoubtedly influence the students' perceptions on programming courses as difficult and complex. One expert participant argued that factors such as lecturer using ineffective teaching strategies and taking the matter into granted contribute to the difficulty in understanding and confused the students when they try to apply the concept into programming code. According to this expert participant, the effective teaching strategies should start with teaching structured or procedural type of programming language; object-oriented type of programming language is not a good starting point to introduce the students to the basic concept of programming. Two other expert participants believe that the main cause for the above problems is the inactive involvement of students during programming practical session.

All the expert participants also agreed that the concept of programming should be taught to the students in a form that support their spatial and visualization abilities as these aspects will help them to understand and visualize the process of control and data flow in a program in a more general context. All of them agreed that techniques, approaches and strategies used in teaching programming should be applicable to the content of programming with different paradigms in order to help students strengthen their basic problem solving skills and be able to plan and organize the solution by using an effective cognitive strategy. The cognitive strategy will hopefully help them to acquire the problem solving skills that together with knowledge on the syntax of a programming language can help them to solve novel problems.

Some of the problems suggested by the experts include doing enough practical exercises relating to real world examples as these would allow them to apply the concept of programming correctly to solve novel problem. Practical sessions or tutorial should also be enriched with activities, feedback and practice opportunities.

Problem Type IV: Do Not Understand and Master the Programming Syntax and Constructs

According to the experts, students need to have both the understanding of the concept of programming and the knowledge of syntax and constructs of a specific programming language in order for them to be able to write a good program. They added that lecturers normally give lectures on the concepts and principles of programming along with simple examples of problems and provide students with practical exercises to build program concepts and translate them into programs. Practical exercises are done in the computer laboratory during tutorial sessions. For the weak students, they are urged to make appointment for consultation or create small group remedial session to help them overcome these problems. The experts also added that practical exercises are important and students should be active participants during these tutorial sessions and should spend time understanding the syntax, construct, and concept of the programming languages.

In order to overcome these problems, the experts have also suggested the collaborative and cooperative group work amongst the students. Team work allows for the use of scaffolding and coaching on how to programming effectively thus allowing them to explain and understand the programming concept, know the syntax and semantics of programming statements and know how to combine these features into valid computer programs.

DISCUSSION AND CONCLUSION

Analyses of the data from the needs assessment revealed some similarities between problems identified by the expert participants and the first author's experience in teaching similar courses. There are gaps or deficiencies in students' knowledge in computer programming course in each phase of the programming processes. Four main problems were identified, including (i) the lack of skills in analyzing problems, (ii) ineffective use of problem representation techniques for problem solving, (iii) ineffective use of teaching strategies for problem solving and coding, and (iv) the difficulty in mastering programming syntaxes and functions.

According to McGill and Volet (1997), most introductory computer programming courses and text books emphasize only the lower level knowledge, also known as declarative and procedural knowledge. Declarative and procedural knowledge are types of knowledge that emphasize the knowledge of "what" and "how" respectively. As such, these are knowledge that are related to the what and how of programming concepts and syntax. Rist (1996) believes that the acquisition of only low level knowledge made it difficult for students to apply a complete form of programming even though they are able to explain and understand the programming concept. This will cause the development of inert knowledge to the students during the learning process. This is the same observation made by Winslow (in Soloway & Spohrer, 1989) where he noticed that students may know the syntax and semantics of individual statements, but they do not know how to combine these features into valid programs.

Computer programming requires higher level knowledge or knowledge at the strategic or conditional level. This is the knowledge of "when and why" which requires meta-cognitive skills which are apparently are lacking among the students. Lack of meta-cognitive skills has been reported in several studies on computer programming courses (Linn, 1985; Linn & Clancy, 1992; McGill & Volet, 1997; Oliver, 1993; Volet, 1991). If one were to look at the different phases of the programming processes as shown in Table 1, even at the initial and first phase of problem solving, analysis of the problem requires the student to be able to identify, analyze, plan and create possible ways to put the problem into whatever programming language at hand, a task that requires the highest cognitive dimension identified in the Revised Bloom Taxonomy (Anderson & Krahwohl, 2001). The experts' opinion from this needs assessment concur with the literature on computer programming education in that the critical part of the programming process starts at the analysis of the problem solving and consequently will have an effect on the next phase of the programming sequence.

Is there a teaching or learning strategy that can be used to help lessen the burden at this stage? Is there a need for a specific kind of technique to represent the individual's knowledge and understanding regarding computer programming problem? Are pseudo codes and flowcharts adequate in helping the students to see the problem to be programmed? What are some of the visual representations other than the flowchart that can be used at this stage? These are some of the questions that need to be answered and further research need to be done to find the solution. Otherwise our computer programmers in the future will not have the skills necessary to create new applications, merely users of programs created by others. In the era of digital technology and knowledge workers, these are inadequate skills that need to be addressed in the field of Instructional Technology.

REFERENCES

- Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's Taxonomy of educational objectives: Complete edition*, New York: Longman.
- Bonar, J. & Soloway, E. (1989). Pre-programming knowledge: A major source of misconceptions in novice programmers. In Soloway & Spohrer (1989), *Studying the Novice Programmer* (pp. 325-354), Mahwah, NJ: Erlbaum.
- Dale, N. et.al. (1996). *Programming and Problem Solving with C++*. Boston: Jones and Bartlett Publishers.
- Dalton, D. W., & Goodrum, D. A. (1991). The effects of computer programming on problem-solving skills and attitudes. *Journal of Educational Computing Research*, 7(4), 483-506.
- Gage, N. & Berliner, D. C. (1992). *Educational Psychology*. Boston: Houghton Mifflin.
- Gal-Ezer, J. (1996). A pre-programming introduction to algorithmics. *Journal of Mathematics and Computer Education*. 30(1), 61-69.
- Gray, J. et.al. (1998). Proceedings from ItiCSE '98: *Integrating Technology into Computer Science Education*, pp. 94-97, New York: ACM Press.
- Henderson, P. B. (1986). Proceedings of the 17th SIGCSE '86: *Technical symposium on Computer Science Education*, pp. 257-263, New York: ACM Press.
- Linn, M. C. (1985). The cognitive consequences of programming instruction in classrooms. *Educational Researchers*, 14(5), 14-16 & 25-29.
- Linn M. C. & Clancy M. J. (1992). The case for case studies of programming problems. *Communications of the ACM*, 35(3), 121-132.
- Maheshwari, P. (1997a). Improving the learning environment in first-year programming: Integrating lectures, tutorials, and laboratories. *Journal of Computers in Mathematics and Science Teaching*, 16(1), 111-131.
- Maheshwari, P. (1997b). Proceedings from ACM International Conference Proceeding Series '97: *Proceedings of the second Australasian Conference on Computer Science Education*, pp. 32-39, New York: ACM Press.
- McGill, T. J. & Volet, S.E. (1997). A conceptual framework for analyzing students' knowledge of programming. *Journal of research on Computing in Education*. 29(3), 276.
- Oliver, R. (1993). The contextual model: An alternative model for teaching introductory computer programming. *Journal of Computers in Mathematics and Science Education*, 12(2), 147-167.
- Riley, D. (1981). Proceedings from Technical Symposium on Computer Science Education '81: *Proceedings of the twelfth SIGCSE Technical Symposium on Computer Science Education*, pp. 244-251, New York: ACM Press.
- Rist, R. (1996). Teaching Eiffel as a first language. *Journal of Object-Oriented Programming*, 9, 30-41.
- Soloway, E. & Spohrer, J. (1989). *Studying the Novice Programmer*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Volet, S. E. (1991). Modeling and coaching of relevant metacognitive strategies for enhancing university students' learning. *Learning and Instruction*, 1, 319-336.

INVESTIGATING THE USAGE OF BLOGS IN EDUCATIONAL SETTINGS FROM MULTIPLE INTELLIGENCES PERSPECTIVE

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ABSTRACT

In this case study, it is aimed to investigate the use of blogs in educational settings from the multiple intelligences perspective. Thus both qualitative and quantitative measures were used to gather and analyze the data. The results of the study revealed that the participants favored creating, managing their own blog page and sharing their own works through their blog pages with others. The blog usage activity was addressing interpersonal, intrapersonal and linguistics intelligence types, which were also the top three leading intelligence types of the group, besides visual/spatial and kinesthetic.

Keywords: blogs, multiple intelligence, technology integration, educational social software

INTRODUCTION

The aspects of the education are changing in parallel with the innovations in technology. It is very essential for instructors benefit from the opportunities and possibilities of these innovations in order to facilitate the effective teaching and learning according to their needs. Among these computer and Internet-based innovations, educational social software come to forth recently due to their technical capabilities for providing communication and interaction among users. Socialization, communication and level of interactivity are the factors that directly influence the quality of online learning environments.

Blogs are like online diaries published on the web that reflects personal opinions, feelings, hobbies, and experiences about specific topic or theme. Moreover, blogs are updated on a regular basis by using software with user-friendly interface. This sort of software provides users with opportunity for using and managing their own blogs with little or even no technical information. Furthermore, these web pages allow other blog readers post their comments or news to the blogs. "Blogging" is an act of updating and keeping a blog whereas "blogger" refers to the person who performs the blogging activity.

Todoroki, Konishi and Inoue (2006) summarize the basic functions of blogs as displaying the contents in a chronological order, displaying various kinds of contents, commenting on posted entries, and registering newly edited contents. Basically, blog readers read information and opinion, post their opinions, and interact with bloggers and other blog readers. Users may fully participate in online discussions and send their links to additional information. The amount of participation can vary from session to session, blog to blog or user to user (Kaye, 2005).

In addition to their growing popularity, blogs can be used in educational environments for many purposes. Constructing blogs are not only be used for enhancing writing-reading skills, analytic, critical thinking skills, for supporting interaction, communication and discussion, but also for sharing and publishing artifacts like e-portfolios. Related to this issue, Hsu (2007) stated that the educational uses of blogs benefit from the opportunity of their ability to support and encourage expression and development of online relationships. Birney, Barry, and Ó hÉigeartaigh (2006) stated as the some features of blogs that they allow students to socialize and support each other as a part of learning community and in e-learning they provide a platform for learners to reflect their learning. Moreover, as a support for distance learning, instructors can use blogs in blended and online learning to facilitate some strategies: posting student work, exchanging hyperlinks, fostering reflective approaches to educational genres, forming and maintaining knowledge communities (Oravec, 2003). Basically, blogging can be used for many purposes by engaging students in discussion, exploration and discovery (Glogoff, 2005).

Glogoff (2005) illustrates the value of blogging in educational environment; he suggests some aspects to the use of blogging as follows:

- Instructional blogging, where instructors engage students in research activities by supporting discussion and leading them to learn knowledge domain,
- Learner-centered blogging, where instructors take care about learners' characteristics and give importance to give positive feedback and comments to their blog entries,
- Community-centered instruction for supporting the importance of social and peer interaction,
- Receptive learning tool for encouraging students to acquire information from resources and reflect,
- Directive learning environment for providing students to access information and directing them to explore additional information, and
- A guided discovery and knowledge construction for presenting information architecture and exploring more from resources.

According to Hsu (2007), the common advantages of the use of blogs are “reflection and critical thinking are encouraged, authenticity through publication, social presence, development of a learning community, active learning encouraged and ability to receive and respond to feedback” (p. 78). Moreover, the researcher offered that blogs can be used as online learning journal, problem solving/manipulation space, online gallery space (writings, portfolio, other work), peer review exercises in writing, foreign language courses and research seminars.

Publication and sharing of artifacts, lecture notes, reflections on specific topics may provide others opportunity to review, comment, critique or study. Moreover, blog readers can support communication and interaction with content, bloggers and others.

Technology-rich environments like blogs, also helps educators to respond individual differences such as cognitive styles, learning styles and multiple intelligences or various content presentations. The perspective of multiple intelligences was considered for this study. It is very significant here to discuss the multiple Intelligence theory in terms of individualizing aspect of blogs.

Multiple Intelligences Theory was posed by Howard Gardner in 1983. The underlying idea of the theory was to address differences of learners in terms of teaching and learning from different perspectives. According to this theory one individual may differ from others with different skills, where these different abilities composed the scope of Multiple Intelligences Theory. Moreover, one student can interest in calculating, one may enjoy dealing with people and one other may interested in playing in musical instruments. Gardner and Hatch (1989) defined the intelligence as the capacity to solve problems or to fashion products that are valued in one more cultural setting. And he formulated a list of eight intelligences: Verbal-Linguistic (Word Smart); Logical-Mathematical (Number Smart), Visual-Spatial (Picture Smart), Bodily-Kinesthetic (Body Smart), Musical-Rhythmic (Music Smart), Interpersonal (People Smart), Intrapersonal (Myself Smart) and Naturalistic (Nature Smart) (Gardner, 1983, 2006; Gardner & Hatch, 1989).

Verbal-Linguistic intelligence (Word Smart) includes the sensitivity to written and spoken language, the ability to learn languages, and the ability to use language to accomplish certain goals like effectively use language to express ideas.

Logical-mathematical intelligence (Number Smart) involves the capacity of analyzing problems logically, solving mathematical operations, and investigating and reasoning issues scientifically.

Visual-Spatial intelligence (Picture Smart) consists of the capacity to visualize graphics, to imagine the details of an object mentally, to use the patterns of space and to draw visually appealing graphics and arts.

Bodily-kinesthetic intelligence (Body Smart) involves the potential to use one's whole body or parts of the body mentally and physically in harmony.

Musical-Rhythmic intelligence (Music Smart) includes the capacity to recognize and to compose of musical patterns, rhythms, tones.

Interpersonal intelligence (People Smart) interests in the potential of to understand and interpret the intentions, motivations and desires of other people.

Intrapersonal intelligence (Myself Smart) deals with one's ability to recognize own inner process meaning feelings, fears and motivations.

Naturalist intelligence (Nature Smart) involves sensitivity towards features and elements in environment and nature.

To enhance learning environment addressing multiple intelligences of the students, educators can use the opportunities of computer and other technologies. Lamb (2004) stated that technology can be integrated to the classrooms to facilitate learning in each intelligence area. The key point for successful technology integration of multiple intelligences is to provide the most effective learning environment for students.

In technology based environments, instructors can use words, images, sounds, animations, films and other software programs to organize, and present the information. Additionally, instructors also take advantages of web technologies for accessing different resources, materials and experts from any organizations. It is possible to support and address each type of multiple intelligence through using computer-based and internet-based technologies.

Computer based technologies can be a valuable and vital tool when they addressed the Multiple Intelligences to allow instructors to reach students with a variety of learning styles (Davis, 1991). The digital medium facilitating active student learning with public, visual, and kinesthetic properties, especially well-suited for active, collaborative student-centered learning that covers multiple intelligences (Schrand, 2008). When students are supported to use their intelligences creatively, computers may help the students to extend and enhance what they are able to perform, regardless of tasks like a report, a concept map, and a presentation. The role of the instructor is to investigate how students learn best and which instructional media enhance their intelligences, motivation, and inquiry (Carlson-Pickering, 1999).

There are many ways and programs to integrate the use of computer to support and enhance the multiple intelligences of the students: For Linguistic intelligence, any activity aiming the use of writing reading skills can be accomplished by using word processor, desktop publishing, animation software, multimedia editing software, web development tools, web-based educational software, and search engines, virtual courseware, research tools, collaborative software, educational games, electronic libraries. In order to address Logical ability of the students, desktop publishing, simulation software, educational games, drill and practice, mathematical software, concept mapping software, database management software, search engines, research tools, programming languages, architecture software can be considered according to the specific situations.

For Kinesthetic intelligence, all hands-on activities with computers, simulation games, and virtual reality environments might be useful. For Visual/Spatial ability of the students, animation software, video editing software, graphics/image editor, simulation software, educational games, tutorials, drill and practice, multimedia editing software, video conferencing, concept mapping software, modeling (3d) programs, search engines, architecture software can be preferred to support the visual representations in the mind.

It is possible to motivate students through music, animation software, audio editing software, video editing software, simulation software, educational games, tutorials, drill and practice, multimedia editing software, audio conferencing, video conferencing, musical and melody software, voice synthesizer can be best choices among alternatives for improving Musical intelligence. To empower Interpersonal ability of the students any activity required to communicate and interact with others can be offered them. Some programs like educational social software, simulation games, and multiplayer games provide opportunities for that kind of activities. Intrapersonal intelligence can be addressed with any type of activity performed in a self-paced and as an individual. Computer-aided software like tutorials, drill and practice, web-based courses are special examples that can be used for this intelligence type. To support Naturalistic part of the students any topic covering issues from the nature can be required to complete with the programs mentioned above.

Context of the activities or tasks may determine standard in evaluating and selecting software. A software application should be part of a larger instructional approach addressing a variety of intelligences in classroom settings (McKenzie, 2003). By means of context, it is easy to match with more than one intelligence types. Computer based applications are ways that offer some opportunities for students to work in different platforms whereas, context of tasks include some specific goals like teaching content, providing different learning opportunities, and meeting needs of students.

Addressing the concept of learning styles, meaning learning in different ways, instructors need to try to best meet the needs of the learners by providing a variety of lessons using various teaching methods and technologies. Technology and computers are easy ways that helping to combine various media formats and can support a variety of different learning opportunities (Rosen, 1997).

METHODOLOGY

This research was conducted to investigate the usage of blogs in educational settings from multiple intelligences perspective. For this purpose, both qualitative and quantitative measures were used. The proposed study attempt to find solutions to the following research questions:

1. What are dominant intelligence types of the participants?
2. What are the general thoughts of the participants about usage of blogs?

Participants

The participants of this study were the students of one undergraduate course “Computer II” offered by the Turkish Education Department (TE) of a private university. This course was offered to second year students of TE and lasted in fourteen weeks in spring semester. Weekly schedule of the course consists of four hours where 2 hours for theoretical underpinnings and 2 hours for hands-on experience. Simple graphic editing, advanced Internet searching, advanced MS Office programs usage, creating documentary films and constructing blog pages are formed the main scope of this course. 33 students in this course participated in this study. Among 33 sophomores, 24 of them were female (72.7 %), and 9 male (27.3%). The mean of the students’ age was 21.6. Of these, 31 have personal computer at home and 2 do not have computer at home. Among these students, 26 have access to the Internet from their house or dormitory whereas 7 have no access to the Internet from their house or dormitory. 11 students used computer more than 5 years, 9 students used computer 3-5 years, 10 students use computer 1-3 year and 3 students use computer less than 1 year. Regarding average usage of the computer in a day, 3 students use computer more than 5 hours, 4 students use computer 3-5 hours, 19 students use computer 1-3 hours and 7 students use computer less than 1 hour.

Instruments

The questionnaire consisted of 3 parts. The first part of the questionnaire consisted of seven items for eliciting demographic data about participants. In the second part, the Multiple Intelligence Evaluation Questionnaire originally developed by Armstrong was used to answer the first research question of the study. These items are related to 8 intelligence types and each intelligence type consisted of 6 items. The questionnaire was translated into Turkish and a pilot study was carried out by different researchers in a private educational institution, where the reliability coefficient value was found to be 0.94. For the current study reliability coefficient was found as 0.85. The items in this part were in the type of yes/no type and coded as 1 yes and 2 as no. In order to elicit more detailed information about participants’ thoughts about blog usage, ten open-ended questions were asked to participants. These questions are listed below.

1. What are the thoughts of participants about constructing blog page?
2. What are the thoughts of participants about their “own blog page”?
3. How are participants affected by publishing and sharing their own works on their blogs?
4. What are the problems that participants encountered while constructing their blogs?
5. What are the perceptions of the participants about writing comments to their own works?
6. What are the perceptions of the participants about writing comments to their friends’ works?
7. What are the thoughts of the participants whether they will plan to have their students prepare blog page in their teaching profession?
8. What are the most favored activities completed in the scope of the course by the participants?
9. What are the least favored activities completed in the scope of the course by the participants?
10. What are perceptions of the participants about the comparison of their improvement of computer and Internet usage skills before and after the course?

The procedure

The course syllabus was planned and prepared regarding each activity would match one or more multiple intelligence type. The course schedule and plan can be seen in Table 1.

Table 1 Course plan with activities addressing all types of multiple intelligences

Activities	Multiple Intelligence Type	Application Program
Curriculum vitae	Linguistic, Visual/Spatial, Kinesthetic, Intrapersonal	MS Word
Puzzle	Logical, Visual/Spatial, Kinesthetic, Intrapersonal	MS Word
Brochure	Linguistic, Visual/Spatial, Kinesthetic, Intrapersonal	MS Word
Course Document	Linguistic, Visual/Spatial, Kinesthetic, Intrapersonal	MS Word

Self-improvement raph	Logical, Visual/Spatial, Kinesthetic, Intrapersonal	MS Excel
Scoring page	Logical, Visual/Spatial, Kinesthetic, Intrapersonal	MS Excel
Concept map	Visual/Spatial, Logical, Linguistic, Kinesthetic, Intrapersonal	MS PowerPoint
Story telling presentation	Linguistic, Visual/Spatial, Musical, Kinesthetic, Intrapersonal	MS PowerPoint
Documentary film	Naturalistic, Linguistic, Visual/Spatial, Musical, Interpersonal, Kinesthetic	Windows Movie Maker
Blog page	Linguistic, Visual/Spatial, Interpersonal, Kinesthetic, Intrapersonal	Blogspot.com

In order to prepare the activities, firstly, the advanced Internet search was taught and next, simple graphic editing was shown. Following that the site blogspot.com were introduced and students were required to get a domain name for their blog page for creating their own blogs. Moreover, how to upload files to their school server was also explained clearly.

After detail MS Word application description, students were asked to design a detailed “curriculum vitae” by means of curriculum vitae template from their computer or the site of Microsoft.com. After completion of each activity, students uploaded their works to the server and published them on their blog page, respectively. Additionally, students were told to post comments to their own works including their feelings, concerns or problems etc while completing activities, and also evaluate their performance in terms of points that each activity deserves. As a second activity, students prepared a criss-cross puzzle covering a specific subject of their field, with the help of puzzle maker from the site, discoveryeducation.com. After completion of puzzle, a place that students would choose or create would be introduced to people who are interested as a brochure. To summarize MS Word usage skills, a last activity were proposed as a Course Document that might cover a subject of their field including features like advanced use of styles and formatting, table of contents, text and picture alignment, readable font style and size. Following that a description of MS excel, a new activity was introduced to the students called Scoring Page including a list of 15 people’s 2 midterm, 2 quiz and 1 final exam results and some calculations such as mean, standard deviation, minimum-maximum values. Then, concept map activity was completed after description of MS PowerPoint. As a second Ms PowerPoint activity, story telling presentation including well-known story with different endings or free story writing was designed and presented by the students. After this activity, a group performance was required for the creation of a documentary film covering any topic like global warming, its causes-effects, nature problems, sea, and weather pollution. As the last one, an excel activity was for the self improvement report included chances in computer and internet use skills from beginning of the course. At the end of the semester, when students had finished all the activities a questionnaire was administered to them in order to collect the data.

Data Analysis

The quantitative data obtained through questionnaire were analyzed through descriptive methods such as frequency, percentage, means, and standard deviation. The qualitative data were analyzed by using content analysis method. First, data were coded inductively by two different researchers and controlled, and emerging themes were found. After that, data were coded again according to the new emerged themes, and finally, the results were interpreted (Yıldırım & Şimşek, 1999, p. 162-175).

FINDINGS

Quantitative Findings

The results are presented below according to research questions specified previously.

Dominant intelligence types of the participants

There were 6 items, which questioned the Linguistic – Word Smart Intelligence type of participants. Being marked four or more items meant that participants had the Linguistic - Word Smart type. As it is seen in figure 1, 9 participants (27, 3 %) marked four items, 8 participants (24,2 %) marked five and 6 participants (18,2 %) marked 6 items that meant that 23 (69,7 %) of the 33 participants had the Linguistic - Word Smart type.

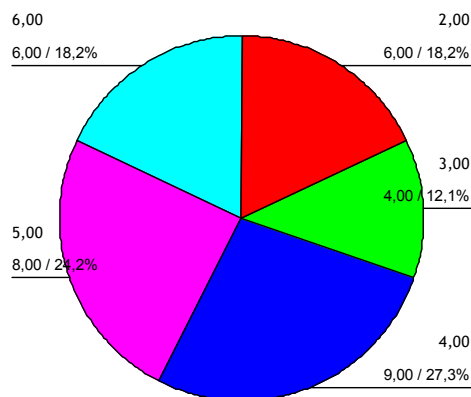


Figure 1 Linguistic – Word Smart

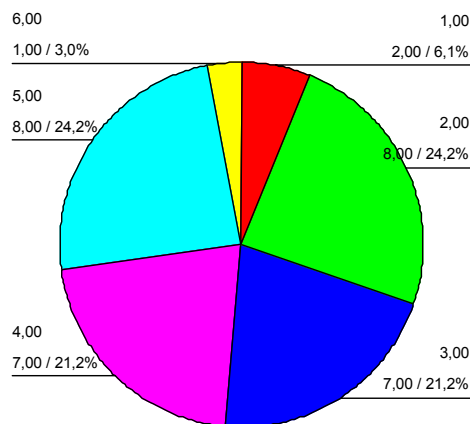


Figure 2 Logical – Number Smart

Same with previous intelligence type, there were 6 items questioning the Logical – Number Smart Intelligence type of participants. As it is seen in figure 2, 7 participants (21, 2 %) marked four items, 8 participants (24,2 %) marked five and 1 participants (3,0 %) marked 6 items that meant that 16 (48,4 %) of the 33 participants had the Logical- Number Smart.

Of the six items addressing the intelligence type of Visual/Spatial – Picture Smart, 2 participants (6,1 %) marked four items, 8 participants (24,2 %) marked five and 7 participants (21,2 %) marked 6 items that meant 17 (51,5 %) of the 33 participants had the Visual/Spatial – Picture Smart intelligence type (Figure 3).

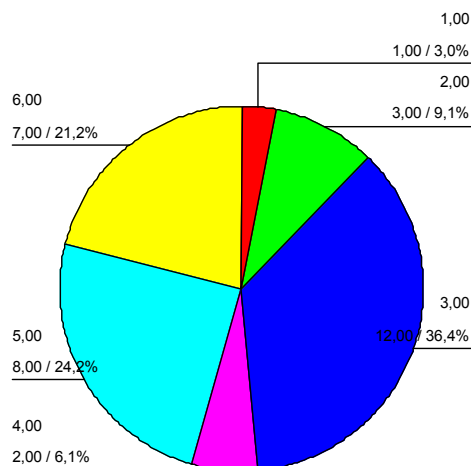


Figure 3 Visual/Spatial – Picture Smart

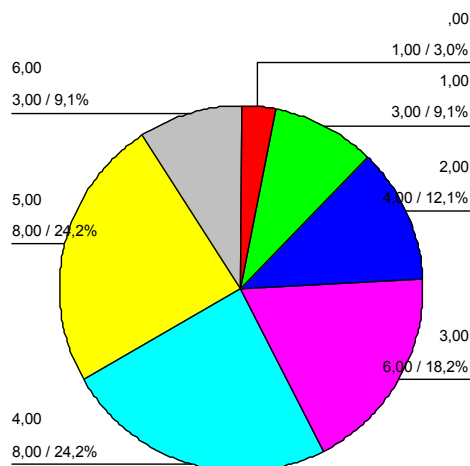


Figure 4 Kinesthetic – Body Smart

Among the six items questioning the intelligence type of Kinesthetic - Body Smart, 8 participants (24,2 %) hinted four items, 8 participants (24,2 %) hinted five and 3 participants (9,1 %) hinted 6 items that meant 19 (57,5 %) of the 33 participants had the Kinesthetic - Body Smart intelligence type (Figure 4).

As it is seen in figure 5, among the six items addressing the intelligence type of Musical – Music Smart, 6 participants (18,2 %) listed four items, 6 participants (18,2 %) listed five and 1 participant (3,0 %) listed 6 items that meant 13 (39,4 %) of the 33 participants had the Kinesthetic - Body Smart intelligence type.

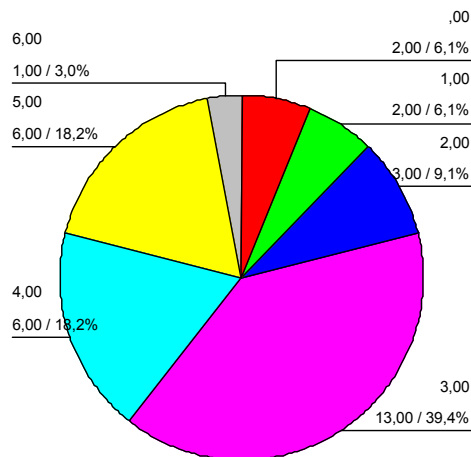


Figure 5 Musical- Music Smart

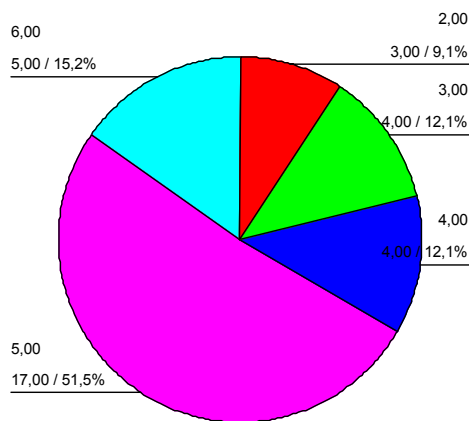


Figure 6 Interpersonal – People Smart

As a next intelligence type, Interpersonal – People Smart among the six items, 4 participants (12,1 %) marked four items, 17 participants (51,5 %) marked five and 5 participants (15,2 %) marked 6 items. These results revealed that 26 (78,8 %) of the 33 participants prefer to be interact people and has Interpersonal – People smart intelligence mostly (Figure 6).

Of the six items addressing the intelligence type of Intrapersonal - Myself Smart, 4 participants (12,1 %) marked four items, 13 participants (39,4 %) marked five and 7 participants (21,2 %) marked 6 items. These results showed that 24 (72,7 %) of the 33 participants love to deal with themselves and has the Intrapersonal – Myself Smart intelligence type (Figure 7).

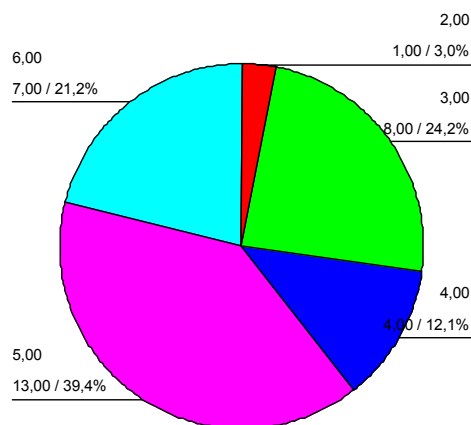


Figure 7 Intrapersonal – Myself Smart

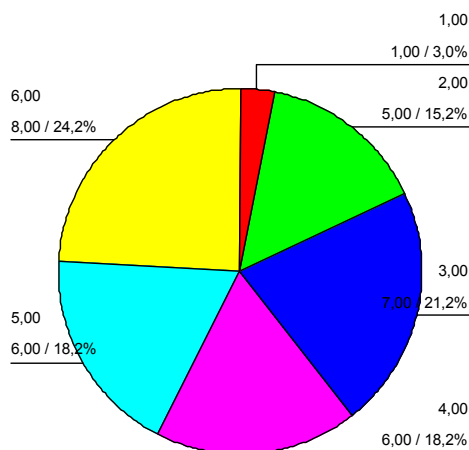


Figure 8 Naturalistic – Nature Smart

As a last intelligence type, Naturalistic - Nature Smart among the six items, 6 participants (18,2 %) ticked up four items, 6 participants (18,2 %) ticked up five and 8 participants (24,2 %) ticked up 6 items. These results

revealed that 20 (60,6 %) of the 33 participants processed nature and its events and has Naturalistic – Nature Smart intelligence type (Figure 8).

Generally speaking, intelligence types of the participants from most to least hinted respectively is shown in Table 2. It is obvious that 78,8 % of participants have Interpersonal – People Smart intelligence type. Following that 72,7 % of the participants enjoy to deal with themselves addressing Intrapersonal – Myself Smart intelligence type. Thirdly most checked off intelligence type by 69,7 % of the participants. In addition to this, Logical- Number Smart and Musical- Music Smart intelligence types were the least checked off types, 48,4 % of the participants marked Logical – Number Smart and 39,4 % of the participants marked Musical – Music Smart intelligence types.

Table 2 General View of the Intelligence Types

	Participants' Number	
	#	%
Interpersonal - People Smart	26	78,8
Intrapersonal - Myself Smart	24	72,7
Linguistic - Word Smart	23	69,7
Naturalistic - Nature Smart	20	60,6
Kinesthetic - Body Smart	19	57,5
Visual/Spatial - Picture Smart	17	51,5
Logical - Number Smart	16	48,4
Musical-Music Smart	13	39,4

Qualitative Findings

The thoughts of participants about constructing blog page

Firstly, participants were asked what they thought about constructing blog page. 23 of the participants thought that constructing blog page is interesting, useful, amusing, a different excitement and an easy experience. 9 of the participants favored constructing blog page because of opportunities of blog page that supports material share and interaction in that platform. Related to this idea, one participant stated “exploring others’ work provide us to exchange opinions about own materials’ deficiencies”. On the other hand, 8 of the participants expressed that they faced difficulties and thought that it was a hard work at the beginning of constructing blog page but some time later it got easy. Regarding this issue, one participant stated “firstly, it was too complicated and thought that there was no need to do but some time later, I had a great time; it was very useful activity for us”. Nevertheless, four participants explained that they felt happy for archiving his/her artifacts in a regular manner. Moreover, four participants were proud of publishing their artifacts and feelings in a private and distinctive place. Related to this, one participant said “I got pleasure for constructing blog page; yet more I participated in more than one blog page”.

The thoughts of participants about their “own blog page”

The second question asked to the participants was related to their own blog page. 29 of the participants liked their own blog page because they found their blog page beautiful, successful, arranged, coherent and attentive. Moreover, 5 participants were getting happy when they were looking at their own page. Related to this, one expressed “I like because I have prepared; sometimes, I open and look at my artifacts”. Another five participants thought that they prepared more colorful, visual supported and sound embedded blog page. Regarding this issue, one stated “my blog page is colorful and reflecting myself. It becomes more beautiful with the help of my friends’ comments”. 3 participants expressed their own blog page as a place where they archived all their artifacts. 2 participants told that they created a blog page that reflecting themselves. On other hand one expressed that constructing a blog page was a compelling study.

The thoughts of participants about publishing and sharing their own works on their blogs

With regard to the question how the participants are affected by publishing and sharing their own works on their blogs, 14 participants expressed that they were affected positively and thought that publishing and sharing their own work on their blogs were beneficial and beautiful. Regarding to this answer, one participant explained “I explored all my friends’ artifacts to explore how they completed some beautiful parts when something stuck in my mind, when I wanted to do something...in my opinion it is very useful activity”. One participant pointed out

that he/she showed ultimate attention whereas two participants stated that they became very excited. Related to this answer, one participant stated “having works to be shared with others excited me”. Moreover, 5 participants thought that this publishing and sharing situation facilitated socialization among them. While 2 participants found this activity extraordinary, 6 participants benefited from other works and were proud of their works because of being their works examples to others. In contrast to these, 2 participants expressed that publishing and sharing were not effective and another two participants stated that they do not want others to see their special things in the Web environment. Regarding to this answer, one stated “It was not effective. There might be some special things; I do not want others to see them”. Another said “the accessibility of my CV to everyone who searches my name in Google disturbed me”.

The problems of participants encountered while constructing their blogs

When the participants were asked about the problems that they encountered while constructing their blogs, 9 participants stated that they did not face any problems while constructing their blogs. Regarding this answer, one stated “I did not face any problems since I use computer and internet properly”. In contrast, 29 participants encountered some problems during the construction of the blog pages. Of 29 participants, 15 had trouble with uploading their artifacts to the server and 14 had difficulty in constructing their blogs in terms of information and technical context. One of the participants stated “I sometimes have difficulty in uploading files” and another said “ftp steps were complicated”. Some technical issues mentioned were being blocked of blog pages by the reason of not being approved the incoming mail from blog page service provider, forgetting the own blog page address and password, not able to modify the profile, and not able to create hyperlink of artifacts to be post in blog pages. Regarding this answer, one participant stated “the biggest problem I have faced in my blog page, is forgetting my password all the time. Except this, I don’t have any difficulty”.

The perceptions of the participants about writing comments to their own works

Participants were asked about the perceptions about writing comments to their own works. 10 participants had difficulty to write comments to their works and thought that writing comments was difficult. 8 participants got happy and cheerful when they were writing comments. Regarding to this answer, one stated “I was assessed many times before but assessing myself is quite cheery”. While one thought that he/she felt as if he/she was praising himself/herself during writing process, other told his/her unwillingness for writing comments. Related to this answer, one stated “I do not want to assess myself, because, I like my artifacts but I hesitated as if I was praising myself”. Moreover, 11 participants took attention to be more objective when writing comments. 31 of the participants, 4 stated that was a different application whereas 6 participants expressed that they were writing comments easily. Regarding this answer, one told that “giving notes of humans to themselves is a different emotion. I do not know how objective it is, but I tried to be objective as much as I can”. Another said “when assessing myself, not only I considered good sides of me, but also I have mentioned my deficiencies”. Lastly, one participant told that he/she realized during the writing process that the hard parts of the works were not as such hard after he/she completed them.

The perceptions of the participants about writing comments to their friends’ works

With regard to the question about the perceptions of the participants about writing comments to their friends’ works, 10 participants expressed that they were found the activity amusing and effective. While 4 participants explained that they did not have any difficulty during writing process, 14 participants told that they tried to be careful not to lacerate others by writing any negative comments to their friends. Therefore, they particularly wrote comments to their friends having better artifacts. Regarding this answer one stated “I like both criticizing and being criticized. But, I avoided writing negative criticism in case they took offense. I wrote faults of my friends that they would not misunderstand me”. Another said “I congratulated my friends’ activities and I posted my criticisms for deficiencies I saw by not making them take offense”. In contrast, 5 participants told that they tried to be objective and neutral when writing comments. Related to this response, one stated “We wrote our opinions clearly”. Another said “I tired to write my comments objectively by looking at their artifacts. I specified what I found as a deficiency of an artifact”. 3 participants benefited from others’ comments, and realized their own deficiencies. One participant expressed that he/she felt himself/herself as if he/she was a teacher.

The thoughts of the participants whether they will plan to have their students prepare blog page in their teaching profession

With regard to the question whether the participants want to make their students prepare blog pages for their profession in the future, except 3 participants the rest of the participants expressed that they wanted to make their students prepare blog pages for different purposes.

Generally, the reasons for the usage indicated by the participants as follows with participants' number;

- For sharing artifacts and course notes (14)
- For being an effective, beneficial, and amusing activity (8)
- For tracking homework easily (6)
- For exploring students' deficiencies with comments (3)
- For improving computer use skills (3)
- For requiring search (1)
- For improving students (1)
- For recognizing students better (1)
- For being an ideal method to create creative and authentic artifacts (1)
- For allowing writing comments (1)

Under the light of the reasons above, one participant said, "I want everybody have a blog page. Thus, I can see given importance and care to the lesson by the students, and recognize them better". Another participant reflected his ideas as follows "I think. Because, with such a page, I can track their work better and they can complete their deficiencies by their friends' comments". Another participant said "yes, I will make my students prepare blog page. Because, by this way they can share their works with each other and I can also observe what they do easily".

The one of three participants, who did not prefer to use blog page in the future, put forward the fact that there is no need in their field, and other one said that "I don't want such a thing. Because I will be a secondary school teacher. But it might be of course if there are enough materials in the schools".

The most favored activities completed in the scope of the course by the participants

22 of the participants mostly favored the story activity, 11 of them favored the documentary film activity, 9 favored the concept map activity, 8 favored the brochure activity, 4 favored the puzzle activity, 1 mentioned the excel activity and 1 emphasized all activities completed in the scope of the course.

Participants pointed out the importance of the story activity for different reasons. The reasons indicated by the participants has different sides. They pointed out that this activity was different, amusing, entertaining, and beautiful (9), it is visual and colorful (5), it required more creativity (3), it required great care (1), it was easy (1), it was beneficial (1), the subject of the activity was chosen by students (1). Related to the reasons, one participant reflected his idea by stating "the presentation of story. It was different and amusing activity".

For the second favored activity, documentary film, participants gave some reasons such as: it was beautiful and cheerful (6), it is completed by a group (2), it has not been performed before (1), it was instructive (1), it required great care (1), I liked this task (1), it was visual (1), it was beautiful to explain something with music and frames (1). Thus one of the participants maintained that "documentary film was too comprehensive and I was very happy when completing it. To see that I can achieve something and work in a group was beautiful".

The factors emphasized by the participants for concept map activity are as follows: it was colorful (4), it was amusing (1), it was instructive (1), it was related with the our field (1), it will be useful in the future (1), and it enabled to review information (1). For the concept map, one participant stated "preparing a story and concept map, in my opinion, was very entertaining. Especially, dealing with the coherence of colors and images was amusing".

For the fourth favored activity, brochure, reasons are as follows: the subject of the activity was chosen by students (3), it was amusing and entertaining (2), it enabled to learn something about some places (1), and it will be useful in the future (1). Regarding this activity, one stated "at most, I enjoyed when completing brochure. Because, I prepared a place of my hometown, Trabzon".

Next, participants favored the puzzle activity for the fact that it was amusing (3) and will be useful in the future (1). One participant liked the excel activity by the reason of repeating all the excel information and one participant favored all the activities as they were all instructive and colorful.

The least favored activities completed in the scope of the course by the participants

When participants were asked their least favored activities completed in the scope of the course, 18 participants least favored excel activities, 7 least favored CV activity, 4 documentary film, 4 story, 3 brochure, 1 word activities and 3 participants did not have any least favored activity.

The reasons that caused them to dislike some kind activities may vary as follows with participant number. For the excel activities, participants put forward such facts: I don't like mathematics and calculations (6), it is a hard study (5), the formulations are difficult and complicated (4), it does not require creativity (1), and I don't like excel (1). In this respect, one said "excel homework. Because, I do not like to calculate. But absolutely it might be said that I have learned".

For the CV activity factors indicated by the participants are as below: It was boring (2), it was not amusing (1), I could not find any thing to write (1), it was not interested me (1), and I had a few computer use skill (1). Regarding this answer, one stated "preparing a CV was not amusing so that I have prepared it unwillingly".

The reasons given by participants to dislike documentary film activity are listed below: It as a tiring activity (1), it was hard (1), and time allowed to complete it was not appropriate (1). Related to this answer one participant stated "Documentary film. Because, it made us feel tired. I have started from the beginning again and again. I was unable to sleep 3 nights".

Four participants disliked the story activity because; one told that he/she could not use any visuals in the product. Another put forward the fact that it was boring to repeat the program and other expressed his dislike that it compelled. In this respect, one stated "rather than unwillingness, story applications compelled me".

Three participants who disliked the brochure activity gave these reasons: one told that he/she had difficulty while completing it, other expressed that it required much usage of style and formatting and lastly one participant put forward the fact that it was boring as well. Finally, one participant explained his/her dislike about word activities, since he/she thought that activities were the review of what he/she has known before.

The perceptions of the participants about the comparison of their improvement of computer and Internet usage skills before and after the course

With regard to the last question posed to the participants about their perceptions about the comparison of their improvement of computer and internet usage skills before and after the course, it could be said that there happened some changes in their technology usage skills. 30 participants told that they have learned many things, their computer and internet usage skills became strong, and they have completed their deficiencies. Related to this answer, one said "absolutely, I can say that I have made great strides. I think that I have learned Word, Excel, PowerPoint and movie maker applications in detail. This is the most important part of the semester for me". In more detail, 3 participants realized that they developed their usage skills of excel, word, PowerPoint and movie maker and 2 participants told that they are more successful at creating effective presentations. Related to this answer, one told "in the past, I had created simple presentations, whereas now, I can create visual supported presentations that will attract attention of others". In word applications, 2 participants explained that they developed using styles and formatting options. Furthermore, 2 participants made a confession that they like computer and internet eventually. In this perspective, one stated "my situation before and after the lesson is that I like computer and I achieve in some degree. In the past, I did not even know to look at images option of the Google while searching images". And other three expressed that they were even helping their friends about using computer and internet. In this respect, one said "I have not known much more about computer except MSN. Now, think that I have completed many things that my friend from the department of computer teaching even did not perform them, I helped them. Actually, I prided myself".

CONCLUSION AND DISCUSSION

This study was conducted to investigate the usage of blogs in educational settings from multiple intelligences perspective. For this purpose, both qualitative and quantitative measures were used to gather and analyze the data.

The findings of this study revealed that most of the participants', approximately 79%, dominant intelligence type was "interpersonal". The following two other intelligence types for this group were "intrapersonal" and "linguistics". Since the group was composed of the students of Department of Turkish Education, it is not surprising that approximately 70% of the participants have "linguistics" as dominant intelligence type.

Although most of the participants have some difficulties due to the technical problems, creating and managing their own blog page was favored by all of the participants. This activity was addressing interpersonal, intrapersonal and linguistics intelligence types, which were also the top three leading intelligence types of the group, besides visual/spatial and kinesthetic. So, satisfaction of participants may be obliged to their types of leading intelligences.

The group was positive, in general, toward publishing and sharing their own works through their blog pages with others. In parallel with study carried out by Williams and Jacobs (2004), students found to be in favour of the use of blogs throughout the semester as a technological support to teaching and learning activities. Birney, Barry & Ó hÉigeartaigh (2006) also stated students' positive feedback by concluding that: "they [students] readily engaged with the new technology and were enthusiastic about its use" (p. 1051). Thus, positive feedback taken from the students seems to indicate that assignments carried through blog usage can be an innovative and important tool for improving writing abilities of students (Lee, 2005).

Although self-evaluation was a new phenomenon for the participants, the results showed that they really benefited from this experience in different ways. In a similar way, writing comments to their friends' works was also found to be useful and motivating. Hence, their choice for future usage of blogs was heavily based on the idea of "sharing". Similar results also disclosed by Ellison and Wu (2008). Their study indicated that the students enjoyed the aspects of the blogging – interactive features of the medium, reading others' ideas and getting feedback. Another study conducted by Wang and Hsu (2007) also revealed that "Pre-service teachers enjoyed exchanging different perspectives on the blog, and considered blogging as an extra channel to allow them express different views or extend the in-class discussion. Writing to a public increases participants' discreteness when they post on the blog" (p. 2488).

Among the activities, preparing a story telling presentation was the most favored activity, which is preferred as approximately 68% of the participants. The reason may be that story telling activity was addressing linguistics type of intelligence primarily, whereas visual/spatial, musical, kinesthetic and intrapersonal types of intelligence also. As also stated by Huffaker (2005), blogs provide a chance to educators for improving students' literacy skills through storytelling and dialogue, since "Telling stories remains important from childhood to adulthood because stories allow people to express experiences and feelings in an engaging way, help them to understand the world around them, and develop and sustain peer relationships" (p. 96).

When the top three favored activities, namely story telling, documentary film and concept map, are investigated, their common points are they are addressing at least five types of intelligence. Addressing several types of intelligence can be explained with the richness of the activity. On the other hand, activities addressing logical type of intelligence primarily are found to be least favored by the participants.

Almost all of the participants have declared that their computer and Internet usage skills have improved and they have completed their deficiencies after this course. This satisfactory finding shows that carrying out course work through technological means, for this study blogs, which permits sharing of one's own work with others, can be used as a supplement to the course. Use of blogs and sharing products and ideas through this medium, not only motivate and attract learners, but also provide them a real-life situation to improve their technological competencies. Moreover, learners experienced online collaboration, self-evaluation and peer-evaluation with this approach. Thus, besides cognitive knowledge and skills, learners gained affective means, such as ethical considerations.

Major finding for this study is that activities addressing several intelligence types, which are appropriate for the group, are preferred mostly for this case. Thus, since improvement of intelligence types is hard for adults, it is important for instructors to design activities from multiple intelligences perspective which may effect the achievement of the group.

Through blogs or other technological tools, instructors should plan activities which address many types of intelligences at once, in order to reach more students and teach more effectively. On the other hand, usage of blogs for designing activities addressing several types of intelligence should be investigated for learners of different subject fields for varying content.

REFERENCES

- Birney, R., Barry, M. & Ó hÉigearthaigh, M. (2006). The Use of Weblogs as a Tool to Support Collaborative Learning and Reflective Practice in Third-Level Institutions. In E. Pearson & P. Bohman (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2006* (pp. 1047-1052). Chesapeake, VA: AACE.
- Carlson-Pickering, J. (1999). Teachers in technology initiative. [On-line]. Retrieved October 20, 2008, from http://www.ri.net/RITTI_Fellows/Carlson-Pickering/MI_Tech.htm.
- Davis, R. (1991). Learning how to learn: Technology, the seven multiple intelligences and learning. *Paper presented at the Spring CUE Conference, Palm Springs, CA, May 11, 1991*. (ERIC Document Reproduction Service No. ED338214)
- Ellison, N. B. & Wu, Y. (2008). Blogging in the Classroom: A Preliminary Exploration of Student Attitudes and Impact on Comprehension. *Journal of Educational Multimedia and Hypermedia*, 17(1), 99-122.
- Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. USA: Basic Books.
- Gardner, H. (2006). *Changing Minds. The art and science of changing our own and other people's minds*. Boston MA: Harvard Business School Press.
- Gardner, H., & Hatch, T. (1989). Multiple intelligences go to school: Educational implications of the theory of multiple intelligences. *Educational Researcher*, 18(8), 4-9.
- Glogoff, S. (2005). Instructional Blogging: Promoting Interactivity, Student-Centered Learning, and Peer Input. *Journal of Online Education*. 1(5). [On-line]. Retrieved October 20, 2008, from, <http://www.innovateonline.info/index.php?view=article&id=126>.
- Hsu, J. (2007). Innovative Technologies for education and Learning: education and Knowledge-oriented applications of Blogs, Wikis, podcasts, and more. *International Journal of Information and Communication Technology Education*. 3(3).70-89
- Huffaker, D. (2005). The educated blogger: Using weblogs to promote literacy in the classroom. *AACE Journal*, 13(2), 91-98
- Kaye, B. K. (2005). It's a Blog, Blog, Blog, Blog World. *Atlantic Journal of communication*, 13(2), 73-95.
- Lamb, A. (2004). Technology and multiple intelligences. [On-line]. Retrieved October 20, 2008, from <http://eduscapes.com/tap/topic68d.htm>.
- Lee, K. (2005). Creating Blogs in a Writing Course. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2005* (pp. 1986-1990). Chesapeake, VA: AACE.
- McKenzie, W. (2003). Find The Best Software: Using Bloom's Taxonomy and Multiple Intelligences to Select and Use Software. *Learning & Leading with Technology*, 30(8).
- Oravec, J. (2003). Blending by Blogging: Weblogs in blended learning initiatives. *Journal of Educational Media*, 28(2-3), 225-233.
- Rosen, D. (1997). Do technology based lessons meet the needs of student learning styles. [On-line]. Retrieved October 20, 2008, from <http://edweb.sdsu.edu/courses/edtec596r/students/Rosen/Rosen.html>.
- Schrand, Y. (2008). Tapping Into Active Learning and Multiple Intelligences with Interactive Multimedia. *College Teaching*, 56(29), 78-84.
- Todoroki, S. Konishi, T. & Inoue, S. (2006). Blog-based research notebook: Personal informatics workbench for high-throughput experimentation. *Applied Surface Science*, 252, 2640-2645.
- Wang, S. & Hsu, H. (2007). Blogging: a Collaborative Online Discussion Tool. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2007* (pp. 2486-2489). Chesapeake, VA: AACE.
- Williams, J. B. & Jacobs, J. (2004). Exploring the use of blogs as learning spaces in the higher education sector. *Australasian Journal of Educational Technology*, 20(2), 232-247.

INVESTIGATION OF PRE-SERVICE TEACHERS' PERCEPTIONS ABOUT CONCEPT OF TECHNOLOGY THROUGH METAPHOR ANALYSIS*

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ABSTRACT

The study aims to analyse the perceptions of the students enrolled at Hacettepe University in the Department of Primary Education about technology through the metaphor analysis. This study is considered as a descriptive study. In the study a mixed method including quantitative and qualitative techniques was used. The study was carried out among the 1st, 2nd, 3rd and 4th grade students studying at Hacettepe University at the Department of Primary Education during the 2007-2008 Fall Term. The perceptions of the pre-service teachers at the Department of Primary Education were analysed through the content analysis. The metaphors developed by pre-service teachers were analysed with appropriate statistical methods to find out whether it differentiates with various variables. In this study pre-service teachers developed one hundred five metaphors on technology and these metaphors were categorised into nine different categories. While there is a significant difference in their perceptions of technology in terms of participants' general point average and learning to use technology, there is not a significant difference in terms of gender, grade and the frequency of technology use and background information about technology use.

Keywords: Technology, perception, metaphor analysis, pre-service teacher.

1. INTRODUCTION

Most of the changes in human's life throughout the history have focused on technology. Technology is individuals' creating new products that make life easier using current equipments and tools. In other words, technology is a multidimensional concept which aims at solving problems depending on scientific knowledge. As the most evident characteristics of a modern society are science and technology, these two characteristics are also an organic component of modern society culture. Individuals' expectations for living in a more modern environment have brought the rapid developments in technology. In recent years, rapid developments in science and technology have affected individuals' life and their education for this life style (Yanpar, 2005; Alkan, 2005; Tor & Erden, 2004; Saban, 2008).

Technology developing and changing remarkably is an indispensable need of contemporary mankind. People encounter new technological device and equipment almost every day. It is important for them not only to realize the benefits of these devices but also use them for their own needs (Çepni, 2005; Çelik & Kahyaoğlu, 2007). Using technology has made individuals and societies stronger about events and phenomena and facilitates life. By technological changes and the opportunities it brings, societies and individuals have new responsibilities. People who are aware these responsibilities and are able to integrate technology with their life situations are always one step ahead (Gündüz & Odabaşı, 2004; Çelik & Kahyaoğlu, 2007).

1.1 Technology and Education

The most significant task of education system is to educate qualified individuals that are able to catch up with the information era. One of the ways to bring this aim to life is to integrate education and technology (Ayvacı, Nas, Şenel & Nas, 2007). Education and technology are two basic elements which have roles in making individual life more active (Alkan, 2005). From this perspective, it is required that technology, which is defined by Yalın (2004) as a discipline which can be regarded as a bridge between science and its implementation, should be used effectively due to the benefits of it in education as in many fields (Çoklar, Kılıçer & Odabaşı, 2007).

Educational environments today, which are different from the ones in the past, are in a better situation with the integration of technology into the education to make education better, facilitate learning and comprehension. Technology should be used effectively in the design of learning environments due to new technological improvements, so technology is considered as an indispensable part of education settings in the future (Baki, Kösa & Berigel, 2007). In addition to this, when technology is considered in terms of education, technology

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should have a supplementary role in instruction; however, it should not be the objective of the instruction (Demirel & Yağcı, 2007).

Technology has a significant role to make progress in education, so educators need to associate their study fields with technology (Akkoyunlu, 2002). Teachers and their students are two important stakeholder groups in any endeavor to integrate technology into schools; their beliefs and views must be thoroughly understood before any initiative takes place. Researchers, educators and parents are exploring the best ways to integrate technology in classrooms to enhance teaching and learning (Li, 2007). Lim and Chan (2007) argue that investigations on teachers and pre-service teachers' pedagogical beliefs about teaching and learning play a crucial role how they use technology in courses. Technology alone does nothing to enhance pedagogy; successful integration is all about the ways in which technology tools are used and integrated into teaching. (Georgina & Hosford, 2009). Survey research and the literature reviewed indicated that learners, faculty, technology, and environment should be influential areas in determining instructional technology use. Besides, study results revealed that attitude seemed more influential in technology use (Spots, 1999).

The studies that are carried out show that pre-service teachers graduate from faculties of education with limited information, so they have difficulties in using technology and as a result of this, they also have difficulties in developing materials although they have this course during their pre-service education. In addition to this, some studies show that even if they can access technology easily they do not use it (Çağiltay, Çakıroğlu, Çağiltay & Çakıroğlu, 2001; Çelik & Kahyaoglu, 2007). Some researchers (Guerrero, Walker, & Dugdale, 2004) summarized teachers' attitudes toward the use of technology in classrooms as "apprehensive," whereas their students' attitudes were "mainly enthusiastic".

It is necessary for pre-service teachers to present their abilities to use technology well and use these technologies effectively in their teaching-learning process. Moreover they must be willing regarding the use technology in their teaching (Luan, Fung, Nawawi & Hong, 2005). Guerrero, Walker, & Dugdale (2004) stated that when technology is used well in middle grade mathematics, it can have positive effects on students' attitudes toward learning, confidence in their abilities to do mathematics, engagement with the subject matter, and mathematical achievement and conceptual understanding. The perspectives and perceptions of pre-service teachers are considerably significant as they enable pre-service teachers to benefit from the opportunities of technology more effectively and more efficiently (Çelik & Kahyaoglu, 2007). Identifying perceptions of pre-service teachers about technology enables to display their ideas, perspectives towards technology and attitudes they obtained through their experiences. The strongest mental devices to display their perspectives, perceptions and attitudes towards technology are the metaphors that are formed about this concept.

1. 2 Metaphor

Metaphor is considered as the strongest device for an individual to comprehend and explain a hypothetical or an abstract, complex fact in a high level (Saban, Koçbeker & Saban, 2006). A metaphor can be defined as Dickmeyer (1989) suggests, "the characterisation of a phenomenon in familiar terms". In other words, people use metaphors to simplify their experiences. The essence of metaphor, according to Lakoff and Johnson (1980) is the understanding and experiencing of one kind of thing in terms of another (Farrell, 2006). Metaphors as representing our entire conceptual system including "the way we think, what we experience and what we do everyday" (Lakoff & Johnson, 1988). Whether metaphors are approached as a way of "seeing" or as a way of thinking about situation, they reflect how situations and processes are perceived (Inbar, 1996). Metaphor is a meaning transfer that passes from one abstract and complex object having perceptual similarity to another. Metaphors enable individuals to compare experienced facts and abstract and complex facts; as a result, it enables to develop comprehension related to unknown facts (Saban et al., 2006; Semerci, 2007). Three important features of metaphor are regognized in the literature: 1) the pervasiveness of metaphors 2) their ability to capture complex constructs in the field and 3) their usefulness as vehicles for reflection and consciousness raising among educators (Guerrero & Villamil, 2001).

In recent years, a perspective which is particularly based on Lakoff and Johnson's (2005) studies and called as "*mental metaphor theory*" has been the point at issue (Saban, 2009). George Lakoff and Mark Johnson's theory of metaphor (1980, 1999) provides a basis for describing everyday cognitive structures using linguistic models and thus, making it possible to uncover both individual and collective patterns of thought and action (Schmitt, 2005). Metaphors can never convey the full content of their message, nor can they transmit only the content of their intended message. Metaphors rest on the mental process of selection and emphasis. Metaphors are useful especially in understanding and explaining a new concept. Therefore, metaphor makes learning new information easier. In most cases, metaphors were the outcome of creative, theoretical thinking attempting to enrich our insight into educational phenomena (Cerit, 2008; Inbar, 1996).

Metaphors play an important role in educational research and learning theory. Metaphors can be considered to be a cognitive tool in educational settings which makes both teachers and students' tasks easier owing to their memory supportive roles in coding new information and restore later; and they can help paying attention and they can support in forming new explanations (Açıkgöz, 2002). Metaphors are also an important part of teachers' personal practical knowledge that shapes their understanding of their role as teachers. Clandinin (1986) suggests that metaphors are indications of the way teachers think about teaching and also guide the way they act in the classroom (Pajak, 1986; Clandinin, 1986 as cited in Farrell, 2006). In general, researchers agree that metaphors are widespread social habits that are part of teachers' discourse providing access to commonly held beliefs about their profession (Guerrero & Villamil, 2001). Studies indicate that teachers often make use of metaphorical language when they speak about their professional work, their beliefs, and their learning environments (Munby, 1987; Tobin, 1990).

1. 3 The Importance and Purpose of the Study

One of the most important elements of education process is the teacher. The expected qualifications of contemporary teachers have varied more with technology (Yanpar, 2005). In today's world, teachers should use technology effectively in education settings and should have positive perceptions about technology to use it effectively. There is a significant relation between teachers' perceptions of technology and their uses of it (Teo, Chail, Hung & Lee, 2008). The studies show that teachers' perceptions about technology affect the level of their technology use (Benson, Farnsworth, Bahr, Lewis & Shara, 2004; Laffey, 2004). In the study carried out by Akpınar (1999) emphasized that negative perceptions about technology delay the application of technology. It can be stated that as some teachers have negative perceptions of technology they do not want to use it or avoid using it, so to make them develop positive perceptions of technology they should be encouraged to use technology before they are in service (Cuban, 1986 as cited in Yanpar, 2005).

The study aims to analyse the perceptions of the students studying at Hacettepe University in the Department of Primary Education about technology through the metaphor analysis. In the study, technology is regarded as a general concept including all technological materials and equipment which pre-service teachers use in daily life and education settings.

2. METHOD

2. 1 Research Design

This study is a descriptive study as it aims to present the available situation as it is. Mixed method including quantitative and qualitative techniques is used in this study. A mixed method research design is a procedure for collecting, analysing, and mixing both quantitative and qualitative research and methods in a single study to understand a research problem. The basic assumption is that the use of both quantitative and qualitative methods, in combination, provides a better understanding of the research problem and questions than either method by itself (Cresswell, 2008). Educational research increasingly should be a mixture of quantitative and qualitative approaches (Fraenkel & Wallen, 2003). In the analysis of qualitative data, the perceptions of the pre-service teachers were analysed through the content analysis. Besides, in the analysis of quantitative data, the metaphors developed by pre-service teachers were analysed with appropriate statistical methods to find out whether it differentiates with various variables.

2. 2 Study Group

The study was carried out among the 1st, 2nd, 3rd and 4th grade students studying at Hacettepe University in the Department of Primary Education during the 2007-2008 Fall Term. This study was performed with 487 students chosen according to convenience sampling method among 560 students enrolled at Elementary Education Program. A convenience sample is a group of individuals who (conveniently) are available for study. The obvious advantage of this type of sampling is that it is convenient (Fraenkel & Wallen, 2003). The distribution of pre-service teachers participated into the study according to their genders and grades were presented Table 1.

Table 1: The Distribution of Pre-service Teachers Participated into the Study According to Their Genders and Grades

Grades			
Gender	f	%	
Female	357	73,3	
Male	130	26,7	
Grades			
1	90	18,5	
2	121	24,8	
3	168	34,5	
4	108	22,2	
Total	487	100	

2.3 Data Collection

Metaphors were used in collecting qualitative data in this study. Metaphor-based data collection process is not different at all from individual or focus group interviews based on open ended questions. Due to the properties of the collected data, it is easier and more practical data collection method than some types of individual interviews, focus group interviews, observation and document investigation because when used alone richer metaphors can be obtained from individuals by means of one or several open ended questions during a typical “metaphor based” qualitative data collection procedure (Yıldırım ve Şimşek, 2006). Metaphor analysis was used as a research tool in this study. In education research, metaphor analysis has long been used as a heuristic to raise awareness about theoretical assumptions, challenge established beliefs and promote change in classroom (Guerrero & Villamil, 2001).

Interview form was prepared to find out the technology related perceptions of pre-service teachers participating in the study. First part of the form includes personal information related to various variables and the second part includes the completion of the sentence “*Technology is like because*”. In metaphor studies “like” concept is used to recall the relationship between metaphor source and metaphor topic clearly (Saban et al., 2006). In the interview forms given to the students in order to make them establish sentences that will support their metaphors logically “because” is used as a conjunction word. The study also includes closed ended questions with an aim to obtain information about the genders, general point averages (GPA), circumstances to access technology, the frequency of technology use, background of technology use and their learning of using technology.

2.4 Data Analyses

The technology related perceptions of the pre-service teachers were analysed through content analysis method. Content analysis is a technique that enables researchers to study human behavior in an indirect way, through an analysis of their communications. It can be used in any context in which the researcher desires a means of systematizing and quantifying data. It is extremely valuable in analyzing observation and interview data (Fraenkel & Wallen, 2003). The basic aim of the content analysis is to access the relations and concepts which can explain the collected data (Yıldırım & Şimşek, 2006). In the study, firstly, 539 teachers were asked to fill in the interview forms, but the forms of 487 pre- service teachers were included to the study. Remaining 52 forms were not included due to the fact that they did not include a reason related to the metaphors, they included more than one metaphor and they did not include any sources or they were not logical. The process of analysing and discussing the metaphors developed by pre-service teachers were carried out in these 5 stages; (1) identification of metaphors (2) categorization of metaphors (3) category development (4) providing the validity and reliability (5) transfer the data to SPSS programme for qualitative data analysis.

1. Stage identification of metaphors. In this stage, metaphors written by pre-service teachers in interview forms were listed. The invalid metaphors were identified.

2. Stage categorizing metaphors. In the study, the metaphors developed by pre-service teachers were analysed through “metaphor analysis” and “content analysis” techniques, so these metaphors were analysed one by one and categorised in terms of their similarities.

3. Stage category development. In this stage of the study, categories were developed for the metaphors that were categorised in terms of similarities. 107 metaphors developed by pre-service teachers were categorised into 10 categories. While categorizing the metaphors, the explanations for the reasons why they developed those categories were considered. For instance; for the explanation of “plant” metaphor it is included differently to “needed” and “developing” categories.

4. Stage providing validity and reliability. Validity and reliability are the most commonly used two important criteria of studies in terms of the plausibility of the findings. Reporting the collected data in qualitative study

thoroughly and how the researcher accessed the findings are two significant criteria of validity. In order to provide the validity of this study, the process of data collection and data analysis were explained in details. Moreover, the findings obtained in this study were supported with the written explanations of the students which were presented in quotations as examples.

Besides, in order to provide the inter reliability, obtained data was firstly analysed by two different researchers. In the second stage, researchers came to an agreement comparing the analysis. Also the metaphors which take place in the categories developed in this study were analysed by three different experts to see whether they represent the related category or not. In this scope, the metaphors developed by pre-service teachers and developed categories were given to three experts in their fields as a list. Field experts were asked to write down the metaphors below the related categories. After that, the categorizations made by experts and categorizations made by researchers were compared. The number of agreements and disagreements in these comparisons was identified and the inter reliability of the data of this study was calculated with Miles and Huberman's formula ($\text{Reliability} = \text{number of agreements} / (\text{total number of agreements} + \text{disagreements})$). The result of this calculation, 96%, 90% and 92% (inter reliability) agreement related to this study was procured. According to Miles and Huberman, the accordance of the researchers and experts approximation to 90 % and/or is over 90 % means that reliability was procured at the demanded level (Miles & Huberman, 1994 as cited in Saban et al., 2006).

Furthermore, in qualitative research, researchers should clarify their situation in the research process for the sake of inter reliability (LeCompte & Goetz, 1982). In this scope, in studies the roles and responsibilities of researchers mean organizing the study process, implementing and finalizing; planning the application process, constituting and implementing application settings; making necessary analysis and reporting findings and results. Researchers' own ideas are included in the stage of reporting results.

5. Stage transferring the data to SPSS programme for qualitative data analysis. In the study, after identifying 107 metaphors developed by pre-service teachers and 10 categories, categories were transferred to SPSS with coding. The percentage and frequency of the metaphors and categories that belong to the students were calculated. In the second stage, it was analysed whether the perceptions of the pre-service teachers change according to the gender, class level, GPA, opportunities to access a computer, frequency of using a computer, background information about technology and learning technology and it was analysed with Pearson Chi Square statistical technique.

3. FINDINGS AND RESULTS

The pre-service teachers participating the study developed 105 metaphors. These metaphors were categorised into 9 groups in general. Categories related to the metaphors are “needed”, “constantly changing”, “developing”, “harmful”, “beneficial”, “addictive”, “both beneficial and harmful”, “rapidly developing” and “facilitating our life”. The frequency and percentage of the metaphors developed by pre-service teachers for “needed technology” were presented in Table 2.

Table 2: The Distribution Frequency and Percentage of the Metaphors About “Needed Technology” Category

Metaphor name	f	%
Food	16	3,29
Water	24	4,93
Money	4	0,82
Plant	1	0,21
Air	4	0,82
Sleep	1	0,21
Life	6	1,23
Sense organ	3	0,62
Family	2	0,41
Mirror	1	0,21
Pencil	2	0,41
Car	1	0,21
Glasses	1	0,21
Human brain	1	0,21
Total	67	13,76

Analysing Table 2, it is seen that pre-service teachers developed 67 metaphors related to “needed technology” category. In this category, pre-service teachers likened technology mostly to water. An example of the metaphor developed related to this category and the reason of developing this metaphor follows as this:

Technology is like the water we drink because it is a concept which we need in all seconds of our lives. Water is necessary for going on our lives and technology is necessary for the continuation of our lives.

The frequency and percentage of metaphors developed by pre-service teachers related to the “constantly changing technology” category were presented in Table 3.

Table 3: The Distribution Frequency and Percentage of the Metaphors About “Constantly Changing Technology” Category

Metaphor name	f	%
Chameleon	36	7,39
Virus	2	0,41
İguana	2	0,41
Flowing water	2	0,41
Frog	1	0,21
Fashionable	3	0,62
Nature	2	0,41
Caterpillar	1	0,21
Weather forecast	1	0,21
Total	50	10,27

According to the data presented in Table 3 pre-service teachers developed totally 50 metaphors related to this category. They likened technology mostly to a chameleon. The metaphor related to this category was stated with an example below:

Technology looks like a chamelon as it is constanly changing. It never stays as it is.

The frequency and percentage of metaphors developed by pre-service teachers related to the “developing technology” category were presented in Table 4.

Table 4: The Distribution Frequency and Percentage of the Metaphors About “Developing Technology” Category

Metaphor name	f	%
Tree	11	2,26
Human	23	4,72
Child	8	1,64
Seed	6	1,23
Plant	9	1,85
Machine	5	1,03
Giant	2	0,41
Animal	5	1,03
Teacher	2	0,41
Avalanche	2	0,41
Total	73	14,99

According to the data presented in Table 4 pre-service teachers developed totally 73 metaphors related to this category. Pre-service teachers likened the technology mostly to human. An example of the metaphor developed related to this category follows as this:

Technology is like a human because they both grow up and develop.

The frequency and percentage of metaphors developed by pre-service teachers related to the “harmful technology” category were presented in Table 5.

Table 5: The Distribution Frequency and Percentage of the Metaphors About “Harmful Technology” Category

Metaphor name	f	%
Monster	12	2,46
Rodent animal	2	0,41
Mouse	3	0,62
Snake	9	1,85
Hire murder	1	0,21
Dragon	1	0,21
Dark hole	2	0,41
Rain	1	0,21
Darling	2	0,41
Spider	1	0,21
Gamble	3	0,62
Swampy	3	0,62
Dynamite	2	0,41
Total	42	8,62

Analysing Table 5, it is seen that pre-service teachers developed 42 metaphors related to “harmful technology” category. In this category, pre-service teachers likened technology to a monster. The metaphors related to this category were exemplified below.

Technology looks like a monster as a monster eat everything that comes in front of it.
Technology is eating and consuming each human in front of it.

The frequency and percentage of metaphors developed by pre-service teachers related to the “beneficial technology” category were presented in Table 6.

Table 6: The Distribution Frequency and Percentage of the Metaphors About “Beneficial Technology” Category

Metaphor name	f	%
Cow	7	1,44
River	2	0,41
Angel	3	0,62
Donkey	6	1,23
Vitamine	4	0,82
Sun beams	11	2,26
Library	2	0,41
Encyclopaedia	3	0,62
Brain	5	1,03
Toy	3	0,62
School	1	0,21
Total	47	9,65

Analysing Table 6, it is seen that pre-service teachers developed 47 metaphors related to “beneficial technology” category. In “beneficial” category, pre-service teachers likened technology to sunlights. The metaphors related to this category were illustrated below:

Technology looks like sunlights as sunlights brighten and warm up the world. Sunlights breathe life into all creatures. Technology has lots of benefits like sunlights.

The frequency and percentage of metaphors developed by pre-service teachers related to the “addictive technology” category were presented in Table 7.

Table 7: The Distribution Frequency and Percentage of the Metaphors About “Addictive Technology” Category

Metaphor name	f	%
Cigarette	12	2,46
Cola	3	0,62
Anaesthetic	5	1,03
Chewing gum	5	1,03
Cream-cake	2	0,41
Hamburger	3	0,62
Chocolate	5	1,03
Darling	3	0,62
Sunflower seed	2	0,41
Total	40	8,23

Analysing Table 7, it is seen that pre-service teachers developed 40 metaphors related to “addictive technology” category. In “addictive” category, pre-service teachers likened technology mostly to cigarettes. An example of the metaphor developed related to this category follows as this:

Technology looks like a cigarette which is a bad habit because once you get accustomed to cigarette, it is impossible to spend time without it.

The frequency and percentage of metaphors developed by pre-service teachers related to the “both harmful and beneficial technology” category were presented in Table 8.

Table 8: The Distribution Frequency and Percentage of the Metaphors About “Both Beneficial and Harmful Technology” Category

Metaphor name	f	%
X Rays	4	0,82
Nuclear weapon	2	0,41
Bee	7	1,44
Woman	4	0,82
Bacteria	9	1,85
Plant	6	1,23
Delphin	1	0,21
Worm	6	1,23
Wine	3	0,62
Lovebird	1	0,21
Knife	6	1,23
Dog	6	1,23
Rose	3	0,62
Medicine	8	1,64
Lama	3	0,62
Paper	2	0,41
Fire	2	0,41
Cat	3	0,62
Total	76	15,61

Analysing Table 8, it is seen that pre-service teachers developed 76 metaphors related to “both beneficial and harmful technology” category. In this category, pre-service teachers likened technology mostly to bacterias. An example of the metaphor developed related to this category follows as this:

Technology looks like bacteria as bacteria provides life cycle, enables to form some food, but it causes illnesses with weakening the strength of the human body. Technology enables to obtain a lot of information, but it decreases the interaction between people to the minimum degree.

The frequency and percentage of metaphors developed by pre-service teachers related to the “rapidly developing technology” category were presented in Table 9.

Table 9: The Distribution Frequency and Percentage of the Metaphors About “Rapidly Developing Technology” Category

Metaphor name	f	%
Cheetah	11	2,26
Tiger	10	2,05
Leopard	5	1,03
Rabbit	9	1,85
Car	6	1,23
Greyhound	2	0,41
Mosquito	2	0,41
Seal	1	0,21
Total	46	9,45

Analysing Table 9, it is seen that pre-service teachers developed 46 metaphors related to “rapidly developing”category. In the category of rapidly developing technology category, pre-service teachers used cheetah and tiger metaphors related to technology. An example of the metaphor developed related to this category follows as this:

Technology is like a cheetah because a cheetah is very fast. Technology also improves very fast. Additional features are added to mobiles every day.

The frequency and percentage of metaphors developed by pre-service teachers related to the “facilitating life technology” category were presented in Table 10.

Table 10: The Distribution Frequency and Percentage of the Metaphors about “Facilitating Our Life Technology” Category

Metaphor name	f	%
Bulb	2	0,41
Friend	10	2,05
Sun	2	0,41
Magic box	3	0,62
Robot	7	1,44
Compass	3	0,62
Refrigerator	4	0,82
Language	5	1,03
Dishwasher	2	0,41
Telephone	3	0,62
Umbrella	2	0,41
Key	2	0,41
Carrier	1	0,21
Total	46	9,45

Analysing Table 10, it is seen that pre-service teachers developed 46 metaphors related to “facilitating our life technology”category. In “facilitating our life” category participants likened technology mostly to friends. An example of the metaphor developed related to this category follows as this:

Technology looks like a friend because my friends help me whenever I want. I can get help from technology whenever I want.

The comparison of the categories of the technology related metaphors developed by pre-service teachers in terms of gender was presented in Table 11.

Table 11: Comparison of the Categories Related to Technology Concept According to Gender

Metaphor name	Female f (%)	Male f (%)	Total f (%)
Needed	56 (15,69)	11 (8,46)	67 (13,8)
Constantly changing	35 (9,80)	15 (11,53)	50 (10,3)
Developing	52 (14,56)	21 (16,15)	73 (15,0)
Harmful	32 (8,96)	10 (7,69)	42 (8,6)
Beneficial	29 (8,12)	18 (13,85)	47 (9,7)
Addictive	32 (8,96)	8 (6,15)	40 (8,21)
Both harmful and beneficial	54 (15,13)	22 (16,92)	76 (15,6)
Rapidly developing	31 (8,68)	15 (11,54)	46 (9,4)
Facilitating life	36 (10,08)	10 (7,69)	46 (9,4)
Total	357	130	487
$\chi^2=9,98$	sd=8	p=0,27	

Analysing the data presented in Table 11, male and female pre-service teachers' perceptions related to technology concept does not differentiate significantly ($\chi^2=9,98$; sd=8; p=0,27).

The comparison of the categories of the technology related metaphors developed by pre-service teachers in terms of grades was presented in Table 12.

Table 12: Comparison of the Categories Related to Technology Concept According to Grades

Metaphor name	1 st grade f (%)	2 nd grade f (%)	3 rd grade f (%)	4 th grade f (%)	Total f (%)
Needed	9 (10)	18 (14,88)	22 (13,09)	18 (16,67)	67 (13,8)
Constantly changing	8 (8,88)	8 (6,11)	21 (12,5)	13 (12,04)	50 (10,3)
Developing	15 (16,67)	18 (14,88)	29 (17,26)	11 (10,18)	73 (15,0)
Harmful	5 (5,55)	13 (10,74)	17 (10,12)	7 (6,48)	42 (8,62)
Beneficial	7 (7,78)	12 (9,92)	15 (8,93)	13 (12,04)	47 (9,65)
Addictive	10 (11,11)	5 (4,13)	19 (11,31)	6 (5,55)	40 (8,21)
Both harmful and beneficial	18 (20)	22 (18,18)	18 (10,71)	18 (16,67)	76 (15,6)
Rapidly developing	6 (6,67)	14 (11,57)	16 (9,52)	10 (9,26)	46 (9,44)
Facilitating life	12 (13,33)	11 (9,09)	11 (6,55)	12 (11,11)	46 (9,44)
Total	90	121	168	108	487
$\chi^2=25,87$	sd=24	p=0,36			

Analysing the data presented in Table 12, the perceptions of pre-service teachers in different grades related to technology concept does not differentiate significantly ($\chi^2=25,87$; sd=24; p=0,36).

The comparison of the categories of the technology related metaphors developed by pre-service teachers in terms of general point average was presented in Table 13.

Table 13: The Comparison of the Categories Related to Technology Concept According to General Point Average

Metaphor name	1 (0,00–1,99) f (%)	2 (2,00–2,99) f (%)	3 (3,00–4,00) f (%)	Total f (%)
Needed	16 (9,09)	28 (13,53)	23 (22,11)	67 (13,8)
Constantly changing	21 (11,93)	18 (8,69)	11 (10,58)	50 (10,3)
Developing	26 (14,77)	28 (13,53)	19 (18,27)	73 (15,0)
Harmful	16 (9,09)	22 (10,63)	4 (3,85)	42 (8,6)
Beneficial	21 (11,93)	19 (9,18)	7 (6,73)	47 (9,7)
Addictive	17 (9,66)	19 (9,18)	4 (3,85)	40 (8,21)
Both harmful and beneficial	23 (13,07)	36 (17,39)	17 (16,35)	76 (15,6)
Rapidly developing	22 (12,5)	20 (9,66)	4 (3,85)	46 (9,4)
Facilitating life	14 (7,95)	17 (8,21)	15 (14,42)	46 (9,4)
Total	176	207	104	487
$\chi^2=28,74$	sd=16	p=0,02		

Analysing the data presented in Table 13, the perceptions of pre-service teachers having different general point averages related to technology concept differentiate significantly ($\chi^2=28,74$; $sd=16$; $p=0,02$). It is possible to summarise these differences with these points. The participants whose GPAs are between 2.00 and 2.99 adopt the roles of technology “needed”, “developing”, “harmful”, “addictive”, “both harmful and beneficial” and “facilitating our life” more than the participants whose GPAs are between 0,00 – 1,99 and 3.00 and 4.00. The participants whose GPAs are between 0,00 and 1,99 adopt the roles of technology “constantly changing”, “beneficial” and “rapidly developing” more than the participants whose GPAs are between 2.00 and 2.99 and 3.00 and 4.00.

The comparison of the categories of the technology related to metaphors developed by pre-service teachers in terms of the frequency of using technology was presented in Table 14.

Table 14: The Comparison of the Categories Related to Technology Concept According to the Frequency of Using Technology

Metaphor name	1 (everyday) f (%)	2 (a few hours in a week) f (%)	3 (a few days in a week) f (%)	4 (never) f (%)	Total f (%)
Needed	14 (14,28)	24 (16,90)	18 (12,95)	11 (10,18)	67 (13,8)
Constantly changing	10 (10,20)	15 (10,56)	16 (11,51)	9 (8,33)	50 (10,3)
Developing	11 (11,22)	27 (19,01)	18 (12,95)	17 (15,74)	73 (15,0)
Harmful	8 (8,16)	9 (6,34)	14 (10,07)	11 (10,18)	42 (8,6)
Beneficial	10 (10,20)	9 (6,34)	17 (12,23)	11 (10,18)	47 (9,7)
Addictive	12 (12,24)	12 (8,45)	6 (4,32)	8 (7,41)	40 (8,21)
Both harmful and beneficial	18 (18,37)	19 (13,38)	21 (15,11)	18 (16,67)	76 (15,6)
Rapidly developing	8 (8,16)	14 (9,86)	12 (8,63)	12 (11,11)	46 (9,4)
Facilitating life	7 (7,14)	13 (9,15)	15 (10,79)	11 (10,18)	46 (9,4)
Total	98	142	139	108	487
$\chi^2=15,36$ $sd=24$ $p=0,91$					

Analysing the data presented in Table 14, the perceptions of pre-service teachers whose frequency of using technology are different about the technology concept do not differentiate ($\chi^2=15,36$; $sd=24$; $p=0,91$).

The comparison of categories developed by pre-service teachers about technology concept according to backgrounds was given in Table 15.

Table 15: The Comparison of the Categories Related to Technology Concept According to Pre-Service Teachers' Backgrounds

Metaphor name	1 (very limited) f (%)	2 (slightly) f (%)	3 (very good) f (%)	Total f (%)
Needed	10 (11,63)	31 (13,02)	26 (15,48)	67 (13,8)
Constantly changing	8 (9,30)	25 (10,50)	17 (10,12)	50 (10,3)
Developing	14 (16,28)	34 (14,28)	25 (14,88)	73 (15,0)
Harmful	12 (13,95)	18 (7,56)	12 (7,14)	42 (8,6)
Beneficial	6 (6,98)	22 (9,24)	19 (11,31)	47 (9,7)
Addictive	5 (5,81)	20 (8,40)	15 (9,20)	40 (8,21)
Both harmful and beneficial	13 (15,12)	39 (16,39)	24 (14,28)	76 (15,6)
Rapidly developing	8 (9,30)	25 (10,50)	13 (7,74)	46 (9,4)
Facilitating life	10 (11,63)	24 (10,08)	12 (7,14)	46 (9,4)
Total	86	238	163	487
$\chi^2=8,97$ $sd=16$ $p=0,91$				

According to the data in Table 15, pre-service teachers' perceptions who had different backgrounds about technology did not show any differences ($\chi^2=8,97$; $sd=16$; $p=0,91$).

The comparison of the categories of the technology related metaphors developed by pre-service teachers in terms of the learning of technology was presented in Table 16.

Table 16: The Comparison of the Categories Related to Technology Concept According to Preservice Teachers' Learning to Use Technology

Metaphor name	1 (in class or for making presentation) f (%)	2 (from books/ magazines) f (%)	3 (by the help of friends) f (%)	4 (by myself) f (%)	Total f (%)
Needed	29 (18,71)	15 (26,31)	5 (7,46)	18 (8,65)	67 (13,8)
Constantly changing	11 (7,10)	2 (3,51)	8 (11,94)	29 (13,94)	50 (10,3)
Developing	18 (11,61)	8 (14,03)	16 (23,88)	31 (14,90)	73 (15,0)
Harmful	16 (10,32)	2 (3,51)	5 (7,46)	19 (9,13)	42 (8,6)
Beneficial	10 (6,45)	5 (8,77)	9 (13,43)	23 (11,06)	47 (9,7)
Addictive	8 (5,16)	7 (12,28)	4 (5,97)	21 (10,10)	40 (8,21)
Both harmful and beneficial	29 (18,71)	8 (14,03)	7 (10,45)	32 (15,38)	76 (15,6)
Rapidly developing	15 (9,68)	7 (12,28)	5 (7,46)	19 (9,13)	46 (9,4)
Facilitating life	19 (12,26)	3 (5,26)	8 (11,94)	16 (7,69)	46 (9,4)
Total	155	57	67	208	487
$\chi^2=43,09$	sd=24		p=0,01		

Analysing the data presented in Table 16, pre-service teachers' perceptions related to technology differentiates according to the pre-service teachers' learning to use technology ($\chi^2=43,09$; $sd=24$; $p=0,01$). These differences can be summarised with these points. Ones who learn to use technology first in classes or ones who learn to use it for presentations adopt the roles of technology "needed" and "facilitating our life" more than one who learn it from books/magazines, by the help of friends and by myself. One who learn to use technology by themselves adopt the roles of technology "constantly changing", "developing", "harmful", "beneficial", "addictive", "both beneficial and harmful" and "rapidly developing" more than ones who learn to use technology from books/magazines, who learn to use it in class or for making presentation and by the help of friends.

4. CONCLUSIONS AND RECOMMENDATIONS

In this study, it is aimed at investigating pre-service teachers' perceptions related to technology by means of metaphor analysis. In the study, the pre-service teachers' perceptions related to technology is consisted of nine categories as "needed", "constantly changing", "developing", "harmful", "beneficial", "addictive", "both beneficial and harmful", "rapidly improving" and "facilitating our life". Pre-service teachers perceive technology mostly as "both beneficial and harmful" and "addictive" at the very least. This finding of the study indicates that the perceptions of pre-service teachers about the technology vary and the perceptions about the technology are generally positive. This findings obtained in the study are in parallel with the findings indicating that students attitudes and perceptions towards technology are positive and carried out by Boon, Fore and Rasheed (2007). Similarly, the data collected through the interviews enabled the determination of the positive ideas of students on the utilization of technology (Yavuz & Coşkun, 2008). In an experimental study carried out by Lin (2008), opinions of pre-service teachers related to technology based instruction were collected and it was found that the perceptions of pre-service teachers towards the use of technology in Maths classes were positive in general. In the experimental study carried out by Gunter, Gunter & Wiens (1998), it was seen that pre-service teachers who took instructional technology course had positive attitudes towards technology and less anxiety; and the attitudes of pre-service teachers towards technology at the end of the interviews were positive.

The findings obtained in the study carried out by Li (2007) indicated that teachers and students had different perspectives towards the use of technology at schools. This difference reflects their beliefs related to the advantages and disadvantages of technology. Students usually have more positive attitudes towards technology when compared to their teachers. For example, this study indicated that although most of the students found technology in educational settings useful and effective, most of the teachers considered technology as extra work load for both teachers and students; and its educational value was low in terms of the spent time and effort. On the other hand, it was found that students adopt technology willingly and they wanted technology to be used better and more frequently at schools. These findings are supported with the finding that teachers' attitudes towards technology were negative and students' were positive which was obtained by Guerrero, Walker, & Dugdale (2004).

Zoller & Ben-Chaim (1996) found that teachers and students had positive attitudes and beliefs towards working with computers in science teaching. Moreover, in the study carried out by Whetstone & Carr-Chellman (2001), it was seen that although pre-service teachers considered computers as important tools, teachers' positive attitudes towards computers were not enough to use computers successfully and effectively in their classes. In the study carried out by Li (2007), it was stated that 87,3 % of students enjoyed using technology and believed that technology is an effective tool in learning and teaching process. In the study conducted by Spotts (1999) technology users were divided into three levels as low, medium and high. According to Spotts, perception of technology in terms of its being useful and valuable differs among the users: Users at high level perceived that using instructional technologies had more benefits than low level users perceived. Studies conducted in previous years indicated that most teachers were afraid of the facts that the use of technology made understanding mathematical concepts harder for students, students became addicted to technology and technology was not effective as a teaching tool. Moreover, in this study results indicated that teachers expressed concern regarding negative effects of extensive technology usage on mathematical learning (Schmidt & Callahan, 1992). Other research studies indicated that the perceptions of teachers towards technology differ from each other. In these studies, it was found that teachers and their students inferred different meanings from the word technology at schools and in daily life; and some students perceived technology as positive and some perceived negative so that teachers and their students' views of technology will play a crucial role in determining the outcomes of courses (Rennie, 1987; Harding & Rennie, 1992; Rennie & Jarwis, 1995a; Rennie & Jarwis, 1995b). In addition, in the study performed by İşman, Çağlar, Dabaj, Altınay, Altınay (2004) students' perceptions towards computers concluded that students give importance to the computers as a part of their life. In addition to this, research results represent that high percentages concentrated on that there are positive attitudes towards computers because of being tool to organize life efficiently.

When the categories formed as the perceptions of pre-service teachers related to technology are considered as a whole, the most developed metaphors are water, chameleon and human. This finding of the study indicate that the most common metaphors that pre-service teachers developed are related to the categories "needed", "constantly changing" and "developing". When the categories formed as the perceptions of pre-service teachers related to technology are considered apart from each other, the most common metaphors for each category are water, chameleon, human, monster, sun lights, cigarette, bacteria, cheetah, friends and hospital.

Furthermore, pre-service teachers' perceptions related to technology were investigated in terms of the variables like the participants' gender, grades, GPA, frequency of technology use, the background information about technology use and learning to use technology. Pre-service teachers' perceptions related to technology differentiate significantly according to the participants' GPA and learning to use technology. Pre-service teachers' perceptions related to technology do not differentiate significantly according to the participants' gender, grade, the frequency of technology use and the background information about technology use. Similar results were also obtained by other researchers (Tsai, Lin & Tsai, 2001). This finding obtained in the study is in parallel with the Parker, Bianchi, Cheah's (2008) study results indicating that individual factors such as gender, grade point average, class/faculty rank, and length of tenure influence orientation toward technology from some aspects. Moreover, although studies indicate that there is a significant difference between the students' attitudes towards computers, anxieties and gender (Chen, 1986; Collis, 1985; Collis, 1987; Okebukola, 1993), another study on this issue indicates that there is no significant difference between the opinions of instructors on the importance of technology and their genders (Spotts, Bowman & Mertz, 1997)

In the light of the results of this study these recommendations can be given for teacher education and later studies:

1. Education settings should be developed for pre-service teachers to enable them develop positive perceptions towards technology. Thus, it is achieved that pre-service teachers use technology more actively in learning and teaching process.
2. Instructors should use technology effectively in classes and they should be a model for pre-service teachers to enable them develop positive perceptions towards technology.
3. Similar studies can be carried out with teachers to identify their perceptions related to technology.
4. Similar studies can be carried out with teachers in different fields and considering different variables.

REFERENCES

- Açıkgöz, K. (2002). *Aktif öğrenme*. [Active learning]. İzmir: Eğitim Dünyası Yayınları.
- Alkan, C. (2005). *Eğitim teknolojisi*. [Educational technology]. Ankara: Anı Yayıncılık.
- Akkoyunlu, B. (2002). Educational technology in turkey: past, present and future. *Educational Media International*, 39 (2), 165–174.
- Akpınar, Y. (1999). *Bilgisayar destekli öğretim ve uygulamalar* [Computer aided teaching and applications]. Ankara: Anı Yayıncılık.
- Ayvacı, H. Ş., Nas, S., Şenel, T. & Nas, H. (2007, Mayıs). Öğretmen adaylarının öğretim teknolojilerini kullanmaya yönelik düşünceleri ve bu teknolojileri kullanmaya yönelik yeterlilikleri [Student teachers' thinking about using teaching technologies and their using sufficiency]. In H. Uzunboylu & N. Çavuş (Eds.) *Proceedings of 7th International Educational Technology Conference*: Vol. 1. (pp. 284-288). Near East University, KKTC.
- Baki, A., Kösa, T. & Berigel, M. (2007, Mayıs). Bilgisayar destekli materyal kullanımının öğrencilerin matematik tutumlarına etkisi [The effect of using computer based material towards students' mathematics attitude]. In H. Uzunboylu & N. Çavuş (Eds.) *Proceedings of 7th International Educational Technology Conference*: Vol. 1. (pp. 20-24). Near East University, KKTC.
- Benson, L. F., Farnsworth, B. J., Bahr, D. L., Lewis, V. K & Shara, S. H. (2004). The impact of training in technology assisted instruction on skills and attitudes of pre-service teachers. *Education*, 124 (4), 649–652.
- Boon, R. T., Fore, C. & Rasheed, S. (2007). Students' attitudes and perceptions toward technology-based applications and guided notes instruction in high school world history classrooms, *Reading improvement*, 44 (9), 23–31.
- Cerit, Y. (2008). Öğretmen kavramı ile ilgili metaforlara ilişkin öğrenci, öğretmen ve yöneticilerin görüşleri. [Students, teachers and administrators' views on metaphors with respect to the concept of teacher]. *Türk eğitim bilimleri dergisi*, 6 (4), 693-712.
- Chen, M. (1986). Gender and computers: the beneficial effects of experience on attitudes. *Journal of educational computing research*, 2, 265-281.
- Collis, B. (1985). Sex differences in secondary school students' attitudes toward computers. *Computing Teacher*, 12 (7), 33-36.
- Collis, B. (1987). Sex differences in the association between secondary school students' attitudes toward mathematics and toward computers. *Journal for Research in Mathematics Education*, 18 (5), 394-40.
- Cresswell, J. W. (2008). Educational Research. New Jersey: Pearson Education Inc.
- Cummings, L. (1996). Educational technology a faculty resistance view. Part II: Challenges of resources, technology and tradition. *Educational Technology Review*, 5, 18–20.
- Çağiltay, K., Çakıroğlu, J., Çağiltay, E. & Çakıroğlu, N. (2001). Öğretimde bilgisayar kullanımına ilişkin öğretmen görüşleri [Teachers' perspectives about the use of computers in education]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 21, 19–28.
- Çelik, H. C. & Kahyaoğlu, M. (2007). İlköğretim öğretmen adaylarının teknolojiye yönelik tutumlarının kümeleme analizi [The cluster analysis of primary school candidate teachers' attitudes toward technology]. *Türk Eğitim Bilimleri Dergisi*, 4 (5), 571–586.
- Çepni, S. (2005). *Fen ve teknoloji öğretimi* [Teaching science and technology]. Ankara: PegemA Yayınları.
- Çoklar N. A., Kılıçer, K. & Odabaşı, F. (2007, Mayıs). Eğitimde teknoloji kullanıma eleştirel bir bakış: teknopedagoji [A critical view to technology usage in education: Technopedagogy]. In H. Uzunboylu & N. Çavuş (Eds.) *Proceedings of 7th International Educational Technology Conference*: Vol. 1. (pp. 39-44). Near East University, KKTC.
- Demirel, Ö. & Yağcı, E. (2007). *Eğitim, öğretim teknolojisi ve iletişim*. [Educational, instructional technology and communication. Özcan Demirel-Eralp Altun. (Ed.) Öğretim teknolojileri ve materyal tasarımı [Instructional technology and material design]. Ankara: PegemA Yayıncılık.
- Dickmeyer, N. (1989). Metaphor, model, and theory in education research, *Teachers College Record*, 9 (2), 151-160.
- Drier, H. S. (2001a). Teaching and learning mathematics with interactive spreadsheets. *School science and mathematics*. 101 (4), 170-179.
- Drier, H. S. (2001b). Beliefs, experiences, and reflections that affect the development of techno-mathematical knowledge. In G. Marks, *Proceedings of Annual meeting of the Society of Information Technology and Teacher Education* (pp. 1103–1106). Charlottesville, VA: AACE.
- Farrell, T. S. C. (2006). 'The teacher is an octopus': uncovering preservice english language teachers' prior beliefs through metaphor analysis. *Regional Language Centre Journal*, 37 (2), 236–248.
- Fraenkel, J. R. & Wallen, N. E. (2003). *How to design and evaluate research in education*. New york: McGraw-Hill Companies.

- Georgina, D. A. & Hosford, C. C. (2009). Higher education faculty perceptions on technology integration and training. *Teaching and Teacher Education*, 25, 690–696.
- Guerrero, S., Walker, N., & Dugdale, S. (2004). Technology in support of middle grade mathematics: what have we learned? *Journal of Computers in Mathematics and Science Teaching*, 23, 5–20.
- Guerrero, M. C. M. & Villamil, S. O. (24-27 February 2001). *Metaphor analysis in second/foreign language instruction: a sociocultural perspective*. Paper presented at the annual meeting of the American association of applied linguistics, St Louis, MO.
- Gunter, G. A. Gunter, R. E. & Wiens, G. A. (10–14 March 1998). *Teaching pre-service teachers technology: an innovative approach*, Paper presented at the 9th society for information technology & teacher education international conference, Washington, DC.
- Gündüz, Ş. & Odabaşı, F. (2004). Bilgi çağında öğretmen adaylarının eğitiminde öğretim teknolojileri ve materyal geliştirme dersinin önemi [The importance of instructional technologies and material development course at pre-service teacher education in information age]. *The Turkish Online Journal of Educational Technology*, 3 (1).
- Harding, J. & Rennie, L. J. (1992). Technology education in science and mathematics, what research says to the science and mathematics teacher, No. 10 (Perth, Australia, National Key Centre for School Science and Mathematics).
- Inbar, D. E. (1996). The free educational prison: metaphors and images. *Educational research*, 38 (1), 77–92.
- İşman, A., Çağlar, M., Dabaj, F., Altınay, Z. & Altınay, F. (2004). Attitudes of students toward computers. *The Turkish Online Journal of Educational Technology – TOJET*, 3 (1).
- Laffy, J. (2004). Appropriation, mastery and resistance to technology in early childhood teacher education. *Journal of Research on Technology in Education*, 36 (4), 361–382.
- Lakoff, G. & Johnson, M. (1980). *Metaphors we live by*. Chicago: University of Chicago Press.
- LeCompte, M. D. & Goetz, J. P. (1982). Problems of reliability and validity in ethnographic research. *Review of Educational Research*, 52, 31–60.
- Li, Q. (2007). Student and teacher views about technology: a tale of two cities? *Journal of Research on Technology in Education*, 39 (4), 377–397.
- Lim, C. P. & Chan, B. C. (2007). MicroLESSONS in teacher education: Examining pre-service teachers' pedagogical beliefs. *Computers & Education*, 48, 474–494.
- Lin, C. Y. (2008). Beliefs about using technology in the mathematics classroom: interviews with pre-service elementary teachers. *Eurasia Journal of Mathematics, Science & Technology Education*, 4 (2), 135–142.
- Luan, W. S., Fung, N. S., Nawawi, M. & Hong, T. S. (2005) Experienced and inexperienced Internet users among pre-service teachers: their use and attitudes toward the Internet, *Educational Technology & Society*, 8 (1), 90–103.
- Munby, H. (1987). Metaphor and teachers' knowledge. *Research in the Teaching of English*, 21 (4), 377–397.
- Okebukola, P. A. & Woda, A. B. (1993). The gender factor in computer anxiety and interest among some Australian high school students. *Educational Research*, 35 (2), 181–189.
- Parker, R. E., Bianchi, A. & Cheah, T. Y. (2008). Perceptions of instructional technology: factors of influence and anticipated consequences. *Educational Technology & Society*, 11 (2), 274–293.
- Rennie, L. J. (1987). Teachers' and pupils' perceptions of technology and the implications for curriculum. *Research in Science & Technological Education*, 5, 121–134.
- Rennie, L. & Jarvis, T. (1995a) Three approaches to measuring children's perceptions about technology, *International Journal of Science Education*, 17, 755–774.
- Rennie, L. J. & Jarvis, T. (1995b). English and Australian Children's Perceptions about Technology. *Research in Science and Technological Education*, 13 (1), 37–52.
- Saban, A., Koçbeker, B. N. & Saban, A. (2006). Öğretmen adaylarının öğretmen kavramına ilişkin algılarının metafor analizi yoluyla incelenmesi [An investigation of the concept of teacher among prospective teachers through metaphor analysis]. *Kuram ve Uygulamada Eğitim Bilimleri*, 6 (2), 461–522.
- Saban, A. (2008). Öğretim teknolojisi ve materyal tasarımı ile ilgili kavramlar. Kıymet Selvi (Ed.) Öğretim teknolojileri ve materyal tasarımı [Concepts related to instructional technology and material design. Instructional technology and material design]. Ankara: Anı Yayıncılık.
- Saban, A. (2009). Öğretmen adaylarının öğrenci kavramına ilişkin sahip oldukları zihinsel imgeler [The mental images pre-service teachers have in their mind related to the student concept], *Türk Eğitim Bilimleri Dergisi*, 7(2), 281–326.
- Schmidt, M. & Callahan, L. G. (1992). Teachers' and principals' beliefs about calculators in elementary mathematics. *Focus on Learning Mathematics in School*, 14, 17–29.
- Schmitt, R. (2005). Systematic metaphor analysis as a method of qualitative research. *The Qualitative Report*, 10 (2), 358–394.

- Semerci, Ç. (2007). “Program geliştirme” kavramına ilişkin metaforlarla yeni ilköğretim programlarına farklı bir bakış [A view to the new primary school curricula with the metaphors relating to “curriculum development”]. *Cumhuriyet Üniversitesi Sosyal Bilimler Dergisi*, 31 (40), 125–140.
- Senge, P. M. (1990). *The fifth discipline*. New York: Bantam Books.
- Spotts, T. H. (1999). Discriminating factors in faculty use of instructional technology in higher education. *Educational Technology & Society*, 2 (4), 92-99.
- Spotts, T. H., Bowman, M. A., & Mertz, C. (1997). Gender and use of instructional technologies: A study of university faculty. *Higher Education*, 34 (4), 421.
- Teo, T., Chai, C. S., Hung, D. & Lee, B. L. (2008). Beliefs about teaching and uses of technology among pre-service teachers. *Asia-Pacific Journal of Teacher Education*, 36 (2), 163–174.
- Tobin, K. (1990). Changing metaphors and beliefs: a master switch for teaching. *Theory into practice*, 29, 122–127.
- Tor, H. & Erden, O. (2004). İlköğretim öğrencilerinin bilgi teknolojilerinden yararlanma düzeyleri üzerine bir araştırma. [A study on the benefit levels of primary school students from instructional technologies]. *The Turkish Online Journal of Educational Technology – TOJET*, 3 (1), 16.
- Tsai, C. C., Lin, S. S. J. & Tsai, M. J. (2001). Developing an internet attitude scale for high school students. *Computers and Education*, 37 (1), 41-51.
- Whetstone, L. & Carr-Chellman, A. A. (2001). Preparing preservice teachers to use technology: survey results. *TechTrends*, 46 (4), 11-17
- Yalın, H. İ. (2004). *Öğretim teknolojileri ve materyal geliştirme* [Instructional technologies and material development]. Ankara: Nobel Yayınevi.
- Yanpar, T. (2005). *Öğretim teknolojileri ve materyal geliştirme* [Instructional technologies and material development]. Ankara: Anı Yayıncılık.
- Yavuz, S. & Coşkun, A. E. (2008). Sınıf öğretmenliği öğrencilerinin eğitimde teknoloji kullanımına ilişkin tutum ve düşünceleri. [Attitudes and perceptions of elementary teaching through the use of technology in education]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 34, 276-286.
- Yıldırım, A. & Şimşek, H. (2006). *Sosyal bilimlerde nitel araştırma yöntemleri* [Qualitative research methods in social sciences]. Ankara: Seçkin Yayıncılık.
- Zoller, U. & Ben-Chaim, D. (1996). Computer inclination of students and their teachers in the context of computer literacy education. *Journal of Computers in Mathematics and Science Teaching*, 15 (4), 401-21.

MIDDLE SCHOOL ENGLISH LANGUAGE TEACHERS' PERCEPTIONS OF INSTRUCTIONAL TECHNOLOGY IMPLEMENTATION IN NORTH CYPRUS

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ABSTRACT

This study investigated the current state of instructional technology utilization in English Language classes at middle schools in North Cyprus. The study intended to reveal teacher's perceptions of contribution of technology to English classes. The participants of the study were 80 middle school English Language teachers. A questionnaire was prepared and used as the instrument for data collection. The results of the study revealed that although teachers are generally positive about technology use in English Language classes instructional technology implementation is below the desired rates due to some restrictions mainly lack of the technological means and lack of time. Those teachers that use technology frequently assert that the traditional technologies mostly provide good control over English Language teaching and improve vocabulary development and that the modern technologies provide interactive environment and improve English skills, while both types of technology increase the motivation of the students.

INTRODUCTION

It is a widely agreed fact that technology has unavoidably been well established in our lives. We live in an era that no one can imagine a proper life without the use of any technological means. While every single bit of our lives got its share of the huge technological improvements, over the last decades, education has represented a prominent field to be affected by the appealing technological developments. Educational settings have been significant environments for technology to fit in so far. Making use of educational technology has been inevitable to keep in step with the rapid changes in the contemporary educational systems and their targets. The field of education has quickly familiarized itself with technology, and the outcomes have been outstanding. Instructional technology offered quick and effective solutions to educational goals.

In 1975, Fraley and Vargas mentioned that, as the individuals of the modern and complicated world, the learners face many technological improvements, and challenges in responding these developments. They stated that, "To meet these challenges, today's instruction must be equally technological and sophisticated" (p.2). Today, many administrators and principals around the world attach a primary importance to technology in the design of school curriculums. At the present, recently reconstructed education system in North Cyprus, also intends to utilize technological facilities at all levels of education under the principles of a student-centered constructivist approach.

Background of the Study

Over the last few decades, foreign language teaching has welcomed many rapid changes. The most apparent change was that the traditional grammar-based instruction left its place to efforts of promoting communicative ability. Communicative approach caught on with its emphasis on the actual use of language, student engagement, interaction and contextualized discourse (Warschauer, 2000). As a result of this substantial change in language teaching, teachers needed extra aids to provide learners with the desired environments and foster exposition to authenticity. In the meantime, the emergence of new technological tools in foreign language teaching built teachers' hopes up to fulfill the requirements of communicative settings. Since then, "... technological innovations have significantly changed the scene where foreign language instruction takes place" (Salaberry, 2001, p.1). Today, the use of instructional technology is seen inevitable for effective outcomes in foreign language classrooms. Cakır (2006) assumes that technology is a part of society, thus, language teachers can not be far away from using it since they have the prior aim of addressing social needs.

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Context of the Study

Cyprus had been a British Colony until a bi-communal Cyprus Republic, comprised of Turkish and Greek Cypriots, was established in 1960. English had remained as one of the three official languages of the new republic together with Turkish and Greek. At the present, the two communities are separated each having administrations and foundations of their own both in the Northern and Southern parts of the Island. There had been no interaction between the two communities for more than thirty years; therefore young generations of the two communities are not familiar with each other's mother languages at all. Thus, English Language remains the only common means of communication and cooperation between the two communities. In the last century, English Language has been a world-wide common language, but both the history and the present situation in Cyprus specially increase its significance for people living on the island.

The education system in North Cyprus has been reconstructed recently and has gained a new frame. Generally speaking, the traditional teacher-centered education system has been replaced by a learner-centered emphasis with the major aim of "providing individuals with appropriate environments to improve themselves in all respects and raising generations who are open to new ideas, are continuously able to improve themselves, and obtaining confident individuals who are able to express their ideas freely" (Department of Educational Planning and Program Development, 2005). Furthermore, it has been stressed that students should be capable of using the information technology efficiently.

To attain the above objectives, teachers are expected to create learning environments in line with the students' interests and abilities, and provide interaction of the students with their environment. Teachers are also expected to utilize teaching methods with the understanding of learner-centered education and utilize technology efficiently.

In order to facilitate the needs of the contemporary education system, technologically equipped rooms to be used for language teaching and for other subjects are planned to be established. This type of technology rooms have already been built in a few schools and are being constructed in some other schools.

English is an essential course with at least seven 40-minute periods a week at middle school level. English Language Curriculum for middle schools, which has also been revised recently, depends on a four-skill (reading, writing, listening and speaking) based approach.

Problem Statement and Research Questions

English Language, which is considered as the key for reaching information and interacting with people all around the world, represents one of the fundamental components of the education system in North Cyprus as well. As a developing country, aiming to have effective communication and cooperation with other countries in the world, English Language Teaching (ELT) becomes a more crucial aspect to be considered. Warschauer and Meskill (2000) suggested that "With the advent of networked multimedia computing and the Internet, language teachers throughout the country have been warming up to using computers in the language classroom" (p.2). Another example from Venezuela stated by Mayora (2006) stresses that multimedia technology used in English classes results in motivating, productive and advanced lessons. Both examples demonstrate the integration of technology into teaching of English around the world. Is that the situation in North Cyprus as well?

The answer for the above question has not been answered because no such research has yet been conducted in North Cyprus. Therefore, the researchers intended to carry out the present study with the aim of providing scientific evidence about the implementation of instructional technology in English language lessons. In this context, the study intends to answer the following research questions:

1. How do the English teachers implement different forms of instructional technology in their classes?
2. How do the English teachers perceive any existing restrictions regarding the never or seldom use of instructional technology in their classes?
3. How do the English teachers perceive the contribution of instructional technology to their classes?
4. How do the English teachers perceive the necessity of using instructional technology in their classes?

Significance of the Study

Certainly, technology has gained a vital importance in satisfying the requirements of both the new Education System and the revised English Language Curriculum for English Language Teaching (ELT). However, there has been an obvious lack of evidence demonstrating the use of instructional technology in English Language classes in North Cyprus. This study aims at providing empirical evidence for the current state of technology use

in middle school English Language classes. It will open the gateway for further improvements in ELT in the country. Being aware of the current situation, it will be easier for both teachers and principals to fix any deficiencies and to improve the quality of teaching. The study will also alert teachers of English in terms of new improvements that they can implement in their classes to enhance student learning. The present study should be considered as significant since it aims at shedding light on the current state of technology use in ELT classes which has not been investigated earlier in North Cyprus. Furthermore, it will discover potential restrictions for technology use in classes. The current study also intends to explore how the contribution of instructional technology to English Language teaching is perceived by English teachers.

Limitations of the Study

This research is limited to the time when the data were collected; the situation investigated may change as time goes on. Furthermore, the researchers did not carry out any observation about the use of technology and teaching-learning methods in English Language classes. The responses to the questionnaire were self-reported by the participants, so the data collected rely on the participant teachers' perceptions of the existing situation.

REVIEW OF LITERATURE

Definition of Instructional Technology

As said by Abelle (1973), "Instructional technology may be viewed as the whole range of communications media available to supplement the traditional approach to the teaching-learning process" (p.610). Instructional technology (IT) was also defined by Seels and Richey (1994) as "the theory and practice of the design, development, utilization, management and evaluation of processes and resources for learning" (p.1). In 2000, Fardanesh uttered a simplified definition and referred instructional technology as "the knowledge of skillful execution of instruction" (p.3). According to Smaldino, Russell, Heinich, and Molenda (2005), "An instructional system consists of a set of interrelated components that work together, efficiently and reliably, within a particular framework to provide learning activities necessary to accomplish a learning goal" (p.21). In this study, the term instructional technology refers to both traditional (not electronic) and modern (electronic) technologies which organize instruction to provide a strong foundation for an efficient learning experience, and to deliver information in a well structured manner to endure learning.

Instructional Technology at the Service of Education

According to Lusty (1969), educational technology derived just after educators realized the need for solutions for 'here-and-now problems' rather than seeking for the perfect method of all for teaching. In Özhelvaci's (2003) view, an effective teaching lies beneath addressing to all five sense organs of the students. The more the teacher manages to address students' senses the better learning occurs. Therefore the key for this success is the instructional technology. According to İşman (2002), technology contributes to education by fostering faster distribution of information, providing individual learning situations, promoting permanent learning, representing a ground for project works and giving opportunity for global education.

Ferdig (2005) suggested some issues to be considered for good implementation of technology in education from a social constructivist perspective. First, he asserted that the innovation provided by technology should be authentic, interesting and challenging for the learners to be engaged in the subject matter. Second, he recommended that the innovation should give learners a sense of control. He went on to suggest that when students are in charge of their own learning, they become better learners. Ferdig also pointed out that it is important for learners to find the chance of active participation, collaboration and social interaction. In this way, learners can work together during the construction process of knowledge and attain more meaningful learning. Moreover, technology should lead learners to create artifacts since producing real solutions makes learners more aware of practical concepts of what they have learned. Lastly, technologies implemented in education should provide opportunity for publication, reflection and feedback. It is essential for learners to produce work on their new information, reflect on their learning and get feedback from others.

Instructional Technology and the Teacher

Without any doubt, teachers are the keys for bringing educational technology to life more efficiently. However, just like in any other field, there is always some resistance against new ideas and improvements in education as well. Teachers need to be enthusiastic about the innovations to overcome such possible prejudices. In this manner, teachers' attitudes towards the use of technology play an important role in integrating available facilities into teaching successfully.

Denson (2005) conducted a research on teachers' attitudes toward technology and revealed that the level of integration of technology into lessons depends on the skill levels of teachers in the use of technology. Teachers with higher skill levels integrated technology in their classes more frequently. Another study conducted by

Meskill, Mossop, DiAngelo, & Pasquale (2002) compared and contrasted eight novice and expert teachers. The results demonstrated that “Indeed, those novice teachers who had received “state of the art” training in classroom technologies use were less comfortable in their implementations than the more experienced who had no formal training with computers but had a great deal of classroom experience.” (Meskill et al., p.54). Arkin’s (2005) study on teachers’ attitudes towards technology use in vocabulary instruction revealed statistically significant differences between teachers who had undergone computer technology training and those who had not. His study suggested that simply providing appropriate technological means to the teachers does not assure the utilization of them. Findings highlighted the need for providing guidance, support and training for teachers in integrating technology into language instruction.

Dudeney and Hockly (2007) mentioned the term “technophobe” (p.8) referring to teachers who have hesitations towards utilizing new technologies. In their view, “a large part of the negative attitudes teachers have towards technology is usually the result of a lack of confidence, a lack of facilities or a lack of training, resulting in an inability to see the benefit of using technologies in the classroom” (p.9). As stated by Garrett (1991), “conservative teachers fear that the technology will weaken or interfere with their control of the class are willing to consider only those technology-based materials which perform electronically the most traditional teaching tasks” (p.92). On the other hand, skillful, knowledgeable, confident and enthusiastic teachers may face some external restrictions concerning technology integration such as lack of technical support, curriculum restrictions or lack of the suitable technological means in their schools (Usluel, Mumcu, & Demiraslan, 2007).

A study carried out with 150 English teachers on their attitudes to educational technology showed that in spite of teachers’ awareness of the importance of using educational technology, they are not willing to use it in their classes (Gömleksiz, 2004). A recent study in Cyprus with 100 science teachers indicated that only a small number of teachers have integrated educational technology resources in their lessons (Isman, Yaratana, & Caner, 2007).

As stated by Forrest (1993), “Technology is the state of the art in language teaching, and well-informed language teachers are seeking to avail themselves of information with respect to instructional possibilities and resource materials in this realm” (p.317).

Instructional Technology in Teaching Foreign and Second Languages

Technology use in language teaching is not a new concern. It dates back to the times at which blackboard was used as the one and only technological tool supplementing language instruction. The blackboard served as a perfect medium for teacher centered language classes which perfectly supported the approach of the grammar translation method in which the teacher acted like an orchestra leader and directed learners to perform mechanic translations. “The blackboard was later supplemented by the overhead projector, another excellent medium for the teacher dominated classroom” (Warschauer & Meskill, 2000, p.1). According to Harmer (2007), the overhead projector (OHP) and overhead transparencies (OHT) still retains their ‘unique versatility’ regardless of the newer and more popular technologies.

Alongside the blackboard and OHP, language teachers further investigated the ways to enliven the language classroom. Soon after, they started to make use of aids like flashcards, wall charts, posters and real objects in classrooms to promote visual quality in language learning. Haycraft (1978) referred to these visual aids as an addition to language teacher’s “armoury” (p.99).

Among the visual aids for the language classroom, magnet boards, flannel boards and authentic printed materials have also been the popular ones. According to Wright and Haleem (1991) “a great variety of language can be contextualized through the use of these visuals” (p.39). They further emphasized on the use of newspapers by saying that “Students must experience the flow of native language use and know how to do their best with it. The topicality of newspapers is relevant and so too is the reflection of the culture” (p.85).

The appearance of newer and more popular methods in language teaching brought new technologies along to be integrated into language instruction. For instance, the audio-tape was a chief component of the audio-lingual method with a focus on repetitive drills in the target language. The tape recorder mentioned as “an invaluable aid to the language learner and teacher” and was rated as “one of the most commonly used pieces of equipment” in the language classroom (Hubbard, Jones, Thornton, & Wheeler, 1983, p.122). As an alternative to the audio tape the phonograph, also known as the record player (Clarke as cited in Salaberry, 2001), and radio broadcasts (Wiph as cited in Salaberry, 2001) also served as instructional media for audio-based instruction. As a consequence of the audio-lingual era, language laboratories were being established rapidly in the early 1960’s and as reported in Salaberry’s (2001) retrospective study, they have been one of the most eye-catching

technological improvements for second language instruction so far. Numerous studies have been conducted questioning their practicality and many conclusions were put forward. In this respect Haycraft (1978) asserted that “There were those who attacked it as mechanical, soulless device which would eliminate the teacher, and as commercial gimmick which ‘conned’ the students into thinking they were being taught in a modern, and therefore effective, way” (p.113).

Television and video have also been major visual contributors to language teaching contexts. In Lonerger’s (1984) view, “video in the classroom offers exciting possibilities for language teaching and learning.” (p.1), and Çakır (2006) affirmed that besides the verbal language, it is important for the language learner to have the chance of concentrating on visual clues of language such as the attitudes, gestures, mimes and facial expressions. Results of the experimental study of Herron, Morris, Secules, and Curtis (1995), revealed that students using video based instruction showed higher skill levels than those using text-based instruction. In a previous study Secules, Herron, and Tomasello (1992) had also indicated that classes which used video tapes performed considerably higher in overall listening comprehension than did the classes which did not use video.

In 1970’s, language teachers started to question whether they were following the right path to reach the desired outcome, which was students being able to communicate in the target language (Larsen-Freeman, 2000). As a consequence, they came up with a conclusion that structural knowledge or repetitive drills did not work out for a communicative competence. Along with the emergence of the communicative approaches, the major change came to light and language teachers needed the help of instructional technology more than ever. Now, language instruction had to be more contextualized, students needed to face more real-life situations and there was further need for exposition to the actual usage of language. Technological improvements in the changing world of that time demonstrated a great assistance for meeting all of the above requirements and the computer technology has been a leading facilitator among all instructional technologies since the mentioned changes came to scene.

METHODOLOGY

Population and Sampling Procedures

The population was 253 English Language teachers serving in 30 middle schools in North Cyprus. Twenty-one schools were randomly selected from the total of 30 by using random cluster sampling method. Selection was conducted by writing the names of the schools on different pieces of papers, putting them in a container and then drawing lots.

Convenient sampling method was employed to determine the teachers who would take part in each of the schools already selected. Each selected school was visited at least twice in order to reach as many teachers as possible. At first, the questionnaire was administered to the available teachers. Some of the teachers were having lessons during the first visit and some of them were busy. Therefore, visiting the schools for a second time gave the opportunity to contact more teachers. To obtain equivalent samples from each type of schools, the researchers visited some of the schools for the third time when necessary. There were also some teachers who did not accept to participate in the study. As a result, the total number of English teachers targeted was 192, but only 80 teachers could take part in the survey.

Description of the Data Collection Instrument

A questionnaire was designed for the study and the items were structured by drawing upon the relevant literature and internet resources related to technology enhanced language teaching environments. The types of technological means implemented in language teaching were investigated. The gathered data were categorized into two parts as traditional technologies, and modern technologies. Technologies which do not make use of electrical energy were classified as ‘traditional technologies’ and those which require electrical energy were put into ‘modern technologies’ category (Isman, et al., 2007). The next step was prepared to explore the restrictions preventing teachers from making use of technological means. Finally, the last step was established to look into the contributions of these technological means in case of regular implementation. All these collected information were used to construct the items of the questionnaire.

The questionnaire consisted of 4 sections (See Appendix). The first section of the questionnaire aimed at finding out how frequent the teachers implement different forms of technologies in their classes. The participants were asked to indicate the rate of their implementation of a variety of technologies. A Likert Scale with four points were used for responses (never = 0, seldom = 1, usually = 2, almost always = 3).

Second section inquired teachers’ opinions about the possible restrictions of the use of technology in English classes. If the participants declared never or seldom use of a particular technological mean, then they were requested to specify reasons for each in this section. The response options for this section were ‘lack of the

technological mean', 'lack of time', 'curriculum restrictions', 'lack of interest', 'lack of confidence', 'lack of knowledge' and 'crowded classes'.

In the third section of the questionnaire the participants were expected to specify observed contributions of technology that they usually or almost always use. In this case, the response options were 'gives good control over teaching', 'increases student motivation', 'promotes meaningful learning', 'provides an interactive context', 'improves English Language skills', 'improves vocabulary development', 'improves cultural awareness'.

The fourth section of the questionnaire was designed to explore teachers' general perceptions of technology use in English Language teaching. The teachers were asked whether they agreed or disagreed with the following statement; "Technology helps and improves English Language Teaching and should be used more often in English classes." The teachers responded to this item as either 'yes' or 'no'.

Validity and Reliability of the Instrument

The questionnaire was piloted with a random sample of twenty-five ELT teachers. The remedial feedback from the participants of the pilot study was taken into consideration in rewording the instructions, modifying ambiguous wording, adding new items and deleting the ones which were considered as unnecessary. For example, record player was said to be a very old technology which was almost impossible to find in today's schools, so it was omitted from the questionnaire. Some of the terms and concepts in the questionnaire were unfamiliar to the teachers so they were simplified to be more understandable. As the format of the questionnaire was a unique one (see Appendix), some ambiguity was anticipated in terms of practicality but it was observed that the format was clear enough to the respondents and the paths were easy to follow.

After deleting the items that were found unnecessary by the teachers who participated in the piloting study, the reliability analyses was conducted for the questionnaire with the data collected. The Cronbach Alpha value for the questionnaire has been calculated as 0.82, indicating satisfactory reliability according to Fraenkel and Wallen (2006) who stated that a coefficient of at least .70 is necessary.

Administration of the Instrument

The questionnaire was administered within a two-month period. The reason that it took a long time was that the researchers had to contact teachers from different schools one by one. During the administration, the researchers met the teachers and answered their questions about the questionnaire if they had any to avoid any misunderstanding. Each school was visited at least twice because only the teachers who did not have any lessons, who had enough time and who accepted to participate in the study completed the questionnaire during each visit. In some cases third visits were made in order to achieve the desired number of participants.

ANALYSIS OF DATA AND FINDINGS

In order to find the rate at which the English teachers implement different forms of technology in their classes, how the English teachers perceive any existing restrictions regarding the use of technology in their classes, and how they perceive the contribution of technology to their classes, percentage of each item was computed.

Findings

As shown in Table 1, the most preferred technology by the teachers was the textbook, which was considered to be among the traditional technologies in this study. A great majority, 86.3% of the teachers, pointed out that they almost always used the textbook in their English classes, and 12.5% of them made use of it usually. Hence, 98.8% of teachers used the textbook frequently in their English classes. There was no one who answered 'never' for the use of the textbook. Following the textbook, writing board (almost always = 68.8%, usually = 23.8%) was used mostly by the teachers. Handouts (almost always = 27.5%, usually = 56.3%) were also among the frequently used traditional technologies. After these three top utilized technologies, stationeries (almost always = 31.3%, usually = 27.5%), flashcards (almost always = 3.8%, usually = 35.0%), real objects (almost always = 3.8%, usually = 31.3%), wall charts, posters, maps (almost always = 10.0%, usually = 27.5%) and mounted pictures and photos (almost always = 5.0%, usually = 33.8%) were the technologies that were used moderately. Among the modern technologies, CD players and audio-tape players were the only frequently used technologies. While 37.5% of the teachers said that they almost always included a CD player in their lessons 38.8% said that they usually made use of it. Audio tape player was also a frequently used technology in English lessons and 77.6% of teachers indicated that they almost always or usually used this technology in their classes. Internet and downloaded materials were also quite frequently used by the English language teachers (almost always = 13.8%, usually = 8.8%).

Beside the above mentioned technologies teachers seemed not to make significant use of other technologies that were appropriate for teaching English lessons (see Table 1).

Table 1. Percentages of teachers who used instructional technology at different rates.

Traditional Technologies	Percentages of teachers for different rates of use			
	Never	Seldom	Usually	Almost always
Textbooks	-	1.3	12.5	86.3
Handouts	-	16.3	56.3	27.5
Writing Board	-	7.5	23.8	68.8
Stationeries	13.8	27.5	27.5	31.3
Magnet Boards	72.5	20.0	3.8	3.8
Flashcards, index cards	18.8	42.5	35.0	3.8
Wall charts, posters, maps	10.0	52.5	27.5	10.0
Mounted pictures, photos	16.3	45.0	33.8	5.0
Objects, real materials	15.0	50.0	31.3	3.8
Pamphlets, brochures	30.0	56.3	11.3	2.5
Puppets	76.3	20.0	3.8	-
Newspaper, magazines	16.3	61.3	20.0	2.5
Modern Technologies				
Audiotape player/recorder	8.8	13.8	46.3	31.3
CD player/ Recorder	8.8	15.0	38.8	37.5
Radio	66.3	15.0	15.0	3.8
Television	55.0	31.3	13.8	-
Video player/ Recorder	45.0	37.5	13.8	3.8
Telephone	88.8	8.8	2.5	-
Overhead projector	77.5	18.8	3.8	-
Film Strip	78.8	15.0	6.3	-
Opaque Projector	90.0	8.8	1.3	-
Slide Projector	87.5	10.0	2.5	-
Desktop Computer	73.8	17.5	7.5	1.3
Laptop Computer	88.8	3.8	7.5	-
Language Lab	80.0	11.3	6.3	2.5
Computer Lab	75.0	18.8	5.0	1.3
Multimedia Lab	92.5	6.3	1.3	-
Internet & Downloaded Mat.	56.3	21.3	8.8	13.8
Data Projector/ Data Show	87.5	8.8	2.5	1.3
Interactive Whiteboard	70.0	20.0	5.0	5.0

N = 80; Percentages greater than or equal to 50% were highlighted as bold face

Regarding the traditional technologies a great majority of teachers (72.5%) mentioned that they could not make use of magnet boards due to the lack of the technological means (see Table 2). About one third of the teachers (35%) indicated that they could not use flash cards, index cards, objects and real materials due to lack of time. Similarly, 37.5% of the teachers related the nonuse of pamphlets and brochures due to lack of time. Another interesting result was that 42.5% of the teachers did not use puppets due to lack of interest. Although traditional technologies were usually available in schools, their use was limited due to lack of time and curriculum restrictions.

Table 2. Percentage of teachers who never or seldom use traditional technologies for the specified reasons.

Type of Technology	Reasons						
	lack of techno.	lack of time	curric. restric.	lack of interest	lack of confide.	lack of knowl.	crowded classes
Textbooks	-	-	-	-	-	-	-
Handouts	3.8	6.3	8.8	-	-	-	1.3
Writing Board	-	1.3	1.3	5.0	-	-	-
Stationeries	5.0	26.3	17.5	6.3	-	1.3	1.3
Magnet Boards	72.5	12.5	13.8	16.3	3.8	1.3	2.5
Flashcards, index cards	17.5	35.0	25.0	7.5	1.3	1.3	5.0
Wall charts, posters, maps	15.0	28.8	17.5	15.0	-	5.0	6.3
Mounted pictures, photos	17.5	27.5	12.5	8.8	-	-	7.5
Objects, real materials	6.3	35.0	17.5	10.0	-	-	6.3
Pamphlets, brochures	18.8	37.5	31.3	5.0	-	3.8	6.3
Puppets	17.5	12.5	31.3	42.5	-	2.5	7.5
Newspaper, magazines	12.5	28.8	20.0	25.0	2.5	2.5	7.5

N = 80; Percentages greater than or equal to 35% were highlighted as bold face.

Table 3. Percentage of teachers who never or seldom use modern technologies for the specified reasons.

Type of Technology	Reasons						
	lack of techno.	lack of time	curriculum restriction	lack of interest	lack of confide.	lack of knowl.	crowded classes
Audiotape player/recorder	6.3	12.5	3.8	-	-	-	-
CD player/ Recorder	10.0	7.5	6.3	-	-	-	-
Radio	27.5	17.5	23.8	22.5	-	1.3	1.3
Television	35.0	35.0	13.8	5.0	-	-	5.0
Video player/ Recorder	42.5	25.0	15.0	8.8	-	-	6.3
Telephone	77.5	1.3	5.0	12.5	-	-	3.8
Overhead projector	71.3	12.5	5.0	6.3	-	1.3	3.8
Film Strip	72.5	16.3	5.0	-	-	2.5	1.3
Opaque Projector	87.5	6.3	-	5.0	-	1.3	-
Slide Projector	81.3	10.0	3.8	1.3	-	1.3	1.3
Desktop Computer	70.0	15.0	5.0	-	-	1.3	1.3
Laptop Computer	80.0	6.3	3.8	1.3	-	1.3	1.3
Language Lab	78.8	11.3	3.8	-	-	2.5	1.3
Computer Lab	66.3	15.0	11.3	2.5	-	2.5	3.8
Multimedia Lab	83.8	5.0	2.5	-	12.5	18.8	1.3
Internet/Downloaded Mat	46.3	18.8	8.8	1.3	5.0	6.3	2.5
Data Projector/Data Show	70.0	10.0	6.3	2.5	10.0	6.3	5.0
Interactive Whiteboard	68.8	1.3	-	-	15.8	10.0	-

N = 80; Percentages greater than or equal to 35% were highlighted as bold face.

Table 3 clearly presents that the most common restriction preventing English teachers from using modern technologies in their classes is the lack of technological facilities in schools. This result indicates that schools in North Cyprus are still behind in using modern technologies.

As can be seen from Table 4, majority of teachers perceived textbooks (75.0%) and writing boards (80%) as “good controllers over teaching”. Teachers generally thought that handouts (40.0%), stationeries (32.5%) wall charts, posters, maps (26.3%) and objects and real materials (25.0%) increased motivation of learners in English language classes. Furthermore, flashcards, index cards (35.0%), mounted pictures and photos (32.5%), pamphlets, brochures (12.5%) and newspapers and magazines (16.3%) were rated as contributors to vocabulary development by the teachers who used these technologies regularly.

Table 4. Percentage of teachers who use traditional technologies regularly for the specified contributions.

Type of Technology	Contributions						
	Gives good control over teaching	increases student motivation	promotes meaningful learning	provides interactive context	improves English skills	improves vocabulary development	improves cultural awareness
Textbooks	75.0	20.0	40.0	23.8	27.5	23.8	18.8
Handouts	38.8	40.0	32.5	17.5	17.5	18.8	3.8
Writing Board	80.0	18.8	23.8	8.8	17.5	13.8	2.5
Stationeries	30.0	32.5	20.0	7.5	2.5	1.3	1.3
Magnet Boards	5.0	5.0	1.3	-	-	-	-
Flashcards, index cards	21.3	27.5	13.8	8.8	3.8	35.0	2.5
Wall charts, posters, maps	15.0	26.3	13.8	6.3	5.0	6.3	17.5
Mounted pictures, photos	13.8	18.8	8.8	5.0	10.0	32.5	2.5
Objects, real materials	3.8	25.0	13.8	8.8	5.0	7.5	12.5
Pamphlets, brochures	-	3.8	2.5	2.5	5.0	12.5	10.0
Puppets	-	-	-	3.8	-	-	-
Newspaper, magazines	1.3	5.0	8.8	8.8	6.3	16.3	13

N = 80; Highest percentage for each technology was highlighted as bold face.

As shown in Table 5, 41.3% of the teachers thought that audio tape players increased student motivation and 56.3% of teachers thought that they improved English Language skills. Similarly, according to 43.8% of the teachers, using CD players increased student motivation and 58.8% of the teachers believed that they improved English Language skills. The Internet and downloaded material were thought to provide an interactive context by 20% of the teachers. Contributions to the teaching learning process of the rest of modern technologies were perceived by the teachers to be very little.

Table 5. Percentage of teachers who use modern technologies regularly for the specified contributions.

Type of Technology	Contributions						
	Gives good control over teaching	increases student motivation	promotes meaningful learning	provides interactive context	improves English skills	improves vocabulary development	improves cultural awareness
Audiotape player/recorder	6.3	41.3	22.5	21.3	56.3	18.8	28.8
CD player/ Recorder	8.8	43.8	15.0	22.5	58.8	16.3	30.0
Radio	2.5	10.0	7.5	7.5	11.3	12.5	11.3
Television	1.3	10.0	6.3	5.0	8.8	5.0	6.3
Video player/ Recorder	5.0	13.8	8.8	13.8	13.8	10.0	11.3
Telephone	-	-	1.3	-	1.3	-	-
Overhead projector	3.8	1.3	1.3	1.3	1.3	1.3	1.3
Film Strip	1.3	2.5	2.5	6.3	3.8	3.8	5.0
Opaque Projector	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Slide Projector	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Desktop Computer	6.3	2.5	2.5	7.5	1.3	1.3	1.3
Laptop Computer	5.0	2.5	2.5	5.0	2.5	1.3	1.3
Language Lab	5.0	3.8	1.3	6.3	1.3	1.3	1.3
Computer Lab	2.5	3.8	2.5	3.8	3.8	1.3	1.3
Multimedia Lab	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Internet/Downloaded Mat.	7.5	17.5	5.0	20.0	6.3	6.3	6.3
Data Projector/Data Show	3.8	2.5	1.3	1.3	1.3	1.3	1.3
Interactive Whiteboard	5.0	2.5	-	10.0	-	-	-

N = 80; Highest percentage for each technology was highlighted as bold face.

CONCLUSIONS AND DISCUSSION

This study examined the current status of instructional technology implementation in English Language classes in the middle schools of North Cyprus. The study also aimed at revealing teachers' perceptions of restrictions which limit the use of different technologies. Lastly, the study revealed general perception of teachers about contributions of instructional technology in English Language classes.

Analyses of responses to the questionnaire strongly suggested that the English Language teachers at middle schools of North Cyprus were mostly underutilizing technology in their teaching.

The most revealing finding from data analyses in regard to factors limiting the use of technology was the lack of technological means in schools. A conclusion can come up that middle schools in North Cyprus are seriously deficient in technologies such as television, video player, overhead projector, language lab, computers, the Internet and interactive whiteboard. As most teachers stated however, audio-tape players and CD players are the most common modern technologies found in schools, and high rates of implementation regarding these technologies has been found. This indicates that if modern technologies were supplied to the schools the teachers would try to integrate them into their lessons. Hence, the authorities should seriously make the necessary planning for supplying more technology to the present technology poor schools.

Lack of time was also a prominent factor restricting the implementation of technology for English language teachers. This may mean that being already concerned with covering all the content in the syllabus by the end of the year as proposed by the Ministry of Education and Culture, teachers cannot create additional time for technology to take place in their lessons.

When the analyses of responds to the questionnaire were interpreted, it was found that teachers did not perceive lack of interest, lack of confidence and lack of knowledge as big issues to prevent them from integrating technology into their classes. So, it can be said that, according to teachers' self-reports, they were ready to use technology if they had access to suitable technological equipment and if they were given enough time.

Those teachers that used technology frequently reported that the traditional technologies mostly provided good control over English Language teaching and improved vocabulary development and that the modern technologies provided interactive environment and improved English skills, while both types of technology increased the motivation of students. Hundred percent of the teachers agreed with the statement "Technology helps and improves language learning and should be used more frequently in English language classes". This was among the strongest findings of the study. We can conclude that the teachers are generally positive about technology use in English Language classes and are willing to integrate technology into their teaching.

Suggestions for Further Research

This study investigated the use of instructional technology and several teaching-learning methods at middle schools depending on teachers' responses to the questionnaire. In a future study, classroom observations may be carried out. This will prevent the researcher from relying solely on the responses of the teachers.

A topic for further research may also be an investigation of the correlation between teachers' use of instructional technology and student achievement.

Finally, students' perceptions of the use and effectiveness of instructional technology and methods can be investigated by future studies.

REFERENCES

- Abelle, B. E. (1973) The teaching learning implications of educational technology. *The Journal of Risk and Insurance* 40(4), 607-615.
- Arkin, E. I. (2005). *Teachers' attitudes towards computer technology use in vocabulary instruction*. Unpublished master's thesis. Department of Teaching English as a Foreign Language, Bilkent University, Ankara.
- Çakır, İ. (2006) The Use of Video as an Audio-Visual Material In Foreign Language Teaching Classroom. *Turkish Online Journal of Educational Technology*, 5(4).
- Denson B. (2005). Teacher attitudes toward technology. *Dissertation Collection for Tennessee State University*, Paper AAI3167774. <http://e-research.tnstate.edu/dissertations/AAI3167774>
- Department of Educational Planning and Program Development (2005). *The Cyprus Turkish education system*. Turkish Republic of Northern Cyprus: Ministry of National Education and Culture.
- Dudeney, G., & Hockly, N. (2007). *How to teach English with technology*. England: Pearson Education Limited.

- Fardanesh, H. (2000). The knowledge of skillful execution of instruction. *Electronic Journal of Instructional Science and Technology*, 3(3), 2-7.
- Ferdig, R. E. (2005). Towards implementing technologies in education: Exploring the pedagogy and people of good innovations. *Turkish Online Journal of Educational Technology*, 4(2).
- Forrest T. (1993). Technology and the language classroom. Available technology. *TESOL Quarterly*, 27, 316-318.
- Fraenkel, J. R., & Wallen, N. E. (2006). *How to design and evaluate research in education, sixth edition*. Boston: McGraw Hill.
- Fraley, L.E., & Vargas E.A. (1975). Academic tradition and instructional technology. *The Journal of Higher Education*, 46, 1-15.
- Garrett, N. (1991). Technology in the service of language learning: Trends and issues. *The Modern Language Journal*, 75, 74-101.
- Gömlüksiz, M. N. (2004). Use of education technology in English classes. *The Turkish Online Journal of Educational Technology*, 3(2)
- Harmer, J. (2007). *The practice of English language teaching*. England: Pearson Education Limited.
- Haycraft, J. (1978). *An introduction to English language teaching*. UK: Longman.
- Herron, C., Morris, M., Secules, T., & Curtis, L. (1995). A comparison study of the effects of video-based versus text-based instruction in the foreign language classroom. *The French Review*, 68, 775-795.
- Hubbard, P., Jones, H., Thornton, B., & Wheeler, R. (1983). *Diploma in education graduates' attitude towards communicative language teaching*. New York: Oxford University Press.
- İşman, A. (2002). Sakarya ili öğretmenlerinin eğitim teknolojileri yönündeki yeterlilikleri. *Turkish Online Journal of Educational Technology*, 1(1).
- İşman, A., Yaratın, H., Caner, H. (2007). How technology is integrated into science education in a developing country: North Cyprus case. *Turkish Online Journal of Educational Technology*, 6(3).
- Larsen-Freeman, D. (2000). *Techniques and principles in language teaching*. Oxford: Oxford University Press.
- Lonergan, J. (1984). *Language teaching*. Cambridge: Cambridge University Press.
- Lusty, S. (1969). Educational technology. *Peabody Journal of Education*, 47, 53-56.
- Mayora, C. A. (2006). Integrating multimedia technology in a high school EFL program. *English Language Teaching Forum*, 44(3), 14-21.
- Meskill, C., Mossop, J., DiAngelo, S., & Pasquale, R. K. (2002). Expert and novice teachers talking technology: Precepts, concepts, and misconceptions. *Language Learning & Technology*, 6(3), 46-57.
- Özhelvacı, H. (2003). *Sakarya ilinin ilçelerinde görev yapan öğretmenlerin eğitim teknolojilerini kullanma düzeyleri*. Unpublished master's thesis, Sakarya University, Sakarya, Turkey.
- Salaberry, M. R. (2001). The use of technology for second language learning and teaching: A retrospective. *The Modern Language Journal*, 85, 39-56.
- Secules, T., Herron, C., & Tomasello, M. (1992). The effect of video context on foreign language learning. *The Modern Language Journal*, 76, 480-490.
- Seels, B. B., & Richey, R. C. (1994). *Instructional Technology: The Definition and Domains of the Field*. Bloomington, IN: Association for Educational Communications and Technology.
- Smaldino, S. E., Russell, J. D., Heinich, R., & Molenda, M. (2005). *Instructional technology and media for learning*. Upper Saddle River, NJ: Pearson Education, Inc.
- Usluel, Y. K., Mumcu, F. K., & Demiraslan, Y. (2007). ICT in the teaching-learning process: Teachers' views on the integration and obstacles. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 3, 164-178.
- Warschauer, M. (2000). The changing global economy and the future of English teaching. *TESOL Quarterly*, 34, 511-535.
- Warschauer, M. (2002). Developmental perspective on technology in language education. *TESOL Quarterly*, 36, 453-475.
- Warschauer, M., & Meskill, C. (2000). Technology and second language teaching and learning. In J. Rosenthal (Ed.), *Handbook of Undergraduate Second Language Education*. Mahwah, NJ: Lawrence Erlbaum.
- Wright, A., Haleem, S. (1991). *Visuals for Language Classroom*. UK: Longman.

Appendix: The Questionnaire

Approximately how often do you use each of the following educational technologies in your English classes?
Please specify reasons.

II.A.	TRADITIONAL TECHNOLOGIES					III. I never or seldom use this technological mean, because of	IV. This technological mean that I use regularly contributes to my classes because it
		ALMOST	USUALLY	SELDOM	NEVER		
II.A.1.	Textbooks					III.1.lack of the technological mean III.2.lack of time III.3.curriculum Restrictions III.4.lack of interest III.5.lack of confidence III.6.lack of knowledge III.7.crowded class Other:	IV.1. gives good control over teaching. IV.2. increases student motivation. IV.3. promotes meaningful learning. IV.4. provides an interactive context. IV.5. improves English Language Skills. IV.6.improves vocabulary development IV.7. improves cultural awareness. Other:
II.A.2.	Handouts						
II.A.3.	Writing board						
II.A.4.	Stationeries						
II.A.5.	Magnet boards						
II.A.6.	Flashcards, index cards						
II.A.7.	Wall charts, posters, maps						
II.A.8.	Mounted pictures, photos						
II.A.9.	Objects, real materials						
II.A.10.	Pamphlets, brochures						
II.A.11.	Puppets						
II.A.12.	Newspaper, magazines						

[illegible]

V. In general, do you agree with the statement below?

“Technology helps and improves English Language Teaching and should be used more often in English classes.”

YES	NO

Thank you very much for your cooperation

OPEN SOURCE LEARNING MANAGEMENT SYSTEMS IN DISTANCE LEARNING

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ABSTRACT

This paper presents the major findings from evaluation the most widely used open source learning management systems and identify the most suitable open source e-learning platform. In this study, some analyses and comparisons were made about open source learning management systems the outcome of which was that Moodle was found to be outstanding with many features more than other LMS since it aims to improve the educational quality and include the tools that an e-learning system should have.

Keywords: Moodle, open source LMS, learning management system, distance learning, open source software

INTRODUCTION

In the last decade, the effect of Internet usage in education has increased gradually and new technologies have improved students' learning. The tremendous improvements in information and communication technologies and increase in the use of internet brought lots of opportunities to different fields and especially to Instructional Technologies. Based on these new technologies, learning environments are able to provide a wide range of educational alternatives for learners. Distance learning is one of these alternatives which became attractive where students and instructors are physically in different locations and time (Ozkul, 2003). By using distance learning tools, their education can be more flexible with respect to place and time constraints. Thus, students can access information any time and anyplace, such as either in libraries or during lectures.

As is widely known, distance learning is costly, and cost-effectiveness becomes more important as the institutions become large-scale providers of distance education. In relation to this, Miller R.L (1990) states that, more and more educational institutions and companies are adopting distance learning methods to train and develop their employees because it delivers more training to a wide range of people for the least cost. What is more, studies show that, it is also effective through including e-learning tools, which reduce the learning time requirements by an average of 50 percent (Miller, 1990) and the retention rate of trainees is greater with e-Learning rather than a solely classroom based model (Miller, 1990). Throughout the distance learning process, Learning Management Systems (LMS) also known as the Virtual Learning Environments (VLE) or Learning Platforms have a significant role. Hall (2003) defines an LMS as: "software that automates the administration of training events. All Learning Management Systems manage the log-in of registered users, manage course catalogs, record data from learners, and provide reports to management." The definitions of LMS systems and related terms encountered in this article are discussed in further detail in the Paulsen, (2002).

In many organizations LMSs are being used to support and improve learning. According to Observatory on Borderless Higher Education (2002), some higher education institutions continue to develop in-house systems or buy into open source alternatives, but an ever-larger majority is purchasing licenses for proprietary platforms. In another study that supports the results of Observatory on Borderless Higher Education (Paulsen 2003) shows that, many institutions find it quite easy to start with a commercial LMS, but they face many problems such as; linguistic, assessment tools, suitability to target groups and pricing. However, open source LMS may have an impact on the future of the LMS market with its cost effectiveness and advanced features.

Open Source Software

In a distance learning process, open source software can be used in many different phases such as application software that performs learning content preparation and in LMS which provides learning content presentation in a web based environment and as web server software (APACHE e.g.).

Due to the advantages of distance learning, schools and companies are adopting these new learning technologies and increasing their investments in it. However, along with the advantages, installation and support costs appear to be big disadvantages compared to a traditional learning environment. These disadvantages can be reduced to a great extent by the use of open source software which provides further gains. OpenOffice, StarOffice, KDE

Office, GNU Office software, which are under open source content authoring tools, are among the most widely used content preparation tools.

Statistical studies show that open source web server software is again found mostly preferred and widely used in learning content presentation in a web based environment such as (Netcraft Survey, 2008). Figure 1 shows that open source application and web server software are used in an open source e-learning system.

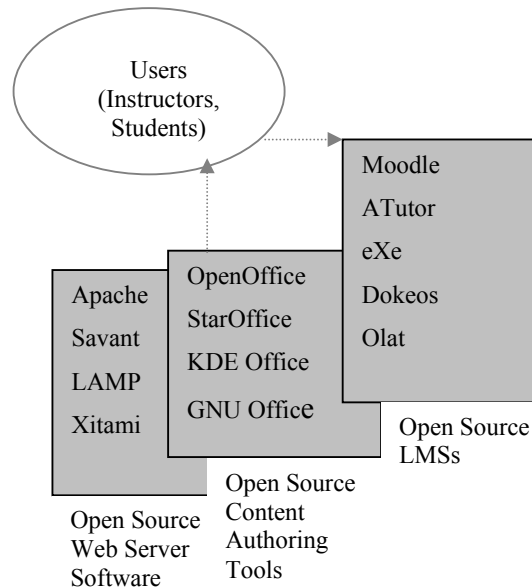


Figure 1. Open Source Application and Web Server Software

Advantages of Open Source Software

Most debated advantages and disadvantages of open source (OSC) software are; total cost, other financial and forensic subjects (Okmen, 2008).

Advantages of using OSC software can be summarized as follows (Okmen, 2008):

There is no single feature on which the future of the software depends: Open source architecture enables the user to take away the software company dependency risk that originated the code chosen to stop development and increase maintenance and development fees.

Confidence:

Popular OSC software is examined by many developers and software experts so; it is filtered and cleaned of errors. In this way, with the increase in quality, the fundamental aim of software production and the process of usage, Users confidence in the software increases.

Sensitivity and flexibility for User Requirements:

OSC software is often updated more frequently than proprietary software. Most of the time, these changes reflect the needs of the user and the developer community.

The Support of Innovation:

The Production process of OSC software is improved by a broader range of diverse and creative ideas. In this way, each developer has equal rights to reflect his own innovative thoughts to the product.

Security:

OSC software provides security according to the level of user requirements but usually not at the level of commercial software. Users with commercial software do not have access to the underlying contents of the code, so they do not have a definite knowledge of their security.

In a study of Computer Science Corporation (CSC), total cost of ownership has been defined after the comparison between OSC software and proprietary software as follows (Republic of Turkey State Planning Organisation, 2005):

- Hardware costs (contains purchasing cost and maintenance).
- Direct software costs (contains purchasing cost, support and maintenance).
- Indirect software costs (especially license management).
- Personnel costs.

- Supporting costs.
- Breakdown period costs.

Requirements for Learning Management System in an E-Learning Process

A learning management system is defined as software that has been used in a learning content presentation which has a significant role and complexity in e-learning environment. An advanced e-learning system has to comply with the following requirements (Kis, 2007; Kritikou, P. Demestichas, Adamopoulou, K. Demestichas, Theologou&Paradia, 2008):

- Compatibility and the ability to work with other LMS.
- Content management ability such as Electronic filing and file management,
- How the learning content is created and managed as a “learning object”,
- Reusability of the content (Content compatibility like Scorm, AICC, IMS),
- Rapid content creation, distribution, integration and authorizing tools,
- Support for the tools using in content creation such as (Dreamweaver, Flash, Word, PowerPoint),
- Performance and extendibility of the environment,
- Multi-Language Support

In the light of the features mentioned above, when these headings are analyzed in detail, as shown in tables below, the analysis shows that the success rate and the rate of wide-spread usage goes up in similar order to the number of these features included in the LMS,. These features can be listed as follows:

- Creating content in different input format (Scorm, IMS Content Package, MPEg file, Office file, JavaScript, PHP),
- Including tools for content development and management of content installation (Modular Structure),
- Database support,
- Advanced search and header hiding ability,
- XML support to work with different systems,
- Compatibility with industrial standards (AICC and SCORM e.g.),
- Video Conferencing support,
- Exam module, Online exam (test based question preparation),
- Student education process prosecution,
- Multiple language support,
- Calendar,
- Backup support,
- Chat tool,
- Whiteboard,
- Group work, debate forums,
- Ease of system installation,
- Survey adding,
- System requirements (the less the requirements are the easier it is to set-up).

Methodology

Comparisons of open source LMSs were conducted for this study. In particular, the purpose of these comparisons is two-faceted. One is to analyze general features of open source LMSs considering the requirements of an LMS in an e-learning process. The other purpose is to conduct comparisons of these features among the mostly preferred four LMSs.

Instruments

Qualitative research technique for data collection was employed. Comparative and contrastive observational approach was the method for this regard. The mostly preferred four LMSs are selected among from fifty free and open source LMSs on the web site of UNESCO (Website of United Nations Educational, Scientific, and Cultural Organization, 2008).

Data Analysis

The selected LMSs are analyzed according to the requirements of an LMS in an e-learning process mentioned above. The features of three LMS's (have been analyzed by using the full access versions reached from their web sites and a detailed analysis carried out by creating courses on each LMS. Each feature is divided into sub-categories including:

- General aspects
- Didactic functionality
- Productivity tools
- Communication tools
- Technical flexibility
- Usability are analysed in details. For each criterion a check-list of the aspects observed and each overall criterion is presented with a brief discussion by using summary tables. Taking the advantages of the trials on usage in different projects has been used to prepare the following table for one LMS only.

RESULTS AND DISCUSSION

In this part a comparative and contrastive study of LMSs are visualized according to their features and the results of the process are set out in summarized tables of comparisons. In Table 1, it can be analyzed that all LMSs have sufficient support and compatibility to standards.

Table 1: General Aspects

	OPEN SOURCE LEARNING MANAGEMENT SYSTEM	MOODLE	ATutor [6]	DOKEOS [7, 8]	OLAT [9]
GENERAL ASPECTS	Support and Compatibility to Standards (AICC, SCORM)	Scorm and IMS Content Package support.	Scorm and IMS Content Package support	Scorm and IMS Content Package support and the ability to import different LMS courses that are in Scorm Format.	Scorm, IMS Content Package and QTI support
	Including content development and content authoring / editing tools, modularity.	There is Html based content editor. Course pages can be edited as Html pages and new applications can be added as a module.	There is Html based content editor. Does not have a modular structure.	There is Html based content editor. Does not have a modular structure.	There is Html based content editor. Does not have a modular structure.
	Backup Tools	System can get backup automatically in required time and date. Every module can be backed up separately.	All course content can be backed up manually. Modules can not be backed up separately.	All course content can be backed up manually. Modules can not be backed up separately.	All course content can be backed up manually. Modules can not be backed up separately.
	User Authentication	Rather than its own database, the data can be held in different servers such as; LDAP, IMAP...	User passwords held in its database.	User passwords held in its database.	User passwords held in its database.

When the items are analyzed under General Aspects, Moodle is the only LMS which has wider options with different access possibilities, modular structure, and advanced backup tools.

Table 2: Didactic Functionality

	OPEN SOURCE LEARNING MANAGEMENT SYSTEM	MOODLE	ATutor	DOKEOS	OLAT
DIDACTIC FUNCTIONALITY	The follow-up of student's learning processes	Visited links, contents, sources and all activities done by visitors can be seen with date details.	Visited links and content usage by user can be seen statistically.	Visited links and content usage by user can be seen statistically.	Visited links, contents, sources and all activities done by visitors can be seen with date details
	Online Exam	10 different types question support. Exams can be prepared according to time, date and duration constraints. Includes "Secure window" option for exams.	8 different types question supports Exams can be prepared according to time, date and duration constraints. Does not exist	6 different types question supports Exams can not be prepared according to time, date and duration constraints. Does not exist	4 different types question supports Exams can not be prepared according to time, date and duration constraints. Does not exist
	Multiple Input Supports (Multimedia etc.)	There is Scorm, IMS Content Package, mpeg, mov, mp3, flash, Office file, JavaScript based content support.	There is Scorm, IMS Content Package, Office file, mpeg, mov, mp3, flash support.	There is Scorm, Office file, IMS Content Package, mpeg, flash support.	No Multimedia support.
	Video Conference Support	Exists. Also holds "White Board" application. (For Moodle version 1.6 and upper WiziQ live Class Module exists)	Does not exist	100 users can connect at the same time and "White Board" application does not exist (Not Free).	Does not exist

In Table 2, the LMSs are analyzed according to their didactic functionality. Comparisons show that, Moodle and OLAT have the ability to view full user logging and tracking and activity reports for each student are available with graphs and details about each module (last access, number of times read) as well as a detailed "story" of each student involvement including postings etc. on one page.

Moodle and ATUTOR have an advanced online exam module with time, date and duration constraints. As shown in Figure 2, with advanced exam and assessment modules, educators can create questions in many formats such as; Multiple-choice questions supporting single or multiple answers, Short Answer questions (words or phrases), True-False questions, Matching questions, Numerical questions (with permitted ranges), Embedded-answer questions (close style) with answers within passages of text. The answer to each question includes separate feedback.

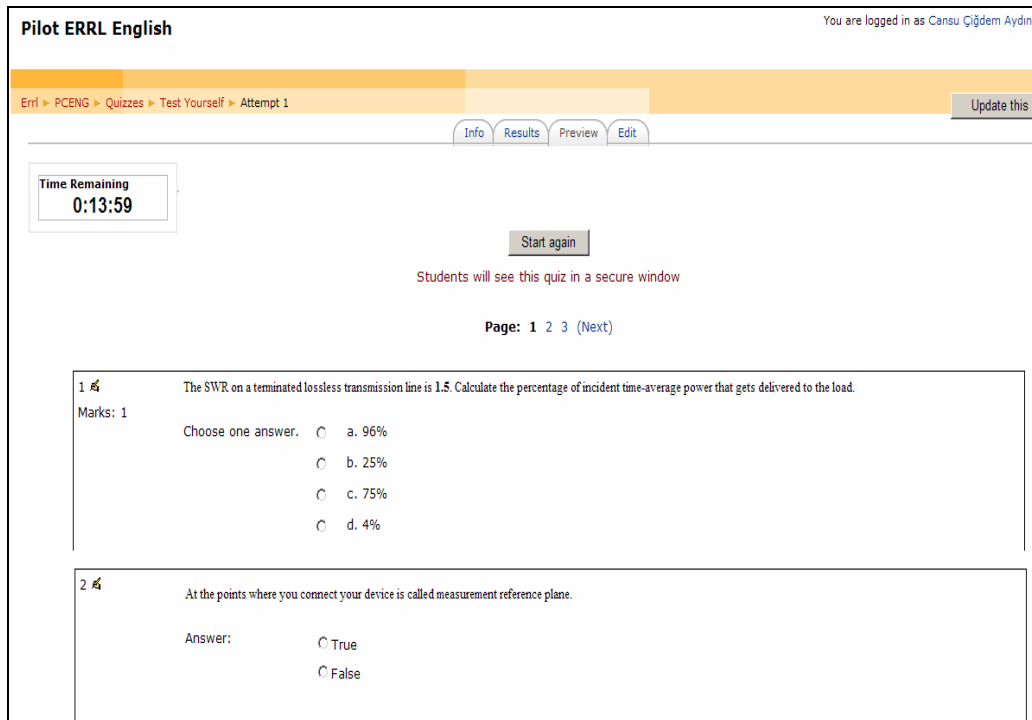


Figure 2. General Look of an Exam Module

The functionality of the multiple input supports in the LMSs adds a significant value especially to language teaching and it supports learning content variety for students having different learning styles.

When the support option of video conferencing is analyzed within the LMSs, only Moodle and Dokeos have the “video conferencing” support. By the use of video conferencing tool, virtual class application can be performed by using tools such as; online chat, file transferring (.pdf, .swf, .doc, .docx, .xls, .xlsx, .ppt, and .pps), white-board application, two side video and voice transfer on a specified date and time. A screenshot from mentioned application can be seen in Figure 3.

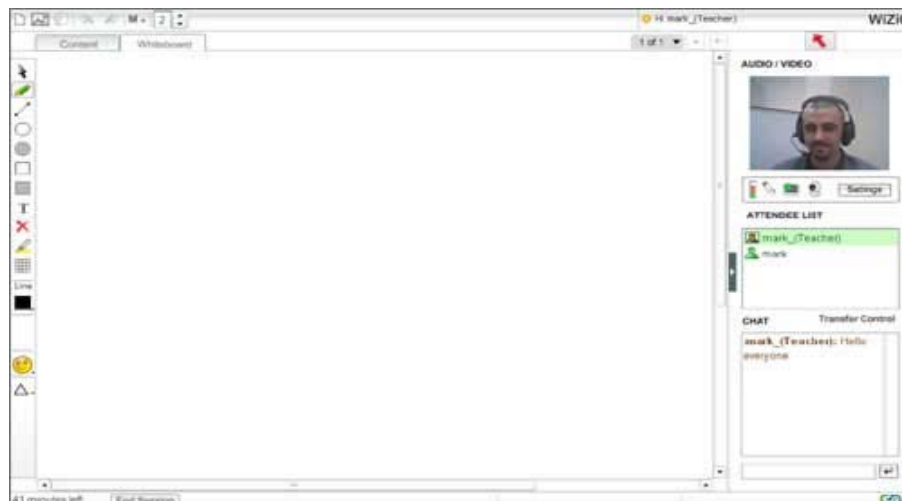


Figure 3 Video Conference and White Board Application Screen Shot

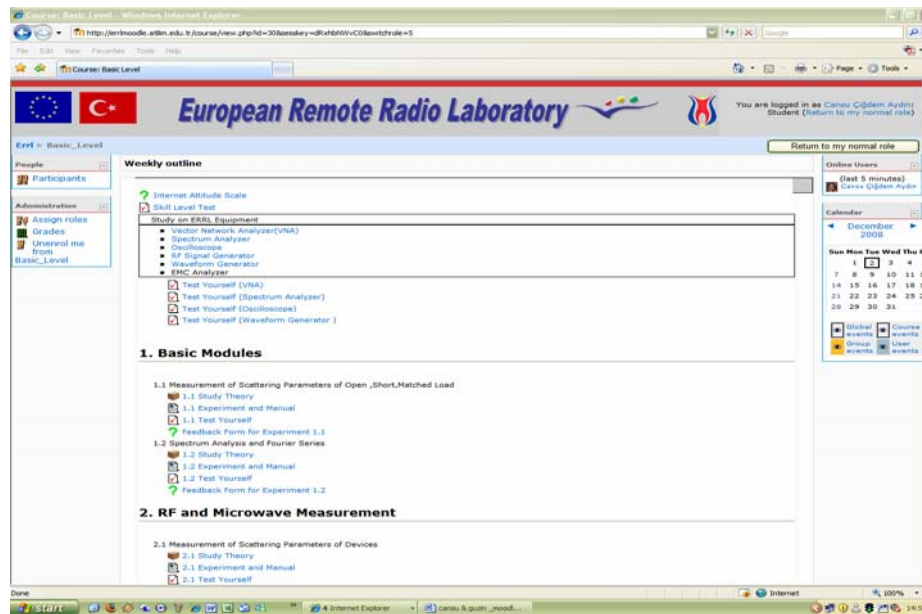


Figure 4. Weekly Course Schedule

Table 3: Productivity Tools

	OPEN SOURCE LEARNING MANAGEMENT SYSTEM	MOODLE	ATutor	DOKEOS	OLAT
PRODUCTIVITY TOOLS	Online Help and Documentation	Installation and maintenance documents can be reached from Moodle.org and different sites.	Not enough installation and maintenance documents	Includes only flash based installation and introduction documents on their home site.	Not enough installation and maintenance documents except their home site.
	Calendar	Course can be followed on calendar. Courses can be arranged weekly.	Does not exist	Does not exist	There is a calendar that can be used as agenda.

As a productivity tool, except for Moodle, the other LMSs do not have a sufficient online help and documentation files. In Moodle, the course can be followed from the calendar day by day and educators can put discussions and course activity on special dates where the system can check these dates and synchronize course dates according to the corporate calendar.

Table 4: Communication Tools

	OPEN SOURCE LEARNING MANAGEMENT SYSTEM	MOODLE	ATutor	DOKEOS	OLAT
COMMUNICATION TOOLS	Survey and forum support	Exists	Exists	Exists	Exists
	CHAT and GROUP WORK	Includes chat and group creating tools. Each user can work in his/her own group.	Includes chat and group creating tools. Doesn't exist Doesn't exist	Includes chat and group creating tools. Doesn't exist Doesn't	Does not include chat and group creating tools. Doesn't exist Course content

		Doesn't exist		exist	can be separated according to groups
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As a learning communication tool, Moodle LMS owns debate forums, file transfer, e-mail, calendar and white board and real time chatting options. In Moodle, students can also do research in discussion and debating forums.

Table 5: Technical Flexibility

	OPEN SOURCE LEARNING MANAGEMENT SYSTEM	MOODLE	ATutor	DOKEOS	OLAT
TECHNICAL FLEXIBILITY	XML support	Exists	Exists	Does not exist	Does not exist
	System Requirements	Apache, MySQL, PHP	Apache, MySQL, PHP	Apache, MySQL and PHP.	Java 1.5, Tomcat 5, MySQL 4.1, Apache 2.0 and OpenFire 3.3

XML support option in software adds a technical flexibility providing a basic syntax that can be used to share information between different kinds of applications. As shown in table 5 above, Moodle and Atutor have the XML support. When system requirements are analyzed, OLAT is the only LMS having a difficult installation process because of the program requirements.

Table 6: Usability

	OPEN SOURCE LEARNING MANAGEMENT SYSTEM	MOODLE	ATutor	DOKEOS	OLAT
USABILITY	Multiple Language Support	77 different foreign language supports. Easy navigation between languages.	64 different foreign language supports Not available	5 different foreign language supports (fully translated languages) Not available	14 different foreign language supports Not available
	User Interface and ease of usage	Extremely good. According to their profile, users can change their information and menus with a user interface that gives opportunity to design. Themes/skins allow for easy font/color/layout, etc. to suit local needs	Owens a good menu design. Very sleek, easily modified by individual user (e.g., menu locations, icons vs. text, font, colors)	Owens a good menu design.	Owens a complicated menu design.
	Frequency of Usage	73.000 registered users	23,925 registered users	600 registered organizations	150 registered organizations

Language is an important issue having an impact on the selection and use of LMS systems according to Paulsen's data (Paulsen, 2003). With the 77 language support, and the numerical data in the frequency of usage as shown in Table 6 proves why Moodle is the most preferred open source LMS.

CONCLUSION

In this study, open source LMSs were analyzed and it was observed that Moodle LMS among other LMSs, include many features that improve pedagogical quality and many needed tools that an e-learning system should have.

On the other hand, all three LMSs offer sufficient basic functions for their use as an LMS in an educational organization. However, Moodle appears to present a clear advantage practically in all the features compared. Briefly put, these are:

- (1) The modular design of the Moodle environment guarantees its flexibility: depending on the modules employed, it can lend support to any type of teaching style or educational mode.
- (2) A further asset resulting from its modular design and its greater attention to user interface is Moodle's superior rate of usability, compared with its competitors. In the case of the environment, the fact that it has a wider range of options does not make its use more complicated at all.
- (3) A wider range of user authentication options, ease of installation and maintenance in Moodle increase the frequency of usage.

All in all, it is possible to state that; due to the fast improvements of distance-learning, generalization of the use of open source software would provide the development of learning tools and educational quality. Also, the cost, which is the biggest advantage of e-learning rather than traditional learning environments, is removed by the use of open source e-learning tools.

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REFERENCES

- Garrett, R. (2002). Leading Learning Platforms: International Market Presence, March 2009, retrieved January, 2002 from Observatory on Borderless Higher Education Web site:
http://www.obhe.ac.uk/documents/view_details?id=575
- Hall, B. (2003). New Technology Definitions, retrieved August 5, 2003 from
<http://www.brandonhall.com/public/glossary/index.htm>
- KIS, M. (2007). Upon Learning Management Systems. Retrieved July 10, 2007, from
http://kodveus.blogspot.com/2007_03_01_archive.html
- Kritikou, Y., Demestichas, P., Adamopoulou, E., Demestichas, K., Theologou, M., Paradia, M., (2008). User Profile modelling in the context of web-based Learning management systems. *Journal of Network and Computer Applications* 31(4), 603–627.
- Miller, R. L, Learning Benefits of Interactive Technologies, Multimedia and Videodisc Monitor, February 1990, 14.
- Netcraft Survey, Retrieved December 25, 2008, from
http://news.netcraft.com/archives/2009/01/16/january_2009_web_server_survey.html
- Republic of Turkey State Planning Organisation. (2005). The applicability of Open Source Software in public agencies (1st ed.). Ankara, DC: Information Society Department.
- Okmen A.K., (2008), Yazılım Telif Hakları ve Özgür/Açık Kaynak Kodlu Yazılım (Software Copyright and Free/Open Source Software). Retrieved March 10, 2006, from
<http://members.comu.edu.tr/kemal/doc/oakky.pdf>

- Ozkul, A. (2003, May). E-Öğrenme ve Mühendislik Eğitimi (E-Learning and Engineering Education), Paper presented at the meeting of the Elektrik, Elektronik, Bilgisayar Mühendislikleri Eğitimi 1. Ulusal Sempozyumu (First National Symposium on Electric, Electronic, Computer Engineering Education) Ankara, Turkey.
- Paulsen, F. M. (2003). Experiences with Learning Management Systems in 113 European Institutions, *Educational Technology & Society*, 6 (4), 134-148.
- Paulsen, M. F. (2002). Online Education Systems in Scandinavian and Australian Universities: A Comparative Study. *The International Review of Research in Open and Distance Learning*, Volume 3 (2), 152-167.
- Website of Atutor Demo Version, Retrieved December 15, 2008, from <http://www.atutor.ca/atutor/demo.php>
- Website of Dokeos Demo Version, Retrieved December 15, 2008, from <http://www.opensourcecms.com/elearning/dokeos/admin.html>
- Website of Moodle, Retrieved December 5, 2008, from <http://www.moodle.org>
- Website of Olat Demo Version, Retrieved December 15, 2008, from <http://demo.olat.org/demo/dmz/>
- Website of United Nations Educational, Scientific, and Cultural Organization, Retrieved October 14, 2008 from Free & Open Source Software Portal http://www.unesco-ci.org/cgi-bin/portals/foss/page.cgi?g=Software/Courseware_Tools/index.html;d=1

THE DEFINITIONS AND PREFERENCES OF SCIENCE TEACHER CANDIDATES CONCERNING WEB 2.0 TOOLS: A PHENOMENOLOGICAL RESEARCH STUDY

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ABSTRACT

Web 2.0 tools are becoming more popular day by day and various Web 2.0 applications are encountered in both daily life and educational environments. Since Web 2.0 tools do not require any technical knowledge in terms of either usage facilities or content development, they are preferred by both professional and novice computer users. With the help of facilities like the access to the content in any time and place; reading, regulating and changing the content with any web browser; Web 2.0 applications have taken a lodge in educational environments. The current study investigates how senior students at a science teaching department in a university define Web 2.0 tools. Phenomenological research method has been adopted and the data related to Web 2.0 tools which were obtained through the definitions of teacher candidates have been analyzed. Results indicated that while the participants defined forum, wiki, blog and social web applications easily, they had difficulty in defining the social bookmarking and RSS (Really Simple Syndication) applications.

INTRODUCTION

The recent changes on the Internet world have been illustrated by different writers in different ways. With the emergence of interactive IT capabilities such as the Internet and WWW, business and knowledge exchange have become very strongly interrelated (Shaohua & Peilin, 2008). Web 2.0 tools, Web 2.0 environment, Web 2.0 technologies or Library 2.0, Health 2.0, Education 2.0 are the names developed for various applications that provide the possibility of interaction with site and content for the users of Internet technologies. Web 2.0 is not a uniform concept, but a generic term or metaphor for new internet technologies and applications (Kool & Wamelen, 2008). The read / write web, encompassing weblog's, social bookmarking, wiki's and other technologies are often seen as key aspects of what is understood by Web 2.0, marking a distinctive shift from earlier, supposedly less participatory, web technologies (Roberts, 2009). Together with Web 2.0 tools, Internet users' relationships with the Internet and the usage patterns have significantly changed. Web 2.0 is a term used to herald the second wave of the World Wide Web, one that allows individuals to publish, collaborate and share experiences with other like-minded individuals or groups (Shaohua & Peilin, 2008). "Web 2.0" is not a technical noun but more suitable to be a collective concept describing the technical features and social behaviors of some of the famous Web 2.0 websites (Hsieh, Kao & Yuan, 2008).

Considering the first days of the Internet, while software specialists produce and upload the web sites to server computers and Internet users access information by visiting the sites they are familiar, even the most inexperienced users of Internet can upload content to web sites and share them through Web 2.0 applications. There are a number of web services or applications which are considered as the key concepts in Web 2.0 (Aharony, 2009). The followings can be counted among those concepts; Blogs, Wikis, Social Networking Tools, Social Bookmarking, Web Office Tools, Online Photo Sharing, Podcasting, RSS (Really Simple Syndication) and Online Hosted Video and Mashups and API's web 2.0 (Rethlefsen, Mary & Prince, 2009; Lai & Turban, 2008).

The main characteristic of these tools called Web 2.0, is users' active participation in the content creation process (Koçak-Usluel & Mazman, 2009). With the spread of Web 2.0 tools on the Internet, the Internet users have the opportunity to interfere with any content and write their opinions about the content. As the Web 2.0 tools take part in a broad portfolio, various applications present various facilities to users.

As an umbrella term for an emerging core of technologies, trends, and principles, Web 2.0 is not only changing what's on the Web, but also how the Web works (Lai & Turban, 2008). Being attached to the Web 2.0 tool used, the users have a variety of rights about interacting with the content. While the users have no right to interfere with the content in blog applications, the content is completely formed by the site users in wiki and Social Bookmarking applications.

Web 2.0 environments include social and business networks, and it is influencing what people do on the Web and intranets, individually and in groups (Lai & Turban, 2008). Central to Web 2.0 is the concept of social environments that have been breaking down barriers for sharing information efficiently (Shao, Daley, & Vaughan 2007).

With Web 2.0 tools, the users are freed from the obligation of reading the content passively or communicating with the content producer by e-mail. Whoever the content may be developed by, the users are able to make direct interference to the content with the proceedings like deleting, changing or adding. On the other hand, they can add interpretation to the content and alter the content into some other form. Rather than focusing on the introduction of the new technology, Web 2.0 aims to facilitate sharing and collaboration among users (Shao, Daley, & Vaughan 2007). Web 2.0 has become popular in a short time because it enables the information sharing and web broadcasting without requiring technical skills. The usage of Web 2.0 is not popular only among Internet users, but also among academicians and they have become the most frequently used tools.

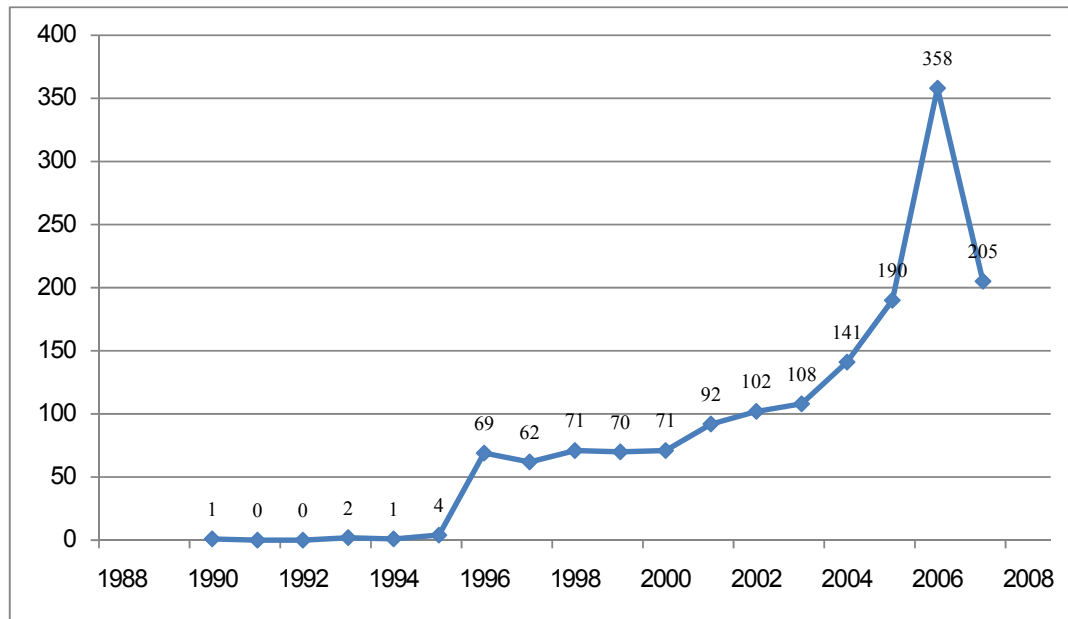


Figure 1. The annual distribution of Web 2.0 publication numbers (Reference: Chu & Xu, 2009)

As it can be seen from the researches of Chu and Xu (2009) concerning Web 2.0, the academic studies about Web 2.0 tools have been seen in literature since the mid 90s and have risen through mid 2000s. Web 2.0 tools find place in a broad area from informatics to medicine, from library research to educational sciences. Web 2.0-based tools provide convenience for learners' participation and interaction (Tan, 2008). Some of the Web 2.0 tools are defined below.

Forum technology is generally the technology, which is configured as subjects and their sub-questions and gives the opportunity to the users to write messages in the determined subjects and sub-questions and respond to the messages written. Forum technology is the technology, which is constructed in a way to show the messages according to the entrance order. Forum users can not only configure the messages on their own but also by the quotations from the former messages while they respond to a message.

A blog or weblog is a web site that works in the same way as a diary, with the exception that the other users who visit it can give their opinions on what the blog owner writes, who may accompany his/her comments with photos, links and videos (Rubio, Martin & Moran, 2007). Blog technologies are configured in a way to show the last entered blog post firstly. While blog entries can be depicted in the opposite order in accordance with the date order depending on the blog owner's adjustment, the entries which are categorized under different categories can be depicted with the help of category choice. While blogs can only be updated by their owners, blog visitors can contribute to the development of the blog by writing comments on the blog entries. For instance, a blog tool with RSS feeds can be used as a replacement for a mailing list and allow more effective communication between students and teachers (Orehovacki, Bubas & Konecki, 2009).

Wikis are also popular tools of Web 2.0, which are suitable for reference and information services in medical library and information centers. The collaborative nature of wiki provides opportunity for instantaneous revision as well as to develop an efficient repository of new information (Gavgani & Mohan, 2008). In sites where Wiki substructure is used, the users do not only read the content. They also can contribute to the processes of examining and rearranging the content. Additionally, since the sites that use Wiki substructure provides the

opportunity to its users to reach the content, read the content and arrange it without requiring any extra program, they can be used easily by any users regardless of their Internet experience. Wikis are websites that can be edited by anyone who has access to them, while blogs are online multimedia personal logs that can be commented on by other users (Kaldoudi, Bamidis, Papaioakeim & Vargemezis, 2008).

Social networking sites are set up to provide individuals with a means for communicating and interacting with one another (Timm & Duven, 2008). After becoming member to social networking sites, the users can message to other users of the site, write messages on their walls and share objects like voice, video and picture. A social network is a configuration of people connected to one another through interpersonal means, such as friendship, common interests, or ideas (Coyle & Vaughn, 2008). Social networking websites enable not only the users who are familiar with each other, but also the ones who have similar fields of interest although they do not know each other, to meet and communicate by the constitution of different groups.

Social bookmarking is another Web 2.0 application. It allows users to create common lists of 'favourites' and to store them on a remote server, so that the list can be shared with other users of the system (Aharony, 2009). With social bookmarking applications, users can easily see the addresses on the sites entered by other users who have similar fields of interest and they can easily go to the sites. Social bookmarking services – provide a way for users to store, categorize, and share their Internet bookmarks. Bookmarks can be either public or private (usually public by default) and users are encouraged to 'tag' them with keywords, of their choosing, to facilitate their cataloguing and retrieval by themselves for other users (Kennedy et al., 2007).

RSS, as originally conceived, is a method for publishing timely and concise information on the Internet, for example, about the main stories in a news site or the latest postings in a blog (Thelwall, Prabowo, & Fairclough, 2006). The sites like news and blog sites, which are often updated by RSS technology broadcast news summary or short information related to blog entries via RSS and Internet users can read the RSS files by RSS reading tools. Among the greatest advantages of RSS technology is that it provides the opportunity for users, who follow more than one news site and/or blog site to save the RSS addresses of the sites they read to the program by RSS reader and follow the latest news without visiting the sites.

Podcasts are repositories of audio and video materials that can be "pushed" to subscribers, even without user intervention. These audio and video files can be downloaded to portable media players that can be taken anywhere, providing the potential for "anytime, anywhere" learning experiences (mobile learning) (Boulos, Maramba, & Wheeler, 2009). Although podcast applications are perceived like video sharing together with popular applications like YouTube, podcast requires a privatized broadcast concept as content. Podcasting is a method of digital recording of audio or video files and their distribution over the web. Its main advantage is the possibility for students to download certain content of their interest from specialized web services and reproduce them with a device of their choice whenever they want (Orehovacki, Bubas, & Konecki, 2009).

Web 2.0 is widely considered one of the most important contemporary developments in the context of the World Wide Web (Ketterl, Mertens, & Vornberger, 2008). Web 2.0 aims to enhance creativity, information sharing and collaboration among users (Chakravarthy & Barde, 2008). With the rapid development of network technology, we have entered a new era of networks, our learning style and the concept of education have undergone a major transformation (Fan, Wang, & Liao, 2008). Regardless of the fact that students as members of the digital generation can adopt new technologies much faster than other groups of learners (Orehovacki, Bubas & Konecki, 2009).

PURPOSE

Since the usage of Web 2.0 tools is becoming more popular among students, teachers and academicians who use the Internet for various purposes, the aim of this study is to determine how science teacher candidates define the Web 2.0 tools they use in their educational settings and which of these tools they expect to use during their own teaching.

METHOD

Phenomenological research approach from the qualitative research methods has been adopted as the research method. Daymon and Holloway (2002, 153) stated that at the core of phenomenology is the study of people's worlds along with their subjective experience of their personal, everyday lives. They characterized phenomenological research as below (2002: 153);

- Researchers consciously suspend, or bracket, their own assumptions so they can see through the eyes of participants,
- Sample sizes are usually small,

- In phenomenological research, you try to make sense of a phenomenon according to participants' own terms, identifying the essence or 'real' meaning of the phenomenon under investigation.

In phenomenology, foundational question is "What are the meaning, structure and essence of the lived experience of this phenomenon for this person or group of people" (Patton, 1990). Phenomology as a method looks at the lived experiences of those who have experienced a certain phenomenon (Lichtman, 2006). Todres (2005) described phenomenological research through the following components:

- The researcher gathers detailed concrete descriptions of specific experience from others,
- The researcher adopts the attitude of the phenomenological reduction in order to intuit the intelligibility of what is given in the experience,
- The researcher seeks the most invariant meanings for a context.

Working Group

As the purpose of this study was to determine how science teacher candidates defined the Web 2.0 tools, science teacher candidates at Sakarya University, Faculty of Education, Department of Science Teaching in the 2009 Fall and 2010 Spring were foreknowledgeed about the research, and they were asked whether they would like to join the study voluntarily. Sixty teacher candidates responded to this request and they were selected as the research group.

Data Collection and Analysis

Research data were obtained through the semi-structured form developed by the researcher. Web 2.0 applications stood in the forefront were searched through a literature review and six Web 2.0 tools were determined: Forum, Wiki, Blog, Social Network applications, RSS and Social bookmarking. Within the context of the research, the participants were asked to define those six Web 2.0 tools. Additionally, with the seventh question in the research, the participants were asked to write which one/s of those tools they were expecting to use when they became teachers along with the reasons to use them. The semi-structured form was given to teachers to be filled and they were asked to make the definitions about Web 2.0 tools.

No informed meeting or education was performed with the students as they tried to define the status in the research. The students were asked to write their knowledge about Web 2.0 tools on the form. Descriptive analysis was applied to the data. During the analysis, as Yıldırım and Şimşek (2008) indicated, a frame was constituted in the light of the participants' definitions. Then, the data were processed in accordance with the thematic frame, the findings were defined and interpreted.

Although the digitization of the data in the qualitative research is not much preferred, the number of the people writing answers like "I have no information", "I have no idea", "I have no opinion about this subject" concerning Web 2.0 tools in the form was very high. The questions, required to be defined in the form and yet being left unanswered with the statements indicated above and the participants who did not answer those questions are given as numbers.

Findings

The number of the unanswered questions regarding Web 2.0 tools or the number of participants who gave responses like "I have no information", "I have no idea", "I have no opinion about this subject" or who did not state an opinion are given in Table 1.

Table 1. The number of participants who did not provide a definition for Web 2.0 tools

Question	Unanswered number	response
How do you define the concept of forum?	9	
How do you define the concept of blog?	30	
How do you define the concept of Wiki?	21	
How do you define the concept of Social Network?	1	
How do you define the concept of Social Bookmarking?	56	
How do you define the concept of RSS?	51	
Which one/s of these tools defined above would you use when you become a teacher?	7	

Examining the Table 1, it is indicated that the participants could write definitions more easily to Web 2.0 tools they used in their daily lives and that they could not define the tools that they did not use very often. It is seen that the fewest responses were for the question regarding Social Network. Since the majority of the participants used sites like Facebook and MySpace, the participants did not have difficulty in defining the concept of Social

Network. Web 2.0 tools which are left unanswered most by the participants were the concepts of Social Bookmarking and RSS. Since Social Bookmarking is a concept which is not generally used in Turkey, it is left unanswered; the concept of RSS is considered to be left unanswered since it evokes the estimation that it requires technical knowledge by the users although it is commonly used on the Internet.

Table 2. The themes regarding the definition of the Forum concept

Information sharing	32
Other sharing	18
Discussion, Conversation	18

The first research question, directed at the participants within the context of the research was “How do you define the concept of Forum?” The themes revealed are given in Table 2. It is seen that the subject of sharing is intensively emphasized. The subject of sharing is separated into two themes as information sharing and other sharing in accordance with the answers of the participants.

The participants indicated the concept of Forum more as a tool used for the purpose of sharing some certain opinions of the individuals without focusing on a definite subject. The direct quotations are as follows:

“Where everyone writes their opinions on a definite subject...”

“Forums are Internet sites, where personal opinions are exhibited. Personal opinions about a subject are presented. People help each other about the subjects, they are interested in. They share information. ...”

“They are the sharing sites, where various topics are discussed and people present their own opinions. ...”

“It is a site, where several people integrate, share, get information, and share information in accordance with the fields of interest in the direction of a common purpose. ...”

“...certain Sharings made...”

Participants specified the concept of forum as an environment used for sharing facts and objects other than knowledge. The direct quotations are as follows.

“Forums are places where pictures, videos, writings, etc. are shared by people amateurish. ...”

“There are forum web sites... sharings like picture, video, etc. happen. ...”

“... They are online environments where sharings like information, photograph and video are made and where comments could be made via sharing's. ...”

“It is a site ... which is founded on a definite subject with sharings. In this site, there could be topics like information sharing, video, discussion related to the subject.”

Participants indicated that the forums are established and used for the purposes of sharing information and other facts and objects, as well as for conversation. The direct quotations from the definitions are as follows.

“Forum is a web database that generally gives the opportunity for discussion and conversation in various areas of network base usages. Although its purpose of use is generally communication via net...”

“... The purpose of use is; to apply to various views about the subject.”

“...The purpose of use is; to share the knowledge, ideas and emotions of different people.”

“... The purpose is to create an environment about a common subject.”

“They are the Internet web sites where everyone expresses an opinion about a subject.”

Table 3. The themes regarding the definition of the blog concept

Personal Web Site	17
Sharing	6

When the definitions of the participants regarding the blogs are examined, it is seen that they defragment the concept of blog with two facts. The first of these facts is the “Personal Web Site”. This fact also constitutes the first theme for the answer to this question. The participants indicated that blogs and weblogs were used to find personal web sites and share information and experiences. The direct quotations are as follows.

“Blogs share the writings that reflect the lives of individuals or their humors’ on the Internet. They form their own sentences freely. ...”

“They are the sites that belong to one person, whose content is formed by them. ...”

"The concepts like blog, weblog and web diary are the personal web sites on the Internet, as well. People share the elements like picture, writing and music, etc. that they like here."
"It is where emotions and opinions that are used daily by the people are shared and that are seen by everyone on the Internet environment."
"... For example, one person can exhibit her/his writings, poems, songs in her/his blog..."

The second theme related to the definition of the blog concept is sharing. Participants indicated that the blogs were founded by individuals or groups for the purpose of sharing. The direct quotations are as follows.

"Video, music, forum room are the Internet sites where files are shared."
"...They are the concepts used –again- in terms of sharing information."
"It is used for information sharing."
"With presentation of personal writings, sharings, studies in the virtual environment..."

Table 4. The themes regarding the definition of the Wiki concept

Information sharing	14
Encyclopedia	12
Dictionary	7

The themes related to the definitions of the wiki concept are given in Table 4. It is seen that the themes are Encyclopedia, Dictionary and Information sharing. While defining the Wikis, the participants mentioned about information sharing, and defined the Wiki sites as the supporter tools concerning information and view sharing. The direct quotations from the definitions are as follows:

"it is the easier access to the exact information"
"they are the sites with more exact and more valid knowledge."
"The virtual environment in which a great amount of information is shared and can be accessed by everyone in Wiki Internet environment"
"...In these sites, more serious scientific sharings and explanations exist."
"The sites where the information, constituted by the people gather."
"The sites where information is shared..."
"Where people write what they know and share their information..."

Participants define the concept of wiki as open encyclopedia sites to be used for research and that would help people search and learn the subjects they do not know. The direct quotations are as follows:

"Wikis are the web applications which are similar to the open source encyclopedias constituted by the people for the purpose of information. ..."
"With its general name, wikis are the encyclopedias open to people. In other words, wikis are the encyclopedias that enable people to define each term. ..."
"The concept of wiki could be the universal encyclopedia. ..."
"... It is the kind of encyclopedia in which everyone makes comment and sharing."

Participants used the concept of dictionary after the concept of encyclopedia while defining Wiki. The direct quotations are as follows:

"... the dictionary about the subject."
"Wiki; in the meaning of dictionary... in my research homework's... I use its site the most."
"... it is something like dictionary..."
"... I can say it is dictionary"
"We can define the concept of Wiki as dictionary..."

While wiki applications are becoming more popular each day, some participants stated that they were not familiar with the application. Fourteen participants stated that they were familiar with the concept of wiki because of Wikipedia as they used it. The direct quotations are as follows.

"The concept of wiki sounds familiar to me from Wikipedia site. ..."
"I only know Wikipedia."
"When wiki is pronounced, only Wikipedia comes to my mind."
"Wiki is generally the research site which we use as Wikipedia. There is a pile of information."
"Wikipedia is the dictionary in which information exist."

Table 5. The themes regarding the definition of the social network concept

Friendship	21
Communication	16
Sharing	31

The most frequently cited Web 2.0 application seems to be social network sites in the current study. Themes like Friendship, Communication and Sharing were revealed. While the participants define the concept of social network, they define it as the tool to make friends from both distant places and their current environments through communicating on the Internet. The direct quotations are as follows:

“...designed basically for people, who know one another to find each other in the Internet environment... It aims find friends by predicating on the common friends of the users.”
“... it performs events like chatting and sharing picture, video on the Internet... .”
“...they are dating sites. They are sites ... that enable to meet old and new friends and share information and photograph. ...”
“Social network sites are the sites that enable social friendship and socialization of people. ...”
“The Internet web, in which people interact with one another is the site of sharing picture, video where old friends find each other. ...”
“It is a social sharing site that activates the conversation among friends. ...”
“It is the site, in which people share emotions and opinions at the moment by building the environment of friendship and social sharing in the virtual environment.”

Another approach that is put forward by the participants was the communication channel. The participants indicated that with the help of social network sites, they could be aware of the activities, communicate with their old friends, get in touch with specialists and people oriented to fields of interest and increase the interaction among people. The direct quotations are as follows:

“It is a site that enables the foundation of the relationship between the people and to always be informed of the social environment.”
“They are the sites... that increase the interaction of the people with one another and that include chatting.”
“They are the sites with communication purposes in which mutual activities could be shared. ...”
“It is the environment in which the social environment gets in touch with each other although the locations of the people have been altered.”
“A way of communication. It is the electronic environment in which friends find each other and then communicate. ...”
“Social network sites are the social sites in which people share (declare to other people) the activities that provide commingling and communication of people with other people concerning the fields of interest, and they find their friends, give information.”

Participants indicated that with the help of social network sites, objects like pictures, videos, music and games could be shared among people easily. The direct quotations regarding this issue are as follows:

“...they are the sites which are used in order to send, share, watch and find something with people... I use facebook generally to find friends, share video, picture and chat. ...”
“Facebook is a social sharing environment in which we can connect with our old or current friends; share activities like video, picture and play games. ...”
“According to me, facebook is a video sharing site. By means of facebook, I talk to my friends. I watch video. ...”
“They are where people add and share their photographs and videos and chat.”
“Generally used for the purpose of finding friends and sharing video and picture...”
“Facebook is the site in which people share everything in every respect.”
“...Pictures, videos, music are shared with their friends. The friends may visit the page and make sharings.”

The number of participants who did not respond to the question “How do you define the concept of Social bookmarking?” was 56. Examining the answer of four remaining participants, it can be suggested that there was nobody to correctly define the concept.

Another question which was left unanswered by the majority of the participants (51 participants) was the question “How do you define the concept of RSS”. Examining the answers of the questions, it was indicated as a tool used to follow the current news and used generally in news sites. The direct quotations are as follows:

“RSS is usually used in news sites. It is sort of resource. The information in this resource is published by the receiver by means of various programs or web software’s. Forums can use the news RSS. The news, arriving from the news site is published automatically on the forum.”
“...they are the applications that enable to get news immediately. ...”
“A continuation having been used by the news sites. ...”
“An attachment used to get the current news on the scanners”

Table 6. The themes related to Web 2.0 tools which are supposed to be used by the participants during their own teaching

Forum	19
Blog	10
Wiki	10
Social Networks	16
Rss	1

Web 2.0 tools, which are expected to be used by the participants, are given in Table 6 along with the frequencies. It is seen that participants prefer to use the substructure of the forum most, followed by social Networks, blog and wiki tools. Only one participant expected to use RSS tools whereas nobody mentioned social bookmarking sites.

Some of the participants stated that when they become teachers, their students may benefit from the forums since they are easy to access and can be used for discussions with their teachers and friends. In addition, they stated that other teachers can also refresh their occupational and teaching knowledge by affiliating to their forums.

“Forums can be used for science and technology course. If forum registrations are made with the administrator’s approval, a special environment can be prepared only for the individuals in the classroom. It can be made only in a school. Separate titles can be entitled for each course and the teachers of the courses can be chosen by the moderators. The students can benefit from the multimedia activities by constituting a classroom in the Web environment.”

“Forum can be used. Because everyone can express their own opinions here. The subjects can be shared and a platform can be constituted. The questions can be solved.”

“... are used in forums to spread the information”

“I can use the forum sites. Of course it is one of the reliable sites since information, concerning my department are shared...”

“The forum areas can be used from the points of information sharing, constant and easy access to all of the students and material sharing. This usage decreases the cost as well. ...”

Participants stated that as well as forums, the social network sites could also be commonly used, since the majority of the students may have accounts, and social network sites could be used not only for educational purposes, but also for entertainment, games and communication. The direct quotations are as follows:

“I think of using the social network sites for educational purpose. It is the technology which is absolutely used by everyone... It could be visualized by various videos, pictures and animations...”

“I would use the social network sites, so that the interaction among students would increase.”

“Since facebook is a site which is used even by the grandfathers and everyone is familiar with now, various sharings and information environments could be formed by founding groups...”

“I would like to use facebook. With the help of facebook, I would share materials and information with my students. I would communicate with my students and learn their problems with the help of facebook.”

“I can use facebook or twitter. Because such sites, which have a common use enable to reach out to the students although they are not old enough? On the other hand, blogs can be used in order to share documents.”

Participants stated that blogs could be founded and controlled by the teachers. In addition, since picture, voice and video sharing could be easier with blogs, they indicated that they could effectively be used in educational environments. The direct quotations are as follows:

“... Although scientific, useful information are shared in the Web diaries, these could be recommended and used in the course environments.”

“I would consider to use the blogs. Because blogs are controlled by me (controlled by the teacher) and students are informed.”

“... I can use blogs and the sites in which school subjects are added.”
“in blogs... things like information concerning education, pictures and videos, etc. are shared.”

Participants claimed that wiki sites can be used as a resource and that the students can easily use the wiki sites. The direct quotations are as follows:

“I can use wiki. It is a site that channels teachers and students into research. From this aspect, it could be useful.”
“... We can use wiki for the purpose of enabling students to learn the concepts they do not know.”
“I use... wiki sites.”
“... as far as I know wiki, I can use it ...”

There is a participant who states that s/he can use the RSS technology in her/his teaching. S/he stated that s/he could use the RSS tool in order to follow the current events and developments and in order to inform the students.

“I can use RSS in informing the students following the current events...”

DISCUSSION, CONCLUSION AND SUGGESTIONS

The current study, which investigated how science teacher candidates defined the Web 2.0 tools along with their expectations regarding the technologies to use in their own teaching, poses several implications and evaluations based on the findings. Examining the definitions of Web 2.0 tools, it is seen that participants defined social network sites the most, as tools used to enable the communication with friends, communication in general, meeting with new people, and sharing some objects. It is also observed that they defined the forum technology as a tool used to share and discuss. While they defined the blog technology as the technology used to found personal web sites and share information and experiences, it is seen that they defined the concept of Wiki as the technology used as encyclopedia and dictionary sites in which they would get information about what they did not know. While there is no teacher candidate defining the concept of social bookmarking among these tools, it is determined that the concept of RSS is defined as the tool used in news sites.

According to the results, it is observed that while the science teacher candidates had the skills to define Web 2.0 technologies they frequently used, whereas they had difficulty in defining the tools (social bookmarking, RSS) they did not use actively. According to another finding, the teacher candidates stated that they expected to use forum, blog, wiki and social network sites in their own teaching. As a reason of using these tools, they specified that since those tools were more familiar to them, they expected to use them more in their teaching experiences. Since some of the Web 2.0 tools are used by the teacher candidates in their daily lives, it will be easier to use them in educational environments. However, before using the Web 2.0 tools in the educational environments, teaching plans should be made well; student activities and what students shall do while using the Web 2.0 tools should be planned carefully. For instance, for a wiki to work well as a learning space, one which is characterized by genuinely collaborative writing and collective meaning-making, it is perhaps necessary to nurture among students a sense in which it is acceptable to be ruthless – to edit, amend and challenge each other via the direct manipulation of each other's text (Hemmi, Bayne, & Land, 2009). Since students can change the writings of each other in wiki applications, the students should be warned about this and should also be recommended to think one more time before they change or delete another person's writing.

Web 2.0 provides an excellent platform for collaboration, which can be invaluable in solving problems and making better decisions (He et al., 2009). With the help of Web 2.0 tools, the real world problems could be presented to students and they could be provided to solve the real world problems and share their contributions via the same platform. Web 2.0 technologies could provide methods to stimulate user participation, facilitate case adaptation, and help invigorate these repositories (He et al., 2009). The teachers desiring to perform web-reinforced teaching and yet having no learning management system shall enable the participation of the students to the site by the different Web 2.0 applications that they shall found in the web sites. The applications developed with Web 2.0 applications render the passive Internet users into the users building the content. Web 2.0 implies a new era that liberates Web users from linear, context-binding, and goal-directed information seeking and instead opens doors to easy creation, collaboration, sharing, and remixing of content on the Web for ordinary users (Chiang, Huang, & Huang, 2009). Web 2.0 tools' serving as a model in the process of educating teacher candidates together with caring shall encourage the teacher candidates to use these tools in their teaching experiences as well.

REFERENCES

- Aharony, N. (2009) The influence of LIS students' personality characteristics on their perceptions towards Web 2.0 use. *Journal of Librarianship and Information Science*, 41(4), 227 – 242.
- Boulos M. N. K., I. Maramba & S. Wheeler. (2009). Wikis, blogs and podcasts: a new generation of Web-based tools for virtual collaborative clinical practice and education. *BMC Medical Education*, 6(41). Retrieved: <http://www.biomedcentral.com/content/pdf/1472-6920-6-41.pdf> 24.12.2009
- Chakravarthy, G.S. & R. R. Barde. (2008). Web 2.0 Applications – An Approach to Testing. *International Conference on Innovations in Information Technology, IIT 2008*. Pp: 195 – 198. DOI: 10.1109/INNOVATIONS.2008.4781705
- Chiang, I., C. Y. Huang & C. W. Huang. (2009). Characterizing web users' degree of web 2.0-ness. *Journal Of The American Society For Information Science And Technology*, 60(7), 1349–1357.
- Chu, H. & C. XU. (2009). Web 2.0 and its dimensions in the scholarly world. *Scientometrics*, 80(3), 719–731.
- Coyle, C. L. and H. Vaughn. (2008). Social networking: Communication revolution or evolution?. *Bell Labs Technical Journal*, 13(2), 13 – 17.
- Daymon C. & I. Holloway. (2002). *Qualitative Research Methods in Public Relations and Marketing Communications*. Routledge. ISBN: 0-415-22273-7.
- Fan, X., Z. Wang & L. Liao. (2008). Web 2.0 environment's support to the Web Learning Community. *International Symposium on Knowledge Acquisition and Modeling*. Pp: 530 – 533. DOI: International Symposium on Knowledge Acquisition and Modeling
- Gavani V. Z. & V. V. Mohan. (2008). Application of web 2.0 tools in medical librarianship to support medicine 2.0 *Webology*, 5(1). Retrieved: <http://www.webology.ir/2008/v5n1/a53.html> 22.12.2009
- He, W., L. D. Xu, T. Means & P. Wang. (2009). Integrating web 2.0 with the case-based reasoning cycle: A systems approach. *Systems Research and Behavioral Science*, 26, 717- 728.
- Hemmi, A., S. Bayne & R. Land. (2009). The appropriation and repurposing of social technologies in higher education. *Journal of Computer Assisted Learning*, 25(1), 19-30.
- Hsieh, M.C., Y.W. Kao & S.M. Yuan. (2008). Web 2.0 Toolbar: Providing Web 2.0 Services for Existence Web Pages. *2008 IEEE Asia-Pacific Services Computing Conference*. Pp: 507 – 512. DOI: 10.1109/APSCC.2008.137
- Kaldoudi, E., P. Bamidis, M. Papaioakeim & V. Vargemezis. (2008). Problem-Based Learning via Web 2.0 Technologies. *21st IEEE International Symposium on Computer-Based Medical Systems*. Pp: 391 – 396. DOI: 10.1109/CBMS.2008.136
- Kennedy, G., Dalgarno, B., Gray, K., Judd, T., Waycott, J., Bennett, S., Maton, K., Krause, K.L., Bishop, A., Chang, R. & Churchward A. (2007). The net generation are not big users of web 2.0 technologies: Preliminary findings. In ICT: Providing choices for learners and learning. *Proceedings ascilite Singapore*. (<http://www.ascilite.org.au/conferences/singapore07/procs/kennedy.pdf>)
- Ketterl, M., R. Mertens & O. Vornberger. (2008). Web Lectures and Web 2.0 Proceedings of the 2008 Tenth IEEE International Symposium on Multimedia. Pp: 720-725. DOI: 10.1109/ISM.2008.43
- Koçak-Usluel, Y. & Mazman, S. G. (2009). Adoption of Web 2.0 tools in distance education. *International Journal of Human Sciences*, 6(2). Retrieved: <http://www.insanbilimleri.com/en>
- Kool, D. & J. Wamelen. (2008). Web 2.0: A New Basis for E-Government?. *3rd International Conference on Information and Communication Technologies: From Theory to Applications*, 2008. ICTTA 2008.. 7-11 April 2008. Pp: 1- 7. DOI: 10.1109/ICTTA.2008.4529946
- Lai, L.S.L. & Turban, E. (2008). Groups formation and operations in the Web 2.0 environment and social Networks. *Group Decision and Negotiation*, 17(5), 387-402.
- Lichtman, M. (2006). *Qualitative research in education: A user's guide*, Sage Publications, USA
- Orehovacki, T., G. Bubas & M. Konecki. (2009). Web 2.0 in Education and Potential Factors of Web 2.0 Use by Students of Information Systems. *31st International Conference on Information Technology Interfaces, 2009. ITI '09*. Proceedings of the ITI 2009. pp: 443 – 448 DOI: 10.1109/ITI.2009.5196124
- Patton, M.Q. (1990). *Qualitative Research & Evaluation Methods*. 3rd Edition. Sage Publications. USA
- Rethlefsen M. L., M. Piorun & J. D. Prince. (2009) Teaching web 2.0 technologies using web 2.0 technologies. *Journal of the Medical Library Associatio*, 97(4), 253-260.
- Roberts, B. (2009). Beyond the 'networked public sphere': Politics, participation and technics in web 2.0. *Fibreculture*. Issue: 14. Retrieved: http://journal.fibreculture.org/issue14/issue14_roberts.html: 22.12.2009
- Rubio, R, S. Martín & S. Morán (2007). Collaborative web learning tools: Wikis and blogs. *Computer Applications in Engineering Education*. (DOI: 10.1002/cae.20218)
- Shao, Y., Daley, L. & Vaughan, L. (2007). Exploring Web 2.0 for virtual design studio teaching. In ICT: Providing choices for learners and learning. *Proceedings ascilite Singapore*. <http://www.ascilite.org.au/conferences/perth07/procs/shao.pdf>

- Shaohua, H., & W. Peilin (2008). Web 2.0 and social learning in a digital economy. *IEEE International Symposium on Knowledge Acquisition and Modeling Workshop*, 2008. KAM Workshop 2008. Pp: 1121 – 1124. DOI: 10.1109/KAMW.2008.4810691
- Tan, Zhi-Jun. (2008). The Construction of Web 2.0-based Learning Community. *IEEE International Symposium on Knowledge Acquisition and Modeling Workshop*, 2008. KAM Workshop 2008. pp: 1018 – 1021. DOI: 10.1109/KAMW.2008.4810665
- Thelwall, M., R. Prabowo, & R. Fairclough. (2006). Are Raw RSS Feeds Suitable for Broad Issue Scanning? A Science Concern Case Study. *Journal of the American Society for Information Science and Technology*, 57(12), 1644-1654.
- Timm, D. M. & C. J. Duven. (2008). Privacy and social networking sites. *New Directions for Student Services*, 124, 89 – 101.
- Todres, L. (2005). Clarifying the life-world: Descriptive phenomenology. In Immy Holloway (Ed.). *Qualitative Research in Health Care*. (pp: 104 – 125). Open University Press. UK
- Yıldırım, A. & H. Şimşek. (2008). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri*. Seçkin Yayıncılık, Ankara.

THE EFFECTS OF INTERNET CAFES ON SOCIAL CHANGE IN TURKEY: THE CASE OF HENDEK

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ABSTRACT

This study investigates the impact of Internet Cafes in embarking or bringing social change in Turkey. In this study, a questionnaire was administrated to 96 internet users in 10 different Internet Cafes in Hendek Province of Sakarya and interviews were made with these people on how the internet has been changing their personal and social lives. The survey included questions such as the amount of time spent in Internet cafes and the types of online activities engaged at the cafes. Social change, on the other hand, was defined as changes in somebody's belief system, way of life and his/her relations with other people. The findings of this study suggest that the internet cafes have been changing all facets of social life in Hendek and in many cases, the internet seems to have created a new way of doing old things and changing the manner in which people live their lives.

SOCIAL CHANGE AND INTERNET

Social change is a general term which refers to change in the social institutions, the social behavior or the social relations of a society, community of people, or other social structures. Social change is caused by any event or action that affects a group of individuals that have shared values or characteristics; it is an act of advocacy for the cause of changing society (Wikipedia, 2010). One of the most popular definition of social change is supplied by Charles L. Harper in his *Exploring social change*, where social change is characterized as the "significant alteration of social structure and cultural patterns through time" (Harper, 1993).

Social change is defined by sociologists as changing social structure of a community and its social intuitions such as family, religion, traditions and social relations among its people (Tezcan, 1993). Social change is created by revolutions, political or military leaders, inventions and discoveries, new doctrines or ideologies, conflicts and wars. Among other means of creating social change are direct action, protest, advocacy, community organization, community practice and political activism. Education also plays a critical role in disseminating and sustaining social changes in a society. More importantly technology plays an essential role in creating social change. Let us think about how computer and new information technologies have been fundamentally changing our lives for the last 10 or 15 years! In recent years enormous developments in information and internet technologies have begun to influence the life of human being with its all spheres.

There is no question that easy access to the internet, like the availability of personal computers with rather cheap prices, introduction of reliable internet services and the establishments of Internet Cafes, has changed the nature of people's connection to others in their social world. Sending and receiving emails have made possible connections among people without physical proximity, and the internet facilitated communication among distant people, making rapid connections possible across long distances. People can now write electronic mails that are transmitted virtually immediately throughout the globe.

But has this communication revolution changed the nature of interpersonal and group processes? Does the Internet make people socially isolated from the community? Does it undermine family relations or friendships? The research from the field makes it clear that many aspects of the lives of people especially young people and the basic nature of their relationships with others have been profoundly changed because of the global diffusion of information and communication technologies (ICT). For example, Gergen (2002) claims that ICT has expanded the domain of "absent presence" which in turn, leads to an erosion of face-to-face community centered or privatized sense of self, and a decrease in the "depth" but an increase in the "breadth" of social relationships.

Information and Communication Technologies (ICT) and especially internet and web have created "new type social relations" and "virtual communities" that we have never seen before. Rheingold (2000) uses the term "virtual community" and defines it as "virtual communities are social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace." According to Rheingold (2000), a virtual community is a social network of individuals who interact through specific media, potentially crossing geographical and political boundaries in order to pursue mutual interests or goals. One of the most pervasive types of virtual community includes social networking services, which consist of various online communities. Virtual communities are used

for a variety of social and professional groups. It does not necessarily mean that there is a strong bond among the members; on the contrary, virtual communities are formed when people want personal relationships online. A person may have hundreds of members in his/her email distribution list, but members may still remain relatively strangers to one another. Sometimes strong ties in the online world are established that lead to close friendship and even to marriage among its members, sometimes people remain anonymous or invisible in the social network of the virtual society (Rheingold, 1993). Today, it is not really known how virtual communities can work across space, time and organizational boundaries. But one thing is certain that a socialization process which is very different from interaction among people in traditional settings takes place. This virtual socialization presents the impersonality of virtual networks and it sometimes has a negative influence on offline interaction between individuals. Calhoun (1991) argues that virtual life often takes over our lives and creates different personalities in people, groups and personal relations. Recently Parsell (2008) has suggested that virtual communities can be pernicious by leading to attitude polarization, increased prejudices and enabling sick individuals to deliberately indulging in their diseases.

On the other hand, Tyler (2002) argues that internet may have had less impact on many aspects of social life than is frequently supposed. According to Tyler, in many cases the internet seems to have created a new way of doing old things, rather than being a technology that changes the manner in which people live their lives (Tyler, 2002). Tyler insists that the basic nature of people's relationships with others may have changed less because of the internet than is often suggested. There are new and useful capabilities associated with electronic communication may have led to changes in pattern of life, the basic social patterns of life have remained very much the same in spite of these internet-induced changes.

INTERNET CAFES

Internet has been a part of our daily lives since the beginning of 1990's and has influenced almost all aspects of our lives from education to trade, from engineering to medicine. However, not many people can afford to have personal computer (PC) due to economic reasons; therefore, they can not get access to the Internet. For example, in Turkey there are about 35 million internet users but only 7.5 million of them have internet access at home or at their offices. This means that only 26.2% of all internet users in Turkey have their own access to internet (TIEV, 2010). Even though some people with low income have PC's, the internet connection rates so high that not everyone can afford to have access to the virtual reality of the Internet.

To provide public access to the virtual world, in 1994, the first Internet Cafe was opened in England and soon spread out all over the world from city centers to small villages. With the notion of seeing the internet as a window unto the world, and in the face of low levels of computer ownership and internet access from home, Internet Cafes have become alternatives to bridge the digital divide by providing Internet access to all citizens. The wide spread of Internet Cafes in all over the world have increased Internet access especially for those who don't have personal computer at home or teenagers who want to play game together.

Internet Cafes can be defined as locations, in which people without computers and/or modem connections can purchase temporary Internet access. Emerging as a practical solution to the problem of lack of income for permanent computer ownership and/or Internet connectivity, Internet Cafes have soon become quite popular worldwide, and have usually owned by private entrepreneurs. In fact, it has become one of the fastest growing service sector businesses in the world. Wakeford (1999) argues that the Internet café is, "a translation landscape of computing where the Internet is produced and interpreted for 'ordinary people' who consume time on the machines, and/or food and drink".

Wakeford sees Internet Cafes as techno-cultural systems, located at the intersection of on-line landscapes (the visual and textual landscapes interacted with when logged on), expert landscapes (the technical expertise that establishes the net and is necessary for the inhabitation of other net landscapes), and translation landscapes (the sites where the Internet is produced and interpreted for ordinary people) (Crang et al., 1999).

People use Internet Cafes for various reasons such as interpersonal communication (e-mail, chat), professional development (job search), entertainment (games, surfing, browsing pornographic sites), academic uses (school search, using various software such as word processors), technical uses (printing, scanning) to name just a few. Internet Cafes not only offer online means of communication, people also use these places for sociability and socializing with other cafe users (Miller and Slater, 2000). Thus, as Musatov (2001) keenly observes, "Internet Cafes satisfy a combination of physiological and information needs of the individual".

Internet Cafes serve both hot and cold drinks as well as snacks and have an hourly charge. Besides coffee, tea and sandwiches, Internet cafes often also offer office-style services - such as printing and copying the documents and information from the world wide web. In addition to the wider range of supplementary services offered some Internet Cafes divided the space into cabins, allowing the kind of privacy and quiet environment.

INTERNET CAFES IN TURKEY

Since its introduction in the mid-1990, the Internet has received a warm welcome from Turks especially by young people who were quick to adopt new technologies. In Turkey the internet has been seen as “a window unto the world,” or “the means to catch up the information age.” It has also presented a new business avenue for entrepreneurs. In the face of low level of PC ownership and online access from home Internet Cafes started to crop up all over Turkey synchronically with the world. It is believed that there are around 20.000 registered Internet Cafes in Turkey by the year of 2009 and 1880 of them (approximately 10%) were located in Istanbul (BTK). The number of Internet Cafes in Sakarya Province is 278 and around 30 of them are located in Hendek. Internet Cafes are subjected to the same legal regulations that govern entertainment places such as casinos, bars and tea houses.

Internet Cafes in Turkey have soon become popular social outlets for Turkish youth to hang out and access to the internet. Internet Cafes have been perceived for the young Turks as alternative to traditional Coffee Houses, *Kahvehaneler*. Internet Cafes are seen by the most Turkish youth as places of relaxation and entertainment rather than as places of learning and self-development so they come to the Cafes to play games especially in a group.

Internet Cafes in Turkey are divided into three subgroups: The first subgroup (organizational cafes) is regarded as the same with educational institutions and libraries of public organizations. These cafes are located in a public agency and they can only serve their own personnel. They cannot be regulated by outside agencies. The second subgroup (commercial cafes) can provide Internet access but can not let its customers use gaming software. The third subgroup (game cafes) has both Internet access and gaming facilities. This last group of cafes needs to be at least 200 meters (about 600 feet) away from educational institutions and mosques. On March 26, 2001, the police further regulated the commercial and gaming cafes. According to this latest legislation, there is no longer a minimum age requirement for entering commercial cafes. For game cafes, the minimum age was decreased from 15 to 12, but parental consent was made necessary for everyone below 18 (Goker, 2001).

There is an intense debate in the Turkish media regarding the potential benefits and harms of Internet Cafes. On the one hand, crimes such as stalking, assault, rape and even murder that originate from Internet Cafes chat sessions (Gurol, 2001). On the other hand, there are optimistic news stories such as Cuyar's (2001), which contend that banning the children from visiting Internet Cafes is not a solution. Instead, parents need to regulate the amount of time their children spend and the content that they are exposed to in Internet cafes. It is even argued that chatting and playing computer games may improve children's decision-making abilities. Although some aspects of Internet cafes might be beneficial to its customers, these places need to be controlled vigorously: In the first three months of the year 2001, 600 (nearly 15%) of the then 4,472 registered cafes were penalized by government authorities on the charges of providing access to separatist, indecent, gambling sites, letting underage users in, violating copyright laws, etc. (Goker, 2001).

On the other hand, the rapid increase in the use of these places in Turkish society has particularly raised concern about social and psychological development of Turkish youth. It has recently been complained that youngsters visit Internet Cafes not for educational or informational purposes but rather to access violent-oriented electronic games, pornographic and separatist materials which assumed to undermine their moral values and social inclusion with the community.

RESEARCH METHODOLOGY

A quantitative research design was adopted by employing a survey technique. The target population consists of individual who are using Internet Cafes in Hendek, Sakarya. The questionnaire of 48 items was delivered to 100 internet users in 10 Internet Cafes whose ages ranged from 15 to 25. A total of 96 surveys were returned. Of these, 23 were female and 73 were male. Most of the participants in the study were high school and university students. Most of these young internet users were residents of Hendek (%53). After applying the questionnaire, interviews were conducted with the participants of the study. A total of people interviewed were 60. The rest of the internet users didn't want to participate in the study. Interviews divided into six separate sessions, in each session 10 people were interviewed. Some interviews with cafe owners were also made in order to check the replies of Internet Cafe users. The outcomes of this survey have been statistically analyzed by SPSS for Windows 16.0. The data has been analyzed using techniques such as, frequency and percentage calculations.

FINDINGS

The first sets of questions in the survey were designed to find out how many days in a week the participants came to the Internet Cafes and the number of hours they spent in Internet Cafes per week.

Table 1 .The number of days that users come to the cafes per week

How often	Frequency	Percentage (%)
One day	15	14.4
Two days	22	21.1
Three days	20	19.2
Four days	13	12.4
Five days	12	11.5
Six days	10	9.6
Seven days	4	3.8

Most of the Internet Café users in Hendek come to the cafes 2 or 3 days per week. These days are usually the days at the weekend because Saturdays and Sundays the youths find more spare time than the week days for internet use.

Table 2. The number of hours that users come to the cafes per week

How often	Frequency	Percentage (%)
1 -2 hours	15	14.4
2-3 hours	21	20.1
4-5 hours	19	18.2
6-7 hours	13	12.4
8-9 hours	10	9.6
10-15 hours	8	7.6
15-20 hours	8	7.6
21 and more	2	1.9

Internet Cafe users in Hendek usually spend 2-5 hours (38.3 %) per week, approximately 15% percent of the participants of the study spend 1-2 hours in internet cafe. On the contrary, more than 15% spend more than 10 to 15 hours. The average is about 5-6 hours per week.

The second set of questions in the survey included the frequency of patterns of activities engaged at the cafes. Internet activities include as follows: 1-educational and informational use such as reading about news research were class assignments, gathering general information from governmental, educational medical and communication sites 2-communication use (making online new friends, sending and receiving e-mail, online chat, participating in forums and discussion boards) 3-entertainment use (playing games, watching movie, visiting pornographic sites) 4-business use (online shopping, online banking and paying bills).

Table 3. The distribution of using Internet for electronic mail

Options	Frequency	Percentage (%)
Never	15	15.6
Rarely	13	13.5
Sometimes	18	18.8
Often	27	28.1
Always	23	24.0
Total	96	100

For electronic mail, Internet use seems to be quite widespread in Hendek. Interviews with the users show that almost all of them have electronic mail addresses. The subjects have mentioned that almost everyday they send e-mail to their family or friends and come to Internet Cafes to check their e-mails.

Table 4. The distribution using internet for searching a job or an employment

Options	Frequency	Percentage (%)
Never	28	29.2
Rarely	20	20.8
Sometimes	9	9.4
Often	33	34.4
Always	6	6.3
Total	96	100

About 1/3 of cafe customers in Hendek use internet cafes to look for a job or an employment. According to the interviews in the cafes, the people prefer the internet to search for a job rather than go to the Job and Employment Office. One user mentioned that it was easier to check many sites for an employment in a short period of time and looked for many alternatives through internet. There are also some users who may want to change their jobs and that's why they often check employment advertisements for better job opportunities.

Table .5 The distribution of using internet to play games

Options	Frequency	Percentage (%)
Never	11	11.5
Rarely	24	25
Sometimes	9	34.4
Often	6	9.4
Always	32	33.3
Total	96	100

Most of the Internet users in Hendek come to the Internet Cafes to play games. War and strategy games are the most played games in the Internet Cafes. All computer games in Internet Cafes have such contents as violence, war, strategy (Half Life, Counter Strike, Red Alert, and Doom). Many users have mentioned that they had played football, basketball and had gone to traditional cafe houses, *Kahvehane* to play cards, *oke* and *tavla* before the openings of Internet Cafes in Hendek. Now they say, "we sometimes play football and basketball, but we never go to *Kahvehanes* to play cards any more." For youths in Hendek Internet Cafes are more attractive than traditional cafe houses. For many youths of Hendek playing games with friends in Internet Cafes is more interesting than spending time in traditional café houses.

Table 6 The distribution of using internet for entertainment purpose

Options	Frequency	Percentage (%)
Never	13	13.5
Rarely	12	12.5
Sometimes	26	27.1
Often	27	28.1
Always	18	18.
Total	96	100

Together with television, internet is one of the most important instruments for entertainment. Many people in Internet Cafes watch videos, films, shows and advertisements but there are not many people who listen to do music in the Internet Cafes. Also only a few people play cards, chess or *oke* through internet in the Cafes.

Table 7 The distribution of using internet for research purposes

Options	Frequency	Percentage (%)
Never	13	13.5
Rarely	12	12.5

Sometimes	26	27.1
Often	27	28.1
Always	18	18.
Total	96	100

Because the Faculty of Education is located in Hendek, university students come to Internet Cafes to research for their class assignments. The percentage of students using internet for research is quite high. Because of the lack of library sources and opportunities, the internet is the most important device for students to collect information for their research papers.

Table 8. The distribution of using internet for communication network

Options	Frequency	Percentage (%)
Never	3	3.1
Rarely	19	19.8
Sometimes	30	31.3
Often	26	27.1
Always	18	18.8
Total	96	100

Internet Cafe users often use facebook, messenger, icq, twitter for communication purposes. Communication sites are trying to create very attractive opportunities, and offer special services to users. Most of the students have chat with their family and friends visually. Many Internet Cafe users have facebook and messengers accounts.

Table 9. The distribution of using internet for visiting educational sites

Options	Frequency	Percentage (%)
Never	41	42.7
Rarely	29	30.2
Sometimes	20	20.8
Often	5	5.2
Always	1	1
Total	96	100

According to the Table 9 educational sites are rarely visited by Internet Cafe users in Hendek. Some high school students said that they visited university web pages to get information about universities they are planning to apply for. Also some people mentioned that they sometimes visited Ministry of Education and some other governmental sites such as National Social Security Services, Ministry of Tourism.

Table 10. The distribution of using the internet for porno sites

Options	Frequency	Percentage (%)
Never	71	74
Rarely	14	14.6
Sometimes	9	9.4
Often	1	1
Always	1	1
Total	96	100

In the Internet Cafes, porno sites are almost never visited by the users. Because there are a lot of restrictions for not doing such a thing. Even some cafe owners put a sign of saying "entering into porno sites is forbidden". In the interviews with the cafe owners it is understood that a special attention is paid for monitoring internet users

for not visiting porno sites and some cafe owners mentioned that they had trouble with some users who insisted on watching some porno videos.

Table 11 The distribution of using the internet to follow the daily news

Options	Frequency	Percentage (%)
Never	47	49
Rarely	26	27.1
Sometimes	11	11.5
Often	7	7.3
Always	5	5.2
Total	96	100

Internet Cafes users do not often follow daily news from internet. The percentage of people who read news from the internet and follow daily newspaper is very low. Because most Internet Cafe users are young people, they are not very interested in daily politics and current events.

Table 12 The distribution of using the internet to feel more comfortable

Options	Frequency	Percentage (%)
Never	5	5.2
Rarely	4	4.2
Sometimes	20	20.8
Often	20	20.8
Always	47	49
Total	96	100

Many Internet Cafe users say that they can express their feelings more comfortably in virtual world than they do in real world. Because they use nicknames and hide their real identities, they express themselves freely when they are chatting with others. According to the Table 12 almost half of the participants of the study feel comfortable in the virtual world so that they write whatever they think to the people in the chat rooms. Especially the ones who are shy against opposite sex demonstrate emotional feelings through chatting with somebody who has a opposite sex. Also they participate in political and religious talks freely.

Table 13 the distribution of users' internet addiction

Options	Frequency	Percentage (%)
Never	31	32.3
Rarely	26	27.1
Sometimes	16	16.7
Often	9	9.4
Always	14	14.6
Total	96	100

Internet use sometimes makes addiction for those who spend many hours on the internet. This addiction is especially valid for playing games and making chat with somebody through internet. According to the Table 13, 24 % Internet Cafe users described themselves as addicted to internet use, however 32.3 % of them think that they are not addicted to internet use all the time.

DISCUSSION AND CONCLUSION

This study is intended to investigate the effects of Internet Cafes on social change in a small province, Hendek. It is emphasized that the new information and internet technologies have brought new type social relations and imaginary communities by creating a new social gathering places called "Internet Cafes." This study points out that Internet Cafes have become an alternative social gathering place to traditional Turkish coffee houses, *Kahvehane* for youths of Turkey. In this study, a questionnaire about internet use and its influences on the youths of Hendek was administered and the potential impacts of Internet cafe on Turkish community are discussed.

According to the findings of the study, the activities performed in Internet Cafes in Hendek are as following. 42.7 % playing games, 52.1 % for using electronic mail, 40.7 % searching for a job or employment, 46.1 % for entertainment, 45.9 % for communication (online chat and participating in forums and discussion boards) and 36.1 % for research and education. Reading about news and current events on internet is not common in Internet Cafes in Hendek and online shopping, online banking and paying bills as well. The study shows that youngsters visit Internet Cafes not mainly for research and educational purposes but rather to access electronic games (mostly violent-oriented). They are often denied access to pornographic materials which are assumed to undermine their social and moral values.

Internet Cafes have brought some changes in social life in Hendek. For example the youths prefer not to go to traditional cafe houses (*Kahvehane*) for playing cards, *okey* and *tavla* but prefer going to the cafes for playing games in a groups or searching for fun on the internet. According to some interviews with the cafe owners the bad habit of gambling among youths in Hendek has declined dramatically with the opening of Internet Cafes. Hendek is a small conservative province and there are not many places for entertainments so the Internet Cafes have become places where youngsters often spent much time.

Considering the users' profile of the Internet Cafes in Hendek, it has been found that individuals of 15–25 years of age have usually been using the Internet Cafes. However, female population of Hendek do not often go to Internet Cafes. For example in the case of Hendek in proportion to 10 males, 1 female has been using the Internet Cafes. This result causes a digital separation both in different ages and different sexes. Female university students often go to Internet Cafes to do their class assignments. The amount of time spent at the cafes is about 5-6 hours per week. Many users come to cafes because of feeling loneliness. Therefore, they would like to engage in a social network of online communication activities with friends and other network users. Because such an atmosphere provides them to feel themselves in a group.

Internet Cafe use in Hendek doesn't displace youth's social activities because users in cafes can engage in face to face social contacts with others in the cafe especially when they are playing games in a group. The space in the Internet Cafes in Hendek isn't usually divided into cabins. This flexibility provides more social network of communication and interaction with cafe users. Moreover, Internet Cafes not only offer an alternative sphere of communication to sustain existing social ties, but also facilitates a new online social relationships that may also be continued offline. For example in Hendek there are at least two cases that their friendships started with online communication in Internet Cafes and ended with marriage in real life.

REFERENCES

- Andic, Y. (2003). Türkiye'de internet kafeler ve yasal konumları [Internet cafes in Turkey and their legal issues]. Paper presented at the meeting of the First Police Information Technologies Symposium, Ankara, Turkey.
- Bucky, E.P. (2000). Social access to the internet. *The Harvard International Journal of Press/Politics* 2000; 5; 50
- Bozkurt, V. (2000). Enformasyon toplumu ve Türkiye. Sistem Yayıncılık, İstanbul Bilgi Teknolojileri ve İletişim Kurumu, www.tk.gov.tr (BTK)
- Calhoun, C. (1991) Pseudohistory, "<http://www.sas.upenn.edu/transcult/pubwor40.html>
- Crang, M. & Crang, P. & May, J. (1999). Introduction. Crang, Mike et al. (Eds.) *Virtual Geographies: Bodies, Space and Relations*. London: Routledge: 1-20.
- Cuyar, N. (2001). İnternet'ten Soğutmayın (Do not Discourage from İnternet). *Milliyet Daily*. Retrieved on 04/07/01 from [<http://www.milliyet.com.tr/2001/01/21/yasam/ayas.html>].
- Gergen, K. (2002). The challenge of the absent presence. In J. Katz & M. Aakhus (Eds.), *Perpetual contact: Mobile communication, private talk, public performance* (pp. 227- 241). Cambridge, England: Cambridge University Press.
- Gökçe, F. (2000). Değişme sürecinde Devlet ve Eğitim. Eylül Yayınları, Ankara
- Goker, Gamze (2001). İnternet Kafesantan (İnternet Cafe-Bar). *BTHaber*. Retrieved on 04/16/01 from [http://www.bthaber.com.tr/haber.php?yazi_id=1500000004].
- Güneş, S. (1995). Medya ve Kültür. Vadi Yayıncılık. Ankara
- Gurol, M. & Sevindik, T. (2006) Profile of İnternet Cafe users in Turkey. *Telematics and Informatics* 24 59–68
- Gurol, N. (2001). :) Slim.. Ben 'Chat' Sapığınız (Hi © This is Your Chat Psycho). *Milliyet Daily*. Retrieved on 04/03/01 from [<http://www.milliyet.com/2001/02/11/yasam/ayas.html>] Harper, L.C. (1993). Exploring the social change. Portland OR,
- Karasar, Ş. (1999). İnternet Ortamında Eğitim. *Kuram ve Uygulamada Eğitim Yönetimi Dergisi*. Ankara, Bahar, sayı 18.

- Katz, J. E., & Rice, R. E. (2002). *Social consequences of Internet use: Access, involvement and interaction*. Cambridge, MA: The MIT Press
- McKenna, K., Green, A., & Gleason, M. (2002). Relationship formation on the Internet: What's the big attraction? *Journal of Social Issues*, 58(1), 9-31
- Koç, M. & Ferneding, K.A. (2007) The consequences of internet café use on turkish college students' social capital. The Turkish Online Journal of Educational Technology – TOJET July 2007 ISSN: 1303-6521 volume 6 Issue 3 Article 9
- Liang, G., & Wei, B. (2002). Internet use and social life/attitudes in urban mainland China. *IT & Society*, 1(1), 238-241.
- Miller, D. & Slater, D. (2000). *The Internet: An Ethnographic Approach*. New York: Berg.
- Musatov, A. (2001). Net Cafés: A Chance to Surf and Snack. *The St. Petersburg Times*. 02/13/2001.
- Reingold, H. (2000). Virtual communities. Homesteading on the electronic frontier. London MIT press.
- Parsell, M. (2008). Pernicious virtual communities: Identity, polarisation and the Web 2.0. *Ethics and Information Technology*. Volume 10, Number 1: 41-56
- Tezcan, M. (1998). *Toplumsal Değişme ve Eğitim*. Ankara Üniversitesi Eğitim Bilimleri Fakültesi Yayını. Ankara.
- TIEV, 2010. Tüm İnternet Evleri Vakfı. <http://www.tiev.org.tr>.
- Tyler, T.R. (2002). Is the internet changing social life? It seems the more things change, the more they stay the same. *Journal of Social Issues*, vol. 58, no. 1, 195-205
- Yesil, B. (2003). Internet café as battlefield: State control over Internet cafés in Turkey and the lack of popular resistance. *The Journal of Popular Culture*, 30(1), 120-127.
- Wakeford, N. (1999). Gender and the Landscapes of Computing in an Internet Café. In Crang, Mike et al. (Eds.) *Virtual Geographies: Bodies, Space and Relations*. London: Routledge: 180-20

THE PARADIGM SHIFT IN EDUCATIONAL MANAGEMENT: AN EVALUATION OF DISTRIBUTED LEARNING AS FUTURE APPROACH

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ABSTRACT

The purpose of this article is to explore the evolution of the paradigm shift in educational management, to evaluate Distributed Learning (DL) as a future approach, to establish data of the perceptions of DL program members and to guide educational managers in improving DL programs. The current study is based on to build a conceptual framework of a holistic approach to DL programs. To investigate the program members' perceptions of DL, a rating scale questionnaire (O'Malley & McCraw, 1999) was implemented. The responses from 50 graduate program members of management education yielded a response rate of 80 % from the total sample of 62 program members. Descriptive statistics were used to analyze the data. The findings, as related by educational managers; suggest that program members see their job as one of facilitating program quality rather than owning responsibility for program success. The industry of DL should be more closely aligned with the profession of continuing education administration, where success, effectiveness, and quality have less to do with the formal actions of the office and more to do with the linkages and bridges that one can build with various academic units. In conclusion, the class and the DL each have their own strengths and weaknesses. By using a successful combination of both methods, more learning benefits can be attained than when using the traditional class or DL alone. According to the results of the survey, a holistic model -covering learning resource centre, instructors, learners and learning climate as a whole- is suggested in improving success in DL.

Keywords: Educational management, Education, Distributed learning, Learning resource centre, Management learning.

INTRODUCTION

The major goal of the educational management process is to help learners gain a learning ability and to create a behavioral change. The educational management paradigm of the past –symbolized by classical class environment- was only based on “the transfer of the knowledge” which describes the interaction among instructors, learners and education/training contents viewed from educational/teaching traditions of the past. The educational management paradigm of today –symbolized by case studies- requires a two-way communication between instructor and learners as well as among learners themselves. In that respect, the educational management paradigm of the future –symbolized by distributed learning (DL)- requires a “knowledge base” (learning resource centre) which is placed on internet, and the instructor’s role as well as the learners’ roles is equally important for the learning process.

It is clear that the way a class is organized and the expectations of the instructor play a major role in the accomplishments of the class. According to Dooley and Skinner (1977), there are three factors influencing classroom pedagogy; the educational objectives of the instructor, the pedagogic philosophy of the instructor, and the roles played by the learners and the instructor. In using either the class or DL, each of these factors must be addressed.

In today’s world, a well-educated learner; knows how to obtain information, makes use of the information he/she accesses, has advanced thinking, perception and problem solving skills, processes information creatively, does not hesitate to assess and express himself and has the ability to create new information by relating the data he obtains with future goals. In that respect, here are some changes that relate with the educational managers in today’s educational environment:

- from tactical and technical level to a intuitive, interrelated and conceptual level,
- from event-oriented paradigm to systemic thinking and implementation,
- from top-heavy hierarchies to integrated joint task groups in organizations,
- from following doctrinal rules, being conventional and accepting low risk to embolden leaders and create risk-taking leaders,
- from scarcity of information to an overload of information,
- from stovepipes to interoperable networks in communications,
- from clearly defined tasks to open ended projects,
- from predictable tempo to increased operational tempo,

- from large budget to decreased spending,
- from unilateral activities to multinational and joint activities,

The changing environment as described above also requires some changes on educational management as discussed in the next questions:

- How can the educational managers of 21st century be flexible and adjust to new realities on globalization, cultural and technological change and social revolution?
- How to increase the role of feedback in improving education?
- How to develop adaptable, innovative educational managers, who know how to communicate, can build effective organizations and are willing to take calculated risks?
- How can management systems best balance institutional education & training and self-development to adapt to both technological and social change?
- What cross-cultural educational management is necessary in multinational organizations?

The Paradigm Shift in Educational Management

In this connection, “educational management paradigm” means; the collective set of attitudes, values, procedures, techniques that form the generally accepted perspective of teaching and learning at a point of time. The educational management paradigms of past and today primarily have focused upon the interaction between instructors, learners and given subject matters. Naturally, the structure and the developments in the surrounding society play an important role as far as the models individual lifetime and the transition from one model to another are concerned. The models may be looked upon as changes of paradigms, assuming new forms in connection with the implementation of new discoveries or theories and new decisions or changes in views and attitudes (Sigri & Nielsson, 2003). The educational management paradigm of the past describes the interaction among instructors, learners and education/training contents viewed from educational/teaching traditions of the past (Figure-1). To a very great extent, this situation was characterized by a verbal flow, streaming from the instructor directly to the learners. The instructor possessed all existing knowledge and experience, and he/she alone decided in which way knowledge should be transmitted. In fact, the concept unfortunately may lack internal coherence and connection to anything the learner already knows (Amig, 2001: 2).

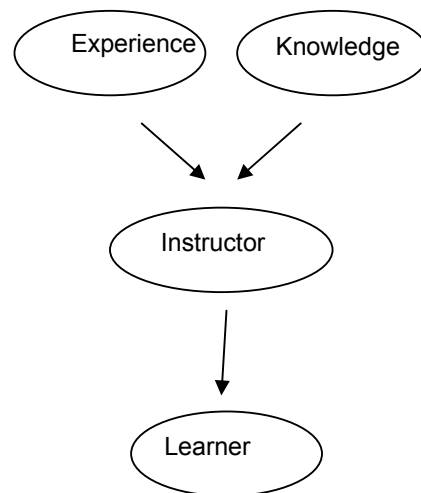


Figure-1: The Educational Management Paradigm of the Past
Source: Sigri, U., & Nielsson, L. (2003).

The educational paradigm of today shown at Figure-2 is an expression of how interaction between instructor, learners and contents may be experienced. Still the instructor plays a central role and the main part of the communication is based upon the instructor's knowledge and experience. The communication is two-ways and it takes place both between instructor and learners as well as among learners themselves. The responsibility is a bit more differentiated from the past paradigm. Both instructor and learners are responsible for the parts of the teaching process (Husmann & Miller, 2001).

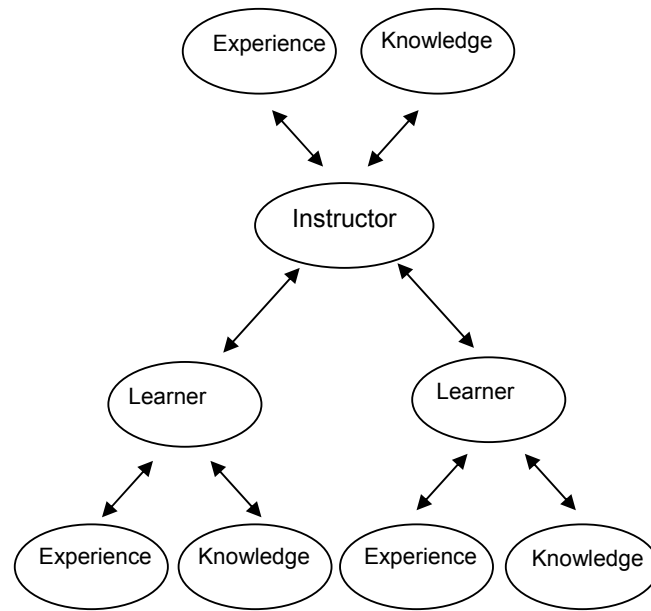


Figure-2: The Educational Management Paradigm of Today.
Source: Sigri, U., & Nielsson, L. (2003).

The educational paradigm of tomorrow shown at Figure-3 may already be experienced as a fact in great parts of the highly civilized world. One might call it “e-learning based” paradigm with the “management knowledge base” (learning resource centre) element in which the phrase “e-learning” has to be perceived as “information technology” (Sigri & Nielsson, 2003). Here we experience an essential difference from the two other paradigms. The knowledge base (learning resource centre) is placed in the centre, and the instructor’s role as well as the learners’ roles is equally important for the learning process. The communication is two-ways between instructor and learning resource centre, instructor and learners and among learners themselves. In comparison with the two other paradigms the general idea now is to place the responsibility upon the shoulders of the learners (Crumpacker, 2001).

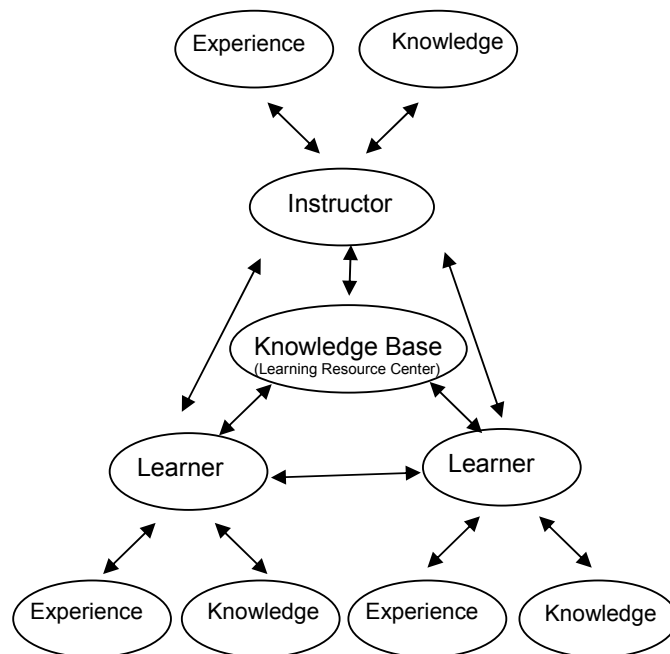


Figure-3: The Educational Management Paradigm of the Future.
Source: Sigri, U., & Nielsson, L. (2003).

The new educational management paradigm stresses the importance of “learning resource centre” (LRC) which is a place where learners may go to locate instructional materials and use equipment to solve a problem or fulfill a learning objective. Furthermore, a specific clarification with regard to technological capacities and limitations is required, in order that teaching processes are accomplished in appropriate ways. The new educational management paradigm with learning resource centre expresses a “searching-responsibility” of the learners unlike the “receiving-responsibility” of the earlier paradigms. In a pedagogic sense of the words one must distinguish between actually attending a series of lectures with only limited or no dialogue and the kind of teaching in which learners/learners actively participate in the learning process, including problem identification, discussions, identification of key issues in the problem, individual learners/learners research in connection with the gathering of information of specific issues (Sigri & Nielsson, 2003).

Distributed Learning (DL) as a Future Approach

The information age has sparked a new trend in education; learning anytime, anyplace. Learners traditionally have gone to a specific classroom, on a specific campus, at specific times in order to take courses. Most still do so, but a growing number of management learners choose distributed learning (DL). In this mode of educational management, the learners and the instructor are separated by space or by both space and time.

Learning is no longer encapsulated by time, place, and age, but has become a pervasive activity and attitude that continues throughout life and is supported by all segments of society. Teaching is no longer defined as “the transfer of information”; learning is no longer defined as “the retention of facts”. Rather, instructors challenge learners to achieve deeper levels of understanding and guide learners in the collaborative construction and application of knowledge in the context of real-world problems, situations, and tasks. Education is no longer the exclusive responsibility of instructors; it benefits from the participation and collaboration of people, peers, seniors, and learners across age groups (Mathieu, Tannenbaum & Salas 1992).

Distributed learning (DL) programming has become an important component of education. A major “program focus” problem associated with DL is generated by analytic viewpoints. A holistic view including administrators, instructors, support staff and learners instead of an analytic view must be assumed for DL programs to be considered “effective”. If one of the components of this system is studied separately with an analytic manner, the whole system may be affected by the rest of the components in an unexpected way.

A prominent concern for institutions has been the structuring of how to offer courses via DL programming. Nowadays the structure and offering of courses has become the responsibility for highly trained and skilled program administrators. These individuals understand that programs are successful only when adequate numbers of learners choose to enroll in any one given course or offering. These individuals, however, are rarely the subjects of study, as instructor dimensions to teaching and learning generally dominant questions about program effectiveness (Husmann & Miller, 2001).

The question of curriculum delivery has been debated as instructors and administrators engage with outside components of learning effectiveness and the quality of programs. This dialogue, although meaningful, generally provides a disadvantage to the instructor. In a sense, the academic content of a course is the domain of an instructor, and program members looking to promote programs become secondary both on campus and in the media. The role of these individuals, however, cannot be ignored, as they provide the institutionalized impetus to offer more and better programs (Miller & Padgett, 2003).

Realizing that learners as consumers only purchase what they perceive to be legitimate products (learning), program administrators of DL programs often become caught in the middle between the key players of DL courses. These DL program administrators generally find themselves serving a wide variety of consumers with often conflicting expectations. (Husmann & Miller, 2001).

RESEARCH METHODS AND DESIGN

The aim of this study is to establish data about what DL members perceive to be essential in the improvement of DL programs which are reliant on a number of different factors in accomplishing diverse goals (Moore, 1993). The current study is based on to build a conceptual framework of a holistic approach to DL programs. The delivery of learning product is but one of several factors to be considered in advancing the notion of learning. The instructional delivery is based on variables such as, learning resource centre, instructor ability, learning climate, learner attitudes etc. These types of variables have been laid out in a variety of scenarios of teaching and learning, and for the purposes of this discussion, are considered “holistic factors” of distributed learning delivery. The holistic design encompassed in the current study is comprised of the elements, namely such as, delivery

appropriateness, learner responsibility, instructor responsibility, administrative responsiveness, and cultural values that encourage the degree of learning.

To investigate the graduate program members' perceptions on DL, a rating scale questionnaire (O'Malley & McCraw, 1999) was implemented to program members who attend DL programs in management education. Individuals were asked to respond to the question "what can program members distributed learning programs do to improve DL program quality and success?". Individual items of DL program members were rated on a 1-to-5 rating scale, where 1=no agreement that the technique would encourage success, and 5=very high agreement with the technique. Descriptive statistics were used to analyze the data. The responses from 50 graduate program members (officers who attend master education of management in Turkish Military Academy) yielded a response rate of 80 % from the total sample of 62 program members.

FINDINGS

Program members were asked to rate each of the statements on a rating (1-to-5) scale with five representing very high agreement to one representing no agreement. The mean ratings of program members' final round responses ranged from a high of 4.600 to a low of 3.520. 11 of 12 statements received a high degree of agreement (greater than 4.0 of a five-point scale).

Members rated most strongly the need to provide additional support for academic content development of course materials –support for enrichment of learning resource centre- (mean 4.600), give high priority to the quality of the program (mean 4.550). There was high agreement with creating a reward system that promotes the instructor to be involved in DL (mean 4.300). Program members also supported the concept of providing a reward system that assures instructor recognition or compensation for innovative and creative efforts (mean 4.270), and developing new courses and workshops to respond to changes and new trends –development of learning resource centre- (mean 4.220). Agreement was also found to encourage continual updating of course content –updating of learning resource centre- (mean 4.200), encouraging learner responsibility (4.180), providing the delivery of the technically most appropriate program (4.160), committing the energy and resources in hand directly for the development of the programs (mean 4.150). Program members found high agreement in implementing a reward system to promote creativity in a distributed learning teaching (mean 4.090) and assuring cost-competitiveness (mean 4.040) providing the same "product," that of educational opportunity, at often reduced or alternative rates to a broader group of people in a more cost-effective manner (Cushman, 1996). Program members had less agreement in promoting distance educating techniques as a method of complementing the academic department's mission (mean 3.520). Provided in Table-1 are complete statements identified by program members with each statement's mean and standard deviation.

Table 1: Perceptions on "How to Improve Success in Courses Offered through DL"

What can educational managers in DL do to improve program quality and success? (Scale: from 5 = "very high agreement with technique" to 1 = "no agreement with technique")		
Technique	Mean	SD
1. Provide additional support for content development of course materials.(provide support for enriching learning resource centre-LRC)	4.600	0.5688
2. Give high priority to the quality of the program	4.555	0.5133
3. Create a reward system that promotes the instructor to be involved distributed learning	4.300	0.7978
4. Provide a reward system that assures instructor recognition or compensation for innovative and creative efforts (e.g., fees, royalties, etc.)	4.270	0.7540
5. Develop new courses and workshops to respond to changes and new trends (development of learning resource centre-LRC)	4.220	0.6827
6. Encourage continual updating of course content (updating of learning resource centre-LRC)	4.200	0.7516
7. Encourage learner responsibility	4.180	0.6500
8. Provide the delivery of the technically most appropriate program	4.160	0.7080
9. Commit the energy and resources in hand directly for the development of the programs	4.150	0.7708
10. Implement a reward system to promote creativity in DL teaching	4.090	0.7989
11. Assure cost-competitiveness	4.040	0.7560
12. Promote distance education techniques as a method of complementing the academic department's mission	3.520	0.7170

DISCUSSIONS AND CONCLUSION

Traditional class or DL as a future approach in educational management? This has been a controversial question for so long regarding the pedagogy for educational managers. Each of these pedagogies has its own strengths and

weaknesses. The best strategy might be to integrate both pedagogies and apply them concurrently to the delivery of instruction in the same course.

Change and technology go hand-in-hand in most successful environments, and technology has proved itself as a change agent. As the educational environment has faced the need for changes, distributed learning (distance learning-DL) has provided excellent opportunities to enhance educational performance. Distributed learning (DL) has emerged as a proven strategy for meeting demands and serving diverse learning populations. Distributed learning delivers knowledge to those who need it by learning resource centre. Its convenience, cost-effectiveness, flexibility, and responsiveness allow learners in any environment to access knowledge that can be applied directly to social, educational, or work dynamics.

The notion of DL displays parallelism with traditional perspective of many program members. The work of the instructors has the highest potential to greatly impact the overall effectiveness and quality of the learning environment. The notion was reinforced by the current study findings, as program members reported their highest agreement favoring instructors and faculty in eight of their twelve perceptions. Only two of the twelve highest rated statements were tied directly to the function and work of administrative bodies. The second statement, "give high priority to the quality of the program" and the fifth statement "develop new courses and workshops" both largely were grounded in the work of administrative units rather than instructor or learner partnerships. And only one of the twelve highest rated perceptions, "encouraging learner responsibility" was grounded on learners and also only one of the twelve highest rated perceptions, "providing delivery appropriateness technically" was grounded in the work of support staff.

The findings, as related by educational administrators of DL; suggest that program members see their job as one of facilitating program quality rather than owning responsibility for program success. The industry of DL should be more closely aligned with the profession of continuing education administration, where success, effectiveness, and quality have less to do with the formal actions of the office and more to do with the linkages and bridges that one can build with various academic units. This has meaningful results in areas such as professional development and graduate program training, but most importantly, stresses the need for an academic preparation and understanding of the academic industry by program members.

Findings also reveal that most program members perceive quality to be based mostly on the performance of instructor. With such high mean ratings tied to instructor's performance, the logical conclusion is that there is a need to invest heavily in programs that enhance instructor performance. The notion of instructor development is certainly a component of this conclusion, but specifically, findings indicate that program members and "programs" in general must find ways to adopt the instructor to the DL mindset, different set of skills and expectations for instructor's performance.

In all, the traditional classroom and the DL each have their own strengths and weaknesses. The problem, therefore, is not to discover the one right method, but to use the most appropriate methods to enhance the type and level of learning we want learners to achieve. By using a successful combination of both methods and a mixed pedagogical viewpoint, more learning benefits can be attained than when using the traditional class or DL alone.

REFERENCES

- Amig, S. (2001). Harnessing the power of distance learning. *Behavioral Health Management*, Vol. 21, Issue 2.
- Crumpacker, N. (2001). Faculty pedagogical approach, skill and motivation in today's distance education milieu. *Online Journal of Distance Learning Administration*, Vol. 4, No. 4. Retrieved March 1, 2009, via access <http://www.westga.edu/~distance/ojdla/winter44/crumpacker44.html>
- Cushman, R. (1996). From a distance. *Lingua Franca*, 6(7), 53-63
- Dooley, A., & Skinner, W. (1977). Casing case method methods. *Academy of Management Review*, 2, 277-288.
- Husmann D. E., & Miller, M. T. (2001). Improving distance education: Perceptions of program administrators. *Online Journal of Distance Learning Administration*, Vol. 4, No.3, 66-89.
- Mathieu J., Tannenbaum, S., & Salas, E. (1992). Influences of individual and situational characteristics on measures of training effectiveness. *Academy of Management Journal*, 35 (4), 828-847.
- Miller, M. D., & Padgett, T. C. (2003). Redesigning the learning environment for distance education: An integrative model of technologically supported learning environments. *Online Journal of Distance Learning Administration*, Volume I, Number 1.
- Moore, M. (1993). Is teaching like flying? A total systems view of distance education. *American Journal of Distance Education*, 7 (1), 1-10.

- O'Malley, J., & McCraw, H. (1999). Students perceptions of distance learning: Online learning and the traditional classroom. *Online Journal of Distance Learning Administration*, Vol.II, No.IV.
- Sigri, U., & Nielsson, L. (2003). Efficiency and Effectiveness of Distributed Learning. *NATO Training Group Working Group on Individual Training and Educational Developments* (NTG WG/IT&ED), September 2003.

THE PROBLEMS ENCOUNTERED IN DESIGNING CONSTRUCTIVIST LEARNING ENVIRONMENTS IN SCIENCE EDUCATION AND PRACTICAL SUGGESTIONS

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ABSTRACT

The aim of this study is to determine the needs and problems of classroom teachers about designing constructivist learning environments and to lay down the practical suggestions concerning these problems. To this end, a total of 94 classroom teachers from 81 provinces who participated in the workshop aimed at designing constructivist learning environments within the framework of SBEP project were included in the scope of this study. The groups evaluated their own learning environments. Based on these evaluations, they formed documents which included defining their needs, the problems encountered and practical suggestions. It was concluded by means of document analyses that the learning environments were not real-life oriented, that they did not sufficiently relate to students' experiences, that the constructivist approach was not grasped efficiently and that students were not properly granted autonomy in learning process.

Keywords: Learning environment; constructivism; primary education curriculum

INTRODUCTION

Recent changes and developments experienced in the world today openly reveal the truth that the knowledge, skills, attitudes and alike which are meant to be acquired by individuals need revising as well. The fact that individuals in today's world are expected to produce knowledge rather than just absorb it requires active participation in creating meaning by interpreting knowledge instead of taking the knowledge directly as it is given or to be passively and shaped. This therefore, requires academic curricula to be designed that facilitate and raise individuals possessing.

The 1980s are considered to be the early years of world-wide reform movements in education, especially in science and mathematics education. A report issued in the USA in 1983, *A Nation at a Risk: The Imperative for Educational Reform*, argued that academic standards had fallen in the U.S. as evidenced by the embarrassingly low test scores of American youth, especially in math and science. The suggested solution was to create more rigorous academic curricula. Similarly, many countries like Australia, England, France, Russia and China started reform movements in education in the following years. The rationale provided by these countries for reform movements was for new curricula to ensure transition from teacher-centred approach to student-centred approach (Smerdon, Burkam & Lee, 1999; Gough, 1999; Boyd, 2000; Sani, 2000). These countries also negotiated on new assessment techniques and started to apply TIMSS.

Turkey participated in TIMSS (Third International Mathematics and Science Study) assessment in 1999 for the first time and Turkish students ranked as 33rd out of 38 countries. TIMSS is an international educational assessment study. 38 countries joined in this study which were mostly from Europe but also from Asia, Australia and United States of America. The PISA (Programme for International Student Assessment) which is another international assessment study results in 2003 and 2006 showed similar results. 41 countries participated in 2003 PISA assessment and Turkey was in the 37th rank in science education. Continuous unsuccessful results of the international assessments for the Turkish education system urged that Turkey revise its academic curricula and come up with a new one in parallel with science education in the world. For this reason, Turkish Ministry of National Education decided to revise the curricula of primary education institutions, which undertake the responsibility of preparing individuals for life in addition to that of preparing them for a higher educational step, in order to catch up with the age and to raise more qualified individuals. The new academic curricula for primary education was designed by taking the constructivist approach adopted by many countries into consideration (the USA, Canada, England, Australia, New Zealand, Spain, Finland, Ireland, Israel, Austria, Singapore etc.) Then it

started to be implemented in primary education institutions step by step beginning from 2005-2006 academic years.

It is obvious that the adequate implementation of the new constructivist-oriented primary education curriculum in Turkey depends heavily on teachers. Therefore, the new educational curricula designed in accordance with the principles of constructivism, assign teachers new tasks, responsibilities and roles. In order for teachers to realize the roles mentioned above and to implement the curriculum successfully, they must be well informed about the structure, philosophy and implementation of the curricula. However, several research findings point out that there are some problems about the implementation of the curricula in Turkey. The findings of the researches conducted in Turkey show that classroom teachers are certainly in need of an in-service training in terms of acquisitions, content, learning-teaching process, instructional technologies and material development, and measurement and evaluation dimensions in order to perform the implementation of the program properly. Besides it was also determined by these findings that there are some problems concerning the implementation of the new curriculum such as insufficient resources and equipment, limited time provided for experiment and research, the overwhelming tendency towards traditional methods. Research results also point out that the problems generally emerge in practical phase, particularly in designing learning environments (Yaşar et al, 2005; Erdoğan, 2005; Bozylmaz & Bağcı-Kılıç, 2005; Saylan & Yurdakul, 2005; Özdemir, 2005; Selvi, 2006; Yücel et al, 2006; Çubukçu, 2006; and Batdal, 2006).

The design of learning environment is one of the most important factors for implementing the academic curricula effectively. New curricula of Turkey recommend taking student at the center of learning. According to new curricula, teachers are supposed to let students manage the lesson and change teaching strategies and content. It is expected from Turkish teachers to create an efficient communication environment between teachers and students, to ask thought-provoking and open-ended questions which promote students' natural curiosity, to value individual responses, to encourage discussions about opposing hypotheses and to allow students to establish relationships and create metaphors.

The success of the new primary education curriculum in Turkey depends heavily on conducting the researches which examine learning environments deeply, determine the existing problems and recommend efficient solutions for these problems and on designing applications in accordance with the results of these researches. The aim of this study is to determine the needs and problems of classroom teachers about designing constructivist learning environments and to state the practical suggestions concerning these problems.

METHOD

The research is designed based on document analysis, a qualitative research method. Documents analysis is a method that involves the analysis of printed materials containing information about the phenomena and events (Yıldırım & Şimşek, 2005). The documents obtained by one of the researchers from 94 teachers who participated in the workshop held by Ministry of National Education within the scope of SBEP project were used in this study as well. Through the "Support to Basic Education Programme", run by the Ministry of National Education, the European Union supports enhancing the quality of formal and non-formal education in Turkey as well as improving access to education. The Programme, with a budget of 100 million Euros funded by the EU, encompasses a broad range of activities covering various areas such as improving the primary education curriculum.

The steps followed while carrying out the research are listed below:

1. A total of 94 classroom teachers from 81 provinces who participated in the workshop aimed at designing constructivist learning environments in science education within the framework of SBEP project were included in the scope of this study. The teachers who attended in the workshop had at least ten years teaching experience. All teachers divided into groups consisted of five or six person. One of the researcher as a workshop lecturer paid attention to manage groups with the members who were coming from different provinces. So that it had been provided to work different persons together from different provinces. There were eighteen groups in total.
2. Within the scope the curricula one of the researchers gave a lecture to the teachers for two hours. Then, teachers were delivered booklets explaining the characteristics of constructivist learning environments. The booklets were consisted of 25 pages explaining the constructivist principles, teacher, student and other shareholder's roles, learning environment's features and how to arrange a constructivist learning environment. In accordance with the information provided in these booklets, were asked to evaluate their own learning environments in implicational phase of the new primary education curricula. Firstly, teachers shared their own teaching experiences and then they explained their problems while they were implementing the curricula. They were discussed about possible solutions of the problems. all of the problems and solution

suggestions wrote down to the papers. After that teachers discussed and ranked the problems and solution successions according to priority rank.

3. Based on these evaluations, they formed group documents including their needs, the problems they run into and the practical suggestions they came up with. Each group presented their evaluation results to others and discussed their views.
4. Finally it was reached to eighteen documents from eighteen groups. These documents were collected and analyzed by means of documents analysis method.

Data Analysis

Descriptive analysis method was employed in data analysis process. Descriptive analysis is a method used in the researches in which the conceptual and theoretical framework is determined clearly beforehand. The research questions, the questions utilized in interview and observation processes or the dimensions in these processes are considered during the presentation of the data (Yıldırım & Şimşek, 2005). The analysis of research data were carried out in the following phases:

Writing down and evaluating the data: The documents collected from the groups were examined separately by each of the three researchers. Based on the relevant literature, a total of six themes – namely personal relevance, scientific uncertainty, shared control, student negotiation, critical voice and Attitudes towards Lesson – were predicated upon for this study (Taylor, Dawson & Fraiser, 1995; Taylor, Fraiser & Fisher, 1997; Aldridge, Fraiser, Chen, C. & Taylor, 2000).

Coding the data: The researchers coded the suitable themes by independently reading the forms where the data within the scope of the study was written. In situations where there were not any themes to mark, they formed another theme under “other” title for this data and performed the markings under that theme.

Comparing the coding and reliability: After coding the themes independently, the researchers compared the reliability of the coding keys. During the comparison, themes which included each question item and were marked by the researchers were controlled and the “agreement” and “disagreement” among the researchers were determined. If the three researchers marked the same theme or did not mark a specific one at the same time, this situation was considered to be an “agreement among experts;” whereas the situations where they marked different themes were considered as “Disagreement.” The conciliation percentages were determined based on Miles and Huberman’s (1994) formula. The result gained through this formula showed that there’s 85% reliability. The 15% data on which the three researchers could not reach an agreement was placed into the existing themes with the consensus reached through the joint study by the researchers.

FINDINGS AND INTERPRETATION

The following findings were gained as a result of the data analysis. The problems determined by the teacher groups participating in the workshop are presented below.

Personal Relevance

Problems	f
Students cannot establish connections with what they learn at school and the outside world (the 4 th , 5 th , 10 th and 13 th groups)*	4
New learning does not start with the problems related to real life (the 2 nd and 7 th groups)*	2
What is learned at school is not related to real life directly (the 2 nd group)*	1
Learning does not match with the realities of life due to the reasons such as dependence on the curriculum, lack of suitable examples compatible with the environmental conditions, complete obedience to the examples provided in the textbooks and inadequate knowledge about the philosophy of the curriculum (the 7 th group)*	1
Science Course is not connected to the world outside the classroom sufficiently (the 12 th group)*	1
Students do not know why they learn (the 4 th group)*	1
The teacher faces a confusion caused by the former curriculum and the new one (the 18 th group)*	1

* Groups are homogeneous. Each group has members from different regions but all teachers have at least ten years teaching experience.

The dimension of personal relevance could be defined as ensuring that students can relate what they learn in science courses to their lives and form knowledge constructions peculiar to them in their personal meaning worlds. (Moussiaux & Norman, 2003). In this respect, the problem stated as *“the fact that students cannot establish connections with what they learn at school and the outside world”* was considered to be a major issue by four groups (the 4th, 5th, 10th and 13th groups). This situation points out that the constructivist learning environments desired to be achieved through the new primary education curriculum cannot transfer outside life into the classroom and that knowledge is restricted to what is covered at school and in textbooks.

The problem stated by the 7th group as *“learning does not match with the realities of life due to the reasons such as dependence on the curriculum, lack of suitable examples compatible with the environmental conditions, complete obedience to the examples provided in the textbooks and inadequate knowledge about the philosophy of the curriculum”* and, another problem stated by the 18th group as *“the teacher faces a confusion caused by the former curriculum and the new one”* points out that teachers have not been able to adopt the philosophy of the new curriculum and they have had problems in the practical phase. The fact that the exam-oriented structure of Turkish Educational System has not changed yet could be a major reason for that. The fact that the exams are composed of multiple choice tests aimed at measuring knowledge rather than measuring the skills acquired by students through the curriculum leads to a clash between the requirements of the curriculum and the exams. As a result, misguided by parents' demands, teachers facing this dilemma tend to act in favor of exams.

Scientific Uncertainty

Problems	f
The fact that students cannot conceive how different people in different countries learn Science (the 5 th and 11 th groups)	2
The fact that students have difficulties due to the presence of the common absolute judgments about questionability of scientific knowledge (the 1 st group)	1
The fact that people's values and opinions do not influence Science, in other words natural phenomena (the 2 nd group)	1
Student role in questioning scientific knowledge (the 1 st group)	1
Emphasis on absolute facts (positive knowledge) because of worries about catching up with the curriculum, exam anxiety and the pressure from the family and environment (the 6 th group)	1
The fact that students are supposed to choose knowledge from a planned structure and therefore do not confront a complicated structure (the 9 th group)	1

In contrast with positivist paradigm which highlights objectivity, constructivism in respect of educational philosophy argues that knowledge is interpreted (Yıldırım & Şimşek, 2005) and formed as a result of the mutual reflections and discussions. In other words, knowledge is composed of experience, observation and rational thinking; it is subjective (Bağcı-Kılıç, 2001). It is only natural that individuals living in different countries construct knowledge in different ways in relation with their cultural backgrounds and with the characteristics of the environment they live in. The problem stated as *“students cannot conceive how different people in different countries learn Science”* by the 5th and 11th groups indicates that teachers have difficulties in interpreting the subjective structure of the philosophy of constructivist approach.

Also, the problem stated as *“students have difficulties due to the presence of the common absolute judgments about questionability of scientific knowledge”* by the 1st group and another stated by the 6th group as *“the emphasis on absolute facts (positive knowledge) because of worries about catching up with the curriculum, exam anxiety and the pressure from the family and environment”* show that the dogmatic nature of Turkish Educational System has not changed yet. It could be suggested that the individuals who are prepared for life through multiple choice and only-one-truth exams at each level of instruction are bound to have difficulties in developing perceptions concerning the questionability of knowledge and that this is a factor handicapping their skills to question knowledge.

Critical Voice

Problems	f
The fact that students do not have the right to question how their own teaching is realized (the 11 th and 14 th groups)	2
The fact that students' critical thinking skills are underdeveloped (the 11 th group)	1
Insufficient student participation (12 th group)	1
The fact that students' tendency to complain increases due to their underdeveloped problem solving skills (the 8 th group)	1
The fact that students do not have the right to criticize the teacher in every aspect (the 16 th group)	1
The fact that students are not allowed to ask questions about the subjects within the teacher's responsibility (the 16 th group)	1

Students in constructivist learning environments do their best to perform the tasks assigned to them within the group efficiently so that the group dynamics can be achieved. They evaluate group members and themselves objectively and are tolerant of any criticism levelled at themselves in the group (Yaşar, 1998). However, the problem stated by the 11th and 14th groups as *"students do not have the right to question how their own teaching is realized,"* and those stated by the 16th group as *"students do not have the right to criticize the teacher in every aspect"* and *"students are not allowed to ask questions about the subjects within the teacher's responsibility"* could be interpreted to mean that democratic teacher attitudes are still not pre-eminent in our country and a student-centred education is not practiced in our country.

Shared Control

Problems	f
The fact that students cannot assist the teacher in planning what to teach because they lack the relevant knowledge and do not know what they should know exactly (the 2 nd , 5 th , 8 th , 9 th , 12 th and 17 th groups)	6
The fact that students do not have the right to decide how much time to devote for the activities (the 2 nd , 5 th and 9 th groups)	3
The fact that lesson objectives are not shared with students and students do not participate in lesson planning and time management because of teachers' underdeveloped democratic attitudes and behaviour (the 7 th and 17 th groups)	2
Student role in planning due to the ready-made curriculum, time-limits and teacher-centred understanding (the 1 st and 14 th groups)	2
Motivation and collaborative and active learning are not achieved (the 1 st group)	1
Student role in the teaching of the teacher (the 1 st group)	1
The fact that democratic culture supposed to be acquired through the new curriculum could not be achieved (the 18 th group)	1
The fact that sufficient student participation in planning what to teach could not be achieved in practice because of the inadequate assumptions of the new curriculum about this issue (the 13 th group)	1
The fact that teachers cannot involve students in planning since teachers are not well-equipped (the 6 th group)	1

Considering the problems presented in the table, the problem stated by the 2nd, 5th, 8th, 9th, 12th and 17th groups as *"students cannot assist the teacher in planning what to teach because they lack the relevant knowledge and do not know what they should know exactly"* could be seen as an indication of the fact that the understanding that in constructivist learning environments, the teacher lets students direct their reactions, experiences, thoughts and interests into the lessons and change teaching strategies and content; encourages them to communicate with both him or her and among themselves; and steers them towards asking each other meaningful questions (Erdem & Demirel, 2002; Saban, 2003) has not been put into practice. Also, the problem stated by the 2nd, 5th and 9th groups as *"students do not have the right to decide how much time to devote for the activities"* and another one stated by the 7th and 17th groups as *"lesson objectives are not shared with students and students do not participate in lesson planning and time management because of teachers' underdeveloped democratic attitudes"*

and behaviour” could be interpreted to mean that the principle of constructivist approach that students are allowed to determine their own objectives and to make preferences about the teaching techniques and content (Brooks & Brooks, 1993; Honebein, 1996; Windschitl, 2002; Akar & Yildirim, 2004) could not be transferred into practical phase.

Student Negotiation

Problems	f
The fact that communication is not used for learning (the 13 th and 18 th groups)	2
The insufficiency of students’ collaboration culture (the 12 th group)	1

The interactive learning environments which can enable students to construct knowledge and meaning are vital for a meaningful learning environment. The problem stated by the 13th and 18th groups as “*communication is not used for learning*” and the other one stated by the 12th group as “*the insufficiency of students’ collaboration culture*” could be interpreted to mean that teachers have difficulties in arranging constructivist learning environments and problems in creating interactive learning environments.

Attitudes towards Lesson

Problems	f
The fact that activities are not interesting (the 9 th group)	1
The fact that students do not approach every lesson with the same willingness because of their different interests and motivation levels (the 17 th group)	1
The fact that students do not enjoy some of the activities because ready-made activities are preferred (the 6 th group)	1
The fact that teachers cannot provide students with complexity in reaching knowledge (the 2 nd group)	1

The problem stated by the 9th group as “*activities are not interesting*” and another one stated by the 6th group as “*students do not enjoy some of the activities because ready-made activities are preferred*” could be interpreted both to mean that the principle of the theory that constructivist learning activities should be carried out in a way promoting active learning (Wilson, 1996) could not be adopted sufficiently and to mean that the resources provided to teachers are perceived as resources obligatory to use. It is vital in constructivist educational environments that learning resources be varied. The use of rich learning resources will increase student interest in the lesson and develop positive attitudes in the students enjoying the tasks they do (Brook & Brooks, 1993; Marlowe & Page, 1998).

Constructivist learning processes are supposed to be complicated (Yurdakul, 2005). However, the problem stated by the 2nd group as “*teachers cannot provide students with complexity in reaching knowledge*” could be taken as an indication of the fact that teachers are not able to understand this principle adequately.

CONCLUSION AND RECOMMENDATIONS

According to the research results, the problems emerging about the theme of personal relevance are the facts that what is learnt in the classroom cannot be associated with the real life and that learning activities cannot be designed in accordance with the real life problems. The principal reason for the problems listed under personal relevance theme could be the inefficiency of teachers in Turkish educational system to provide their students with the environments where students can seek solutions for real life problems and to manage the teaching-learning activities in this environment. The results of the research conducted by Beck (1997) revealed that teachers’ behaviors have the force to affect performing the phenomena such as personal relevancy, scientific uncertainty, shared control, student negotiation, critical voice and attitudes toward lesson. It is advisable in constructivist learning environments to prepare activities which make it possible for students to have real-life related experiences and which require problem-solving and to make use of problem-based learning method. It could be suggested, however, that an academic curriculum, a course book and companion guides designed in a centralist approach prevent that. Designing resource books and teacher’s books which are compatible with the local life conditions may be a contribution to the solution of this problem. Another recommendation for the solution might be carrying learning activities out of the classroom so that students can have real-life related experiences.

The most noticeable one among the problems emerging under the heading scientific uncertainty is the fact that students experience some problems in interpreting Science and questioning knowledge. It could be argued that this problem derives from the exam-oriented structure of the Turkish Educational System. No matter how hard the curricula designed try to put the student in the centre, the worries emerging during the preparation for the qualifying exam system at the end of primary education prevent implementing the curriculum and manipulate instruction into memorizing education which praises only one correct answer. As a solution for the problem, students' ideas should be welcomed without making any judgments and the reasons underlying such responses be examined in learning environments. In this process, students should be directed thought-provoking questions and discussion environments should be created.

The statements that students have no right to question their own teaching process is conducted and that their critical thinking skills are not developed are noticeable among the problems under the heading critical voice. It could be suggested that these problems are caused by the transition from an educational system in which the teacher has been seen as the only authority contrary to learning environments where responsibilities for learning are shared between the teacher and student. It is quite natural for students to go through some difficulties in expressing themselves because they just move from family authority to the school authority and cannot develop critical thinking and self-expression skills. Aldridge et al (2000) compared Taiwanese and Australian high school students' views according to constructivist learning environment survey. The research results showed that cultural factors affected student responses. Students in Taiwan appeared to have a higher regard for their teachers than Australian students and were therefore less likely to criticize them. These results are associated with the results of this research. In order for students to develop critical thinking skills communication patterns should be developed where students are asked questions such as "what do you think about this subject?", "why do you think so?", "how could you reach to that conclusion?". In this way, students get the opportunity to put forward their interests as well as to argue based on their weaknesses and strengths. Also, redesigning sitting arrangement and physical environment of the classroom in a way that enhances communication could help solve this problem.

The problems under the heading shared control are similar to those under the heading critical voice. It could be argued that the limited technologic facilities of schools and the insufficiency of resources sometimes make it impossible to apply the activities required by the constructivist theory and to let students manage the process. The results of Yilmaz's (2005) research put forward those teachers having some problems on teaching science and technology course. These problems are classified as the lack of equipment, not having enough practice, time problems, crowded classrooms and not having well equipped laboratories. Our research results are associated with Yilmaz's research results as well.

Moreover, the fact that textbooks were prepared without providing technical equipment which facilitates the implementation of the constructivist theory in educational environments obscures receiving student opinions to determine the activities to be performed and may lead to a return to the traditional methods. Among the practical suggestions are improving the technological equipment and physical conditions at schools in accordance with the requirements of the constructivism, providing students with the resources and equipment which make it possible for them to make researches and increasing school-parents collaboration so that students receive extra support at home. Designing activities through which students can make researches individually or in a group will contribute to shared control and help students acquire a critical perspective.

It can be argued that the problems stated under the heading student agreement are caused by the fact that teachers are not able to manage the classroom environments required by the curriculum. We might assume that this situation derives from expecting teachers to apply the curriculum properly without first training them. The findings of the research conducted by Yaşar et al (2005) showed that classroom teachers are certainly in need of an in-service training in order to implement the program properly. Providing teachers, who are the chief components of the system, with an in-service training that will help them grasp the philosophy of the constructivist approach and its applications could be useful as a solution for the problem. Similarly, Marra's (2005) research results exposed that instructors' epistemologies have an impact on designing constructivist learning environments. Schools and universities should cooperate and teachers should become involved in case studies with the support from expert researchers so that they improve themselves professionally.

The problems stated under the theme developing positive attitudes in students towards lesson are also caused by the fact that teachers are not able to arrange the learning environments required by the constructivist activities. The results of Ogbuehi and Fraser's (2007) study revealed positive associations between learning environment and students' attitudes. Students, who cannot study in interactive classroom environments and who don't get any pleasure from the activities performed only because they are covered in textbooks, naturally do not like the

lesson. The reasons such as those parents do not support schools in terms of physical conditions and non-school tasks hinder arranging group works. In addition, an exam-oriented educational system and other reasons mentioned above prevent students from developing positive attitudes towards Science and Technology course. Presenting students with the opportunity to work in groups will develop mutual respect and communication skills as well as helping develop notions such as respecting individual differences, developing self-confidence and developing positive attitudes towards the lesson. Providing a variety in learning resources in learning environments plays a key role in developing positive attitudes. A teaching process supported with various resources will be more attractive and permanent learning will be assured by addressing to different sense organs. Finally, setting a positive classroom atmosphere and providing space for the activities that will make it possible for students to learn through hands-on experiences could also be suggested among the ways to ensure that students develop positive attitudes towards the lesson.

Continuing with the textbook-centred education is among the major reasons of the problems. Educational settings that will yield an authentic learning process in a natural environment should be created. In order for the constructivist education approach to be implemented in Turkey properly, uniform notion of schools should be left and a school setting which reflects the real life needs to be created.

REFERENCES

- Akar, H. and Yildirim, A. (2004). *Use of constructivist teaching activities in classroom-management course: A case study*. Retrieved October 15, 2005, from <http://www.erg.sabanciuniv.edu/iok2004/>
- Aldridge, J. M., Fraser, B. J., Chen, C. ve Taylor, P. C. (2000) Constructivist learning environments in a cross-national study in Taiwan and Australia. *International Journal of Science Education*, 22(1), 37-55.
- Atkin, J. M., Black, P & Coffey, J. (2001). *Classroom assesment and the national science education standards*. Washington D.C.: National Academy Press.
- Bağcı-Kılıç, G. (2001). Constructivist science teaching. *Educational Sciences in Theory and Practice*, 1, 9-22.
- Batdal, G. (2006). *The fourth grade teachers' opinions about the new curriculum in terms of measurement and evaluation*. Proceedings of National Educational Sciences Congress, Vol:15.
- Beck, J. (1997). Teachers beliefs regarding the implementation of constructivism in their classroom. (Ph D). The University of Toledo. Accession Number: AGD 9729139, *Dissertation Abstract International*, 58 (04), A1188.
- Boyd, W. L. (2000). "The "R" s of school reform and the politics of reforming or replacing public schools" *Journal of Educational Change* 1(3), 225-252.
- Bozyılmaz, B. and Bağcı-Kılıç, G. (2005). *Analysis of the 4th and 5th grade science and technology course curriculum in terms of science literacy*. The Symposium on the Evaluation of the New Primary Education Curriculum. Vol. 8: *Reflections on Education*, 320-328.
- Brooks, J and Brooks, M (1993). *In search of understanding: The case for constructivist classrooms*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Çubukçu, Z. (2006). *Evaluation of learning environment dimensions in student-centred education*, Proceedings of. National Educational Sciences Congress, Vol:15.
- Dart B. C., Burnet P. C., Purdie P., Lewis G. B., Cambell J., Smith D., (2000). Student' conceptions of Learning the Classroom Environment and Approach to Learning, *The Journal Of Education Research*, 93(4) 262-270.
- Erdem, E. and Demirel, Ö. (2002). Constructivist approach in programme development. *Journal of Hacettepe University Faculty of Education*, 23, 81-87.
- Erdoğan, M. (2005). *The newly developed 5th grades science and technology course curriculum: Pilot project reflections*, The Symposium on the Evaluation of the New Primary Education Programme. Vol. 8: *Reflections on Education*, 299-310.
- Gough, N. (1999). Globalization and school curriculum change: locating a transnational imaginary, *Journal of Educational Policy*, 14(1), 73-84.
- Harden, R.M. & Crosby, J. (2000). AMEE Guide No 20: The Good Teacher is More than a Lecturer the Twelve Roles of the teacher, *Medical Teacher*, 22(4), 334-348.
- Honebein, P. C. (1996). Seven goals for the design of constructivist learning environments. In B. G. Wilson (Ed.), *Constructing learning environments: Case studies in instructional design* (pp. 11-24) New Jersey: Educational Technology Publications.
- Kelly, J. & Horder W. (2001). The how and the why: competences and holistic practice, *Social Work Education*, 20, (6) 689-699.
- Kester, L. & Pass F., (2005). Instructional interventions to enhance collaboration in powerful learning environments, *Computers in Human Behavior* 21 689–696.
- Layman, J. (1996). *Inquiry and learning: Realizing science standards in the classroom*. New York: The College Board.

- Llewellyn, D. (2002). *Inquire Within: Implementing Inquiry based scientific standards*. California: Corwin Pres Inc.
- Marra, R. (2005). Teacher beliefs: The impact of the design of constructivist learning environments on instructor epistemologies, *Learning Environments Research* 8 135-155.
- Marlowe, A. B., & Page, L. M. (1998). *Creating and sustaining the constructivist classroom*. California: Corwin Press.
- Miles, M. B. and Huberman, A. M.. (1994). *Qualitative data analysis: A sourcebook of new materials*. (2nd Edition). Thousand Oaks, CA: Sage Publications.
- Moussiaux, S. J. and Norman, J. T. *Constructivist teaching practices: perceptions of teachers and students*. Retrieved December14, 2003, from <http://www.ed.psu.edu>.
- National Research Council (NRC). (2000). *National Science Education Standarts*. Washington DC: National Academy Press.
- Ogbuehi, P. I. & Fraser, B. J. (2007). Learning environment, attitudes and conceptual development associated with innovative strategies in middle school mathematics, *Learning Environments Research* 10 101-114.
- Özdemir, M. S. (2005). *Opinions of teachers in primary schools about the new primary education curricula (I-V grades)*, Proceedings of. National Educational Sciences Congress, Vol:14, 221-229.
- Saban, A. (2003). *Learning-teaching process*, Ankara: Nobel Publications.
- Sani, J. M. (2000). "The potentials and challenges of information and communication Technologies for education: The training teachers. In: *Globalization and living together: The challenges for educational content in*
- Saylan, N and Yurdakul, B. (2005). *The extent to which classroom teachers and classroom teacher candidates possess the qualities required by the new primary education programme designs*, Proceedings of. National Educational Sciences Congress, Vol:14.
- Selvi, K. (2006). *Evaluation of primary education curricula based on the opinions of classroom teachers*, Muğla: XV. The Congress of National Educational Sciences, Muğla University, September 13-15, 2006.
- Smerdon, B. A., Burkam, D. T. & Lee, V. E. (1999). "Access to constructivist and didactic teaching: who gets it? Where it is practiced?" *Teachers College Record*, 101, 5-34.
- Smeets, E. (2005). Does ICT contribute to powerful learning environments in primary education? *Computers & Education* 44 343-355.
- Taylor, P. C., Dawson, V. ve Fraiser, B. (1995). *A constructivist perspective on monitoring classroom learning environments under transformation*. San Francisco: Annual Meeting of the National Association for Research on Science Teaching.
- Taylor, P. C. Fraiser, B. J. and Fisher, D. L. (1997). Monitoring constructivist classroom learning environments. *International Journal of Educational Research*, 27 (4), 293-302.
- Vermeten Y. J., Vermunt J. D. & Lodewijks H. G. (2002). Powerful learning environments? How university students differ in their response to instructional measures, *Learning and Instruction*, 12 (2002) 263-284.
- Wilson, G. B. (1996). *Constructivist learning environments*, New Jersey: Educational Technology Publications.
- Windschitl, M. (2002). Framing constructivism in practice as the negotiation of dilemmas: An analysis of the conceptual, pedagogical, cultural, and political challenges facing teachers. *Review of Educational Research*, 72(2), 131-175.
- Yaşar, Ş. (1998). Constructivist theory and learning-teaching process, *Anadolu University Journal of Education Faculty* 8: 1-2, 68-75.
- Yaşar, Ş., Gültekin, M., Türkkan, B., Yıldız, N. and Girmen, P. (2005). *Determination of classroom teachers' readiness levels concerning the implementation of the new primary education programme and educational needs*, The Symposium on the Evaluation of the New Primary Education Programme. Vol. 8: Reflections on Education, 51-63.
- Yıldırım A. and Şimşek H. (2005). *Qualitative research methods in social sciences*, Ankara: Seçkin Publications.
- Yılmaz, F. (2005). *Teachers' opinions about the effectiveness of science course to have students acquire scientific attitude and behavior in primary education*, Unpublished Master Thesis, Eskişehir: Anadolu University Institute of Educational Science
- Yurdakul, B. (2005). *Constructivism*, In Özcan Demirel (Ed). *New tendencies in education*, Ankara: PegemA Publications.
- Yücel, C., Karaman, M. K., Batur, Z., Başer, A. and Karataş, A. (2006). *Teacher opinions about the new primary education programme and evaluation of the programme*, Proceedings of National Educational Sciences Congress, Vol:15

THE SURVEY STUDY OF MATHEMATICS MOTIVATED STRATEGIES FOR LEARNING QUESTIONNAIRE (MMSLQ) FOR GRADE 10–12 TAIWANESE STUDENTS

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ABSTRACT

This study draws attention in understanding senior high and vocational school students' mathematics learning motivation and strategies. While Taiwan students have good mathematics performance in international competition but they have low confidence in learning mathematics well. Two questionnaires about motivation and learning strategies were developed based on Motivational Strategies for Learning Questionnaire (MSLQ), and were issued to 1,282 participants. The results show that the students have weak motivation and a less usage rate of learning strategies in learning mathematics. Besides, the result showed that the students went to cram school showed higher motivation for learning mathematics, and the students went to cram school also used learning strategies better than the students didn't go to cram school. Also, male students showed higher motivation for learning mathematics, and male students also used learning strategies better than female students.

Keywords: MSLQ, motivation, learning strategies, confirmatory factor analysis, adaptation of MSLQ

INTRODUCTION

According to the report of TIMSS program in 2003, at both the fourth and eighth grades, Taiwan had the fourth-highest average achievement in mathematics among the countries joining this program in 2003 (Mullis, Martin, Gonzalez, & Chrostowski, 2004). Moreover, in the report of TIMSS program in 2007, it showed that at the fourth grade, Taiwan had the third-highest average achievement in mathematics, and at the eighth grade, Taiwan had the highest average achievement in mathematics among all participating countries in 2007 (Mullis, Martin, & Foy, 2008). However, when talking about the affection and confidence of learning mathematics, the report of Timss 2003 indicated that most of Taiwan 8 graders' attitudes toward mathematics were negative. Moreover, seventy four percent of them reported they have no confidence in learning mathematics. These results are even worse than some countries whose mathematics grades were lower than Taiwan. The phenomenon of Taiwan students having good performance but low confidence and interest in learning mathematics, therefore, is worth paying close attention to and investigating. There are numerous factors which may affect students' learning performance such as teachers' instructional methods, learning environment, students' learning strategies, and motivation etc. Among all, it is always believed that the students' motivation and learning strategies play crucial roles in their learning (Schunk, 1990; O'Neil & Drillings, 1994; Pajares & Kranzler, 1995). Motivation and learning strategies, hence, are of particular interests to educational psychologist and researchers.

Because parents in Taiwan usually want their children to be better than others, common expectation from the parents is hoping their children getting good grades and enter a better school. In Taiwan, not only senior high school students have to attend the college entrance examination, but vocational school students have to face the Technological and Vocational Education joint college entrance examination. Therefore, in Taiwan, not only senior high school but also vocational school students have to endure the pressure from examination. The higher score they get the more chance to enter better schools they have. Besides, in the college entrance examination or the Technological and Vocational Education joint college entrance examination, mathematics is an important subject, and it makes the parents and the students pay much attention to this subject. In order to get good grades in mathematics, the parents and students attempt to find more other ways to improve mathematics skill. Because of the need of the parents and the students, cram schools showed up and developed. Contrary to school education, students may need to attend cram schools after regular school to master certain important courses. Cram schools prepare the students for the college entrance examination. In cram schools, the cram school staffs would not only help them review the content the students learn in schools, but also teach some new content in advance. In order to familiar the students with the college entrance examination, cram schools usually provide the students with lots of practice and teach the students different strategies to answer the questions in the examination. In cram schools, students have more chance to learn different strategies to solve similar questions in exams, but also have more channels to help them study the learning content. Going to cram school is a common phenomenon in Taiwan, and it seems that cram schools provide some different kind of learning support for students. In order to understand the effect of cram school on high school students' learning in mathematics, in this study, the effect of

going to cram school on students' learning motivation and learning strategies in learning mathematics would be examined.

In Asian society, the gender stereotype in mathematics learning were affected the senior high school and vocational school students a lot. Boys usually were considered to study in science or engineering-related field, and girls would be suitable to study in liberal arts or related fields. Some studies found that the resource or assist for mathematics learning received from parents were different between boys and girls (Hektner, 1995). The attitude of learning peer also affected the mathematics learning attitude of girls and boys. Girls getting good grades in mathematics were not easy to be accepted in the peer groups; however, boys who get good grades in mathematics usually won recognition easily from peers. These kinds of stereotypes affect different aspect of mathematics learning of boys and girls. Boys would consider that they should learn mathematics well, and it is shameful if they don't learn mathematics well. Therefore, boys endure much pressure when learning mathematics. Contrarily, girls don't take getting good grades in mathematics too serious, and even take it for granted. It seems that boys and girls have different learning attitudes in mathematics. In order to understand the gender differences in motivation and learning strategies of mathematics, in this study, the differences of motivation and learning strategies in mathematics would be discussed.

Accordingly, the research questions will include:

1. What is the status of Taiwan senior high school and vocational school students' motivation toward mathematics learning?
2. What is the status of Taiwan senior high school and vocational school students' learning strategies used in mathematics learning?
3. How is the effect of going to cram schools on Taiwan senior high school and vocational school students' learning motivation and learning strategies in mathematics?
4. How is the effect of gender difference on Taiwan senior high school and vocational school students' learning motivation and learning strategies in mathematics?

RELATED RESEARCHES

Learning Mathematics

A widely accepted consensual definition of learning proposed by Atkinson, Atkinson, Smith, and Hilgard is "a relatively permanent changes in behavior those results from practice" (Atkinson, Atkinson, Smith, & Bem, 1993). Although there are infinite subjects that may be learned and taught in the world, the knowledge that people acquire from learning may include facts, concepts, processes, procedures, and principles (Clark & Chopeta, 2004). Among these categories, learning mathematics involves the categories of concepts, procedures, and principles. However in Taiwan, senior high school students need to attend the university entrance examination and vocational school students have to face the technological and vocational education joint college entrance examination. The higher score the students get, the better university they can enter. Under pressure of the University Entrance Examination, right now in Taiwan most of the senior high and vocational high schools focus only on skills of correctly answering the questions. Consequently, the students can obtain high scores on test or international competitions, whereas their mathematics learning became a kind of rote learning.

Motivation

It is believed that motivation is an individual's internal status toward something. It has power to enhance the strength of the relationship between the input and the output of human behavior. Motivation refers to the reasons for directing behavior towards a particular goal, engaging in a certain activity, or increasing energy and effort to achieve the goal. The factors that will influence the extents of an individual's motivation include the types and intensity of needs and psychological process (Kleinginna & Kleinginna, 1981). Harmony with Kleinginna and Kleinginna, Geen (1995) indicated that motivation is a word used to refer to the direction, intensity, initiation and persistence of human behaviors.

Pintrich and De Groot (1990) proposed a motivation model named as social cognitive model of motivation. In this model, they asserted that the intensity of an individual's motivation will trigger him or her to execute good or bad learning strategies. Both motivation and learning strategies affect student's learning performance (Lee & Anderson, 1993; Lee & Brophy, 1996). The components of motivation in this model are value, expectancy, and affect (Pintrich & Schrauben, 1992; Pintrich, Smith, Garcia, & McKeachie, 1991). The researcher believed that issues of value will be influenced by intrinsic goal orientation, extrinsic goal orientation, and the task value; issues of expectancy will be affected by self-efficacy for learning and performance and control beliefs for learning. Finally, the issues of the affect will be impacted by test anxiety and the level of the learner's self-esteem.

Motivated Strategies for Learning Questionnaire (MSLQ)

Motivated Strategies for Learning Questionnaire (in short, MSLQ) was developed in 1991 (Pintrich, Smith, Garcia, & McEachie, 1991) and validated in different countries (Karadeniz, Buyukozturk, Akgun, Cakmak, & Demirel, 2008). MSLQ scale contains two sub-scales: Motivation and learning strategies. Motivation scale composes 31 items that assess students' learning motivation. Motivation scales include three components: Value, expectancy, and affect. The component of value contains three elements: Intrinsic goal orientation (4 items), extrinsic goal orientation (4 items), and task value (6 items). Intrinsic goal orientation focuses on the inner reasons why students participate in a task, like: Curiosity, self-development, or satisfaction (ex. The most satisfying thing for me in the course is trying to understand the content as thoroughly as possible.). Extrinsic goal orientation concern about the outer reasons why students participate in a task, like: money, grades, or praises from others (ex. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.). Task value refers to the student's perception or the awareness about the material or task in terms of usefulness, importance, or applicability (ex. I think I will be able to use what I learn in this course in other courses.).

The component of expectancy contains two elements: Control beliefs (4 items), and self-efficacy for learning and performance (8 items). Control beliefs refer to the students' believe that their effort would lead to positive result (ex. If I study in a appropriate way, then I will be able to learn the material in this course). Self-efficacy for learning and performance refer to the judgment about one's ability to complete the task and the confidence in one's skills to accomplish the mission (ex. I believe I will receive an excellent grade in this course.). The component of Affective contains one element: Test anxiety (5 items). Test anxiety refers to the negative emotion related to taking exam (ex. I have an uneasy, upset feeling when I take an exam.). The Cronbach α of the six components in motivation scale ranged from .62 ~ .93, and it showed that the scale have good reliability. Confirmatory factor analysis was used to establish the construct validity of the motivation scale. The Lambda-ksi estimates of the 31 items in motivation scale ranged from .38 ~ .89. Due to the wide range of courses and domains, the result is acceptable, even though the Lambda-ksi estimates of 4 items were lower than .50.

Learning strategies scale consists of 50 items that assess students' learning strategies. Learning strategies include two components: Cognitive and meta-cognitive strategies, and resource management. The component of cognitive and meta-cognitive strategies contains five elements: Rehearsal (4 items), elaboration (6 items), organization (4 items), critical thinking (5 items), and meta-cognitive self-regulation (12 items). Rehearsal strategies involve reciting or naming the learning materials (ex. When I study for this class, I practice saying the material to myself over and over.). Elaboration strategies include summarizing, generative note-taking, or paraphrasing (ex. When reading for this class, I try to relate the material to what I already know.). Organization strategies include clustering, or outlining (ex. I make simple charts, diagrams, or tables to help me to organize course material.) Critical thinking refers to the strategies to make purposeful or reflective judgment or decisions by analyzing the information observed (ex. I try to play around with idea of my own related to what I am learning in this course.). Meta-cognitive self-regulation strategies contain planning, monitoring and regulating (ex. If course materials are difficult to understand, I change the way I read the material.)

The component of resource management includes four elements: Time and study environment (8 items), effort regulation (4 items), Peer learning (3 items), and help seeking (4 items). Time and study environment strategies include scheduling, planning and managing one's time (ex. I attend the class regularly.). Effort regulation reflects the commitment to completing one's goal (ex. Even when course materials are dull and uninteresting, I manage to keep working until I finish.). Peer learning refers to the strategies to cooperate with others to complete the task (ex. I try to work with other students from this class to complete the course assignment.). Help seeking refer to the strategies to manage and use the support from others (ex. I ask the instructors to clarify the concepts I don't understand well.). The Cronbach α of the nine components in motivation scale ranged from .52 ~ .80, and it showed that the scale have good reliability. Confirmatory factor analysis was used to establish the construct validity of the learning strategies scale. The Lambda-ksi estimates of the 50 items in learning strategies scale ranged from .17 ~ .90. Due to the wide range of courses and domains, the result is acceptable, even though the Lambda-ksi estimates of 9 items were lower than .50.

METHOD

The scale was developed based on the theoretical framework of social cognitive model of motivation (Pintrich & De Groot, 1990). In the social cognitive model of motivation, the researchers asserted that the intensity of an individual's motivation will trigger the learner to execute specific learning strategies. The motivation divided into three sub-scales: Value, expectancy, and affect. The learning strategies were classified into cognitive strategies, meta-cognitive strategies, non-informational resources management, and informational resources management. In this study, the MSLQ were adapted into the Mathematics Motivated Strategies for Learning

Questionnaire (in short, MMSLQ). Yet, because of the wildly spread of the use of informational technology (Chang & Lee, 2010; Işman & Celikli, 2009; Işman & Işbulan, 2010), the resource management strategies were divided into information related and non-information related sub-scales. Non-information related resource management strategies included two elements: Time and study environment and help-seeking. Information-related resource management strategies included two elements: Exploratory behaviour on internet and communication behaviour on internet.

Population

Participants of this study were 1,282 senior high and vocational school students in Miao-Li County of Taiwan. According the record of the Ministry of Education there were a total of 16 senior highs and vocational schools in Miao-Li County and 17,411 students not including the students in night schools which provided courses for on-job students in the night.

Sample

In this study, the authors first divided Miao-Li County into three strata based on the geographical location. Second, the stratified sampling method is used. The sample of 7.4% from the population of each stratum is then selected separately. Finally, a total 1,502 students were randomly selected and issued the questionnaire from 16 schools. However, after subtracting 220 invalid questionnaires from 1,502 questionnaires there were 1282 questionnaires retrieved. Among the participants, 582 were male, and 700 were female. It showed that in this study, the percentages of different genders were very close. The students ranged from grade 10 to grade 12, and the age of students ranged from 17 to 19 years old. Among the participants, 570 were grade 10 students, 384 were grade 11 students, 323 were grade 12 students, and there were 5 missing data. It showed that in this study, the percentage of grade 12 students was lowest. About the frequency of going to cram school, 996 students did not go to cram school, 162 students went to cram school one time a week, 90 students went to cram school two times a week, 15 students went to cram school three times a week, 10 students went to cram school more than three times a week, and there were 9 missing data. Among the participants, 727 were senior high school students, 554 were vocational school students, and there was 1 missing data. It showed that in this study, the percentages of senior high school students and vocational school students were very close.

Statistical Analysis

To study the senior high and vocational school student's motivation and learning strategies toward mathematics learning in Miao-Li County factor analysis was applied to analyze the construct validity of MMSLQ. Because there is no theoretical criterion for referencing, in this study, the average of 3 was set to be the criteria. Therefore, when interpreting the data, the practical mean and effect size were adopted to determine the rank between the factors. The t test was applied to analyze the differences between different student groups.

Measurement Instrument

Mathematics Motivation Scale: Selection of the Items. The items for the mathematics motivation scale were developed by both creating new items and adapting items from MSLQ. The items adapting from MSLQ were translated into Chinese by the authors with the supervision of two experts in English language. And then, the items, factors, design, and rating points of this scale were examined by three testing experts. According to these suggestions, the needed correction was made by the authors. Originally, there were three factors (value, expectancy, and affect) in mathematics motivation scale, and 36 items were included in this scale. The component of value could be divided into three elements: Intrinsic goal orientation (6 items), extrinsic goal orientation (6 items), and task value (6 items). The component of expectancy could be divided into two elements: Control beliefs for learning (6 items) and self-efficacy (5 items). The component of affect only included one element: Test anxiety (7 items) (Table 1).

Table 1: Mathematics Motivation Scale

	Sub-scale	Factor	Item
Mathematics motivation	Value	Intrinsic goal orientation	1, 7, 13, 18, 24, 30
		Extrinsic goal orientation	2, 8, 14, 19, 25, 31
		Task value	3, 9, 15, 20, 26, 32
	Expectancy	Control beliefs for learning	4, 10, 16, 21, 27, 33
		Self-efficacy	5, 11, 22, 28, 34
	Affect	Test anxiety	6, 12, 17, 23, 29, 35, 36

All the items in this scale adopt five-point Likert scale: strongly disagree (1), disagree (2), normal (3), agree (4), and strongly agree (5). Besides, the scores of all the negatively stated items in both sessions would be reversed before being calculated. The Mathematics Motivated Strategies for Learning Questionnaire with two sessions

was then given to the sample of 310 students from senior high and vocational school for initial item analysis. After receiving 293 completed scales from the participants, the reliability and validity of the questionnaire would be examined. The 36 items listed in the pilot questionnaire were listed below.

Value: Intrinsic Goal Orientation

- M01. In math class, I would like to have some challenging materials and they will make me learn more.
- M07. I would like to have curiosity-initials materials in math class even they are quite difficult.
- M13. My biggest wish is to understand the content of the learning material used in the math class.
- M18. In math class, I would like to have more projects and homework which will help me learn more, even though these will not improve my scores.
- M24. Learning math can improve my thinking logics.
- M30. To get better score in math, I will learn harder.

Value: Extrinsic Goal Orientation

- M02. My most wanting is to get best grades in math class.
- M08. To me, take math class can improve my overall academy score.
- M14. I hope I can get higher grade in math than any other classmates.
- M19. I want to get higher scores in math class, because I want to demonstrate my capability to my classmates.
- M25. My best wish is to attend ideal university via learning math.
- M31. I want to get other people's recognition so I want higher scores in math class.

Value: Task Value

- M03. The skills I learn from the math class can be applied in other classes
- M09. I am interested in the learning material in math class.
- M15. I feel the leaning materials used in math class are useful.
- M20. I like every topics and contents in math class.
- M26. What I learn in the math class can be apply in my daily life.
- M32. Mathematics contributes a lot to whole human beings.

Expectancy: Control Beliefs for Learning

- M04. If I have correct learning pattern to learn math, I will learn better in the class.
- M10. If I do not learn better in the math class, I believe it is my fault.
- M16. If I study hard enough, I can understand the content of the learning materials used in math class.
- M21. If I could not understand every topics in math class, that is because I did not work hard enough.
- M27. If I pay full attention in math class, I can get better grades.
- M33. If I have enough time to do practice in math, I will have better performance.

Expectancy: Self-efficacy

- M05. I believe that I will have excellent math grades in math class.
- M11. I believe that I can understand the most difficult part in the math materials by my own.
- M22. I believe that I can master every topic in math class.
- M28. As for math, I am competent to teach other my classmates.
- M34. Math is not difficult to me.

Affect: Test Anxiety

- M06. In taking math exam, I will have negative thought that I am inferior than other classmates
- M12. In taking math exam, I will keep thinking of the questions that I can not answer in previous part.
- M17. In taking math exam, I would think about the consequence of failing in the exam.
- M23. In taking exam, I feel nervous and worry.
- M29. In taking math exam, my hear beat faster.
- M35. In taking math exam, I am totally blank and can not remember what I have learned before.
- M36. Before taking math exam, I am too wary to take a good sleep.

Mathematics Moitvation Scale: Reliability. A Cronbach α analysis was calculated for each components of mathematics moitvation scale. The Cronbach α analysis could examine if the items were internally consistent, stable, and homogenous. In order to raise the reliability and lower the error, some unsuitable items would be deleted.

Reliability Analysis: Value. After the reliability analysis, item 8, item 18, item 30, and item 32 were deleted, and the value of Cronbach α raised to .884.

Reliability Analysis: Expectancy. After the reliability analysis, item 10, and item 21 were deleted, and the value of Cronbach α raised to .872.

Reliability Analysis: Affect. After the reliability analysis, item 12, was deleted, and the value of Cronbach α raised to .759.

Mathematics Motivation Scale: Validity. A principle components factor analysis was performed on the 29 items in mathematics motivation scale with varimax rotation. After factor analysis, the item which loaded smaller than .399 on the relevant factor would be overlooked. Some of the items were suggested to move to the other factors by the analysis, and some factors were renamed. Before the factor analysis, in order to explain the correlation between items and suitability of sampling, the Bartlett's Test of Sphericity and the value of KMO (Kaiser-Mayer-Olkin of sampling) were calculated to make sure if the data were suitable for factor analysis.

Validity Analysis: Value. In this sub-scale, the Bartlett's Test of Sphericity reached significant level (1604.891, $p < .001$), and it meant that some degree of correlation between items was shown. Besides, the value of KMO was .888 that meant the data was suitable for factor analysis. A principle components factor analysis was performed on the items with varimax rotation. After factor analysis, the item which factor loading was smaller than .399 on the relevant factor would be overlooked. In this sub-scale, no item was deleted, and two factors were extracted. The total variance explained of the first factor reached 39.896 %, and the total variance explained with the second factor reached 53.217 %. After examined the content of the items, the two factors were named: Intrinsic goal orientation and task value, and extrinsic goal orientation.

Validity Analysis: Expectancy. In this sub-scale, the Bartlett's Test of Sphericity reached significant level (1016.43, $p < .001$), and it meant that some degree of correlation between items was shown. Besides, the value of KMO was .883 that meant the data was suitable for factor analysis. A principle components factor analysis was performed on the items with varimax rotation. After factor analysis, the item which factor loading was smaller than .399 on the relevant factor would be overlooked. In this sub-scale, no item was deleted, and two factors were extracted. The total variance explained of the first factor reached 48.914 %, and the total variance explained with the second factor reached 62.131 %. After examined the content of the items, the two factors were named: Self-efficacy, and control beliefs for learning.

Validity Analysis: Affect. In this sub-scale, the Bartlett's Test of Sphericity reached significant level (425.191, $p < .001$), and it meant that some degree of correlation between items was shown. Besides, the value of KMO was .733 that meant the data was suitable for factor analysis. A principle components factor analysis was performed on the items with varimax rotation. After factor analysis, the item which factor loading was smaller than .399 on the relevant factor would be overlooked. In this dimension, no item was deleted, and two factors were extracted. The total variance explained of the first factor reached 45.536 %, and the total variance explained with the second factor reached 63.924 %. After examined the content of the items, the two factors were named: Phenomenon of anxiety, and causes of anxiety. After the reliability analysis and validity analysis, there are 29 items in the mathematics motivation scale.

Mathematics Learning Strategies Scale: Selection of the Items. The items for the mathematics learning strategies scale were developed by both creating new items and adapting items from MSLQ. The items adapted from MSLQ were translated into Chinese, and two experts in English language provide support on revision. Originally, there were four factors (cognitive strategies, meta-cognitive strategies, non-informational resources management, and informational resources management) in mathematics learning strategies scale, and 68 items were included in the scales. There are four factors in the mathematics learning strategies scale: Cognitive strategies (18 items), meta-cognitive strategies (12 items), non-informational resources management (25 items), and informational resources management (13 items). The component of cognitive strategies could be divided into three elements: Rehearsal (6 items), organization (6 items) and elaboration (6 items). The component of meta-cognitive strategies included two elements: Critical thinking (6 items) and self-regulation (6 items). The component of non-informational resources management could be divided into four elements: Effort regulation (5 items), time and study environment (8 items), peer-learning (6 items), and help-seeking (6 items). The component of informational resources management could be divided into two elements: Exploratory behaviour on internet (6 items) and communication behaviour on internet (7 items) (Table 2).

Table 2: Mathematics Learning Strategies Scale

Sub-Scale	Factor	Item
Cognitive strategies	Rehearsal	3, 11, 22, 33, 44, 55
	Elaboration	4, 12, 23, 34, 45, 56
	Organizaton	5, 13, 24, 35, 46, 57
Meta-cognitive strategies	Critical thinking	6, 14, 25, 36, 47, 58
	Self-regulation	15, 26, 37, 48, 59, 65
Non-informational resources management	Effort regulation	17, 28, 39, 50, 61
	Time and study environment	16, 27, 38, 49, 60, 66, 67, 68
	Peer-learning	7, 18, 29, 40, 51, 62
	Help-seeking	8, 19, 30, 41, 52, 63
Informational resources management	Exploratory behavior on internet	1, 9, 20, 31, 42, 53
	Communication behavior on internet	2, 10, 21, 32, 43, 54, 64

All the items in this scale adapted five-point Likert scale: strongly disagree (1), disagree (2), normal (3), agree (4), and strongly agree (5). Besides, the scores of all the negatively stated items in both sessions would be reversed before being calculated. The mathematics learning strategies scale was then given to the sample of 310 students from senior high and vocational school for initial item analysis. After receiving 293 completed scales from the participants, the reliability and validity of the scale would be examined. The 68 items listed in the pilot scale were listed below:

Cognitive Strategies: Rehearsal

- S03. In studying math class materials, I will analyze again and again.
S11. In studying math, I will study the class notes and textbook again and again.
S22. I memorize the important and key math formula to remind me the important part of my math class
S33. I memorize the important and key math formula to remind me the important part of my math class
S44. In studying math, I will repeatedly practice similar question types.
S55. In studying math, I will repeatedly practice similar question types.

Cognitive Strategies: Elaboration

- S04. I will do my best to link relative portions of math and other subjects.
S12. In reviewing my math materials, I will reorganize the subtraction from class notes and textbook.
S23. I will link the class notes to textbook examples to improve my understanding.
S34. In studying math, I will combine my own known knowledge with the learning materials.
S45. In studying math, I will find out any sample in daily life to link with math materials.
S56. I will ask questions to myself to make sure that I understand the math materials content.

Cognitive Strategies: Organizaton

- S05. In studying math class materials, I will mark-up the important lines for concepts organization.
S13. In reviewing my math materials, I will read through the class notes and textbook and find out the most important parts.
S24. I will make simple charts and tables to help me in organizing my math class materials.
S35. In studying math, I will read through the class notes and mark up the important parts.
S46. In studying math, I will go over the formula and important concepts by myself.
S57. I will categorize the easy-hard type questions of every exam.

Metacognitive Strategies: Critical Thinking

- S06. I usually question what I heard or what I earn in math class, and judge if these information is persuasive.
S14. I will make the math class materials as a start point and try to self-develop my own viewpoint to the topics.
S25. I will combine my own idea into the math class learning.
S36. In math class, I will try to find out other efficient way to solve problem when I hear some idea or some solution.
S47. I will use real example to verify the math theory conclusion.
S58. In studying math, I will compare the difference between the teacher's explanation and textbook content.

Metacognitive Strategies: Self-regulation

- S15. If I feel confused about the math class materials, I will go over to find out where the problem is.
S26. In studying math, I will set up my own target and follow the agenda I make.
S37. I will reorganize and clarify the confused points after class.
S48. I will check my answer again after I finish the question.

S59. In solving math questions, I will list related formula first.

S65. When I make wrong math answers, I will clarify whether this conceptual mistake or miscalculation.

Non-informational Resources Management: Effort Management

S17. Even I do not like math, I still will study hard.

S28. If the materials and content are difficult, I will choice to give up.

S39. If the class material is difficult, I will pick up the easy part to study.

S50. Even the math class is boring; I will still finish the homework.

S61. Even I do not have good math score, I still pay good attention in class.

Non-informational Resources Management: Time and Study Environment

S16. I can make good use of the time to study math.

S27. I have a regular study place.

S38. I will follow the every week schedule to study math materials.

S49. I make it a hobby to study math at the fixed time.

S60. I will use segmented and fragile time to study math.

S66. I can strictly control my math studying time.

S67. In math studying, I can always go to class on time.

S68. Before I study, I have a hobby to clean up the desk for study concentration.

Non-informational Resources Management: Peer-learning

S07. In studying math materials, I will explain the content to my friends or classmates.

S18. I do my math homework or assignment with my classmates.

S29. I will actively invite my classmate to review the materials together.

S40. In studying math, I will discuss with the classmates who have better score than me.

S51. I will have a math study schedule to study and review with my classmates.

S62. I will compete with my classmates and even compete with math scores.

Non-informational Resources Management: Help-seeking

S08. In studying math, even the most difficult part, I intend to solve the problem by myself and will not ask for help from other people.

S19. I will ask the teacher for help to clarify the confused parts in my math class.

S30. If I do not understand the studying materials, I will ask my classmates for help.

S41. I tried to find out the classmates who can help me in math class.

S52. If I do not understand the math study materials, I will go and find solution on the math related websites.

S63. I will ask teacher the confused part immediately in the class.

Informational Resources Management: Exploratory Behavior on Internet

S01. I like to surf and find latest math related websites.

S09. I will visit the new math related websites if I know there is one.

S20. I open key-in the math related keyword and surf the found websites.

S31. I like to find the latest math related information on the websites.

S42. I will do some on-line math test.

S53. I will download the math questions to practice from the websites.

Informational Resources Management: Communication Behavior on Internet

S02. I will share my math learning experience with my friends and classmates via email.

S10. I will ask math questions for help to my friends or classmates via email.

S21. I will email to my teacher for math questions.

S32. I will use BBS to share my math learning experience with my friends and classmates.

S43. I will use MSN to discuss math class experience with classmates and friends.

S54. I will ask math questions on Yahoo knowledge webpage.

S64. I will leave message for asking math questions on some teaching websites.

Mathematics Learning Strategies Scale: Reliability. A Cronbach α analysis was calculated for each components of this scale. The Cronbach α analysis could examine if the items were internally consistent, stable, and homogenous. In order to raise the reliability and lower the error, some unsuitable items would be deleted.

Reliability Analysis: Cognitive strategies. After the reliability analysis, item 57 was deleted, and the value of Cronbach α raised to .921.

Reliability Analysis: Metacognitive strategies. After the reliability analysis, no item was deleted, and the value of Cronbach α was .890.

Reliability Analysis: Non-informational Resources Management. After the reliability analysis, item 39 and item 68 were deleted, and the value of Cronbach α raised to .874.

Reliability Analysis: Informational Resources Management. After the reliability analysis, no item was deleted, and the value of Cronbach α was .932.

Mathematics Learning Strategies Scale: Validity. A principle components factor analysis was performed on the 65 items in mathematics learning strategies scale with varimax rotation. After factor analysis, the item which loaded smaller than .399 on the relevant factor would be overlooked. Some of the items were suggested to move to the other factors by the analysis, and some factors were renamed. Before the factor analysis, in order to explain the correlation between items and suitability of sampling, the Bartlett's Test of Sphericity and the value of KMO (Kaiser-Mayer-Olkin of sampling) were calculated to make sure if the data were suitable for factor analysis.

Validity: Cognitive Strategies. In this sub-scale, the Bartlett's Test of Sphericity reached significant level (941.167, $p < .001$), and it meant that some degree of correlation between items was shown. Besides, the value of KMO was .846 that meant the data was suitable for factor analysis. A principle components factor analysis was performed on the items with varimax rotation. After factor analysis, the item which factor loading was smaller than .399 on the relevant factor would be overlooked. In this dimension, item 3, 4, 5, 22, 23, 33, 34, 35, and 56 were deleted, and two factors were extracted. The total variance explained of the first factor reached 49.183 %, and the total variance explained with the second factor reached 63.553 %. After examining the content of the items, the two factors were named: Rehearsal and organization, and practice and Deduce.

Validity: Metacognitive Strategies. In this dimension, the Bartlett's Test of Sphericity reached significant level (602.816, $p < .001$), and it meant that some degree of correlation between items was shown. Besides, the value of KMO was .842 that meant the data was suitable for factor analysis. A principle components factor analysis was performed on the items with varimax rotation. After factor analysis, the item which factor loading was smaller than .399 on the relevant factor would be overlooked. In this sub-scale, item 15, 37, 47, 48, 65 were deleted, and two factors were extracted. The total variance explained of the first factor reached 48.258 %, and the total variance explained with the second factor reached 62.824 %. After examining the content of the items, the two factors were named: Critical thinking, and self-regulation.

Validity: Non-informational Resources Management. In this sub-scale, the Bartlett's Test of Sphericity reached significant level (1115.052, $p < .001$), and it meant that some degree of correlation between items was shown. Besides, the value of KMO was .841 that meant the data was suitable for factor analysis. A principle components factor analysis was performed on the items with varimax rotation. After factor analysis, the item which factor loading was smaller than .399 on the relevant factor would be overlooked. In this sub-scale, item 7, 17, 19, 27, 28, 50, 51, 52, 61, 62, 63, and 67 were deleted, and two factors were extracted. The total variance explained of the first factor reached 36.279 %, and the total variance explained with the second factor reached 55.920 %. After examining the content of the items, the two factors were named: Time and study environment, and help-seeking.

Validity: Informational Resources Management. In this factor, the Bartlett's Test of Sphericity reached significant level (2096.933, $p < .001$), and it meant that some degree of correlation between items was shown. Besides, the value of KMO was .910 that meant the data was suitable for factor analysis. A principle components factor analysis was performed on the items with varimax rotation. After factor analysis, the item which factor loading was smaller than .399 on the relevant factor would be overlooked. In this factor, item 10, and 42 were deleted, and two factors were extracted. The total variance explained of the first factor reached 57.532 %, and the total variance explained with the second factor reached 68.811 %. After examining the content of the items, the two factors were named: Exploratory behaviour on internet, and communication behaviour on internet. After the reliability analysis and validity analysis, there are 37 items in the mathematics learning strategies scale.

Administration and Scoring

The final scale was developed with two sub-scales. There were total 66 items in form of five-point Likert scale: Strongly disagree (1), disagree (2), normal (3), agree (4), and strongly agree (5) listed in this questionnaire. This formal questionnaire can be administered and completed in 20 minutes. When the questionnaire was issue to the

participants, a succinct introduction was provided to tell the participants that this scale was designed and administered only for survey their learning motivation and strategies not for testing. Besides, the personal data would not be leaked to anyone not in the research team, and those data were used only for research purpose. By doing so, the researcher would more possible to get the real status of participants' motivation and learning strategies of mathematics in use.

By allocating a numerical value to each response: Strongly disagree (1), disagree (2), normal (3), agree (4), and strongly agree (5), the scores can be obtained. The researchers can sum up and average the scores in its belonging factor. When the average score in that factor was greater than 3, the median, it means that the motivation and learning strategies of mathematics in use which the participants posses in this factor were positive or more used. However, when the obtained score was smaller than 3, it means that their motivation and learning strategies were more negative or less used.

RESULTS

The Status of Students' Mathematics Motivation

The five of six dimensions have medium effect size whereas their effect size greater than .3 and lower than .8 in absolute value. Those five dimensions in the questionnaire are the control belief for learning ($M=3.40$, $SD=.85$, $ES=+0.47$), cause of anxiety ($M=2.63$, $SD=.91$, $ES=-0.41$), intrinsic motivation and task value ($M=2.65$, $SD=0.79$, $ES=-0.44$), phenomenon of anxiety ($M=2.57$, $SD=0.91$, $ES=-0.47$), and self-efficacy ($M=2.45$, $SD=.92$, $ES=-0.41$). The dimension which effect size lower than .3 is extrinsic goal orientation ($M=2.93$, $SD=.86$, $ES=-0.08$). Accordingly, the senior high and vocational school students have most motivation in control beliefs for learning factor and least motivation in the factor of self-efficacy.

The Status of Students' Mathematics Learning Strategies

Seven dimensions including self-regulation ($M=2.66$, $SD=.84$, $ES=-0.40$), rehearsal and organization ($M=2.61$, $SD=.81$, $ES=-0.48$), critical thinking ($M=2.58$, $SD=.85$, $ES=-0.49$), practice and deduce ($M=2.53$, $SD=.80$, $ES=-0.59$), time and study environment ($M=2.14$, $SD=.74$, $ES=-1.16$), exploratory behavior on the internet ($M=1.63$, $SD=.67$, $ES=-2.04$), and communication behavior on the internet ($M=1.51$, $SD=.61$, $ES=-2.44$) have medium to high effect size greater than .3 and even greater than .8 in absolute value. The dimension which effect size lower than .3 is help-seeking ($M=2.99$, $SD=.69$, $ES=-0.01$). Among all, the highest average comes from the factor of help-seeking while the lowest one comes from the factor of communication behavior on the internet.

Difference in Mathematics Motivation and Mathematics Learning Strategies between Students Who Went to and Who Didn't Go to Cram School

Mathematics Motivation. In order to compare the learning motivation between students who went to cram school and students who didn't went to cram school, the t test was used in this study. The result showed that the mean of the motivation of students who didn't go to cram school is 2.726 ($SD=.548$) and the mean of the motivation of students who went to cram school is 2.974 ($SD=.464$). The motivation between the students who didn't go to cram school and the students who went to cram school reached significant difference ($t = -7.208$, $p<.001$). It showed that students who went to cram school had higher motivation on learning mathematics than students who didn't go to cram school. The possible reason is that the cram school provided more support to the students, and these supports can help students to solve the problems students faced in math class.

In order to realize the difference more clearly, the t test was used to exam the difference in the six factors. In the factors of intrinsic goal orientation and task value ($t = -5.066$, $p<.001$), extrinsic goal orientation ($t = -7.120$, $p<.001$), control beliefs for learning ($t = -5.543$, $p<.001$), self-regulation ($t = -6.477$, $p<.001$), and phenomenon of anxiety ($t = -3.359$, $p<.001$), the motivation between the students who didn't go to cram school and the students who went to cram school reached significant difference. After comparing the means between the two group students in the six factors, the result showed that students who went to cram school had higher intrinsic motivation, extrinsic motivation, control beliefs, self-regulation, and anxiety on learning mathematics than students who didn't go to cram school. However, in the factor of cause of anxiety, the motivation between the students who didn't go to cram school and the students who went to cram school didn't reach significant difference ($t = .980$, $p>.05$). It showed that the cause of anxiety between students who went to cram school and students who didn't go to cram school was no significant difference in this study.

Mathematics Learning Strategies. In order to compare the learning strategies between students who went to cram school and students who didn't went to cram school, the t test was used in this study. The result showed that the mean of the learning strategies of students who didn't go to cram school is 2.279 ($SD=.597$) and the mean of the leaning strategies of students who went to cram school is 2.531 ($SD=.503$). The learning strategies between students who didn't go to cram school and the learning strategies of students who went to cram school

reached significant difference ($t = -6.746, p < .001$). It showed that students who went to cram school used more learning strategies for learning mathematics than students who didn't go to cram school.

In order to realize the difference more clearly, the t test was used to examine the difference in the eight factors. In the factors of rehearsal and organization ($t = -6.324, p < .001$), practice and deduce ($t = -5.602, p < .001$), critical thinking ($t = -6.536, p < .001$), self-regulation ($t = -6.872, p < .001$), time and study environment ($t = -6.612, p < .001$), help-seeking ($t = -4.206, p < .001$), and exploratory behavior on internet ($t = -3.173, p < .001$), the learning strategies between the students who didn't go to cram school and the students who went to cram school reached significant difference. After comparing the means between the two group students in the seven factors, the result showed that students who went to cram school used the learning strategies, rehearsal and organization, practice and deduce, critical thinking, self-regulation, help-seeking, exploratory behavior on internet better than students who didn't go to cram school. Besides, students who went to cram school managed their time and study environment better than students who didn't go to cram school. However, in the factor of communication behavior on internet, the learning strategies between the students who didn't go to cram school and the students who went to cram school didn't reach significant difference ($t = -1.732, p > .05$). It showed that the communication behavior on internet between students who went to cram school and students who didn't go to cram school was almost the same.

Difference in Mathematics Motivation and Mathematics Learning Strategies between Students in Different Genders

Mathematics Motivation. In order to compare the learning motivation between different genders, the t test was used in this study. The result showed that the mean of the motivation of male is 2.866 ($SD = .558$) and the mean of the motivation of female is 2.707 ($SD = .515$). The motivation between male and female reached significant difference ($t = 5.041, p < .001$). It showed that male students had higher motivation on learning mathematics than female students.

In order to realize the difference more clearly, the t test was used to exam the difference in the six factors. In the factors of intrinsic goal orientation and task value ($t = 8.883, p < .001$), extrinsic goal orientation ($t = 5.217, p < .001$), control beliefs for learning ($t = 3.440, p < .01$), self-regulation ($t = 8.397, p < .001$), cause of anxiety ($t = -2.467, p < .05$), and phenomenon of anxiety ($t = -4.143, p < .05$), the motivation between male students and female students reached significant difference. After comparing the means between the two group students in the six factors, the result showed that male students had higher intrinsic motivation, extrinsic motivation, control beliefs, self-regulation on learning mathematics than female students. Moreover, female students had more cause of anxiety and phenomenon of anxiety on learning mathematics than male students.

Mathematics Learning Strategies. In order to compare the learning strategies between different genders, the t test was used in this study. The result showed that the mean of the learning strategies of male is 2.405 ($SD = .626$) and the mean of the learning strategies of female is 2.268 ($SD = .545$). The learning strategies between male and female reached significant difference ($t = 3.990, p < .001$). It showed that male students had better learning strategies for learning mathematics than female students.

In order to realize the difference more clearly, the t test was used to examine the difference in the eight factors. In the factors of rehearsal and organization ($t = 1.153, p > .05$), practice and deduce ($t = 4.422, p < .001$), critical thinking ($t = 8.844, p < .001$), self-regulation ($t = 2.471, p < .05$), time and study environment ($t = 3.756, p < .001$), help-seeking ($t = -3.755, p < .001$), exploratory behavior on internet ($t = 4.771, p < .001$), and communication behavior on internet ($t = 3.550, p < .001$), the learning strategies between male students and female students reached significant difference. After comparing the means between the two group students in the eight factors, the result showed that male students used the learning strategies, rehearsal and organization, practice and deduce, critical thinking, self-regulation, exploratory behavior on internet, and communication behavior on internet better than female students. However, in the factor of help-seeking, female students used the learning strategies, help-seeking, better than male students.

DISCUSSION

The scales to measure students' mathematics motivation and learning strategies studying in senior high and vocational schools were developed under the theoretical framework and the MSLQ (Pintrich et al., 1991). Besides, the scales were with high internal consistency, reliability and validity. It is hoped that the educators and researchers will use this scale in their class. The scale could be used before the teaching in order to understand the current status of the students' mathematics motivation and the learning strategies they used, or used after instruction to acknowledge whether they uptrend their motivation and improve their learning strategies.

Taiwan's students usually have good performance in international mathematics competitions; however, their good performance did not enhance their confidence or interest in learning mathematics as a matter of course. Therefore, this study focused on senior high and vocational school students' real condition of learning mathematics from the aspect of motivation and learning strategies and find out that senior high and vocational school student slanted to have almost negative perceptions toward both their motivation and learning strategies. The participants gave the lowest score to self-efficacy which could be translated into low confidence. Besides, the analysis result of motivation scale shows that the senior high and vocational school students consider mathematics as a difficult subject for them. Although the students viewed mathematics as a difficult subject, they also believe only if they study harder, pay more attention in class, spend more time on practicing, and use appropriate learning approaches, they will have good performance in mathematics. Moreover, they think they are the only ones who have to be responsible to the learning results.

The most and the least frequent use learning strategies among eight categories are help-seeking and communication behaviour on the internet respectively. The order from the most to the least are seeking help, self-regulation, rehearsal and organization, critical thinking, practice and deducing, time and study environment, exploratory behaviour on the internet, and finally communication behaviour on the internet.

An interest issue of ambivalence revealed that although the students believe they can learn mathematics well with spending more time on learning, the learning strategies of time and study environment was not frequently used when they study. Therefore, a suggestion is proposed that the teachers and parents should teach students how to arrange and use their time and study environment well. Furthermore, even though the students consider math as a difficult subject and possess less motivation, they did not give up learning mathematics because they still kept seeking others help to improve their performance. Therefore, it is suggested that the teachers should actively care about the students' study and provide their encouragement to the students. Finally, with the development of internet and informational technology, people can learn a lot of knowledge about mathematics on the internet (Crawford & Brown, 2003). However, from this study it shows the students rarely improve their learning with the aids of the internet. Hence, the suggestion that the teachers have to teach their students how to find resources from internet and get assistance are proposed to make the students learning a continual process.

In this study, effect of gender difference and the effect of the experience of going to cram school were discussed. The result showed that students who went to cram school had higher motivation and used leaning strategies better than students who didn't go to cram school. This showed that the cram school did provide some useful supports students needed. The instructors should consider how to provide this kind of support in school.

Besides, the differences of motivation and learning strategies between different genders were found. In general, male students showed higher motivation on learning mathematics, and male students also used learning strategies better than female students. The instructors should provide more support to help female students to solve the problems they faced, and improved their motivation for learning mathematics. Furthermore, the instructors should also teach the female students how to use the learning strategies to learn mathematics better.

For future study, it is suggested that the researcher could focus on the influence of the students' background on their mathematics learning. Especially, in Taiwan going to cram schools where provide courses for students after school are a popular way to make up for bad performance could be an interesting phenomenon to discuss concerning its impact on the learning of mathematics and even other subjects.

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REFERENCES

- Atkinson, R. L., Atkinson, R. C., Smith, E. E., & Bem, D. J. (1993). *Introduction to psychology* (11th ed.). Ft Worth, TX: Harcourt Brace Jovanovich College Publishers.
- Clark, R. C., & Chopeta, L. (2004). *Graphics for learning: proven guidelines for planning, designing, and evaluating visuals in training materials*. San Francisco: Pfeiffer.
- Chang, C. Y., & Lee, G. (2010). A major e-learning project to renovate science leaning environment in Taiwan. *The Turkish Online Journal of Educational Technology*, 9(1), 7-12.
- Crawford, C., & Brown, E. (2003). Integrating internet-based mathematical manipulatives within a learning environment. *Journal of Computers in Mathematics and Science Teaching*, 22(2) 169-180.
- Geen, R. G. (1995). *Human motivation: A social psychological approach*. Belmont, CA: Cole.

- Hektner, J. M. (1995). *Sex-stereotyping of mathematics and English at three developmental periods: Students' attitudes toward peers*. Paper presented at the Annual Meeting of the Mid-Western Educational Research Association, October, Chicago. (ERIC Document Reproduction Service No. 394 825)
- Karadeniz, S., Buyukozturk, S., Akgun, O. E., Cakmak, E. K., & Demirel, F. (2008). The Turkish adaptation study of motivated strategies for learning questionnaire (MSLQ) for 12-18 year old children: Results of confirmatory factor analysis. *The Turkish Online Journal of Educational Technology*, 7(4), 108-117.
- Kleinginna, P. R., & Kleinginna, A. M. (1981). A categorized list of emotion definitions, with suggestions for a consensual definition. *Motivation and Emotion*, 5(3), 263-291.
- Lee, O., & Anderson, C. W. (1993). Task engagement and conceptual change in middle school science classrooms. *American Educational Research Journal*, 30(3), 585-610.
- Lee, O., & Brophy, J. (1996). Motivational patterns observed in sixth-grade science classrooms. *Journal of Research in Science Teaching*, 33(3), 303-318.
- Işman, A., & Celikli, G. E. (2009). How does student ability and self-efficacy affect the usage of computer technology? *The Turkish Online Journal of Educational Technology*, 8(1), 33-38.
- Işman, A., & İşbulan, O. (2010). Usability level of distance education website (sakarya university sample). *The Turkish Online Journal of Educational Technology*, 9(1), 243-258.
- Mullis, I. V. S., Martin, M. O., Foy, P. (2008). *TIMSS 2007 international mathematics report: findings from IEA's trends in international mathematics and science study at the fourth and eighth grades*. Chestnut Hill, MA: IEA TIMSS & PIRLS International Study Center.
- Mullis, I. V. S., Martin, M. O., Gonzalez, E. J., & Chrostowski, S. J. (2004). *TIMSS 2003 international mathematics report: findings from IEA's trends in international mathematics and science study at the eighth and fourth grades*. Chestnut Hill, MA: IEA TIMSS & PIRLS International Study Center.
- O'Neil, J. R., & Drillings, M. (1994). *Motivation: theory and research*. Hillsdale, New Jersey Hove.
- Pajares, F., & Kranzler, J. (1995). Self-efficacy beliefs and general mental ability in mathematical problem-solving. *Contemporary Educational Psychology*, 20(4), 426-443.
- Pintrich, P. R., & De Groot, E. V. (1990). Motivation and self-regulated learning components of classroom academic performance. *Journal of Educational psychology*, 82(1), 33-40.
- Pintrich, P. R., & Schrauben, B. (1992). Students' motivational beliefs and their cognitive engagement in classroom academic task. In D. H. Schunk, and J. Meece (Eds.), *Student perception in the classroom* (pp. 149-183). Hillsdale, NJ: Erlbaum.
- Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). *A manual for the use of the motivated strategies for learning questionnaire (MSLQ)*. MI: National Center for Research to Improve Postsecondary Teaching and Learning. (Eric Document Reproduction Service No. ED 338 112).
- Schunk, D. H. (1990). Introduction to special section and efficacy. *Journal of Educational Psychology*, 1, 3-6.
- Spancer, S. J., Steele, C. M., & Quinn, D. M. (1999). Stereotype threat and women's math performance. *Journal of experimental Social Psychology*, 35, 4-28.

THE USE OF INTERNET RESOURCES BY UNIVERSITY STUDENTS DURING THEIR COURSE PROJECTS ELICITATION: A CASE STUDY

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ABSTRACT

Although technology is a very important, useful and indispensable part of the life, effective and appropriate usage of it still needs to be improved in education. This study presents the way university students gather their course project requirements during the project elicitation phase, how they access the Internet and other resources, and their trends in the literature review using the Internet. Furthermore, the diversity of Internet resources which are used for homework and course projects studies, and the reliability and accessibility of these resources have also been investigated and assessed. In addition, the results obtained from the study have been discussed and evaluated, the academic resources accessibility and usability in universities have been assessed and their importance discussed. The internet resources have been divided into sub categories according to their accessibility and reliability. Finally, the effects of reliable and limited accessible internet resources and unreliable and unlimited internet resources on university students' out-of-class works and projects have been presented and discussed.

Keywords: The use of Internet in Course Projects, Internet Resources Accessibility vs. Trustworthy, Educational resources

INTRODUCTION

The use of the Internet in the educational environment has enabled easy access to many resources, and information sharing has, therefore, significantly increased. Moreover, the prevalence of this sharing has brought additional benefits in that these resources can be used in any location and any time. Although the efficiency of this technology, it is evaluated with use of proportion of the desired results in student achievement does not exactly come out and is difficult to determine. Hence, much research has been conducted over time to understand the reasons for this situation.

Since adolescents, especially some university students sometimes, use the Internet for reasons other than educational (they explore the funny view of the Internet). The effect of the Internet in education is, hence, relatively limited. In this study, efficiency and effectiveness of access to resources on the Internet, rather than examination of Internet use has been investigated. In addition, we have sought to identify the impacts of Internet resources used by university students in their project, and which effects of the internet are observed during project elicitation phase.

Internet use, especially in education, has been investigated for sometime, and many different studies, exist in literature about that subject. In the study of D'Esposito and Gardner (1999), Internet usage trends of the university students, and college student perceptions of the Internet and a traditional library were presented. This study showed that when university students have the opportunity to use internet resources, almost all of them prefer to use these, rather than classical libraries for their studies, but when the information source satisfaction in research needs is considered, the students' trends are in the direction of using both. In addition, Cheung and Huang (2005) emphasized the effects of the Internet as an effective teaching tool in university education, and proposed that many university teachers publish their course materials via the internet. They suggested that it is

insufficient for university lecturers and administrators to use the Internet as a good teaching tool, and that students' internet use should also be investigated.

Chen & Pen (2008), in their study, examined the basic relationship between the internet use of university students and their academic performance, interpersonal relationships, psychosocial adjustment and self-evaluations. They prepared a questionnaire and collected 49,609 university juniors' comments about the questions. The results show that non-heavy internet users have better relationship with administrative staff, academic grades and learning satisfaction than heavy users. They claimed that the heavy internet users were likely than non-heavy users to be depressed. This study provoked us to search the raising trends in use trap sites among university students.

Peng et al (2006) in their study of university students' attitudes and self-efficacy towards the Internet, demonstrated the relationship between perceptions of the internet and their internet attitudes and self-efficacy. They showed that there is a positive effect if the students use the Internet as a functional tool or functional technology. In addition to those mentioned, there are many other useful studies which investigate the effects of internet and electronic resources on university students' self-efficacy and performance (Crews & Feinberg, 2002; Wu & Tsai, 2006; Wen & Tsai, 2006; Perry et al 1998; Wainer et al 2008; Odell et al 2000; Crouch, 2001; Mohammed & Al-Karaki, 2008).

A number of publications have studied internet addiction among university and college students. They have attempted to show there can be negative effect of internet use on these students, which may cause the students to become addicted and to digress from their educational studies. In order to assess internet addiction, many new diagnostic tools have been developed in literature. Chan & Law (2008) evaluated the Young's Internet Addiction Test (IAT) for better understanding the structure, validity and reliability of such assessment tools. In their study, they defined the three dimensions of the problem: Withdrawal and social problems, time management and performance, and reality substitution. Moreover, this study showed clearly that academic performance was negatively correlated with internet addiction. Furthermore, they presented another and very important finding that internet addiction is highly related to online activities, cyber-relationships, and online gambling and hence, these kinds of internet sites and usage can be seen as trap sites for education. In the literature, there are other studies about internet addiction and its effects on students and adolescents, the relationship between internet use and culture, and the relationship between educational performance and internet addiction (Siomos et al 2008; Ghassemzadeh et al 2008; Del Castillo et al 2008; Recabarren et al 2008; Tahiroglu et al 2008). Many of these studies indicate that there is a strong relationship between internet use trends and educational performance, and wrong use of the Internet can cause a major decrease in students' academic performance. In our study, the effects of those internet sites which can easily be accessed and are thus called Trap sites are also investigated.

Apart from above studies, in literature there are many others related to internet use in the many different education fields such as medical education, special education, college education, K12 education, engineering education, and so on. In these studies, the effects of the use of technology on students' academic performance and efficacy have been investigated (Limpach et al, 2008; Rouibah & Hamdy, 2009; Scott et al, 2008; Johnson, 2008; Lin et al, 2008; Yeh et al, 2008; Rochester & Pradel, 2008; Barak & Sadovsky, 2008). The common point of the studies is that internet use can have a positive effect on students' performance if it is properly used.

Another important study has been conducted to evaluate the skills of freshmen in universities regarding educational technology standards, and to examine the factors that influence these skills (Kurt et al, 2008). In a similar study, Akbulut (2008) has investigated the motivational aspects of computer-assisted instruction in terms of writing and mailing over freshmen of foreign languages using Warschauer survey (Warschauer, 1996). His findings suggest that the learners had positive attitudes towards CALL (Computer Assisted Language Learning). He clarified these positive attitudes an independent learning environment, collaboration, instrumental benefits, empowerment, comfort and communication.

Some studies suggested that students usually prefer to use search engines instead of e-libraries to review the literature regarding their project or home-work elicitation. Brophy & Bawden (2005) compared Google as an internet search engine with academic library resources in their study. Surprisingly, their finding showed that while Google is superior for coverage and accessibility, library systems are superior for quality of results, and that precision is similar for both systems. Finally, they concluded that using them together for a good coverage is important because both have many unique items. Lazonder (2000) investigated the novice users' training needs in searching for information on the www, noting that locating a website is more important than locating the information on a website.

Although many studies emphasize the importance of academic resources, some studies present the accessibility problems of these resources. “Despite huge efforts to position information and communication technology (ICT) as a central tenet of university teaching and learning, the fact remains that many university students and faculty make only limited formal academic use of computer technology” (Selwyn 2007). The author suggests some reasons for this situation, such as operational inadequacies on the part of students, faculty, and universities.

As a result, the findings of most studies showed that use of the internet is useful for education, in that it can supply many beneficial opportunities to find different resources. However, a basic rule should be considered while using the internet for successful research, that is, how the resources should be properly accessed by the students. Furthermore, the students must be disciplined in keeping themselves away from trap sites and entertainment in order to obtain the best achievements in their studies. This study examines both the attitudes of the university student towards the Internet use as a research tool and difference between more reliable-less accessible and less reliable-more accessible resources during their project elicitation.

INTERNET RESOURCES FOR STUDENTS

The most effective communication resources, computers and the Internet, are part of our daily life and have become one of the important tools in the education. The Internet helps transfer information between different points therefore this saturation makes the Internet a very powerful information system. People in different age groups and jobs, students and academicians who do scientific research and prepare projects prefer using the Internet because it is the easiest, fastest, and cheapest ways of accessing necessary information (Cloud, 1989).

Even though the Internet is a very important and indispensable source for students, the issue of whether the referenced source is trustworthy and/or credible, has been raised. This is because there is no control on any particular piece of information published through the Web, in opposition to the scientific and professional journals published by the scientific institutions, business world and the organizations known to the public. Additionally, other journals and books issued by commercial organizations do not have a control unit including editors and referees. Many of the sites on the Internet enable anybody to submit any kind of information without being controlled, and many of the sites known as reliable are restricted to open access for commercial purposes or security requirements (IP restriction, membership). This limits the accessibility for students and deprives them of these sites. Figure 1 explains the different resources and their accessibility for the students through the Internet.

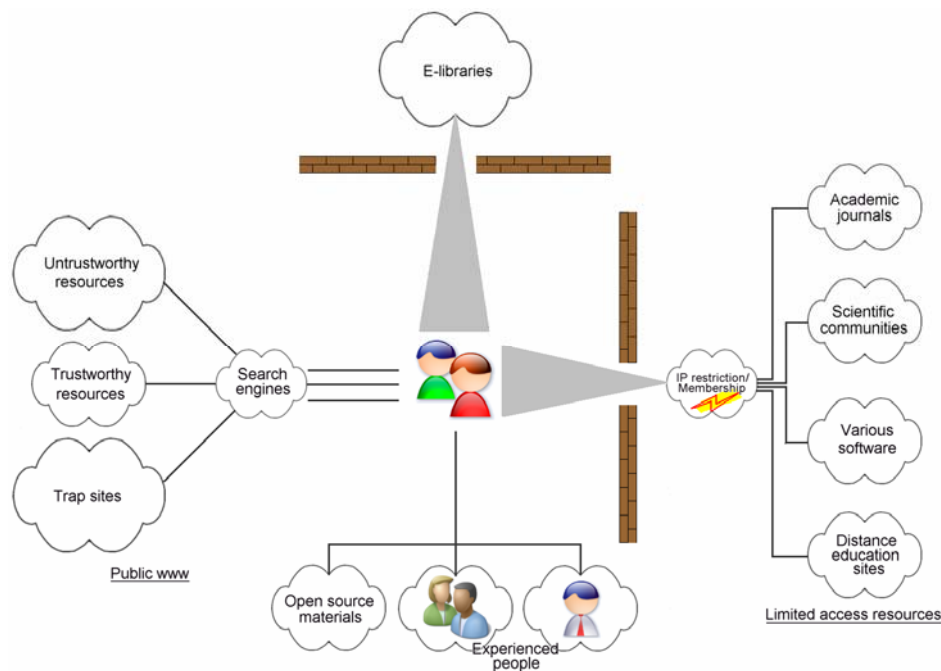


Figure 1. Resource accessibilities for student project

Many of the Internet resources qualified as trustworthy have limited accessibility as shown in the figure. Because of these constraints, information resources used by students are generally untrustworthy or students have been inaccurately forwarded.

Available Resources for the Term Projects

Methods of using academic resources, especially the ability to scan the articles for information is very important for academic research. The similarities and differences between articles on the same subject can be used to classify them for literature review. Grouping of the articles in detail helps keep the expected originality of the text in order to complete the project successfully.

Academic Journals Database

The efficiency of Academic Journals Database is related to the number of periodicals covered and the evaluation techniques of them in order to form a universal academic index. They provide a rich source of specialized information, and are widely used by many academics and students. They are an essential reference tools for these people for detailed research into different subject areas, and are grouped into subjects according to the different disciplines.

Search Engines

Search engines are open access sites and are the most widely used resources for students' projects. Many of them have open access on Internet Explorer programs, but some are customizable tools supplying multiple search engines like "Copernic". Resources which are accessed through these engines are mostly used by students for gathering the required information for their projects. Information obtained from these sites changes according to the student's level and the importance of the project content. By using different filters in the advanced search tabs, directly accessible resources provide more effective query results for specific types of documents such as documents with pdf, ppt, doc extensions. This makes it possible to access the information required or to extract unwanted resources.

However, interesting trap/pop-up sites attract the student's attention and divert them into spending time on different subjects in different sites while working on the project. A future study on the frequency of repetition and prevention of the trap sites would provide an evaluation of the factors affecting the efficiency of open access search engine sites and, indirectly, the performance of the students.

Electronic Libraries

Electronic Libraries which offer an important advantage in accessing information required from related sites are classified into two different groups: open or closed access web sites of universities, and other web sites which are completely open through the Internet. The closed sources in Electronic Libraries in universities are based on academic books and contractual journals and are completely trustworthy. These collections are ideal for the undergraduate/graduate students, researchers, and academicians. However, the reliability of open access libraries is not at a suitable level, and is approximately at the same level of reliability as the external sources that write them. The articles in libraries such as Wikipedia, which has become an official research tool can be compared with the information in other resources and this makes it more detailed and reliable. For this reason, the majority of subjects in Wikipedia are written by accessing official and private libraries, although the reliability of the article can only be judged, if the references have been well documented.

Blogs/Forums

Many students are able to access the required information by using search engines for project assignments. The majority of subjects that are listed in search engines are written blogs and forums. The information given in these links is often all that can be found and so is judged acceptable by the readers. Consequently, a comparison should be made after applying different sources and information should be confirmed. These open-access resources are often personal studies of people who are interested the subject, no matter whether they are academicians or not, and therefore, should be confirmed with other sources on the same subject written by people who are well qualified.

Distance Learning

Through the use of current advanced technologies, students can learn any time, any where by means of distance education, where the student-teacher relationship is carried out at simultaneous or different times without the need for physical proximity. The infrastructure of distance education is based on web-based training. That the current information is reliable and valuable depends on how reliable and well organized the information management of the corporation is. Information management systems should be flexible, easy to understand, dynamic, manageable, valued by people, and with a culture that supports learning.

Related Software

There are many different software programs used by different departments of university students. They are used as part of the current educational programme or related to a specific branch of science after graduation. This software includes the required information for both business life and projects. Many computer programs are for commercial purposes but must be used under license and their usage is very limited for educational purposes.

Trustworthy of the Internet resources

Internet network has eliminated the physical limits and the number of existing educational resources has increased so that it is possible to prepare assignments and projects in anyplace where the internet is accessible.

If we take into account that the steady increase and upgrade in system resources, the large quantities of control mechanisms related with the reliability of the information available is almost impossible to simultaneously implement. In order to get fresh and reliable information from the Internet, it is necessary to consider the evaluation criteria of high quality internet information. However, there is no definite standard related to this (Cebeci & Bek, 1999). In addition, the access to resources is restricted in terms of information security.

Competence of information resources, authors' experience and their academic qualifications should be considered carefully. The differences between information presented by authors who are qualified and those who are not, and issues like writing style and unity of subject matter attracts attention immediately and can be easily understood. While information from authors who are less qualified shows that it should not taken seriously.

Whether Internet resources include updated information related to the subject or not can be evaluated by looking at references of the source used from other. Current academic applications will provide a better understanding and increase the trustworthiness of the resource.

Providing an interactive web site which considers the demands and critiques of the users proves that the information on the site is reliable and can be assayed by looking at the visitors log, customer support and forums.

An evaluation can be made on 5 basic issues related with the trustworthiness and accessibility of the Internet sites:

1. Accessibility: Whether the site is available and the required information is reachable
2. Trustworthiness: Whether the contents in the site are current and correct
3. Authorship: Whether the articles and text are well written by a suitably qualified authors
4. External Links: Whether links to/from the site are reachable
5. Legitimacy: Whether everything is in accordance with the law.

Figure 2 offers a graphic showing the correlation between trustworthiness and accessibility of Internet resources.

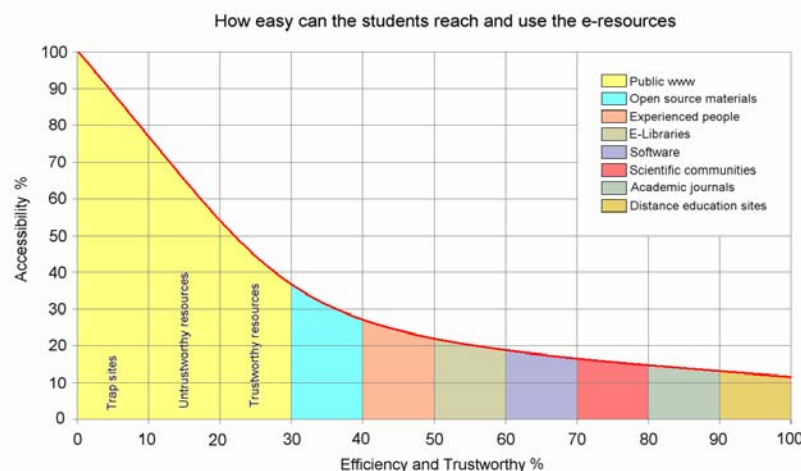


Figure 2. Correlation between accessibility and trustworthy of resources for student project

By looking at these criteria, a classification, such as that shown in Figure 2, can be made for the trustworthiness and accessibility of available sources that students can use for their project studies. The result obtained here demonstrates that resources which are easily accessible are not those which provide reliable information. Accessibility into highly reliable and credible resources is only possible with some constraints, so that it is very difficult to use these resources efficiently.

METHOD

In this study, a questionnaire was used and the effects of internet usage on students' grades were investigated. For the questionnaire, the Tourism and Hotel Management students of Yasar University (Izmir-TR) were selected, since many studies have been conducted on computer related departments' students, but there are a few studies on inexperienced university students such as Tourism and Hotel Management students.

Population and Sample

The research was conducted in Yasar University with the participation of tourism and hotel management students who took part in 2009 spring semester courses. In terms of the semester, the total number of registered students was 143, while participants of the study numbered 102. Table 1 shows the demographic information of the participants.

Table 1. Demographic Characteristics of the Participants

Individual Variables	Frequency
<i>Students Gender Distribution</i>	
Male	53%
Female	47%
<i>Students Age Distribution</i>	
20-23 years	75%
Rest	25%
<i>Students Class</i>	
Freshman	50%
Sophomore	28%
Juniors	16%
Seniors	6%
<i>Internet Access Point</i>	
From Home	70%
From Dormitory	5%
Other points (School, Internet Cafe etc.)	25%
<i>Internet Access Style</i>	
ADSL	55%
Wireless	40%
Cable	5%
<i>University E-Library permission</i>	
No	56%
Yes	44%
<i>Academic Resource Access Permission</i>	2% (over 3000 studs)

Data Collection Method & Analysis

Data was collected through a questionnaire presented by Ersoy and Aktay, 2007, with some modifications. The questionnaire includes 27 nominal, dichotomy questions (Yes or No) and 16 socio-demographic questions to assess student's attitudes towards the use of the Internet during homework and term projects elicitation phase. The questionnaire forms were completed by tourism management students during lecture hours. The frequencies were computed and evaluated, and they were presented in the regarding tables.

Data Analysis & Findings

Table 2 demonstrates the frequency of the students' trends in the use of internet resources during their term's projects studies. From these data, the internet resources used in order of priority, in term project studies are:

- Highest (1st Priority) : Search engines (Especially, Google and Yahoo)
- High (2nd Priority) : Online databases and e-magazines
- Moderate (3rd Priority) : Online-libraries, e-encyclopedias, e-books
- Low (4th Priority) : e-journals

Lowest (5th Priority) : e-mails, forums

One finding of interest obtained from the questionnaire showed that while university students frequently use email and forum/chat-line in their daily-life, they don't use them in their studies. Furthermore, many students claimed that they don't like to collaborate with their friends and interact with experienced persons for information eliciting and sharing during their study.

Table 2. Demographic Characteristics of the Participants

Using the internet sources	N	Yes(%)	No(%)
I make use of search engines for my term projects.	102	98	2
I make use of on-line databases for my term projects.	101	64	36
I make use of e-books for my term projects.	100	51	49
I make use of web-sites assignments for my term projects.	101	99	1
I make use of e-journals for my term projects.	100	37	63
I make use of on-line libraries for my term projects.	101	55	45
I make use of on-line encyclopedias for my term projects.	100	56	44
I make use of e-newspapers for my term projects.	102	68	32
I make use of e-mails received the others for my projects.	100	46	54
I collaborate with other internet users through the discussion forums on the internet for my term projects.	102	38	62

Table 3 provides the rates of the students to use their resources by blending or without questioning.

Table 3. The interpretation using sources of the students

Using the internet sources	N	Yes(%)	No(%)
I use the internet sources without making any change.	101	25	75
I blend the information which I have accessed through internet sources with other information sources.	102	88	12
I combine the information that I have accessed through internet and use it my own words.	102	82	18

In light of the information derived from the survey questions, it would seem that the majority of students try to use their own-ideas combined with internet resources, instead of using only resources from the Internet. Furthermore, some students copy-paste information from resources for writing projects and then edit the results. Attention to rules for using other sources and expectations of the student should be explained clearly by faculty members. The contents of the sources obtained by the students are given in Table 4.

Table 4. The contents of the sources obtained by students

The content of the internet sources	N	Yes(%)	No(%)
I use the text documents on the web pages for my term projects.	102	84	16
I use the images on the web pages for my term projects.	102	92	8
I use the audio files on the web pages for my term projects.	102	23	77

Together with the information obtained from this part of the survey, it would appear that the majority of students preferred visual and textual information and was used more effectively in the projects. Table 5 shows the students' views about the reliability of the sources obtained from the Internet.

Table 5. The students' view about reliability of internet sources

Reliability of the internet sources	N	Yes(%)	No(%)
I crosscheck the accuracy of information that I have accessed through internet sources with other information sources.	101	70	30
I believe the confidence of information on the internet.	99	77	23
I pay attention to the internet addresses which I have used for my term project as to having "gov" or "edu" domain suffixes.	102	41	59
I check the up to date of the sources that I have access through internet.	102	77	23
I make sure weather the documents that I have accessed through internet have an author or not.			

According to the information gathered from the survey, 70% of students compared information obtained thorough the Internet with other information resources. Besides, the preferred rate of reliable sites is about 41%. Many of students take care that these resources are up-to-date, for educational purposes, and free from bias. However these ratios are very limited in order to reflect to the projects as they are. In addition to this, most students prefer sites written in scientific language. Table 6 provides information on students preferred style of language and whether they easily accessed the information.

Table 6. Information on students preferred style of language

Access to internet sources	N	Yes(%)	No(%)
I make use of internet sources in Turkish language for my term projects.	101	72	28
I make use of internet sources in foreign languages for my term projects.	101	95	5
I have difficulty in finding proper internet sources for my term projects.	100	27	73

The majority of students preferred sites in the language of study (for participating students, this was English) rather than their mother language. The reason for this choice was because of the difficulty in finding the exact meanings of the words in their mother language.

The students' response to the different software programs used in the tourism sector (tourism automated systems) were: 1. ODEON, 2. ELECTRA, 3. NETSIS, 4. FIDELIO, 5. GALILEO. None of these computer programs are open-source. This may be because students do not like open-source software or because there is no open-source program in their field.

Result from the information obtained during the assessment process of the students indicates that they show more interest in internet resources than other sources. However, although they have limited access to reliable resources, the majority of the students try to access these resources in order to be more successful in their term projects.

DISCUSSION AND CONCLUSION

In this section, the data gathered from the questionnaire and the results of the literature reviews made by university students during their courses and projects is evaluated, and some suggestions are made. Table 7 shows some of the course scores (including the project scores, home-work scores, and final grades), and the evaluation percentages of projects and home-work on final grades.

Lecture grades obtained from the lecturers reveal some significant findings about students' home-work and project studies and their attitudes on these studies during the semester. One important finding is in 1st, 2nd, 3rd and 6th courses which have low effect (10%) on passing grades. Students took low project and home-work scores, this is because students give little importance to these courses in which project and homework marks have little impact on their final course mark. Here, an important fact can be brought out that the students use more accessible and less secure internet sites in such kind of courses because of their careless, and therefore get low marks for term projects and home-works. In most other courses where term projects required detailed investigation, and had a major effect on passing grades, we detected that the students get high marks for project and home-work and passing grades. For the purposes of our study, this was most evident in Research Methods (BUS362), because a detailed academic investigation was required of students for the term project of the course, worth 40% of the passing grade (this situation, therefore, makes the term project very important for passing from the course). This forced students to collect the term project requirements using academic and trustworthy

resources. The term project scores show an average of 74%, demonstrating that the students obtained the necessary information (elicited) from less accessible and more reliable resources.

Table 7. Project scores the effects of them on final grade

No	Class	Course Name	Code	#of Student	Project-Homework		Passing Grade
					Average	%	
1	1	Introduction to Programming	CS 115	79	31	10	47
2	1	Introduction to Programming	CS 115	42	23	10	43
3	1	Introduction to Programming	CS 115	37	40	10	52
4	1	Travel Agency and Tour Operators	VTHM 110	73	72	20	55
5	1	Travel Agency and Tour Operators	VTHM 110	34	85	20	67
6	2	Consumer Behavior	THM 208	31	31	10	77
7	3	Housekeeping Management	THM-302	19	86	25	94
8	3	Research Methods	BUS 362	41	74	40	72
9	3	Tourism Economics	THM 304	21	75	30	70
10	4	International Hotel Management	THM 408	7	94	25	92
11	4	Travel and Tour Operations	THM 402	5	74	20	77

The achievement distribution of the students according to classes shows that seniors and juniors are much more successful than freshmen and sophomores, because they are aware of term projects importance, as a result of their experiences obtained from previous classes in research methodologies.

As we previously mentioned, our study was mostly based on the questionnaire presented by Ersoy and Aktay, 2007, with some modifications. They stated that the levels of crosschecking the accuracy of the information, using scientific sites, and paying attention to internet addresses with “edu”, “gov” domains suffixes were high, hence the teachers investigate the internet resources carefully from the point of reliability for homework and project preparations. When we consider that teachers are more experienced than senior students who will become teachers soon, and the seniors are more experienced than their juniors, and so on, there would be a high correlation between experience and searching reliable internet resources to obtain more achievement from homework and projects. At this point, we found that senior students were more successful than younger class students because of their experiences acquired in previous courses about research methodologies. Furthermore, as stated in the study of D'Esposito and Gardner (1999), many of the students prefer using internet rather than classical library resources. However, the students' trends are in the direction of using both, when the satisfaction of the information source in research subjects is considered. Our results are similarly in the same direction, and show that the students accept the library resources as reliable, and many of the successful students have used reliable internet and library resources together on their homework and projects elicitation phases.

The main concern of this study is to investigate the diversity, accessibility and reliability of the internet resources used by the inexperienced university students during literature review. Initial results show that the more useful reliable information can be gathered using less accessible and more secure internet resources. Using highly accessible internet sites may give fast results but the reliability of those results can not be ensured. This does not mean that all of these sites give unreliable information, but that these should be carefully reviewed. Less accessible sites have the major disadvantage of difficult access. The negative effects of accessibility can be decreased by using university library databases for academic resources, or by allowing access privileges to students connecting to these sites from their homes.

The use of trustworthy internet resources is of vital importance for academic study, especially in higher class courses which require an academic review of the literature, accessibility problems should, therefore, be solved. University students should be encouraged to use academic and reliable resources in their term project and

homework for successful investigations. In addition to this, easy access opportunities for reliable resources should be supplied by university administrators. One solution to access problems is to give permission for connection to academic resources from the students' homes, using specific software and proxy arrangements, thus equipping students with ability to use e-journals, e-libraries, e-books, online-databases as academic resources for related courses.

REFERENCES

- Akbulut, Y. (2008). Exploration of the attitudes of freshman foreign language students toward using computers at a Turkish state university. *Turkish Online Journal of Educational Technology*, 7, 18-31.
- Barak, A. & Sadovsky, Y. (2008). Internet use and personal empowerment of hearing-impaired adolescents. *Computers in Human Behavior*, 24, 1802-1815.
- Brophy, J. & Bawden, D. (2005). Is Google enough? Comparison of an internet search engine with academic library resources. *Aslib Proceedings*, 57, 498-512.
- Cebeci, Z. & Bek, Y. (1999). İnternet Bilgi Kaynaklarının Kalitesi: Değerlendirme Ölçütleri. In *4th Internet Konferansı*.
- Chang, M. K. & Law, S. P. M. (2008). Factor structure for Young's Internet Addiction Test: A confirmatory study. *Computers in Human Behavior*, 24, 2597-2619.
- Chen, Y. F. & Peng, S. S. (2008). University students' Internet use and its relationships with academic performance, interpersonal relationships, psychosocial adjustment, and self-evaluation. *Cyberpsychology & Behavior*, 11, 467-469.
- Cheung, W. & Huang, W. (2005). Proposing a framework to assess Internet usage in university education: an empirical investigation from a student's perspective. *British Journal of Educational Technology*, 36, 237-253.
- Cloud, C. C. (1989). *Network Ethics: Access, Consent and Informed Community*. USA: Westview Press.
- Crews, M. & Feinberg, M. (2002). Perceptions of university students regarding the digital divide. *Social Science Computer Review*, 20, 116-123.
- Crouch, M. A. (2001). Using the Internet to facilitate student learning in a large therapeutics course: A three-year perspective. *American Journal of Pharmaceutical Education*, 65, 7-13.
- D'Esposito, J. E. & Gardner, R. M. (1999). University students' perceptions of the Internet: An exploratory study. *Journal of Academic Librarianship*, 25, 456-461.
- Del Castillo, J. A. G., Terol, M. D., Nieto, M., Liedo, A., Sanchez, S., Martin-Aragon, M. et al. (2008). Use and abuse of the Internet in university students. *Adicciones*, 20, 131-142.
- Ersoy, A. & Aktay, S. (2007). Prospective elementary school teacher's way of internet use while preparing their projects and homeworks. In *7th International Educational Technology Conference* (pp. 62-67). Near East University.
- Ghassemzadeh, L., Shahraray, M., & Moradi, A. (2008). Prevalence of Internet Addiction and Comparison of Internet Addicts and Non-Addicts in Iranian High Schools. *Cyberpsychology & Behavior*, 11, 731-733.
- Johnson, G. M. (2008). Verbal and visual reasoning in relation to patterns of Internet use. *Internet Research*, 18, 382-392.
- Kurt, A. A., Coklar, A. N., Kilicer, K., & Yildirim, Y. (2008). Evaluation of the skills of K-12 students regarding the national educational technology standards for students (NETS*S) in Turkey. *Turkish Online Journal of Educational Technology*, 7, 6-14.
- Lazonder, A. W. (2000). Exploring novice users' training needs in searching information on the WWW. *Journal of Computer Assisted Learning*, 16, 326-335.
- Limpach, A. L., Bazrafshan, P., Turner, P. D., & Monaghan, M. S. (2008). Effectiveness of Human Anatomy Education for Pharmacy Students via the Internet. *American Journal of Pharmaceutical Education*, 72.
- Lin, M. P., Ko, H. C., & Wu, J. Y. W. (2008). The role of positive/negative outcome expectancy and refusal self-efficacy of Internet use on Internet addiction among college students in Taiwan. *Cyberpsychology & Behavior*, 11, 451-457.
- Mohammed, J. & Al-Karaki, J. (2008). Integrating internet into traditional education: A practical study of university students' usage and attitudes. *International Arab Journal of Information Technology*, 5, 241-252.
- Odell, P. M., Korgen, K. O., Schumacher, P., & Delucchi, M. (2000). Internet use among female and male college students. *Cyberpsychology & Behavior*, 3, 855-862.
- Peng, H. Y., Tsai, C. C., & Wu, Y. T. (2006). University students' self-efficacy and their attitudes toward the Internet: the role of students' perceptions of the Internet. *Educational Studies*, 32, 73-86.
- Perry, T. T., Perry, L. A., & Hosack-Curlin, K. (1998). Internet use by university students: an interdisciplinary study on three campuses. *Internet Research-Electronic Networking Applications and Policy*, 8, 136-+.
- Recabarren, M., Nussbaum, M., & Leiva, C. (2008). Cultural divide and the Internet. *Computers in Human Behavior*, 24, 2917-2926.

- Rochester, C. D. & Pradel, F. (2008). Students' perceptions and satisfaction with a Web-based human nutrition course. *American Journal of Pharmaceutical Education*, 72.
- Rouibah, K. & Hamdy, H. (2009). Factors Affecting Information Communication Technologies Usage and Satisfaction: Perspective from Instant Messaging in Kuwait. *Journal of Global Information Management*, 17, 1-29.
- Scott, S. D., Gilmur, J., & Fielden, J. (2008). Nursing students and internet health information. *Nurse Education Today*, 28, 993-1001.
- Selwyn, N. (2007). The use of computer technology in university teaching and learning: a critical perspective. *Journal of Computer Assisted Learning*, 23, 83-94.
- Siomos, K. E., Dafouli, E. D., Braimiotis, D. A., Mouzas, O. D., & Angelopoulos, N. V. (2008). Internet Addiction among Greek Adolescent Students. *Cyberpsychology & Behavior*, 11, 653-657.
- Tahiroglu, A. Y., Celik, G. G., Uzel, M., Ozcan, N., & Avci, A. (2008). Internet Use Among Turkish Adolescents. *Cyberpsychology & Behavior*, 11, 537-543.
- Wainer, J., Dwyer, T., Dutra, R. S., Covic, A., Magalhaes, V. B., Ferreira, L. R. R. et al. (2008). Too much computer and Internet use is bad for your grades, especially if you are young and poor: Results from the 2001 Brazilian SAEB. *Computers & Education*, 51, 1417-1429.
- Warschauer, M. (1996). Motivational aspects of using computers for writing and communication. In Mark Warschauer (Ed.), *In Telecollaboration in foreign language learning: Proceedings of the Hawai'i symposium*. (Technical Report #12), (pp. 29-46).
- Wen, M. L. & Tsai, C. C. (2006). University students' perceptions of and attitudes toward (online) peer assessment. *Higher Education*, 51, 27-44.
- Wu, Y. T. & Tsai, C. C. (2006). University students' Internet attitudes and Internet self-efficacy: A study at three universities in Taiwan. *Cyberpsychology & Behavior*, 9, 441-450.
- Yeh, Y. C., Ko, H. C., Wu, J. Y. W., & Cheng, C. P. (2008). Gender differences in relationships of actual and virtual social support to Internet addiction mediated through depressive symptoms among college students in Taiwan. *Cyberpsychology & Behavior*, 11, 484-487.

THE USE OF THE INTERNET IN MEDIA EDUCATION

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ABSTRACT

The Internet has become the main information and data provider since its appearance at the end of the 20th century. Currently, all over the world, universities, as the main generators and consumers of information, stand at the top of the privileged organizations that have access to the Internet. Hence, being a tertiary student means not only having easy, quick, and cheap, even in most places free, access, but also being bombarded with information. This led to a considerable body of research into the attitudes and habits of using the Internet by the university students in the world as well as Turkey and North Cyprus.

The present study sets out to explore the attitudes of students, studying at the Faculty of Communication and Media Studies, Eastern Mediterranean University, towards the use of the Internet as a source/tool for obtaining information for their course work, communication and otherwise. Data have been collected through a questionnaire designed in two parts: the first part seeks to collect information about the participants' genders, ages, departments, the year of studies, and their practice related to the use of the Internet and the second part related to their attitudes towards the use of various aspects of the Internet. The results indicate that students hold a positive attitude towards the use of the Internet both for academic and communication purposes. The Internet is considered as the best and fastest information provider and is necessary for tertiary students. Both the lecturers and students should have web-sites. They are, however, undecided about the trustworthiness of the information they find on the web or printing everything they find on it before reading. Furthermore, they are undecided about the fact that the Internet makes them feel lonely. The students also stated that they are undecided about online shopping, online banking, playing games on the Internet rather than doing any other hobby.

Keywords: Internet, tertiary media education, students' attitudes

INTRODUCTION

The Internet, a huge collection of computers connected to each other with networks within a single enormous net throughout the world, constitutes the largest electronic network (Warf and Grimes 1997). Nowadays, not only PCs or laptops but also netbooks, palms, personal digital assistants, mobile phones, even MP4 players and game consoles can connect to it in order to reach a digital medium of communication. The 'Internet' is used to refer to two things: "a technical infrastructure of computers and other digital devices permanently connected through high-speed telecommunication networks, and the forms of content, communication, and information sharing that occurs through these networks" (Flew, 2002:12).

In relation to the second meaning, the Internet provides easy access to information and communication. What is more, it lowers not only the cost but also the time needed for reaching the information. On the other hand, selecting the 'right' or 'good quality' information has become an issue. It also enables people to interact with each other (Kitchin 1998). On the Internet, like everything else, there is a wealth of information about the Internet. A Google search conducted in August 2009 indicated that there were approximately 1 610 000 000 entries about the Internet; about 332 000 000 about the history of the Internet; and in relation to the Internet and education, there were 310 000 000 sources. In addition to this bombardment of information, easy and cheap/free access to it demand different skills from 'read and digest' type of reading required in traditional education. On the Internet, there are also numerous articles on the use of the Internet in higher education. These articles have been written parallel to the developments in information technologies. The present study sets out to present a brief history of the Internet, the role of the Internet in tertiary education, particularly in media education, review of research related to the use of the internet in Higher education in the world, Turkey and North Cyprus. The results of a survey conducted with the students studying at the Faculty of Communication and Media Studies at the Eastern Mediterranean University.

A brief history of the INTERNET

The Internet was initially originated during the cold war, in the second part of the 20th century, for a network of 4 computers designed for military purposes by the US Department of Defense. This system was called Advanced Research Projects Agency Network (ARPANET). It was designed as a precaution against the nuclear attack

threats of the Soviet Union. These four computers communicated in separate computer networks (Gümüş 2004). Later, Local Area Networks (LANs) were developed and started to function by Transmission Control Protocol (TCP)/ and Internet Protocol (IP). The LANs were connected to Wide Area Networks (WANs) (ibid). It was in the 1990's that with the WWW (World Wide Web), the Internet gained its actual meaning (Flew 2002). Indeed, Jordan (1999:42) summarizes the developments in the early 1990's as: "Web pioneered in the 1990's, launched on the Internet around 1992 and had become widely adopted by 1994". This is due to the Hypertext Transfer Protocol (http), which led to the formation of the web-pages in its actual sense. The significant features of the Web can be summarized as: multimedia capability; hypertext principles; search engines; hypertext transfer protocol (Fleur 2002). Recently peer to peer (P2P) file sharing facility has been added to it.

WWW facilitated things like storing multimedia data as hypertext documents, on-line graphics, sound, moving pictures and the text (Cairncross 2005). What is more, through the WWW, people easily have access to enormous amount of information. The "search engines" such as Google, Yahoo, and Alta Vista provide access to data and information easily and quickly. Furthermore, one material can pave the way to the other related materials.

The Internet also added variety and facilitated personal communication through e-mail, chat programs and friendship websites. The forms of communication hold in the Internet medium are summarized as:

- One-to-one asynchronous communication (such as e-mail),
- Many-to-many asynchronous communication (Usenet, electronic bulletin boards),
- One-to-one, one-to-few, one-to-many synchronous communication (multi-user dungeons, chat rooms),
- One-to-one, one-to-many, many-to-one asynchronous communication (according to the need of the receivers, like web-sites) (Morris & Ogan 1996).

The Internet, higher education, and media education

In the 1960's, McLuhan drew our attention to the fact that, the media would convert the world into 'a global village'. This dream was realized, to a large extent, in the 1990's with the Internet. In the 'global village'; people have access to information without the boundaries of time or place. Indeed, the emergence of the Internet and its establishment has initiated discussions in higher education. Baer (1998:1) points out that:

Now the Internet is being proposed as the preferred technology to improve instruction, increase access, and raise productivity in higher education. College and university instructors now routinely post their syllabi and course readings to the World Wide Web. A few use lectures and other instructional materials available on the Web in their own courses. A growing number of schools offer at least some extension or degree-credit courses over the Internet.

In "Trends in Educational Technology", as the second trend, Ely states: "The Internet has become a major source of information for students and teachers. In higher education, the use of the Internet to deliver instruction has been steadily growing" (Ely 2002:9). Quoting Gilberts, Ely mentions that: "this calls for a major shift toward 'learner-center' education". Ely (2002:11) sees some problems like the hesitation of the professors to change, reluctance of the professors to keep up with the technology, unwillingness of the institutions to provide sufficient personnel and financial assistance to cope with technology. Despite all these, the Internet has become the major source of information in higher education. Indeed, a research by the Pew Internet & American Life Project points out that the college students not only start using the internet very early but they also use it extensively (Jones, 2002). The study argues that the college students are more frequently online, check their e-mails, download music files and use instant messages in addition to using the internet for fun (surfing the Internet). Moreover, the study suggests that the Internet has contributed to the education of the tertiary students. The Internet has been used for communicating with their professors, conducting research and preparing projects with their peers and getting academic-oriented e-mails. Furthermore, it is reported that the Internet has altered the social life of the college students on campus. Jones (2002) further reports that college students use the Internet for social communication, entertainment, being in touch with friends and family.

Based on these developments and potential promises, the Internet has been considered to initiate a 'paradigm shift' in education (Goetz 2004:2). Similarly, Barr and Tagg (1995:12-14) suggest that:

"A paradigm shift is taking hold in American higher education. In its briefest form, the paradigm that has governed our colleges is this: A college is an institution that exists to provide instruction. Subtly but profoundly we are shifting to a new paradigm: A college is an institution that exists to produce learning. This shift changes everything. In the Instruction Paradigm, the mission of the college is to provide

instruction, to teach. The method and the product are one and the same. The means is the end. In learning paradigm, the mission of the college is to produce learning. The method and the product are separate. The end governs the means.”

In addition to Internet’s role as information provider in conventional on-campus higher education; it has also been used as a tool for distance education. Based on the innovations, it has even been suspected that the Internet would replace the universities. Hundt (1999), for example, quotes a colleague who lists the function of the universities as four: firstly, as the owner of the libraries; secondly, as the place where academicians meet; thirdly, as the institutions that give degrees and fourthly as the places for contemplation. However, the Internet, currently, can fulfill all of these functions, and thus, can replace the universities. Miller (2001) further suggests that America’s college class of 2001 indicates that almost 100 percent of the college students are connected to the internet. The college students “may well be more literate, creative, and socially skilled because of their early familiarity with the internet, including trying out various aspects of their developing identity online” (Rice, 2001: 124).

However, there are reactions against the dominant role of the Internet in education. Baer (1998:18) argues that “learning from the Internet will complement rather than supplant on-campus traditional higher education ... the Internet may not transform higher education, at least for the foreseeable future, but it will enrich the educational choices generally available to all categories of learners”. Similarly, Daniel (2000) argues that:

“The Internet is such a remarkable technological advance that we must devote our best intellects to ensuring that it promotes, rather than undermines, the millennial ideal of the university. If we do our job well the internet could indeed become the most revolutionary innovation in education since the invention of printing with movable type”.

In addition to facilitating the provision of information, new communication technologies and the Internet also altered the style of communication. In other words, the type of mass communication from one-to-many changed to many-to-many. By removing the boundaries of time and place, the Internet has also lifted the boundaries that stood in the way of reaching the information. This also altered the traditional meaning attached to the ‘media’ as the provider of one-way information from the writer/ designer/ producer to the audience. “Good quality’ or ‘reliable’ sources created ‘gatekeepers’ for ‘quality sources’. On the other hand, the facilities of the new information technologies have influenced the media not only economically and politically, but also, both locally and globally. In other words, as the boundaries of communication disappear, the cost of the media companies’ fall, and, as a result rich media patrons start to monopolize the media institutions. This promotes the Internet as being the only medium to which everyone can contribute. Media students not only have information and skills of using the Internet but also the background information about the media and the construction of the media texts, and, therefore, should be well equipped about the information included in the messages and be able to discard the unwanted/junk information.

On the one hand, some writers emphasize the significance of the Internet as the provider of the fast, cheap and easy access to the information; on the other hand, reliability of the information found on the Internet has been challenged. Some writers even claim that the Internet has become ‘a dustbin of information’ (Çelik and Karaaslan 2005). Therefore, the tertiary students are in the need of been trained in order to develop their ability to select the necessary and appropriate information from the Internet.

Research into the Use of Internet by Tertiary Students in the World, Turkey and North Cyprus

At the beginning of the new millennium, higher education literature is bombarded with articles related to the use of the Internet by university students all over the world, in Turkey and North Cyprus. Some of these studies are given below in chronological order.

Perry et. al. (1998) research into the possible differences among attitudes of the university students in the South-Eastern USA towards the Internet according to the age. They report that all university students, at any age, use the Internet regularly. Crews and Feinberg (2002) report the results of research conducted in the USA on university students who live in the urban, rural and suburban areas. Their findings indicate that difference in means show a medium effect size between the times of week urban students access the Internet when compared to rural students. Similar results are observed for the difference in means between the perceptions of the students with regard to the item that the social service applications are crucial in rural areas. It is suggested that the rural areas are somehow left behind in relation to the “information superhighway”.

Selwyn, Marriott and Marriott (2000) report a study “Net Gains or Net Pains? Business Students’ Use of the Internet”. The study is conducted with 77 students from two different universities in the UK. They look at the factors that make students use the Internet in the university. Four aspects that are identified are as follows: 1) the ways the students are introduced to the Internet; 2) operational problems faced when using the Internet as a source of information; 3) the ways they treat the information they find on the Internet; and 4) social aspect of learning on the Internet. A study on the Internet use of the second year undergraduate students conducted in Malaysia by Hong, Ridzuan, Kuek (2003) shows that students have positive attitude towards the Internet as a learning tool, they have adequate fundamental knowledge of the Internet, and consider their learning environment as supportive for learning.

A research on the “Internet Awareness and Use in the University of Ghana” conducted by Badu and Markwei (2005) conclude that all academic staff and postgraduate students at the University of Ghana are aware of the Internet resources, particularly the email and WWW. What is more, these are the most used sources. However, the frequency of use is very low. The participants note that they use discussion groups and use net both for social and research purposes. Yet, library stands as the main source of information for research.

Peng et. al. (2006) conduct a study on the tertiary students’ perception of the Internet. They confirm that university students have positive attitude towards the Internet and adequate Internet self-efficacy. They further suggest that these students see the Internet as a functional tool/technology. In their study, they report that male students rate higher in their positive attitude towards the Internet than their female peers. What is more, those students who consider the Internet as a leisure tool demonstrate more positive attitudes and communicative self-efficacy than students who use the Internet as a functional tool. In regard to the Internet perceptions, male students consider the Internet as a toy, females, on the other hand, consider it as a tool.

Bon (2007) reports the results of a study in Africa. She explores whether the Internet in university education in Africa has an impact on social and economic development and recommends that African countries need good and inexpensive Internet services in order to become “information societies” universities should collaborate in order to enhance the information and communication technologies for society.

Luan et. al. (2008) look at the gender differences in the use and attitudes of the university students in Malaysia. In the study, male and female student teachers’ reaction to the Internet is sought. They find that there is no gender disparity in Internet usage. Their results contradict with other researchers. They maintain that regardless of gender, student teachers have positive attitudes toward the Internet.

Ogan, Ozakca, Groshek (2008) conduct a study in Indiana University in the USA about embedding the Internet in the lives of tertiary students. The findings suggest that the university students use the Internet more than 4 hours a day. All the students regard a positive impact of the Internet on their lives. For the news and information, 64% of the students prefer to consult Internet sources rather than offline sources. For political discussions, however, most of the respondents prefer offline discussion to those conducted online.

In addition to Badu & Markwei (2005) and Bon (2007), Rena (2008) reports the results of a study conducted in Africa. It is suggested that in order to become “information societies”, African countries are in need of cheap Internet. Universities should be conscious about their significance in the development of their societies.

Selwyn, N. (2008) conduct a study on the differences of the undergraduate students’ use of the Internet. 1222 students in higher education in the UK participated in the study. Findings suggest that students’ academic use is more strongly associated with the lines of gender and subject specialism rather than any other individual characteristics or differences in technology access. What is more, the findings suggest that the Internet is used for communicative purposes such as e-mail, chat room, blogging more than reaching information for educational purposes.

Gras (2009) reports the results of research that was conducted in Spain on 5169 students. It is concluded that ICT altered all aspects of social life but university students and digital illiteracy is almost nonexistent. Internet is mostly used as a source of information, then as an entertainment provider.

Young (2009) conducts a research with 752 Australian university students use of the Internet for communication, recreation, information, production, and transaction activities on the Internet. It was found that the Internet is used mainly for communication and information-seeking purposes. Production technologies, on the other hand, are used less.

In a similar vein, in the Turkish context, research articles related to the Internet and tertiary education proliferated recently. Dursun, (2004) makes a study in Malatya, Turkey on the aims of the tertiary students for using the Internet. 311 students responded point out that the majority of the university students learn how to use the computer and the Internet on their own (52.4%) rather than learning it in schools. He suggests that there should be an increase in the milieu in which students can use the computer and the Internet. Students use the Internet mostly for communicating via e-mail, obtaining online news and following the media. The Internet is least used for gaining money from the Internet. In relation to education, the Internet is mostly used for research and doing home work and least for distance education.

Rüzgar (2005) carries out a survey in Marmara University in Istanbul among 744 students. He points out that 52 % of tertiary students use the Internet for 6-20 hours per week. Most of the students indicate that the primary reasons for using the Internet is to make use of the Internet services.

In another study, Toprakçı (2007) investigates the profiles of the university students in Turkey concerning the study purposes. He concludes that the most frequently used activities are: e-mail (59.2%), study (49.1%), news (41.7%), chat (32.2%), games (29.2%), sports (26.9%), shopping (16.9%), travelling (14%), finance (10.6%), pornography (9.7%), and betting–gambling (8.7%).

Ceyhan & Ceyhan (2007) reports a research they conduct on the problematic Internet usage behaviors of the Turkish university students. They find that male students' problematic Internet behavior is significantly higher than the female students. What is more, academically less successful students have significantly higher problematic Internet behavior than the successful ones. Furthermore, they observe that as the students' average Internet usage time per week increased, problematic Internet usage increased simultaneously. Problematic Internet usage also differs according to the students' reason for using it.

Aydın (2007) conducts a research with the EFL students in Balıkesir University in Turkey. He points out that those students who have their own computers have more positive attitudes towards the Internet as a universal library. He lists considering the Internet as a universal library, the fastest way to teach knowledge, a tool that creates close relationships among societies, a tool used for an effective training, a tool for research, an information provider, a tool for exchanging cultures and a facilitator of positive attitudes towards life. What is more, university students disagree that the Internet does not provide unnecessary or non-useful information. They do not consider it as a threat for societies or consider it as a source of cultural dilemma. On the other hand, they think that the Internet separates them from real life, creates addiction, and makes people feel lonely. Likewise, they think that the Internet does not establish settled friendships or endless freedom for people or socialization. Also, they do not agree that shopping is a safe activity on the Internet.

Tekinarslan (2009) investigates Turkish university students' perceptions of the WWW as a learning tool. He points out that among the Turkish undergraduate students, research is the most common activity (86.3%) followed by e-mail (76.3%) while shopping (18.3%) is the least popular activity. The results show similarities with the findings of the study conducted in Malaysia by Sam et. al. (2005) and Luan et. al. (2005).

In a study conducted at the Eastern Mediterranean University in North Cyprus, İşman and Dabaj (2004) suggest that both the undergraduate and graduate students had positive attitude towards the Internet. Most importantly, students consider the Internet as a universal library (76.6%); as a tool that provides easy life (69.9%); the fastest way to reach knowledge (67.6%); a digital place that creates close relationships among societies (51.4%). They suggest that foreign language used on the Internet is not an obstacle for using the Internet; the Internet is a digital medium that links societies; and it provides easy life. İşman, Dabaj and Gümüş (2006) conduct a research about the Internet addiction at the Eastern Mediterranean University, North Cyprus with graduate students and PhD candidates. Their results show that despite the fact that North Cyprus is a developing country, these students use the Internet heavily for getting information.

The present study sets out to explore the Internet use and the attitudes of the tertiary media students studying at the Faculty of Communication and Media Studies, at the Eastern Mediterranean University located in North Cyprus towards the use of the Internet not only as a source of information but also as a tool of obtaining information for the academic projects. In this context, the Internet has been used as a supplement to the traditional, on-campus education. Some lecturers post their lecture notes on the Web. Posting course descriptions on the Web was advised to the lecturers in the 2005-2006 academic year's Spring Semester. However, for the course work, students are encouraged to use the sources found on the Internet in addition to the printed material.

METHOD

For the present study, quantitative methodology was used. The study was conducted at the Eastern Mediterranean University's (EMU), Faculty of Communication and Media Studies (FCMS). Data was collected through a questionnaire consisting of two parts: in the first part, information about the students (like their field of study, age etc.) and the way they use of the Internet was sought. In the second part, the attitudes of the students towards the Internet and the information obtained from it were explored. For this part, questions were written according to the five-point Likert Scale. In this study, values attached to the choices are as follows: 1=Strongly Agree, 2= Agree, 3=Undecided, 4=Disagree, 5= Strongly Disagree. The scale division Balci (2004) recommends has been used as follows: (1-1.79) Strongly Agree; (1.80- 2.59) Agree; (2.60- 3.39) Undecided; (3.40- 4.19) Disagree; (4.20- 5.0) Strongly Disagree.

The sample for the study was drawn from the junior and senior students of the three Departments of the Faculty of Communication and Media Studies, which are; the Public Relations and Advertising, the Radio Television and Film and the Journalism. Initially, the researchers carried out semi-structured interviews. Data obtained from these interviews were used in constructing the questionnaire, which was the main data collection instrument of the study. Approximately 10% of the student population of the Faculty of Communication and Media Studies participated in the study. 100 students were selected randomly from the junior and senior students and were asked to fill the questionnaire forms. The research participants were selected from the junior and senior students on purpose to ensure that they had reasonable experience as the students studying media. For analyzing the data, SPSS program and descriptive statistics were used. The alpha coefficient of reliability level for the instrument was 0.8469 indicating that the instrument is reliable.

ANALYSIS AND FINDINGS

Out of the 100 students, 62 (62%) were males and 38 (38%) were females. One student did not mention his/her gender. 3% of the participants were in the age gap 17-19, 45% were between the ages of 20-22, 42% were 23-25 years old, 10% above the age of 25. According to the departments they are studying, 65 of them were from the Public Relations and Advertising, 28 were from the Radio Television and Film and 7 of them were from the Journalism Department. These numbers approximately reflect the ratio of the students studying in these departments.

The senior year students were 53% and the students in the freshman, sophomore and junior year were 47% of the sample. The majority of the sample was from Turkey (58%), followed by students from North Cyprus (38%), and the rest (4%) were from the various countries of the world. These numbers also reflect the ratio of the country of origin of these students.

Following the demographic information, the participants were asked whether they used the Internet or not. 98% of the participants replied this question in the affirmative. 49% of the research participants stated that they mostly used the Internet at home, 28% at the net cafes and 21% at the university. This suggests that the students at the Faculty of Communication and Media Studies have access to and use the Internet to a large extent.

The students were also asked for how long they had been using the Internet. The majority of the participants had been using the Internet for more than 5 years. 35% between 3-5 years. 13% for 1-2 years and the rest had been using it less than a year (6%). These findings suggest that the younger generation have been exposed to the Internet at a very early age.

In relation to the main reason for using the Internet, 41% stated that they used the Internet for conducting research for school-related projects; 23% for sending and receiving e-mails; 10% for chatting and 10% for playing games. Using the Internet to obtain the news was not very common as the main reason for using the net among the media students. Furthermore, whether the students got the daily news from the Internet was also explored. 31% of the students preferred to check the news every day from the Internet, 24% once a week, 21% twice a week 9% once a month. 14% of the respondents indicated that they had never used the Internet to obtain the news. This suggests that the students studying at the Faculty of Communication and Media Studies do not consider the Internet as the main source of daily news.

Among the tertiary students studying at the Faculty of Communication and Media Studies, the most common Internet package was the Superonline (48%); followed by the Net House. The students were also asked how many of their lecturers kept their course notes on the Internet. 53% said that only a few of their instructors kept their notes on the Web. The next question sought to clarify whether the students were willing to see the course materials of their teachers on the Internet. 72 % of the participants replied this question in the affirmative.

Hence, it could be concluded that the respondents strongly agreed on the usefulness of having the lecture notes on the Internet.

The most popular search engine among the students is 'Google' (79%); followed by 'Yahoo' (15%); 'Altavista' (3%) and 'Arabul' (3%) are the least popular search engines. The students were asked the duration of time they spent on the Internet every day. The majority of the respondents (44%), spent 1 or 2 hours; 26% spent 3 or 4 hours; 13% spent 5 hours or more; but the rest (17%) spent less than one hour on the Internet every day. What the students did after reaching the information they wanted was another question asked. The majority (57%) claimed that they 'copy and paste' the information they found; followed by 'read and select' (36%) and 'cite' the information they had found' (6%).

When the students were asked how often they went to the net cafes, the majority (28%) stated that they visited the net cafes once a month; 17% every day, 15% twice a week; 9% once a month. 14% of the respondents indicated that they had never gone to the net cafes. The students were also asked how much time they spent on the net cafes. 37% stated to have spent 1-2 hours; 20% 3-4 hours, 4% more than 5 hours. 26% stated that they spent less than one hour every day.

The research participants were asked questions about the role of the Internet as information provider. Table 1 summarizes the averages of questions about the Internet as an information provider.

Table 1: Internet as an information provider

Statements	Mean	Attitude
1. I use the Internet as the main information provider because it is easy to reach.	2.01	A
2. I prefer doing research for my projects on the Internet rather than going to the library.	2.16	A
3. The Internet works as a digital library.	1.83	A
4. The Internet is the fastest way of reaching information.	1.84	A
5. The Internet provides unnecessary information as well.	2.77	U
6. I not only use the Internet to receive information but also respond to the information provided.	2.26	A
7. Information obtained from the Internet is enough for me for doing my projects.	2.37	A
8. The Internet is the best information provider.	1.84	A
9. On the Internet, there is a lot of unnecessary information.	2.53	A
10. When I search for certain information on the Internet, I print everything before reading.	2.80	U
11. The information I get from the Internet is trustworthy.	2.87	U
12. Instead of getting the information that already exists, I subscribe to the necessary sites.	1.96	A
13. Rather than books, I prefer to get the information from the Internet.	2.11	A
14. At the university, students should be given projects based on the Internet.	2.34	A

Number of respondents (n= 100), A stands for 'agree'; U stands for 'undecided'.

Table 1 indicates that the tertiary media students agree with the role of the Internet as the best and the fastest information provider since it is easier to reach information as a digital library. The results indicate that they prefer to get information from the Internet rather than books. They further agree that the Internet is enough as a source for doing projects and that university students should be given projects based on the Internet. They not only receive information but also respond to the information provided and they subscribe to the necessary sites. They are, however, undecided about the necessity or trustworthiness of the information accessed through the Internet. For dealing with the information they reach, they are undecided about printing everything they found before reading. Since they do not disagree with this statement it may suggest that they lack the necessary skills like skimming and scanning that can be used for eliminating the unnecessary information.

Students studying at the FCMS at EMU were also asked questions on the role of the Internet as a communication tool.

Table 2: Internet as a communication tool

Statements	Mean	Attitude
1. I prefer e-mail to establish contacts with my friends (students) and teachers.	2.18	A
2. Chatting programs such as MSN and ICQ are necessary for me.	1.90	A
3. The Internet makes me lonely.	3.00	U
4. Internet is the best mass communication device.	2.15	A

5. The Internet connection should be kept open for 24 hours a day.	2.32	A
6. I receive a lot of junk mail on my e-mail.	2.33	A
7. I read every e-mail I receive.	2.49	A
8. I delete the mails of the people I don't know.	2.53	A

Number of respondents (n 100)

Table 2 presents the averages of the responses given in relation to the use of the Internet as a communication device. Above all, they agree that the Internet is the best mass communication medium and they should have 24 hours access to it. They further agree that they use e-mail and chatting facilities presented by the Internet. They receive a lot of junk mail and they read every e-mail they receive. However, they delete the mails of the people they do not know. Since e-mail is a personal means of communication, they probably eliminate the mails that do not appeal to them. They are undecided whether the Internet makes them lonely. It seems that the students studying at the Faculty of Communication and Media Studies do not consider the Internet as something that makes them feel lonely, on the contrary, they socialize through the Internet.

The students were also asked questions about their attitudes towards the Internet as a student, facilities of the Faculty and the use of the Internet in general.

Table 3 Attitudes towards the Internet

Statements	Mean	Attitude
1. I prefer on-line shopping to traditional shopping.	2.87	U
2. I do banking on-line.	3.04	U
3. I prefer playing games on the Internet rather than doing any other hobby.	2.72	U
4. EMU computer laboratories provide fast and easy access to the Internet.	2.77	U
5. The Internet is important for the students studying at the Faculty of Communication and Media Studies	1.90	A
6. In time, the Internet creates addiction.	2.33	A
7. It is not safe to do shopping on the Internet.	2.73	U
8. It is good to download music from the Internet.	1.99	A
9. It is good to download films from the Internet.	2.10	A
10. Every student should have access to the Internet.	2.08	A
11. University students should have a web-site.	2.56	A
12. The Internet is the best entertainment provider.	2.18	A
13. The Internet must only be used in our free times.	2.34	A
14. Lecturers should have a web-site.	2.05	A
15. I do like and prefer online registration.	2.47	A

Number of respondents (n 100)

The results suggest that students show agreement with the facilities they use and are undecided about what they are not very familiar with (such as online shopping or banking). They are also undecided whether they prefer playing games on the Internet to any other hobby. Besides, they are undecided about the fast and easy access provided by the computer laboratories of the university. However, they agree that the Internet is significant for the media students. Also, they point out that both their lecturers and students themselves should have web-sites. The Internet is considered to be the best entertainment tool to which every student should have access. The Internet is considered to make addiction and should only be used at their leisure. It is used for downloading films, music, books, games, and programs. Moreover, the respondents indicated agreement with doing their registration online.

Two significant issues seem to emerge from the data. Firstly, the Internet infrastructure should be updated. Since the technology develops fast in our day, it seems that the universities should be able to provide the best infrastructure to their students. Secondly, the tertiary students should be guided through not only till they reach the information, but also about what to do when they reach the information on skills like skimming, scanning, quoting and paraphrasing. They need to be able to discard the junk information and get on with what is reliable. Agreement with the statement that they subscribe to the related web-sites indicates that they are conscious about the junk they may encounter on the Internet when looking for information.

CONCLUSION

In conclusion, the data collected for the study suggest that the tertiary media students widely use the Internet both as a communication device and as an information provider. In general, they agree with the facilities of the

Internet they are familiar with. They are, however, undecided about the uses of the Internet that they are not so familiar with. In relation to communication, they are aware of the existence of the Internet as a mass media tool. They use the Internet both for e-mail and chat programs. They suggest that they eliminate also eliminate the junk mail.

The data suggest that, in addition to using the Internet as a source of information, Communication and Media students also use it as a tool of communication. As it has been noted above, tertiary students consider the Internet as the main information provider and sufficient source for their school projects. They prefer doing research for their projects on the Internet rather than visiting the library. They consider the Internet as the fastest way of reaching information. Research participants point out that they not only use the Internet to receive information but they also respond to the information they find on the Internet. Moreover, they agree that they should be given projects based on the Internet. They admit that on the Internet, there is a lot of unnecessary information but are undecided whether to consider the Internet as 'unnecessary information provider'. However, it is suggested that when they reach the information, rather than reading, understanding, quoting or eliminating the unwanted information the students simply print it. This may be a global problem. However, in this context, where the medium of instruction is English, a foreign language to the students; language barrier makes the issue even more complicated. The students, thus, need to be trained not only in skills (like skimming, scanning, eliminating unnecessary information) but also with the language.

When the students consider the Internet as a communication tool they point out that it is the best mass communication tool and they should have 24 hour access to it via computers. They prefer e-mail to establish contacts with their friends and family. Chatting programs such as MSN live messenger and ICQ are necessary for the respondents. The Communication and Media Faculty students claim that they receive a lot of junk mail. They point out that they delete the mails of the people they are not familiar with. They participants are undecided whether the Internet makes them lonely probably because they socialize through the Internet. This is their means for keeping in touch with their friends and family.

When the students attitudes towards the Internet are explored they seemed to show agreement with the activities they are familiar with and are undecided about the ones they are unfamiliar with such as on-line shopping, on-line banking, playing games on the Internet rather than doing any other activities. They agree that Internet creates addiction, it is a good source for downloading music and films. The Internet is considered to be the best entertainment provider. They agree that both the students and the lecturers should have web-pages.

In conclusion, the media students need to be made more conscious about handling the information they reach on the Internet and be trained about how to deal with the enormous amount of information they have access to through the new technologies. Indeed, McMillan & Morrison (2006) draw our attention to the fact that young people should be trained. In other words, "media literacy programs are needed to help young adults critically evaluate and sort through information available on the web. While young people should be encouraged to explore new views and expand their worlds, they should also be educated in how information is assembled and disseminated and how persuasive arguments are framed around information" (McMillan & Morrison, 2006). In the new millennium, an era in which new communication technologies and advancements have been continuously taking place, and new wants are formed as a result of these developments, a different approach to education is required. Indeed, it is suggested that: "Maximizing technology's effectiveness requires well-trained and supported faculty who can use the Internet as a major component of the teaching and learning process. Government policy needs to be certain that these institutions, and the students they serve, are not left behind the Internet explosion" (Merisotis, 2001:12).

Indeed, Uşun (2003) recommends that:

We must not see the Internet as the key to solve the problems of Turkish education. The Internet is not a key or unique source, but it is only supportive, effective and interactive communication technology in distance education to move Turkey into the 21st century named "information age".

Since the education system in North Cyprus is very similar to Turkish education system, Uşun's recommendation well applies to the education system in North Cyprus.

REFERENCES

Aydın, S. (2007). Attitudes of EFL Learners towards the Internet. *The Turkish Online Journal of Educational Technology – TOJET*. Vol. 6. No:3. Article 2.

- Badu, E. E., Markwei, E. D. (2005). Internet Awareness and Use in the University of Ghana. *Information Development*. Vol. 21. No: 4. pp. 260-268.
- Baer, W. S. (1998). Will the Internet Transform Higher Education? *The Emerging Internet*, Annual Review of the Institute for Information Studies, Charles M. Firestone, Program Director. 1998, Institute for Information Studies. Retrieved from: <http://72.14.203.104/search?q=cache:-Z8Pdm0GIO4J:www.rand.org/pubs/reprints/RP685/...>
- Barr, R., & Tagg, J. (1995). From Teaching to Learning. *Change*. 27(6), 12-25.
- Bon, A. (2007). Can the Internet in Tertiary Education in Africa Contribute to Social and Economic Development? *International Journal of Education and Development Using Information and Communication Technology (IJEDICT)*. Vol.3, No: 3. pp. 122-131.
- Cairncross, F. (2005). The Trendspotter's Guide to New Communications. *Living in the Information Age*, edited by Bucy, E. P. Canada: Wadsworth Thomson Learning, pp. 7-11.
- Ceyhan, E., Ceyhan, A. (2007). An Investigation of Problematic Internet Usage Behaviors on Turkish University Students. Paper presented at the *International Educational Technology Conference (IETC) TRNC 3-5 May 2007*.
- Crews, M., Feinberg, M. (2002). Perceptions of University Students Regarding the Digital Divide. *Social Science Computer Review*. Vol. 20. No: 2 Summer. pp.116-123. Sage Publications.
- Çelik, T., & Karaaslan, E. (2005). *İnternet Toplumu Oluşum Süreci*. Retrieved June 20, 2005. <http://inter-tr.org.tr/inetconf9/bildiri/45.doc>
- Daniel, J. (2000). The Internet and Higher Education: Preparing for Change. *The Internet Revolution Conference*. Retrieved from: <http://www.open.ac.uk/Johndanielspeeches/IntEdRev.html>
- Dursun, F. (2004). Üniversite Öğrencilerinin İnterneti Kullanma Amaçları. *XIII. Ulusal Eğitim Bilimleri Kurultayı, 6-9 Temmuz 2004 İnönü Üniversitesi, Eğitim Fakültesi, Malatya*.
- Ely, D.P. (2002). *Trends in Educational Technology*. 5th ed. ERIC, Educational Resources Information Center.
- Flew, T. (2002). *New Media: an Introduction*. New York: Oxford University Press.
- Goetz, J. R. (2004). *Confessions of an Early Internet Educator*, DETC Occasional Paper. Published by the Distance Education and Training Council, Washington D.C.
- Gras, R. M. (2009). Internet Usage and Digital Divide Among Spanish University Students. *Revista Media E Jornalismo*. No: 14. Vol. 8. No: 1. pp.17-25 A Europa E Os Media.
- Gümüş, A. (2004). *Bilgisayarlı İletişim*. İstanbul: Değişim Yayınları.
- Hong, K. S., Ridzuan, A. A., Kuek, M.K. (2003). Students' Attitudes toward the Use of the Internet for Learning: A Study at a University in Malaysia. *Educational Technology and Society*. Vol. 6. No: 2. pp.45-49.
- Hundt, R. (1999). The Telecom Act, the Internet, and Higher Education. *Educom Review*. Retrieved from: <http://www.wducause.edu/copyright.html>
- İşman, A., Dabaj, F. (2004). Attitudes of Students towards Internet, *Turkish Online Journal of Distance Education - TOJDE* 5 (4) Retrieved from <http://tojde.anadolu.edu.tr/tojde16/articles/Dabaj.htm>.
- İşman, A., Dabaj, F., & Gümüş, A. (2006). İletişim Eğitiminde İnternet Bağımlılığı. *Eurasian Journal of Educational Research*. No: 23 Bahar. pp. 117-126.
- Jones, S. (2002). The Internet Goes to College. Washington, DC: Pew Internet & American Life Project.
- Jordan, T. (1999). *Cyberpower the Culture and Politics of Cyberspace and the Internet*. USA: Routhledge.
- Kitchin, R. (1998). *Cyberspace*. England: John Wiley and Sons.
- Luan, W. S., Fuan, N. S. Nawawi, M. & Hong, T. S. (2005). Experienced and Inexperienced Internet Users Among Pre-service Teachers: Their Use and Attitudes toward the Internet. *Educational Technology & Society*. Vol. 8. No: 1. pp. 90-103.
- McLuhan M.(1964). *Understanding Media: the Extentions of Man*. New York:McGraw-Hill.
- McMillan, S. J., Morrison, M., (2006). *Coming of Age with the Internet*, New Media & Society, London, Thousand Oaks, CA and New Delhi, Vol.8(1): 73-95.
- Merisotis, J. P. (2001). *Quality and Equality in Internet-Based Higher Education: Benchmarks for Success*. Closing Keynote Address of Teaching and Organization of Studies in the Virtual and Classical University: Conflict and/or Mutual Reinforcement. International Seminar Organized by the UNESCO European Conference for Higher Education(UNESCO-CEPES) and the University of Puerto Rico in collaboration with the Puerto Rico Council on Higher Education and the Hispanic Educational Telecommunications System.
- Miller, M. (2001) 'A Snapshot of the Class of 2001'. *Public Relations Tactics* Vol. 8. No: 9. pp. 21-2.
- Morris, M., Ogan, C. (Winter, 1996). Internet as Mass Medium. *Journal of Communication*. Vol. 46. No: 1. <http://jcmc.indiana.edu/vol1/issue4/morris.html>
- Ogan, C. Ozakca, M., Groshek, J. (2008). Embedding the Internet in the Lives of College Students Online and Offline Behavior. *Social Science Computer Review*. Vol. 26. No: 2. pp.170-177. Sage Publications.

- Peng, H., Tsai, C. C., Wu, Y. T. (2006). University Students' Self Efficacy and Their Attitudes toward the Internet: The Role of Students' Perceptions of the Internet. *Educational Studies*. Vol. 32. No: 1. March 2006. pp. 73-86.
- Perry, T. T., Perry, L. A., Hosack-Curlin, K. (1998). Internet Use by University Students: An Interdisciplinary Study on three Campuses. *Internet Research: Electronic Networking Applications and Policy*. Vol. 8. No: 2. pp.136-141.
- Rena, R. (2008). The Internet in Tertiary Education in Africa: Recent Trends. *International Journal of Computing and ITC Research*. Vol. 2. No: 1. June 2008. pp. 9-16.
- Rice, R.E. (2001) 'Primary Issues in Internet Use: Access, Civic and Community Involvement, and Social Interaction and Expression', in L.A. Lievrouw and S. Livingstone (eds.) *The Handbook of New Media*, pp. 105–29. London: Sage.
- Rüzgar, N. S., (2005). A Research on the Purpose of Internet Usage and Learning via Internet. *Turkish Online Journal of Educational Technology – TOJET*. October 2005. Vol. 4. Issue 4. Article 4. <http://www.tojet.net/>.
- Sam, H. K., Othman, A. E. A. & Nordin, Z. S. (2005). Computer Self-Efficacy, Computer Anxiety, and Attitudes toward the Internet: A Study Among Undergraduates in Unimas. *Educational Technology & Society*. Vol. 8. No: 4. pp. 205-219.
- Selwyn, N. (2008). An Investigation of Differences in Undergraduates' Academic Use of the Internet. *Active Learning in Higher Education*. Vol. 9. N: 1. pp. 11-22.
- Selwyn, N. Marriott, N. Marriott, P., (2000). Net Gains or Net Pains? Business Students' Use of the Internet, *Higher Education Quarterly*. Vol. 54. No: 2. pp.166-186.
- Tekinarıslan, E., (2009). Turkish University Students' Perceptions of the World Wide Web as a Learning Tool: An Investigation Based on Gender, Socio-Economic Background, and Web Experience. *International Review of Research in Open and Distance Learning*. Vol. 10. No:2. <http://www.irrodl.org/index.php/irrodl/article/view/598/1217>
- Toprakçı, E. (2007). The Profiles of the Use of the Internet for Study Purposes Among University Students. *The Turkish Online Journal of Educational Technology - TOJET*. Vol. 6. No: 3. Article 13.
- Uşun, S. (2003). Educational Uses of Internet in the world and Turkey. (A Comparative Review). *Turkish Online Journal of Distance Education-TOJDE* July 2003 ISSN 1302-6488 Vol. 4. No: 3.
- Warf, B., Grimes, J. (1997). Counterhegemonic Discourses and the Internet, *Geographical Review*, Cyberspace and Geographical Space, 87(2), pp. 259-274.
- Young, K. (2009). The Internet in Tertiary Education: A Survey of Students' Internet Activity. In *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications*. (pp.2686-2696). Chesapeake, VA: AACE. Retrieved from <http://www.editlib.org/p/31858>.

TOWARDS RIGOR OF ONLINE INTERACTION RESEARCH: IMPLICATION FOR FUTURE DISTANCE LEARNING RESEARCH.

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ABSTRACT

For the past decade, distance learning research has shifted the focus from defining the notion of distance as a physical proximity or separateness to a psychological construct such as social presence. We have also witnessed the increasing number of research studies that have examined the role of interaction as a way to minimize psychological distance. However, the overall quality of online interaction research has been questioned due to the lack of rigorous methods, and the overly-positive assumption about the relationship between quantity and quality of interaction. This theoretical paper argues that future online interaction research in the area of distance learning should move beyond merely comparing the types or amounts of interaction, and that more rigorous criteria should be employed to design, implement and evaluate online interaction research studies. This paper presents a design-evaluation framework particularly focusing on the three dimensions of learning research on interaction: a) the conceptualization of interaction, b) the tight coupling of the pedagogical-technological design, and c) the valid and reliable evaluation. It is hoped that this paper will highlight critical theoretical and methodological issues for future research to consider for the advancement of our knowledge on the role of interaction in distance learning environments.

Keywords: Distance Learning, Online Interaction, Interactivity, Design, Evaluation.

1. INTRODUCTION

Interaction has been regarded as a key component of effective instruction in both traditional face-to-face and technology-mediated learning environments. Generally, in the context of distance learning, interaction refers to a reciprocal communication and learning process between two or more human actors (e.g., instructors, other learners) or between learner and non-human agents (e.g., computers). The importance of interaction increases within the context of distance learning since learners are physically separated from instructors and other learners, and this physical distance affects learners' perception of psychological distance. Recognizing the importance of interaction in distance learning contexts, previous research has attempted to answer some fundamental issues: How do students perceive interaction as a critical component? How can instructional technology and pedagogical approaches be used to facilitate interaction? How does the increased use of interaction improve learner engagement in learning processes?

Generally, in online interaction research, there is a widely-accepted belief that the use of interactive technology with the affordances of two-way communication and multiple representations may provide more interactions for online learners, and thus lead to enhanced learning outcomes. This belief has been supported empirically to some extent. In a comprehensive meta-analysis, Zhao, Lei, Yan, Lai, and Tan (2005) found that interaction is a key component in deciding the effectiveness of distance learning compared to face-to-face instruction. Specifically, they found that distance learning programs providing opportunities for both synchronous and asynchronous interactions reported more positive outcomes than programs with a single mode of interaction. Other research studies have suggested positive relationships between the amount of interaction and the perceived level of satisfaction, implying that more interaction is better for affective aspects of learning in distance environments (Driver, 2002; Jung, Choi, Lim, & Leem, 2002; Thurmond, 2003; Thurmond, Wambach, & Connors, 2002).

Some researchers, however, have argued that this assumption regarding the overly- positive relationship between instructional delivery systems and instructional interaction should be critically and empirically examined (Anderson, 2003a; Moore, 1989; Sims, 2003; So & Brush, 2008; Wagner, 1994): how does the increased quantity of interaction mediated by interactive technologies improves the quality of learning in online learning contexts? For instance, Beaudoin (2002) argued that a high amount of learner interaction is not always necessary for online learning because witness learners or low-visibility learners, who did not actively participate in learning via written responses, in fact, spent a significant amount of time in learning-related activities, and also had opportunities to learn vicariously. Similarly, Godwin, Thorpe, and Richardson (2008) reported in their study of 36 distance learning courses that learning outcomes were independent from the levels of interaction and technology integration. The main intent of these studies may not be to completely oppose the importance of interaction in distance learning. Rather, they emphasize that interaction should be carefully planned, implemented and evaluated as one of the critical instructional components rather than as an imposed and enforced component, and that both positive and negative impacts of interaction should be considered equally.

For the past decade, predominant themes of online interaction research have centered on examining a) which type of interaction is perceived as an important factor by learners, and b) whether a different amount of interaction can affect student satisfaction and academic performances. This research trend is characterized as “the interaction-versus-distance scheme in which a negative connotation is implicitly attached to the notion of distance, as it is something to be overcome by increasing the level or frequency of interaction” (Shin, 2002, p.122). However, Wagner (1997) cautioned that interaction should not be seen simply as a quantifiable attribute:

One might attempt to quantify the amount of interaction that is needed to ensure the quality of a learning experience. One may be interested in determining how often interaction should occur for a learning experience to be effective. There may be some interest in determining what types of interaction is the most effective. However, it is hard to imagine that the result of any of these inquiries would offer any useful insights or understandings. (p.25)

Furthermore, Anderson (2003a) argued that meaningful learning experiences can be achieved as long as the level of one interaction among three types (learner-learner, learner-instructor, and learner-content) is high. This equivalency theorem may suggest that research comparing types of interaction against each other (e.g., is learner-learner interaction more important than learner-instructor interaction?) has little pedagogical and practical values. To move beyond merely comparing the types or amounts of interaction, rigorous criteria should be used to design and evaluate research studies. The purpose of this theoretical paper, therefore, is to propose a framework for designing and evaluating online interaction research, drawn from the literature on distance learning research studies. In the conclusions, suggestions for future empirical research on interactive learning environments are presented.

2. ONLINE INTERACTION RESEARCH

Research studies are largely classified into three categories: (a) what is, (b) what may be under generalizable conditions, and (c) what may be under a particular condition (Frick, 2004). First, in the context of interactive online learning research, theoretical studies aim to operationally define what is the concept of interaction based on descriptive theories such as learning and communication theories (e.g., Hillman, Willis, & Gunawardena, 1994; Moore, 1989; Sutton, 2001; Wagner, 1997). A second category is the instructional design and development studies that provide prescriptive instructional strategies about how to design interactive instruction under general contexts (e.g., Gilbert & Moore, 1998; Hirumi, 2002; Strijbos, Martens, & Jochems, 2004). Finally, experimental studies evaluate the effectiveness of interaction on learners’ cognitive and affective learning outcomes under contextualized conditions (e.g., Moallem, 2003; Northrup, 2002; Vrasidas & McIsaac, 1999).

Different criteria should be applied to design and evaluate the three types of research since the purposes of inquiry and research outcomes in each type are different (Frick, 2004). Studies that provide the conceptualization of interaction need to be evaluated based on the pedagogical soundness of theories while instructional design studies should be evaluated in terms of their systemic and systematic design process, and applicability to real settings. Experimental studies, on the other hand, need to be evaluated in terms of research design, theoretical background, valid and reliable assessment, measured outcomes, and theoretical and practical implications.

With regard to the rigor of research on interaction conducted in distance learning contexts, this paper suggests that researchers should consider the following three dimensions for design and evaluation:

- The Conceptual Definition Dimension: Defining interaction with theoretical grounds
- The Pedagogical-Technological Design Coupling Dimension: Tight coupling of pedagogical methods and technological affordances
- The Evaluation Dimension: Empirical measurements on cognitive and affective learning outcomes

Table 1 below lists the main dimensions and critical questions associated with each dimension. In-depth discussions of each dimension are presented in the following sections.

Table 1. Dimensions and critical questions for evaluating online interaction research

Dimensions	Critical Questions
Conceptual Definition	Is the conceptualization of interaction grounded on relevant theories? What are the types of interaction? Do the researchers make a distinction between instructional interaction and system interactivity?
Pedagogical-Technological Design Coupling	How does the research employ instructional methods that go beyond replicating traditional classroom teaching methods? How does the research take advantages of media to facilitate interactive learning processes? How are the methods and media coupling used in the research appropriate for the learner, instructor, learning content, learning outcomes, and environment?
Evaluation	How do the researchers develop and/or use valid and reliable measurement tools? How does the research provide empirical evidence that interaction affects learners' cognitive performance? How does the research provide empirical evidence that interaction affects learners' attitude?

3. THE CONCEPTUAL DEFINITION DIMENSION

Even though interaction is a common term often discussed in distance learning contexts, a lack of functional definitions has been a serious problem in forming basic and shared understanding among researchers and practitioners. Moore (1989) emphasized the need for a clear and functional definition of interaction by stating that “interaction is another important term that carries so many meanings to be almost useless unless specific sub-meanings can be defined and generally agreed upon” (p.1). Therefore, it is important for researchers to clearly conceptualize the meaning of interaction grounded on relevant theories. An example of the functional definition of interaction grounded in theory is found in the work by Vrasidas and McIsaac (1999). They defined interaction as “the process consisting of the reciprocal actions of two or more actors within a given context” (p.25). This definition is theoretically based on the symbolic interactionism which emphasizes the interpretations of meaningful perspectives by human actors.

Another critical question in the conceptualization dimension is whether researchers specify types of interaction. As shown in Table 2, within the literature, two main means of categorizing interaction have been suggested: a) interaction with learning agents and b) interaction for learning outcomes. Learning agents focus on interaction with human agents or non-human agents while learning outcomes focus on the role of interaction as a means for accomplishing certain learning activities and outcomes.

In the first category on learning agents, several previous studies have used the three types of interaction proposed by Moore (1989) - (a) learner and content interaction, (b) learner and instructor interaction, and (c) learner and learner interaction- as a theoretical framework. In addition to the three types of interaction, Hillman, Wills, and Gunawardena (1994) presented interaction between learner and interface as a fourth type of interaction. They stressed that “the learner must interact with the technological medium to interact with the content, instructor, or other learners” (p.33). Vicarious interaction is another important type of interaction that occurs in distance learning environments. As vicarious learning involves active observations of other actors' behaviors, vicarious interaction occurs when distance learners observe the process of interactions between other learners and instructors (Fulford & Zhang, 1993; Sutton, 2001).

While the types of interaction discussed above focused on learning agents, Wagner (1997) addressed a need to shift the focus from learning agents to learning outcomes, and suggested twelve types of interaction, including interaction for participation, communication, team-building, exploration, and so on. Emphasis on learning outcomes helps specify instructional means to achieve a certain goal of interaction.

Table 2. Types of interactions based on learning agents and outcomes

Learning agents	Learning outcomes
Interaction with whom (human) or with what (non-human)?	Interaction to achieve what?
Moore (1989)	Wagner (1997)
1. Learner – Content interaction	Interaction for participation
2. Learner – Instructor interaction	Interaction to develop communication
3. Learner – Other learners interaction	Interaction to receive feedback
Hillman, Wills, & Gunawardena (1994)	Interaction for elaboration and retention
4. Learner – Interface interaction	Interaction for learner control and self-regulation
Sutton (2001)	Interaction to increase motivation
5. Learner – Learner him or herself (Vicarious interaction)	Interaction for negotiation of understanding
	Interaction for team building
	Interaction for discovery
	Interaction for exploration
	Interaction for clarification of understanding
	Interaction for closure

Finally, the conceptualized meaning of interaction should be distinguished from similar terms such as interactivity, transaction, and social presence that are often used interchangeably. Instructional or social interaction as a process of learning events needs to be differentiated from system interactivity as an attribute of technology (Anderson, 2003b; Wagner, 1997). In multimodal learning environments, for instance, Moreno and Mayer (2007) defined interactivity as the responsiveness of learners' actions associated with the use of technology during learning processes, and suggested that there are five types of interactivity: dialoguing, controlling, manipulating, searching, and navigating. High-level interactive learning is possible when technical systems allow communication between learners and some of these interactivity types.

Social presence and transaction are other terms often used related to interactivity or interaction. In differentiating social presence and interactivity Gunawardena and Zittle (1997) argued that “interactivity is a quality (potential) that may be realized by some or remain an unfulfilled option for others. When it is realized and when participants notice it, there is ‘social presence’” (pp. 10-11). For example, when learners make online postings as a fulfillment of minimum requirements and do not actively engage in responding to other postings, it is hard to say that meaningful interaction occurs through the system interactivity of online discussion forums. Woods and Baker (2004) argued that this type of minimum engagement with little intent of continuous communication can be described as a term transaction. This discussion of different terms suggest that for higher levels of interaction, learners should take actions to utilize the affordances of technical interactivity for ongoing communication and engagement, and in turn this activation needs to affect the development of connected feelings with other human actors.

4. THE PEDAGOGICAL-TECHNOLOGICAL DESIGN COUPLING DIMENSION

Often, it is assumed that the use of interactive two-way communication technology enables meaningful interactions to occur. This assumption about a causal relationship between interactive technology and instructional interaction has produced hardware technology-driven research (Jonassen, 1985). An example of hard technology-driven research is media comparison studies which attempt to find the best delivery technology. However, most media comparison studies concluded that there were no significant differences among different types of delivery technologies (Clark & Mayer, 2002; Lockee, Burton, & Cross, 1999). Furthermore, these research studies often fail to examine the transformative nature of interaction across time and space through the mediation of technology. More emphasis should be placed on how to systematically design the aspect of soft technology as well as hard technology, which is named as a coupling of the pedagogical-technological design in this paper.

First, research on interaction should go beyond simply replicating traditional classroom teaching methods, and employ instructional methods appropriate and unique in online learning contexts. The reality, however, is that several forms of online learning often follow an instructor-centered didactic model that gives little opportunities for interactive and collaborative learning. It appears that while interactive technologies have advanced rapidly in the past decade, pedagogical changes in online learning from delivery-centered to interaction-centered formats have been slow as seen in the predominant use of online lecture files and non-interactive media. Rather than centering the notion of interaction on technology itself, synergized effects by a tight coupling of the pedagogical-technical design should be re-examined.

For instance, computer-supported collaborative learning (CSCL) is an area where such efforts have been sought for in-depth understanding of the role of interaction in collaborative learning processes (Koschmann, Hall, & Miyake, 2002). The main inquiry of CSCL research is how to utilize the affordances of computers as a mediating tool to support the interaction of participants for shared understanding and meaningful knowledge building, where a community of learners works collaboratively towards in-depth understanding that individual learners may not reach alone (Scardamalia & Bereiter, 1994). While CSCL research encompasses both face-to-face interaction and technology-mediated interaction, findings related to the tight coupling of the pedagogical-technical design, such as scaffolding design, interaction analysis, and online community models, can bring valuable insights to research studies examining how to design interactive distance learning environments.

Another related question in this dimension is associated with the selection of effective and efficient media. While there are diverse ranges of instructional media available in distance learning, from the simple Web technologies to learning management systems to highly interactive environments (e.g., virtual games, simulations), the selection of media in most cases is constrained by pedagogical, financial, and practical factors. From pedagogical perspectives, while it is efficient to use simple one-way technology in a teacher directed learning mode, the use of sophisticated technology is necessary in a collaborative learning mode to allow for more learner control, social interaction, and collaboration. More importantly, as mentioned earlier in distinguishing learning interaction from system interactivity, it should be noted that technological systems supporting multiple modes of interaction such as online games and simulated 3D environments do not necessarily lead to interactive learning, and potential limitations on cognitive-social aspects of learning (e.g., cognitive load, Moreno & Mayer, 2007) need to be considered equally.

Thus, an important issue for designing interactive learning environments is how to decide on the types of communication technologies for the design of meaningful interaction. Design and technical frameworks based on the types and levels of interaction can be used in this decision. For example, Strijbos, Martens, and Jochems (2004) proposed a process-oriented framework for interaction design in CSCL environments, including five critical elements: learning objectives, task type, level of pre-structuring, group size, and computer support. Each element should be carefully designed and redesigned around the expected interaction, and successes and lessons learned from this process of design should be reported. Similarly, Chou (2003) suggested a technical framework for designing interactive functions to support types of interaction in designing web-based learning environments. These frameworks can be useful tools that guide systematic design processes focusing on critical pedagogical and technological dimensions of interaction.

Finally, it is critical to select instructional methods and media based on the thorough considerations of contextual variables. The traditional sense of replicability for generalization is hard to achieve in online interaction research due to the transformative and context-sensitive nature of interaction. Thus, it is important to examine interaction with associated situational variables such as learner characteristics, learning goals, and instructional settings. With this regard, design research methodology can be employed to carefully document learning contexts and local impacts. Design research, also used interchangeably with design experiments, design-based research, and design studies, is a methodology focusing on the advancement of both theory and practices through the multiple iterations of enactment and progressive refinement (Collins, Joseph, & Bielaczyc, 2004). Design research, compared to traditional experimental approaches, has particular potentials in online interaction research since multiple sources of quantitative and qualitative data are collected and synthesized to disentangle the complex nature of interaction in real-world online learning environments. Additionally, detailed descriptions of learning contexts and lessons learned can allow other researchers and practitioners to understand how to re-contextualize research findings to local contexts and to minimize the chance of repeating similar mistakes (Barab & Squire, 2004).

5. THE EVALUATION DIMENSION

The most common research approach in instructional technology has been the media comparison study which compares learning outcomes via one instructional medium against those via a traditional (mostly lecture and textbook based) medium (Lockee et al., 1999). An inherent problem in these studies, however, is that most of them concluded that there was no significant difference (NSD). Spenser (1991) suggested that results from most media comparison studies are based on “a ‘box score’ tally approach, frequently resulting in a small number of studies favoring the innovation, a similar number favoring the traditional approach, and the vast majority showing NSD” (p.13). Despite this criticism, media comparison studies are still prevalent in arguing for the effects of certain media types. Although there have been ongoing debates regarding whether media or methods influence learning, it is clear that simple media comparison studies do not provide useful theoretical and practical implications to other researchers and practitioners. Indeed, in online interaction research there is a need to go

beyond simply comparing different types of technology itself. There is a need to place more emphasis on examining complex aspects of the interplay between technology and learning.

To this end, the first critical question in the evaluation dimension is the validity and reliability of instruments used to measure online interaction. As most research questions in the instructional technology area show, interaction is a complex concept that is difficult to define and measure. Wagner (1994) addressed the difficulty of defining interaction as an independent variable by stating that “speculating about the role, impact, and effect of interaction is far easier than is establishing working hypotheses and measuring the effect on student achievement” (p.20). Although much research has provided theoretical foundations, overall few research studies employed valid and reliable instruments, as seen in a dominant number of single survey studies.

Despite the difficulty of establishing the construct of interaction, researchers do need to specify how to measure the effect of interaction on cognitive and affective learning domains. Generally, there has been much criticisms about the quality of distance learning research, and the lack of valid and reliable instruments has been pointed out as one of main reasons for this issue (Bernard, Abrami, Lou, & Borokhovski, 2004). In the review of research on the effectiveness of distance learning, Phipps and Merisotis (1999) suggested that although valid and reliable instruments to measure learning outcomes and student attitudes are essential in a well-constructed research, most studies in distance education have not provided detailed information about such instruments.

Another important question in the evaluation dimension concerns measuring learning outcomes, in both cognitive and affective domains. On the whole, while various researchers have contributed to examine affective outcomes such as learner satisfaction and perception of interaction, there has been little research that investigated the relationship between interaction and learning performances (Picciano, 2002). This phenomenon may be associated with the difficulties of controlling extraneous variables and establishing relationships between interaction and learner achievement. Obviously, traditional approaches of experimental research design, often relying on pretest and posttest comparisons, have inherent problems in interpreting results when we accept the view of learning as a socially situated construct. Furthermore, learning outcomes are often measured through survey items and counting the number of postings at an individual level, thus missing out on learning at group and community levels. For instance, Stahl (2002) criticized that the richness of the interactive learning process through the mediation of technology is often lost when researchers try to reduce process data and treat interaction as a quantifiable entity as seen in quantity-oriented content analysis methods. To overcome these methodological issues, researchers should try to capture both the process and product of interactive learning, at both the individual and group level understandings.

6. CONCLUSION

In the past decade, distance learning research has shifted the focus from defining the notion of distance as a physical proximity to a psychological construct. According to Garrison (2000), a theoretical challenge of distance learning research in the new century is to move away from structural and standardized assumptions to in-depth examination of transactional issues. However, studying interaction as a cognitive-social construct is complex especially under distance learning environments since the learning process is mediated through technology, and further distance in both the physical and psychological domains creates a great deal of situational variables that researchers may not be able to control and examine. Indeed, while there has been growing research interests in the role of interaction in online learning environments, the overall quality of research has often been criticized for the lack of research employing rigorous methods. Additionally, the excessive use of single survey studies and media comparison studies has been a barrier for the advancement of our knowledge on the role of interaction and learning.

Towards the rigor of online interaction research, this paper questioned the overly-positive assumption between instructional interaction and the use of interactive technology, and provided a framework for design and evaluation. Three dimensions that this framework particularly focused on are the conceptualization of interaction, the tight coupling of the pedagogical-technological design, and the valid and reliable evaluation. Critical questions associated with each dimension were also discussed. As emphasized throughout this paper, the use of interactive technology supporting multi-modal learning does not necessarily mean that learners are engaged in meaningful interactive learning. Potential negative effects of excessive interaction and forced interaction should be equally considered with positive effects.

In conclusion, online interaction is a complex concept to examine as it involves other agents and mediating tools. Understanding this complexity, future online interaction research should be reframed to focus on learning effects with a tight coupling of the pedagogical-technical design, rather than simply examining interaction as a quantifiable attribute separated from contextual variables. For the rigor of future online interaction research,

there is a need for more comprehensive research methodology, and this paper suggested that design research using mixed methods holds great potentials for building more robust theories of online interactive learning. In addition, future studies need to develop reliable and valid instrument tools to measure the impacts of online interaction on various learning outcomes. It is hoped that this paper has highlighted critical theoretical and methodological issues that future research needs to consider for the advancement of our knowledge on the role of interaction in distance learning environments.

REFERENCES

- Anderson, T. (2003a). Getting the mix right again: An updated and theoretical rationale for interaction. *International Review of Research in Open and Distance Learning*, 4(2).
- Anderson, T. (2003b). Modes of interaction in distance education: Recent development and research questions. In M. Moore (Ed.), *Handbook of Distance Education* (pp. 129-144). Mahwah, NJ: Erlbaum.
- Barab, S. A., & Squire, K. (2004). Design-based research: Putting a stake in the ground. *Journal of the Learning Sciences*, 13(1), 1-14.
- Beaudoin, M. F. (2002). Learning or lurking? Tracking the "invisible" online student. *Internet and Higher Education*, 5, 144-155.
- Bernard, R. M., Abrami, P. C., Lou, Y., & Borokhovski, E. (2004). A methodological morass? How we can improve quantitative research in distance education. *Distance Education*, 25(2), 175-198.
- Chou, C. (2003). Interactivity and interactive functions in web-based learning systems: A technical framework for designers. *British Journal of Educational Technology*, 34(3), 265-279.
- Clark, R. C., & Mayer, R. E. (2002). *e-Learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. San Francisco: Jossey-Bass.
- Collins, A., Joseph, D., & Bielaczyc, K. (2004). Design research: Theoretical and methodological issues. *Journal of the Learning Sciences*, 13(1), 15-42.
- Driver. (2002). Exploring student perceptions of group interaction and class satisfaction in the web-enhanced classroom. *Internet and Higher Education*, 5, 35-45.
- Frick, T. (2004). Scope of knowledge created through disciplined inquiry. Retrieved January 19, 2007, from <http://www.indiana.edu/~tedfrick/typesofknowledgesept1.pdf>
- Fulford, C. P., & Zhang, S. (1993). Perceptions of interaction: The critical predictor in distance education. *American Journal of Distance Education*, 7(3), 8-21.
- Garrison, R. (2000). Theoretical challenges for distance education in the 21st century: A shift from structural to transactional issues. *International Review of Research in Open and Distance Learning*, 1(1), 1-17.
- Gilbert, L., & Moore, D. R. (1998). Building interactivity into Web courses: Tools for social and instructional interaction. *Educational Technology*, 38(3), 29-35.
- Godwin, S. J., Thorpe, M. S., & Richardson, J. T. E. (2008). The impact of computer-mediated interaction on distance learning. *British Journal of Educational Technology*, 39(1), 52-70.
- Gunawardena, C. N., & Zittle, F. (1997). Social presence as a predictor of satisfaction within a computer mediated conferencing environment. *American Journal of Distance Education*, 11(3), 8-25.
- Hillman, D. C. A., Willis, D. J., & Gunawardena, C. N. (1994). Learner-interface interaction in distance education: An extension of contemporary models. *American Journal of Distance Education*, 8(2), 30-42.
- Hirumi, A. (2002). A framework for analyzing, designing and sequencing planned eLearning interactions. *The Quarterly Review of Distance Education*, 3(2), 141-160.
- Jonassen, D. H. (1985). Interactive lesson design: A taxonomy. *Educational Technology*, 25(6), 7-17.
- Jung, I., Choi, S., Lim, C., & Leem, J. (2002). Effects of different types of interaction on learning achievement, satisfaction and participation in Web-based instruction. *Innovations in Education and Teaching International*, 39(2), 153-162.
- Koschmann, T., Hall, R., & Miyake, N. (Eds.). (2002). *CSCL 2: Carrying forward the conversation*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Lockee, B. B., Burton, J. K., & Cross, L. H. (1999). No comparison: Distance education finds a new use for 'no significant difference'. *Educational Technology Research & Development*, 47(3), 33-42.
- Moallem, M. (2003). An interactive online course: A collaborative design model. *Educational Technology Research & Development*, 51(4), 85-103.
- Moore, M. G. (1989). Editorial: Three types of interaction. *American Journal of Distance Education*, 3(2), 1-7.
- Moreno, R., & Mayer, R. (2007). Interactive multimodal learning environments. *Educational Psychology Review*, 19, 309-326.
- Northrup, P. T. (2002). Online learners' preferences for interaction. *The Quarterly Review of Distance Education*, 3(2), 219-226.
- Phipps, R., & Merisotis, J. (1999). *What's the difference? A review of contemporary research on the effectiveness of distance learning in higher education*. Washington, DC: The Institute for Higher Education Policy. Document Number)

- Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Network*, 6(1), 21-40.
- Scardamalia, M., & Bereiter, C. (1994). Computer support for knowledge-building communities. *Journal of the Learning Sciences*, 3(3), 265-283.
- Shin, N. (2002). Beyond interaction: The relational construct of "Transactional Presence". *Opening Learning*, 17(2), 121-137.
- Sims, R. (2003). Promises of interactivity: Aligning learner perceptions and expectations with strategies for flexible and online learning. *Distance Education*, 24(1), 87-103.
- So, H. J., & Brush, T. (2008). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors. *Computers & Education*, 51, 318-336.
- Spencer, K. (1991). Modes, media, and method: The search for educational effectiveness. *British Journal of Educational Technology*, 22(1), 12-22.
- Stahl, G. (2002). Rediscovering CSCL. In T. Koschmann, R. Hall & N. Miyake (Eds.), *CSCL2: Carrying forward the conversation* (pp. 169-181). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Strijbos, J. W., Martens, R. L., & Jochems, W. M. G. (2004). Designing for interaction: Six steps to designing computer-supported group-based learning. *Computers & Education*, 42, 403-424.
- Sutton, L. A. (2001). The principle of vicarious interaction in computer-mediated communication. *International Journal of Educational Telecommunications*, 7(3), 223-242.
- Thurmond, V. A. (2003). Examination of interaction variables as predictors of students' satisfaction and willingness to enroll in future Web-based courses. University of Kansas Medical Center.
- Thurmond, V. A., Wambach, K., & Connors, H. R. (2002). Evaluation of student satisfaction: Determining the impact of a Web-based environment by controlling for student characteristics. *American Journal of Distance Education*, 16(3), 169-189.
- Vrasidas, C., & Melsaac, M. S. (1999). Factors influencing interaction in an online course. *The American Journal of Distance Education*, 13(3), 22-36.
- Wagner, E. D. (1994). In support of a functional definition of interaction. *American Journal of Distance Education*, 8(2), 6-29.
- Wagner, E. D. (1997). Interactivity: From agents to outcomes. *New Directions for Teaching and Learning*, 71, 19-26.
- Woods, R. H., & Baker, J. D. (2004). Interaction and immediacy in online learning. *International Review of Research in Open and Distance Learning*, 5(2).
- Zhao, Y., Lei, J., Yan, B., Lai, C., & Tan, H. S. (2005). What makes the difference? A practical analysis of research on the effectiveness of distance education. *Teachers College Record*, 107(8), 1836-1884.

UNIVERSITY STUDENTS' COMPUTER SKILLS: A COMPARATIVE ANALYSIS

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ABSTRACT

As technology advances, its impacts on people's lives have become more visible. Therefore the dependency on technology has increased in time. Computers are of the most outstanding ones of the technological devices which become part of daily routines. To be able to make use of such a facility, recognizing the potential role of computers and being technologically literate are essential. Computer skills must be improved to become technologically proficient and to prevent the prospect negative situations in the career. In the recent years, education has started to be one of the fields which uses computer based technology intensively. Thus, having computer skills and using computer based technology effectively during the classes have started to become important aspects for teachers. In this study, it was tried to find out the computer skills of university students and their experience levels of using defined software.

Keywords: University student, computer skill, physical education.

INTRODUCTION

In order to be successful in academic programs and careers, it is essential that university students possess improved computer skills (Furst-Bowe & Boger, 1996). There are a lot of factors producing wide variations in the computer skill levels of college students, such as the courses they completed at high school and college, their academic major, their work experience, and their personal interest in computers and computing (Smith & Furst-Bowe, 1993). There is little agreement on what skill level was necessary for success in introductory and advanced coursework or on the types of computer skills necessary to obtain and maintain employment after graduation (Furst-Bowe & Boger, 1996). Researches suggest that factors such as gender, age, experience, and interest in computers might affect students' attitudes toward computers and their computer skills as well (Morahan-Martin, 1992).

Many faculties expect students to know how they should use a word processor to create and format papers, make use of software for classroom presentations and speeches, use spreadsheet software to prepare charts and graphs, navigate the internet for research, and have the ability to learn and participate in online classrooms using various software (Lahore, 2008). On the other hand, many students do not have the knowledge, memory, learning, intelligence, or expertise to assess what they do and do not know and what they need to learn to succeed in a particular course. Because they essentially "don't know what they don't know," they are unable to recognize their exact level of competence (Kennedy, Lawton & Plumlee, 2002).

Technology is human innovation in action and computer literacy is the basic condition for technology learning environment (International Technology Education Association, 1996; Li, 2008). The term "*computer literacy*" is often used as a basis of making decisions regarding a student's ability to perform specific tasks on a personal computer (Lahore, 2008). Computer literacy is important, because it transforms the computer's capability into proficient and productive activities (Simonson, Maurer, Montag-Torardi & Whitaker, 1987). It consists of the experience and ability to operate computers, including knowing the structures of computer software and hardware, having the skills to operate computer software, and applying computer usage to social issues (Foreman, 1998; Lin, 2003; cited in Li, 2008).

The abilities on information technologies have turned out to be vital elements which effect individual economic success, political participation and social interaction. As the information technology becomes more widespread, the importance of computer and technology use increases and turns out to be an important element in human resources (Ono and Zavodny, 2004). Educational technology will contribute to the solution of many problems if it is used accurately. During the last few years educators have begun to use computer assisted teaching methods often to increase the student participation to the classroom activities and to promote access to learning materials. Computer assisted teaching which is defined as the use of computer by the students in teaching is an interactive process which makes learning easier (Azarmsa, 1991).

The aim of this study is to discover computer skills of the university students and the effects of owning personal computers, the presence of computer labs at their schools and their families' computer skills on the students' computer skills.

METHOD

Research Scale

In the study, a 42-item-likert type scale measuring different competence areas on computer using was applied. The students had to choose one of the options between 1-4 in each question; No Experience, Little Experience, Some Experience and High Experience.

In the analysis, the grading was done as: No Experience=1, Little Experience=2, Some Experience=3 and High Experience=4

The scale consists of six parts. In the first part, there are personal questions like having a computer at home, having a computer laboratory at school, family's computer using and benefiting from the computer laboratory. There are items measuring the skills on Windows in the second part, Word in the third part, Excel in the fourth part, PowerPoint in the fifth part and multimedia programs in the sixth part.

In the scale, there are 9 items related to Windows, 9 items related to Word, 8 items related to Excel, 8 items related to PowerPoint, 8 items related to multimedia programs.

Reliability of the Scale

Having Cronbach Alpha level higher than .60 is enough to consider the scale as a reliable one. In the computer use capacity scale used in this research, Cronbach Alpha level is 0,982 for the Recreation Department and 0,992 for the Sport Management Department.

Research Data

The data of this research was obtained by applying the mentioned scale to 282 students studying at Sakarya University Physical Education Sport College Recreation and Sport Management Departments during 2009-2010 academic year. According to the results of the applied scale, an evaluation was made considering the situations of having a computer at home, having a computer laboratory at school, family's computer using and benefiting from the computer laboratory.

Statistical Methodology of the Research

Qualitative and quantitative research skills were used in this research. SPSS Statistics Program was used to analyze the research. Each competence area was evaluated by the frequency, percentage and mean values according to having a computer at home, having a computer laboratory at school, computer using and always benefiting from the computer laboratory of the family. At the last stage, each individual's total points from the whole scale were analyzed and evaluated considering the situations of having a computer at home, having a computer laboratory at school, family's computer using and benefiting from the computer laboratory. For each variable frequency and percentage values were given in addition to Independent Samples T-Test is used to find the correlation between the variables.

FINDINGS

Demographic Situations of the Participants

Table 1. Demographic Situations of the Participants

Variables	RECREATION		MANAGEMENT	
	N	%	N	%
<i>Is there a computer at home?</i>				
Yes	70	48,6	54	48,2
No	74	51,4	58	51,8
Total	144	100	112	100
<i>Is there a computer lab at school?</i>				
Yes	90	62,5	19	17,0
No	54	37,5	93	83,0
Total	144	100	112	100
<i>Do your family use computer?</i>				
Yes	72	50,0	23	20,5
No	72	50,0	89	79,5
Total	144	100	112	100
<i>Do you always benefit from the computer lab?</i>				
Yes	35	24,3	17	15,2
No	109	75,7	95	84,8
Total	144	100	112	100

Table 2. Item Analysis Results

	RECREATION				SPORT MANAGEMENT			
	No Experience	Little Experience	Some Experience	High Experience	No Experience	Little Experience	Some Experience	High Experience
Using the Windows-Start menu	4 2,8	20 13,9	87 60,4	33 22,9	16 14,3	30 26,8	41 36,6	25 22,3
Using Windows-Programs menu	4 2,8	32 22,2	78 54,2	30 20,8	17 15,2	36 32,1	38 33,9	21 18,8
Using Windows-File menu	4 2,8	32 22,2	82 56,9	26 18,1	16 14,3	37 33,0	36 32,1	23 20,5
Using Windows-Set Up menu	10 6,9	36 25,0	72 50,0	26 18,1	20 17,9	39 34,8	30 26,8	23 20,5
Using Windows-Control menu	12 8,3	45 31,3	67 46,5	20 13,9	25 22,3	31 27,7	34 30,4	22 19,6
Using Windows-Search menu	9 6,3	45 31,3	70 48,6	20 13,9	20 17,9	37 33,0	38 33,9	17 15,2
Using Windows-Help menu	9 6,3	49 34,0	68 47,2	18 12,5	25 22,3	32 28,6	36 32,1	19 17,0
Using Windows-Launch menu	4 2,8	35 24,3	79 54,9	26 18,1	19 17,0	32 28,6	42 37,5	19 17,0
Playing Windows -Game	9 6,3	23 16,0	66 45,8	46 31,9	22 19,6	24 21,4	37 33,0	29 25,9
Using Word –File menu	10 6,9	41 28,5	73 50,7	20 13,9	20 17,9	42 37,5	33 29,5	17 15,2
Using Word-Edit menu	28 19,4	52 36,1	50 34,7	14 9,7	33 29,5	31 27,7	30 26,8	18 16,1
Using Word-Insert menu	32 22,2	54 37,5	46 31,9	12 8,3	38 33,9	25 22,3	31 27,7	18 16,1
Using Word-View menu	43 29,9	48 33,3	42 29,2	11 7,6	41 36,6	28 25,0	29 25,9	14 12,5
Using Word-Format menu	34 23,6	49 34,0	48 33,3	13 9,0	38 33,9	32 28,6	27 24,1	15 13,4
Using Word-Tools menu	46 31,9	43 29,9	44 30,6	11 7,6	45 40,2	29 25,9	25 22,3	13 11,6
Using Word-Table menu	34 23,6	46 31,9	52 36,1	12 8,3	36 32,1	28 25,0	32 28,6	16 14,3
Using Word-Window menu	23 16,0	38 26,4	66 45,8	17 11,8	28 25,0	32 28,6	36 32,1	16 14,3
Using Word-Help menu	19 13,2	57 39,6	52 36,1	16 11,1	29 25,9	30 26,8	36 32,1	17 15,2
Using Excel-File menu	18	53	55	18	33	41	24	14

	12,5	36,8	38,2	12,5	29,5	36,6	21,4	12,5
Using Excel-Edit menu	28	62	41	13	46	27	24	15
	19,4	43,1	28,5	9,0	41,1	24,1	21,4	13,4
Using Excel-Insert menu	35	58	41	10	44	28	29	11
	24,3	40,3	28,5	6,9	39,3	25,0	25,9	9,8
Using Excel-View menu	41	56	34	13	45	30	25	12
	28,5	38,9	23,6	9,0	40,2	26,8	22,3	10,7
Using Excel-Format menu	43	50	35	16	47	27	25	13
	29,9	34,7	24,3	11,1	42,0	24,1	22,3	11,6
Using Excel-Tools menu	41	62	28	13	48	25	24	15
	28,5	43,1	19,4	9,0	42,9	22,3	21,4	13,4
Using Excel-Table menu	35	56	40	13	41	32	26	13
	24,3	38,9	27,8	9,0	36,6	28,6	23,2	11,6
Using Excel-Window menu	29	58	40	17	37	30	29	16
	20,1	40,3	27,8	11,8	33,0	26,8	25,9	14,3
Using Excel-Help menu	29	59	39	17	40	33	24	15
	20,1	41,0	27,1	11,8	35,7	29,5	21,4	13,4
Using Power Point-File menu	16	53	58	17	34	29	30	19
	11,1	36,8	40,3	11,8	30,4	25,9	26,8	17,0
Using Power Point-Edit menu	26	53	50	15	37	29	28	18
	18,1	36,8	34,7	10,4	33,0	25,9	25,0	16,1
Using Power Point-Insert menu	30	50	47	17	40	31	23	18
	20,8	34,7	32,6	11,8	35,7	27,7	20,5	16,1
Using Power Point-View menu	35	47	44	18	47	21	32	12
	24,3	32,6	30,6	12,5	42,0	18,8	28,6	10,7
Using Power Point-Format menu	36	48	42	18	46	23	32	11
	25,0	33,3	29,2	12,5	41,1	20,5	28,6	9,8
Using Power Point-Table menu	35	54	41	14	47	28	24	13
	24,3	37,5	28,5	9,7	42,0	25,0	21,4	11,6
Using Power Point-Window menu	31	53	41	19	44	30	25	13
	21,5	36,8	28,5	13,2	39,3	26,8	22,3	11,6
Using Multimedia Programs- File menu	24	55	46	19	38	30	25	19
	16,7	38,2	31,9	13,2	33,9	26,8	22,3	17,0
Using Multimedia Programs - Edit menu	48	40	47	9	37	38	22	15
	33,3	27,8	32,6	6,3	33,0	33,9	19,6	13,4
Using Multimedia Programs - Insert	57	41	39	7	42	36	17	17
	39,6	28,5	27,1	4,9	37,5	32,1	15,2	15,2
Using Multimedia Programs - View menu	55	45	37	7	44	34	18	16
	38,2	31,3	25,7	4,9	39,3	30,4	16,1	14,3
Using Multimedia Programs - Format menu	58	44	35	7	50	29	23	10
	40,3	30,6	24,3	4,9	44,6	25,9	20,5	8,9
Using Multimedia Programs - Tools menu	56	44	36	8	46	30	24	12
	38,9	30,6	25,0	5,6	41,1	26,8	21,4	10,7
Using Multimedia Programs - Table menu	57	45	34	8	48	30	23	11
	39,6	31,3	23,6	5,6	42,9	26,8	20,5	9,8
Using Multimedia Programs- Window menu	47	46	40	11	43	30	25	14
	32,6	31,9	27,8	7,6	38,4	26,8	22,3	12,5

T-Test Results Regarding Having a Computer at Home

As a result of the analysis, students who have computers at home had more experience at a meaningful level $P=0,000$ than the students do not have computers at home considering all of the items in both Recreation and Management Departments.

T-Test Results Regarding Having Computer Laboratory at Home

According to the results of the analysis, students who are in Recreation Department and have computer laboratory at school, stated that they had more experience on “Using Windows - Research menu $P=,045$ ”, “Using Word-File menu $P=,041$ ”, “Using Excel-Edit menu $P=,042$ ”, “Using Excel-Insert menu $P=,016$ ”, “Using Excel-View menu $P=,002$ ”, “Using Excel-Format menu $P=,022$ ”, “Using Excel-Tools menu $P=,022$ ”. According to the results there were not any meaningful differences between the answers of the students from the Management Department.

T-Test Results Regarding Family's Computer Using

In the result of the analysis, the students who are studying in the Recreation Department and whose families use computer, stated that they had a meaningful degree $P<0,005$ of experience on all of the items except those “Using Launch Menu”, “Using Word – File Menu”, “Using Word-Insert Menu”.

Students who are studying in Management Department and whose families use computer, stated that they had experience at a meaningful degree on the items “Using Windows – Start menu $P=,021$ ”, “Using Windows - File menu $P=,042$ ”, “Using Windows – Help menu $P=,022$ ”, “Using Windows - Launch menu $P=,011$ ”, “Playing Windows – Game $P=,028$ ”, “Using Word-Window menu $P=,023$ ”, “Using Word-Help menu $P=,029$ ”.

T-Test Results Regarding Benefiting Computer Laboratory

In the result of the analysis, students who are studying in Recreation Department and who benefit from computer laboratory, stated that they had more experience at a meaningful level on the items “Using Windows – Research menu $P=,049$ ”, “Using Word-File menu $P=,041$ ”, “Using Excel-Edit menu $P=,042$ ”, “Using Excel-Insert menu $P=,016$ ”, “Using Excel-View menu $P=,002$ ”, “Using Excel-Format menu $P=,022$ ”, “Using Excel-Tools menu $P=,022$ ”.

Students who are in Management Department and benefit from the laboratory, stated a meaningful degree of $P<0,005$ experience on all of the items in the scale.

CONCLUSION

The results of the analysis showed that having a personal computer or having the possibility to access computer from the lab at the faculty that they attend affected students' computer skills in a positive way. Similarly, computer skills of the students' families had positive impacts on students' computer experiences. Therefore, it could be stated that the students' chance to access computer easily at home and at school and the families modeling in terms of computer skills might affect students' computer skills in a favorable way.

Depending on the findings the following suggestions might be made: it is important for each student to have the possibility of using computers in order to improve their computer skills. When they do not have such a possibility at home, school labs are the places where they supply their needs. Thus, it could have positive effects on students' computer skills if the labs are organized in way to make students access the computers more comfortably. Moreover the families' positive effects on the students' computer skills should not be neglected. Providing lifelong learning courses for the parents might help the children at home to improve their computer skills.

REFERENCES

- Azarmsa, R. (1991). Educational Computing - Principles and Applications. Educational Technology Publications. Englewood Cliffs: New Jersey.
- Furst-Bowe, J. & Boger, C. (1996). An analysis of required computer competencies for university students. Journal of Research on Computing in Education, 08886504, Winter95/96, 28 (2).
- International Technology Education Association. (1996). Technology for all Americans: Phase 1. International Technology Education Association, Reston, VA. Retrieved March 04, 2010 from http://www.iteaconnect.org/TAA/PDFs/Taa_RandS.pdf.
- Kennedy, E.J., Lawton, L. & Plumlee, E.L. (2002). Blissful ignorance: the problem of unrecognized incompetence and academic performance. *Journal of Marketing Education*, 24(3), 243-252.
- Lahore, L.L. (2008). Community college students and differences between computer skills self-assessment and objective computer-based skills assessment. Unpublished Dissertation, Seattle University.

- Li, L.Y. (2008). The relationship between computer literacy and online learning attitudes for students in the graduate school of education in Taiwan. Unpublished Dissertation, Alliant International University.
- Ono, H.; Zavodny, M. (2004). "Gender Differences in Information Technology Usage: A U.S.-Japan Comparison". Federal Reserve Bank of Atlanta. Working Paper Series.
- Morahan-Martin, J. (1992). Gender differences in computer experience, skills and attitudes among incoming college students. *Collegiate Microcomputer*, 10, 1-7.
- Simonson, M.R., Maurer, M., Montag-Torardi, M. & Whitaker, M. (1987). Development of standardized test of computer literacy a computer anxiety index. *Journal of Educational Computing Research*, 3, 231-247.
- Smith, M., & Furst-Bowe, J. (1993). An assessment of computer skills of incoming freshmen at two University of Wisconsin campuses. Paper presented at the Association for Educational Communications and Technology Annual Conference, New Orleans, LA.