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Message from the Editor-in-Chief

Dear Colleagues,

We are proud to say that TOJET publishes April, 2014 issue. This issue has international different papers from various fields are shared with professionals. It is a free online journal and offeres free Access to all articles. When the journals are free to access all published articles, it increases the level of impact factor.

TOJET is a multidisciplinary peer-reviewed journal in the field of educational technology. TOJET welcomes the submission of manuscripts that meets the general criteria. TOJET is dedicated to increasing the depth of the subject across disciplines with the ultimate aim of expanding knowledge of educational technology. TOJET is seeking for qualified and high profile researchers to join its editorial team as editors or reviewers.

Our guest editor is Prof.Dr. Steve (Stephen) Harmon from Georgia State University, Atlanta, USA. He currently serves as professor and chair of the Learning Technologies Division in the College of Education at Georgia State University. He is the president of the Association of Educational Communications and Technology (AECT), an international professional association of thousands of educators and others whose activities are directed toward improving instruction through technology. TOJET thanks and appreciate the guest editor and the editorial board members who have acted as reviewers for one or more submissions of this issue for their valuable contributions. As always, issue v.13 i.2 - 2014 features contributions from many countries. Any views expressed in these publications are the views of the authors and are not the views of the Editor and TOJET.

TOJET will organize IETC-2014 (www.iet-c.net) in Chicago, USA. IETC series is an international educational activity for academics, teachers and educators. This conference is now a well known educational technology event. It promotes the development and dissemination of theoretical knowledge, conceptual research, and professional knowledge through conference activities. Its focus is to create and disseminate knowledge about the use of instructional technology for learning and teaching in education.

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TOJET invites article contributions. Submitted articles should be about all aspects of educational technology. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJET. Manuscripts must be submitted in English.

TOJET is guided by it's editors, guest editors and advisory boards. If you are interested in contributing to TOJET as an author, guest editor or reviewer, please send your cv to tojet.editor@gmail.com.

April 01, 2014
Editors,
Prof. Dr. Aytekin İŞMAN
Sakarya University
Prof. Dr. Jerry WILLIS
Manhattanville College

Editorial Board

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A STUDY ON INFORMATION SEARCH AND COMMITMENT STRATEGIES ON WEB ENVIRONMENT AND INTERNET USAGE SELF-EFFICACY BELIEFS OF UNIVERSITY STUDENTS'

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ABSTRACT
This study addresses university students' information search and commitment strategies on web environment and internet usage self-efficacy beliefs in terms of such variables as gender, department, grade level and frequency of internet use; and whether there is a significant relation between these beliefs. Descriptive method was used in the study. Study group is composed of students attending the first and fourth degrees in several departments at Kocaeli University. Data collected regarding university students' information search and commitment strategies on web environment and internet usage self-efficacy beliefs were analyzed using descriptive statistics, t test and pearson correlation coefficient. The research results indicate that students' scores on "elaboration" strategy in the Web environment and scores of self-efficacy regarding Internet use were at the intermediate level. Students' educational Internet use self-efficacy beliefs are moderate according to the highest and lowest points of the survey. The analyses found that there was a relation between Internet use self-efficacy beliefs and information search and commitments strategies within the Web environment. A positive, although low-level, relationship was found between the "elaboration" factor, which is one of the one sub-factors of search and commitment among the information strategies in a Web environment, and self-efficacy with respect to Internet use.
Keywords: evaluative standards, information commitment, information searching strategy, self-efficacy beliefs in Internet use

1. INTRODUCTION

The Internet has recently become one of the most important tools in our lives with rapid developments in the field of information and communication technologies. The Internet is now used extensively in many areas, especially in the field of education. Owing to Internet the computer assisted education, web based training, online learning, blended learning some think like that, today these applications frequently heard and these applications that are on web environments alternative to traditional education, and are applied to various institutions and organizations as a supplementary. According to Boldt, Gustafson and Johnson (1995), the Internet is a great tool that can be used to enrich students' learning habits and experiences. When analyzed in terms of students' learning, the Internet provides a host of advantages such as a rich and flexible learning environment, inexpensive and easy access to information, a variety of different animations, videos, and hypertexts. While technology, however, has increased the ease by which one can gain access to information, it has also created certain problems. One of those problems revolves around the validity, reliability, and accuracy of the information accessed on the Internet. While scientific organizations, business associations and institutions are often known for their publicly available published print, such as professional and scientific journals, there is no overarching mechanism that controls the information that is published on the Internet. In other words, while most journals and books that are published by commercial institutions are first evaluated for the accuracy and validity of their content, information posted in the Internet undergoes no such evaluation – no editor or jury reviews the print before it is posted and made public. As everyone who wants to publish on the Internet and because there are numerous technology stations that allow people to post or "publish" their information, it is virtually impossible to control or monitor what is posted. These technology stations cause serious problems because, while the information is easily accessible on the Web, issues regarding accuracy, neutrality, and timeliness are many (Cebeci & Bek, 2003; cited by Tavsanci, 2004; Kurulgan & Argan, 2007). Most scientific knowledge is still, for the most part, published through traditional methods such as scientific journals, books, etc. It is exceptionally challenging, on an individual basis, for the user of the Internet to monitor all texts, images, and data due to the uncontrolled flow of information. As a result, when creating or using a world-wide Internet library, the user is faced with "information pollution" overload. (Yolal & Kozak, 2008).

According to the research, students of the 21st century perceive the Internet as a unique main source of information (Akdag & Karahan, 2004; Akkoyunlu & Yilmaz, 2005; Kurbanoglu, 2002; Oliver & Goerke, 2007; Tsai, 2008; Yalcinalp & Askar, 2003). These students do, however, express doubt about the reliability and validity of the information on the Internet, especially that which is free (Jean-Francois 2003; Kuechler 1999; McDowell 2002; Yolal & Kozak, 2008). Because most students who are accessing the Internet generally research a subject for information without using any form of filter to evaluate the credibility of the information, the student is left to evaluate the reliability of the information. Accordingly, some of the information taken from

a Web environment may be inaccurate or biased (Brandt 1996; Flanagin & Metzger, 2000). Therefore, students need to develop a strategy that will facilitate their ability to evaluate and determine the accuracy and usefulness of the information. Researchers, as a consequence, are interested in assessing student thoughs and feelings about the process of searching for information on the Web (Bilal, 2001; Hess, 1999; Lazonder et al., 2000; Rouet, 2003; Whitmire, 2003, 2004) and interested in determine the factors that influence their thoughts and feelings (Beaufils 2000; Hill 1999; Tsai & Tsai 2003). To date, however, information about the nature of students' search strategies on the Internet have not been fully revealed. Strategies for students to interpret the literature on web-based information search and commitment that more research is needed (Wu & Tsai, 2005). Study results show that the Internet cannot be used effectively during the teaching and learning process (Akkoyunlu, 2002; Olkun & Cakiroglu, 2000). Students should be instructed about how they effectively benefits from the knowledge for educational purpose on the Web, what kind of knowledge is reliable etc. (Olkun & Cakiroglu, 2000).

Students use different search strategies as they look for appropriate and relevant information on the Internet needed to complete a task (obtain information about a topic, prepare homework, create a project, etc.). Wu and Tsai (2005) found that as students search for knowledge and resources within the Web environment, they basically applied two different strategies. In the first strategy, they search for information that they need, while the second strategy involves searching for comments about the research and the information they obtained from the Web. Wu and Tsai (2005) posit that information search strategies in the Web environment that are associated with students learning is one of the most important factors affecting student performance. Tsai (2004) has developed a theoretical framework about the knowledge search on the Web and commitment strategies of students. It is explained in the following section comprehensively.

1.1. Theoretical Framework

According to Tsai, students who have individual differentials and different levels of commitment to learning use different standards to commitment the information they have accessed through the Web environment. Standards in Web-based learning environments include the usefulness of the information and the degree of student commitment. At the same time, the standards that guide a student's search strategy are impacted by the student's current knowledge of the researched topic. While the standards guiding a student's commitments of Web-based materials are implicit, their information search strategies are, for the most part, explicit. Accordingly, students' research strategies and their commitments of information cover two different components. While the former involves more intrinsic behaviors such as evaluating the information and being committed to enhancing one's knowledge as a result of the research, the latter involves identifying the strategies used by students to obtain information from the Web. To understand the commitment of Web users who are seeking information, Tsai (2004) developed a theoretical framework. According to this theoretical framework, students are categorized or defined according to three aspects with respect to their search strategies for and their commitment to accessing valid information in the Web environment.

1. Standards for Accuracy: These are the standards used to evaluate the reliability and accuracy of the Web information. The possible orientation of the standard is "multiple sources". In this strategy, when the students see information about the researched topic on the Web, they can discuss with their teacher or friends or they can research using books and other printed materials to determine the accuracy of the information. "Multiple sources" of the opposite opinion constitute "authority". Using this strategy, students can assess the accuracy and validity of the information based on the actual resource. That is, if the source is a site that is well-known for publishing valid information, if the source is an official institution (government agency, educational institutions, etc.), if the source is an occupational Web site, or if the source is one that was recommended by experts, the information can be considered reliable (Tsai, 2004).
2. Standards for Usefulness: These are the standards students apply to evaluate the relevancy of the information accessed on the Web. The possible orientation of this standard is "content". "Content" means that the Web site has information that is appropriate and applicable to the research aim. When applying this strategy, students may consider the Web site more to be suitable if the information content addresses the specific aim of their search, provides information links to other sites, promotes their learning and research of the topic, provides a high level of information, offers animations or visuals to help students better comprehend and examine the information in the Web environment. "Content" of the opposite opinion constitute "technical". With respect to this component, one must consider the ease with which one can navigate the site as well as the functional aspects and physical aesthetics of the Web site. For example, ease of access is determined by how quickly one can access the site and have access to the required information. Those sites that require passwords or registration are not considered as user-friendly as those that can be accessed with one or two clicks of the mouse. (Tsai, 2004).

3. Search Strategy: Students use research strategies when searching for an appropriate Web environment. One possible orientation of this strategy is “elaboration”. This strategy allows students to quickly summarize found information and to easily conduct a more advanced search through different search engines to find more suitable information for their purpose based on information gained from an initial search. This strategy also involves the integration of information derived from various Web sites, thus facilitating their intended purpose during their research in the Web environment. The opposite of the elaboration strategy is the match strategy, where students usually use only one search engine to find the most suitable Web site. İf they find a suitable Web site that meets their research needs in the first stage, they may not search the other sites or access other search engines (Tsai, 2004).

Within the aforementioned three aspects of Tsai’s framework, the first two items contain standards for student commitment to obtaining reliable and readily available information (“multiple sources”, “authority”, “content”, “technical”) when using the Web environment for their research. These standards are referred to as implicit components. The third item contains searching strategies (elaboration, match), which are considered explicit components.

Wu and Tsai (2005) ascribe specific names to three factors, “content”, “elaboration” and “multiple sources,” and consider these to be “advanced sophisticated” that contribute to and facilitate the students’ access to reliable and valid information.

On the other hand, they ascribe specific names to three other factors, “authority”, “technical” and “match”, and consider these to be “simple information search strategies”, that is, they are less sophisticated, because they do not require that the student put forth much effort when searching for information. A scale was developed by Wu and Tsai (2005) based on Tsai’s (2004) theoretical framework and used to evaluate college students when they were searching for information on the Web. The visual information related to the scale is displayed in Figure 1.

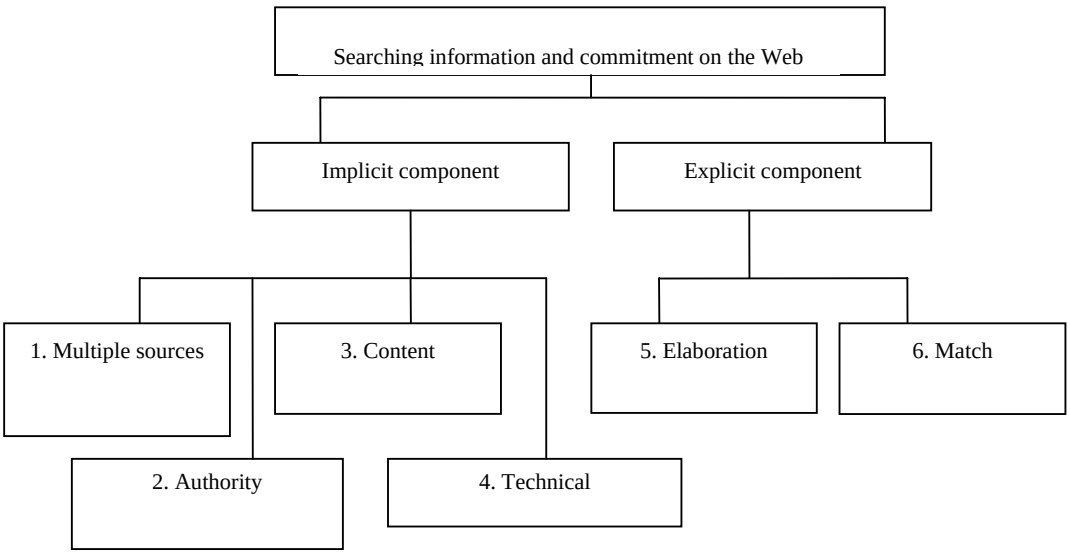

Figure 1. The scale and its sub factors as developed by Wu and Tsai(2005)

The causal relationship between explicit and implicit components in the scale developed by Wu and Tsai (2005) with respect to students' information search and commitment strategies is examined. Reliability and validity studies are conducted, and the scale is used to analyze 610 students in Taiwan. The results of the studies indicate that students' standards of evaluation of Web materials have a significant impact on their information searches in the Web-based learning environments.

Moon (2004) who stated one of the factors that affects students' information search strategies is the specific features of the Web site. Web sites that offer users more detailed, useful, accurate, reliable, current and timely information induce users to use the site and to stay longer on the site (Moon, 2004). Opening speed, design, and ease of use are technical features of the site that may influence student attitudes about the site and their inclination to use the site. Many studies have been conducted regarding the evaluation of the information

obtained on the Internet (e.g., Brandt 1996; Flanagin & Metzger, 2000). Few of these studies, however, relate to the feasibility and usefulness of materials found in a specific Web environment. Thus, this is an area where research needs to be conducted. Studies on this subject are summarized below.

1.2. Related Research

Wu and Tsai (2007) conducted a study of 1220 university and graduate students who use online environments in Taiwan. Using the scope and scale developed in their previous studies, they found that students' information search and commitments strategies on the Web differ significantly according to gender and grade level. Male students use the "match" strategy, which is the less sophisticated strategy, more often than do girls. It was also determined that university graduate students are more oriented to multiple sources than are university undergraduate students when evaluating the accuracy of information accessed on the Web.

Kurulgan and Argan (2007) examined the behavior of students' information searches on the Web. The results of the research indicate that gender, academic department and competency level regarding Internet use were found to have statistically significant effects on Web information seeking behavior. The results also show that students' gender, their average spending level and the status of their academic department all have a significant impact on the frequency with which they use the Internet.

Yalcinalp and Askar (2003) examined student usage of the Internet as an information search tool and as a communication environment in terms of specific student characteristics. The results suggest that there is a relationship between student information search style and information search strategy. The students preferred the Internet to the library or other sources when specific conditions were met.

Additional research findings support (Usluel, 2006) the conclusion that students encounter difficulties accessing information and indicate that there should be emphasis placed on Web-based information search strategies.

As previously mentioned, information overload on Web-based environments often leads to problems related to reliability and impartiality of information. Therefore, students must be awareness of this problem and must be able to evaluate the accuracy of the information they access. Debowski (2001), in his research on college students, found that students who lack experience using the Internet and navigating Web environments may put for the tremendous effort in their studies but they lack effective search strategies to conduct the necessary research. As a result of Debowski's (2001) study, emphasis was placed on the need for educational programs that facilitate students' development of effective search strategy skills.

The use of Internet-based technologies requires that students be familiar with the Internet. Moon (2004) found that students who increased their level of knowledge regarding the use of Internet information search strategies consciously increased the importance they ascribe to this environment. Similarly, as the student's ability to use the Internet evolves, the student will search for more detailed information on the Internet (Yolal & Kozak, 2008). Students' knowledge, skills and attitudes related to Internet technologies are based on their belief that the Internet provides valuable research resources and that they, as users, possess the requisite skills to access the information on the Internet. In other words, student self-efficacy or confidence in their ability to successfully access information on the Internet is essential for student success. For the first time the concept of self-efficacy, Bandura (1997) used by the. Bandura (1997) addressed the concept of self-efficacy in relation to behavioral, environmental, and individual factors and identified three basic levels. The concept of self-efficacy regarding an individual's capacity to perform a task is expressed in the form of Internet self-efficacy beliefs. While today's students have numerous opportunities to benefit from Web-based learning environments, learning in these environments is thought to influence their level of self-efficacy and their competence regarding their use of the Internet, an important area of interest to many researchers. Tsai and Tsai (2003) further define Internet self-efficacy beliefs as the students' perceptions and beliefs about their abilities and skills to efficiently navigate the Internet. Internet self-efficacy beliefs is based on the basic computer skills that are required to effectively and efficiently access the Internet, thereby creating a different set of behaviors (Eastin & LaRose, 2000). A high level of self-efficacy suggests that the individual believes he/she can succeed and accomplish something (Tsai & Tsai, 2003). Thus, Internet self-efficacy beliefs suggests that the individual possesses not only computer skills, but the skills necessary to efficiently use e-mail, access Web addresses, scan information, etc. No doubt hear the performance capabilities of individuals against the negative influence and that the more trust, more performances for doing a job that leads to (Bandura, 1989, cited by: Montcalm, 1999). Similarly, students' level of self-efficacy and Internet competence is necessary for those with low Internet self-efficacy beliefs as they strive to increase confidence their Internet self-efficacy beliefs.

In addition to effective strategies to search and commitments for information, a high level of Internet access competencies can be beneficial as students search for the appropriate information within the environment. Tsai

and Tsai (2003), for example, posited that having a strong sense of self-efficacy when using the Internet facilitates students as they seek to identify effective information searching and commitment strategies for science lessons within Web-based learning environments.

Similarly, there is a positive relation between information search strategies based on Web-based learning and the level of the student Internet self-efficacy beliefs (Hill & Hannafin, 1997; Joo, Bong & Choi, 2000). Wu and Tsai (2006) noted the importance of research regarding the relationship between students' Internet self efficacy and their ability to navigate within the Web environment. It is important that students be able to effectively evaluate the information they obtain from the Web environment and that they develop effective information research strategies when accessing Web-based learning environments. There are few researches about the determination of students' knowledge search strategies on web-based learning environments in the literature.

In the process of information searching, the searching strategies students employ may guide their searching behavior on the Internet. However, when searching information in web-based learning environments, students with expert Internet experience demonstrate better searching strategies than those with novice Internet experience (Tsai & Tsai, 2003). The different searching strategies used by expert and novice users may lead to different search results, which can be viewed as an important indicator of learners' performance and outcomes derived from web-based learning environments (Wu&Tsai, 2007). Tsai and Tsai (2003) have concluded that Internet self-efficacy can foster better information searching strategies and learning outcomes in Internet-based environments. To research of students' information searching and commitments strategy on web environment and their Internet self efficacy may be illuminate studies which will be organized in the future in this subject. In addition, is there a significant relationship between information search and commitments strategies within the Web environment and Internet self-efficacy beliefs? Can a student who has a high degree of competence in using the Internet self-efficacy beliefs regarding the Web environment determine effective information search and commitments strategies to gain access to appropriate, valid information? A research is needed to be done for the answers and it is covered in the study thoroughly.

1.3. Purpose

The purpose of this research is to investigate the student's information search and commitments strategy on the web environments and to determine the relationship between their Internet self-efficacy beliefs beliefs. The sub-objectives developed for this purpose are as follows:

1. What is the level of the students' information search and commitments strategy on the Web and the students' Internet self-efficacy beliefs?
2. Is there a significant difference between a students' information search and commitments strategies in a Web environment and their Internet self-efficacy beliefs when considering other variables such as department, grade, gender, frequency of Internet use?
3. Is there a relationship between the students' information search and commitments strategies on the Web and Internet self-efficacy beliefs?

2. METHODS

2.1. Model of research

A descriptive model was used in this study.

2.2. Participants

Participants in the study included 565 formal education students in either 1st or 4th grade at Kocaeli University in the academic year 2011-2012. As some surveys were eliminated because of incomplete information, the final number of valid surveys used for data collection was 557. Three verbal and three numeric department were selected for the study because the numerical and verbal departments indicated whether students employed different information search and commitments strategies. Whitmire (2002) has determined that students demonstrate different information search behaviors according to their various education disciplines.

2.3. Tools of Data Collection

Data were collected and processed as either "Information Search and Commitments Strategies on the Web Environment Scale" or "Internet self-efficacy beliefs Scale".

2.3.1. Information Search and Commitments Scale in the Web Environment: This scale was developed in 2005 by Wu and Tsai, and the students were assessed using confirmatory factor analysis and structural alignment (Wu & Tsai, 2005). Necessary permission for use of the scale was obtained from Wu and Tsai by e-mail. The scale consists of 24 items and six sub-factors. The first sub-factor of the scale is "multiple sources", which

consists of affirmation commitment strategy information. (İtem 3 in the scale adaptation of this was factor eliminated). The second sub-factor is "authority", which consists of information related to information commitment strategies on the Web environment. The third sub-factor is "content", which consists of information related to the utility of the information accessed on the Web as related to the purpose of the research. The fourth sub-factor is "technical", which refers to the ease of accessing information and navigating Web sites on the Internet. The fifth sub-factor of the scale is "elaboration", which contains research about information search strategies within the Web-based learning environment. The sixth sub-factor is "match", which consists of information related to student search strategies. These first four elements of each of these dimensions comprise the sub-dimension referred to as the implicit component factor and the last two elements comprise the sub-dimension referred to as the explicit component factor.

2.3.2.

Responses to statements range on a six-point Likert scale from "Strongly Agree(1)" to "Strongly Disagree(6)". In the final version of the scale, however, the statements are evaluated using a five-point Likert scale (Hsieh & Tsai, 2011). The adaptation of the scale to a five-point Likert scale for our culture was performed by Gecer and İra (2012). A factor analysis is obtained for the six sub-factors, and the eigenvalue is over 1.00, thus explaining 53.80% of the total variance. Because item (3)'s factor loading value is below .40, the scale's analysis required the elimination of 23 items. The factor loading of items ranges between .544 and .799. The alpha internal consistency of the coefficients of all scale points is α=.75. Scale items in the study were analyzed using a five point Likert form. Taking into account the scale's breadth of range calculations with "series width/number of groups to be performed" formulation (Tekin, 1996), the width of arithmetic average is basic for evaluating research findings. Accordingly, "1.00 to 1.80 = Strongly disagree", "1.81 to 2.60 = Disagree", "2.61 to 3.40 = Somewhat agree", "3, 41 to 4.20 = Agree" and "4.21 to 5.00 = Strongly agree".

2.3.3. Internet self-efficacy beliefs Scale: The scale is taken from the research of Sahin (2009) titled "Validity and Reliability of Educational Internet Use Self-Efficacy Beliefs". The scale is used to measure university students' self-efficacy regarding Internet usage. Response expressions were as follows: "İnsufficient (1)", "Partially had enough", "Had enough", "Enough", "Completely had enough (5)". There are 28 items in the scale. Considering the scale's breadth of range calculations with "series width/number of groups to be performed" formulation (Tekin, 1996), the width of arithmetic average applied is basic for evaluating research findings. Accordingly, "1.00 to 1.80 = İnsufficient", "1.81 to 2.60 = Partially had enough", "2.61 to 3.40 = Had enough", "3, 41 to 4.20 = Enough" and "4.21 to 5.00 = Completely had enough". Scores range between 1.00 and 5.00. İt is assumed that students have a high level of Internet use self-efficacy when their points approach 5.00 and students have a low level of Internet use self-efficacy as their points approach 1.00. The necessary permission to use the scale was obtained from Sahin (2009) via e-mail. The scale was developed as a one-factor scale with item factor loadings of the 28-items ranging between 0.52 and 0.81. The Cronbach's alpha reliability coefficient is α= 0.96.

2.4. Analysis of Data

The SPSS 17.0 program was used to analyze the data, and an acceptable significance level of 0.5 was achieved. Furthermore, methods of frequency (f), percentage (%), arithmetic average ($\bar{X}$), t-test, variance analysis with a single factor, multiplying of Pearson moments and technique of correlation were used in the study.

3. RESULTS

The data were analyzed in accordance with purpose and sub-purpose, and the data were supported by related results.

3.1. Results related to students' demographic features

Findings related to students' demographic features are displayed in Table 1.

Table 1. Findings related with demographic features of students

Department	**N**	**%**
Verbal (Turkish Language and Letter, Philosophy, Psychological Counseling and Guidance)	269	48.3
Numeric (Physics, Metallurgical Engineering, Science Teacher)	288	51.7
Grade	**n**	**%**
1st grade	278	49.9

4th grade	279	50.1
Gender	**n**	**%**
Female	341	61.2
Male	216	38.8
Frequency of using Internet everyday	**n**	**%**
Less than 1 hour	124	22.3
1 hour	116	20.8
2 hours	123	22.1
3 hours	92	16.5
4 hours or more	102	18.3

According to the results displayed in Table 1, students who participated in the survey included 48.3% from the verbal department, 51.7% from the numeric department. Students enrolled in the 1st grade account for 49.9% of the participant population, while the remaining 50.1% are in their 4th year of study. Females (61.2%) outnumber the males (38.8%). With respect to student Internet frequency use, 22.3% of the students use the Internet less than 1 hour a day, 22.1% access the Internet two hours a day, and 18.3% are on the Internet four or more hours a day.

3.1.1. The level of the students' information search and commitments strategy on the Web environments and the student's Internet self-efficacy beliefs beliefs

The values related to students' information search and commitments strategy on the Web environments and the student's Internet self-efficacy beliefs are provided in Table 2.

Table 2. The level of the students' information search and commitments strategies within the Web environment and their Internet use self-efficacy beliefs

Strategies for information searches and commitments within the Web environment	**N**	$\bar{x}$	**Ss**
1. factor: multiple sources	557	3.76	1.58
2. factor: authority		3.89	2.39
3. factors: content		3.87	3.19
4. factors: technical		2.68	2.48
5. factor: elaboration		3.92	2.57
6. factor: match		2.93	2.75
Internet use self-efficacy beliefs	**N**	$\bar{x}$	**ss**
	557	3.33	2.92

When Table 2 is examined, it is seen that highest value strategy is the fifth factor which is "elaboration" ($\bar{x}$=3.92) related with students' information search and commitments strategies on the web environment. This is followed by "authority" ($\bar{x}$=3.89), "content" ($\bar{x}$=3.87), and multiple sources ($\bar{x}$=3.76). Students expressed that they "agree" substances in this category. Students expressed that they "somewhat agree" about the sixth factor, "match" ($\bar{x}$=2.93), and the fourth factor, "technical" ($\bar{x}$=2.68). When assessing students self-efficacy as related to Internet use, students feel that they possess adequate Internet self-efficacy beliefs ($\bar{x}$=3.33).

3.1.2. Is there a significant difference students' information search and commitments strategies on a Web environment and Internet use self-efficacy beliefs according to their department, grade, gender, frequency of using Internet everyday?

The impact of various demographic variables, such as department, grade, gender, frequency of using Internet everyday on information search and commitments strategies on a Web environment and on Internet use self-efficacy beliefs as well as findings are presented in below.

Table 3. The difference between students' information search and commitments strategies within the Web environment according to their academic department

The scale of information search and commitments strategies within the Web environment	Department	$\bar{x}$	Ss	t	p
multiple sources	Verbal department	3.86	1.45	3.01	.003
	Numeric department	3.66	1.67		
authority	Verbal department	3.90	2.48	0.56	.574
	Numeric department	3.87	2.30		
content	Verbal department	3.88	3.24	0.37	.709
	Numeric department	3.87	3.14		
technical	Verbal department	2.56	2.48	3.44	.001
	Numeric department	2.80	2.43		
elaboration	Verbal department	3.92	2.46	0.03	.974
	Numeric department	3.92	2.67		
match	Verbal department	2.84	2.71	2.11	.035
	Numeric department	3.01	2.77		

An independent t-test was applied to determine the difference between students' information search strategies within the Web environment according to their academic department. A significant difference was found between departments with respect to the “multiple sources” factor [$t(557) = 3.01$, $p < .01$]. The arithmetic average of the verbal departments with respect to “multiple sources” strategies on the Web is higher than that of the numeric departments. A significant difference was found between departments regarding strategies [$t(557) = 3.44$; $p < .001$]. The arithmetic average for the factor “technical” regarding Web environment strategies is higher for those students in the numeric departments than for those in the verbal departments. A significant difference was also found between departments with respect to the “match” factor [$t(557) = 2.11$; $p < .05$]. The arithmetic average of regarding the “match” factor as a strategy is higher for those students enrolled in numeric departments than for those in verbal departments.

Table 4. The relationship between grade level and students' information search and commitments strategies within the Web environment.

The scale of information search and commitments strategies within the Web environment	Grade	$\bar{x}$	Ss	t	p
multiple sources	1st grade	3.76	1.52	0.03	.969
	4th grade	3.76	1.64		
authority	1st grade	3.87	2.19	0.50	.615
	4th grade	3.90	2.57		
content	1st grade	3.81	3.48	2.85	.005
	4th grade	3.94	2.81		
technical	1st grade	2.67	2.49	0.35	.721
	4th grade	2.69	2.47		
elaboration	1st grade	3.91	2.47	0.45	.652
	4th grade	3.93	2.66		
match	1st grade	2.95	2.65	0.47	.636
	4th grade	2.91	2.85		

An independent t-test was applied to determine the difference between students' information search and commitments strategies within the Web environment according to their grade level. No significant difference was found for any factor other than "content" strategy with respect to grade level [t(557)=2.85; p<.01]. The arithmetic average of "content" strategy when using the Web to access information is higher for students who are studying at grade 4 than for students studying at grade 1.

Table 5. The relationship between gender and students' information search and commitments strategies within the Web environment

The scale of information search and commitments strategies within the Web environment	Gender	$\bar{x}$	Ss	t	p
multiple sources	Female	3.81	1.52	1.81	.070
	Male	3.68	1.67		
authority	Female	3.89	2.28	0.18	.852
	Male	3.88	2.55		
content	Female	3.85	3.12	1.13	.259
	Male	3.91	3.29		
technical	Female	2.61	2.40	2.35	.019
	Male	2.78	2.57		
elaboration	Female	3.96	2.32	1.98	.048
	Male	3.87	2.90		
match	Female	2.87	2.62	1.74	.082
	Male	3.01	2.94		

An independent t-test was applied to determine the difference between students' information search and commitments strategies within the Web environment and their gender. A significant difference was found between their gender and strategies related to "technical" factor [t(557)=2.35; p<.01]. The arithmetic average with respect to "technical" strategies within the Web environment was higher among males than among females. A significant difference was also found between the genders with respect to "elaboration"[t(557)=1.98; p<.05]. The arithmetic average for female students with respect to elaboration within the Web environment is higher than that for male students.

Table 6. The relationship between the frequency of using the Internet and students' information search and commitments strategies within the Web environment.

The scale of information search strategies within the Web environment	The frequency of using the Internet	$\bar{x}$	Ss	F	p
multiple sources	Less than a hour	3.76	1.64		
	1 hour	3.81	1.59	0.71	.580
	2 hours	3.82	1.25		
	3 hours	3.67	1.76		
	4 hours or more	3.71	1.69		
authority	Less than a hour	3.73	2.59		
	1 hour	3.92	2.09	4.15	.003
	2 hours	3.84	2.44		
	3 hours	3.95	2.44		
	4 hours or more	4.07	2.18		
content	Less than a hour	3.82	3.31		
	1 hour	3.85	3.03	0.83	.506
	2 hours	3.91	3.07		
	3 hours	3.86	3.29		
	4 hours or more	3.93	3.24		
technical	Less than a hour	2.51	2.40		
	1 hour	2.57	2.43	3.64	.006
	2 hours	1.72	2.59		
	3 hours	2.71	2.41		
	4 hours or more	2.78	2.43		
elaboration	Less than a hour	3.83	2.78		
	1 hour	3.90	2.39	2.01	.091
	2 hours	3.95	2.36		
	3 hours	3.94	2.86		
	4 hours or more	4.01	2.39		
match	Less than a hour	2.79	2.64		
	1 hour	2.91	2.73	1.34	.251
	2 hours	2.98	2.70		
	3 hours	2.92	2.82		
	4 hours or more	3.06	2.88		

A one-way analysis of variance and an LSD test were applied to determine the difference between of students' information search and commitment strategies within the Web environment according to their daily Internet frequency use. A significant difference was found between daily Internet use and the "authority" factor [$F(557)=4.15$; $p<.01$]. The arithmetic average for those students who use the Internet for 4 hours or more with respect to the "authority" factor is higher than it is for students who use the Internet "for less than 4 hours a day. A significant difference was also found between daily Internet use and the strategies related to the "technical" factor [$F(557)=3.64$; $p<.01$]. The arithmetic average for students who use the Internet 4 hours or more per day with respect to the "technical" factor is higher than it is for students who use the Internet less than 4 hours per day. No significant differences were found for other factors regarding the daily frequency of student Internet use. Findings related to significant differences between students' levels of Internet self-efficacy beliefs according to students' department, grade, gender, frequency of daily Internet use are displayed in Table 7.

Table 7. The relationship between various variables and students' levels of Internet self-efficacy beliefs

The students' Internet self-efficacy beliefs		$\bar{x}$	Ss	t	p
Department	Verbal	3.15	21.70	5.28	.000
	Numeric	3.49	21.39		
The students' Internet self-efficacy beliefs		$\bar{x}$	**Ss**	**t**	**p**
Grade	1st grade	3.18	21.21	4.38	.000
	4th grade	3.47	22.19		
The students' Internet self-efficacy beliefs		$\bar{x}$	**Ss**	**t**	**p**
Gender	Female	3.18	21.77	5.67	.000
	Male	3.56	20.98		
The students' Internet self-efficacy beliefs		$\bar{x}$	**Ss**	**F**	**p**
Frequency of daily Internet use	Less than 1 hour	2.95	19.84	17.17	.000
	1 hour	3.14	19.32		
	2 hours	3.43	21.52		
	3 hours	3.60	20.66		
	4 hours or more	3.61	23.12		

An independent t-test was applied to determine differentiation between students' level of Internet self-efficacy beliefs and their department of study. As a result of the t-test, there were significant differences between the verbal and numeric departments with respect to students' levels of Internet self-efficacy beliefs [t(513)=5.28; p<.001]. The arithmetic average of those students who are studying in numeric departments is higher than it is for students who are studying in verbal departments with respect to students' levels of Internet self-efficacy beliefs.

An independent t-test was applied to determine differentiation between students' levels of Internet self efficacy and their grade. As a result of the t-test, significant differences were found between the two grade levels (1st grade and 4th grade) with respect to students' level of Internet self-efficacy beliefs [t(513)=4.38; p<.001]. The arithmetic average of those students who are studying at grade of 4 is higher than it is for students at the 1st grade with respect to the students' levels of Internet self-efficacy beliefs.

An independent t-test was applied to determine the degree of differentiation between students' levels of Internet self efficacy and student gender. As a result of the t-test, there were significant difference as between females and males with respect to to students' levels of Internet self-efficacy beliefs [t(513)=5.67; p<.001]. The arithmetic average of the male students is higher than that of the female students with respect to students' levels of Internet self-efficacy beliefs.

A one-way analysis of variance and LSD test were applied to determine differentiation between students' level of Internet self-efficacy beliefs according and their daily frequency of Internet use. A significant difference was found between students' level of Internet self-efficacy beliefs and their daily frequency of Internet use [F(557)=17.17; p<.001]. The arithmetic average of those students who are using the Internet 4 hours or more per day is higher than it is for students who use the Internet less than 4 hours per day with respect to to students' levels of Internet self-efficacy beliefs.

3.1.3. The relationship between students' information search and commitments strategies and Internet use self-efficacy beliefs

A correlation analysis was performed to determine whether there is a significant relationship between students' information search and commitments strategies within the Web environment and their educational Internet use self-efficacy beliefs. The results of the analysis were displayed in Table 8.

Table 8. The relationship between students' information search and commitment strategies and their educational Internet use self-efficacy beliefs

Variables	N	r	p
multiple sources educational Internet use self-efficacy beliefs	557	.004	.928
authority educational Internet use self-efficacy beliefs		.003	.942
content educational Internet use self-efficacy beliefs		- .019	.652
Technical educational Internet use self-efficacy beliefs		.017	.695
elaboration educational Internet use self-efficacy beliefs		.181**	.000
match educational Internet use self-efficacy beliefs		- .071	.096

**p<.01

The absolute value of the correlation coefficient is at its highest between 1.00 and .70; it is medium between .70 and .30; and it is low between .30 and .00 (Buyukozturk, 2002). As shown in Table 8, there is a low-level positive and significant correlation (r = 0.18) between students' level of educational Internet use self-efficacy beliefs and "elaboration", which is sub factor of students information search and commitment strategies within the Web environment. The relationship is significant at the p<.001 level. There were no other significant relationships between other factors and students' level of Internet use self-efficacy beliefs and their information search and commitment strategies.

4. DISCUSSION AND CONCLUSIONS

In this study, university students' information search and commitments strategies and Internet use self-efficacy beliefs were examined in terms of variables such as department, grade, gender, and daily frequency of Internet use. The analyses found that there was a relation between Internet use self-efficacy beliefs and information search and commitments strategies within the Web environment. It was determined that 22.3% of the students use the Internet less than 1 hour per day, 20.8% use it 1 hour per day, 22.1% use it 2 hours per day, 16.5% use it three hours per day and 18.3% use the Internet 4 hours or more per day. This finding shows that all of students use the Internet daily for at least some period of time. This result is similar to conclusions presented in the literature with respect to this issue. In a survey administered to the student participants, the students replied to the question, "How much do you use the Internet on a daily basis?" The responses to this question indicate that 21.87% of the students use the Internet two hours per day, while 7.72% of the students use the Internet for 4 or more hours per day (Dursun, 2004). According to Unal's study (2012), the students enrolled in the Department of Computer Education and Instructional Technology spend between 1 and 4 hours on the Internet per day (67.3%). Asemi (2005) stated that the 40% of the students who study on the Internet spend 2 hours per day, 29% spend 1 hour per day on the Internet and 15% spend 4 hours per day on the Internet.

When examining factors related to students' information search and commitment strategies within the Web environment, it is noted that fifth factor is the highest value, and it is, accordingly, attached to the factor "elaboration" ($\bar{x}$=3.92). This factor appears in "advanced sophisticated" (Wu & Tsai, 2005). Students have stated that when they need to search for information, they summarize the information they have accessed and then use "advanced sophisticated" options to find the most relevant information, thus elaborating on information accessed from various sites, while focusing on their purpose when engaging in the information search and commitments process. They then compare information from various sites, a process which is known as the "elaboration" factor. Also the students included in a study by Wu and Tsai (2007) had the same strategy (elaboration), one of the information searching and commitment strategies.

"Authority" receives the second the highest value after "elaboration" factor. This factor occurs in "less information search strategy" (Wu & Tsai, 2005). According to the "authority" factor, students who attended to the survey believe the accuracy and reliability of the information is high if the information was published on a

well-known Web site, on the site of an official institutions', a professional Web site or a Web site that is recommended by experts in the context of “authority”.

It appears to be a contradiction when considering students' views related to their information search and commitments strategies, that “elaboration” had the highest value and “authority” had the second highest value with respect to searching the Web environment. Strategies in a web environment for students to search for information and commitment of researches are needed to generalize the results can be expressed as more healthy. The highest value within the scope of this research area is the third factor, “content”, while the highest value was the fourth factor “multiple sources”. When considering which of the first four factors has the maximum value, it can be concluded that students who participated in the survey used an “advanced information search strategy” when searching for information and when verifying the actuality of the information within the Web environment. İt is important to note that in this survey, “match”($\bar{x}$ =2.93), which is sixth factor, and “technical” ($\bar{x}$ =2.68), which is the fourth factor have lower arithmetic averages. When considering that they occur as part of a “less-advanced information search strategy”, it is possible to say that this situation is pleasing. Liang and Tsai (2009) examined students' information search and commitment strategies in Taiwan. As a result of their study, it was found that “content”, which is the third factor ($\bar{x}$ =4.96), has the highest value. “Content” was then followed by the fifth factor, “elaboration”($\bar{x}$ =4.78). The first factor is “multiple sources” ($\bar{x}$ =4.65); the second factor is “authority”($\bar{x}$ =4.62); the fourth factor is “technical” ($\bar{x}$ =4.36) and the sixth factor is “match”($\bar{x}$ =2.93). According to conducted this researches' results “elaboration” strategy is the most participated factor and in Liang and Tsai's study (2009) found that “content” is the most participated in factor among university students. İn the conducted this study, “technical” received the lowest score, while in Liang and Tsai's study (2009), “match” is the lowest score factor.

Students’ educational Internet use self-efficacy is moderate according to the highest and lowest points of the survey. Students see themselves as adequate ($\bar{x}$ =3.33) with respect to Internet use self-efficacy. Throughout this study, the increased opportunities for students to access the Internet, to explore the Internet network and to increase their use of the educational databases can be expressed through the increase in the rate of use of the Internet and the self-efficacy regarding educational use of the Internet. Similar results are found in the literature. In studies, Kilic and Coskun (2010) and Yenilmez et al. (2011) consider the teacher candidate’s educational self-efficacy regarding Internet use and find it to be only moderate. On the other hand, in a study by Bozkurt et al. (2010) self-efficacy regarding Internet use is higher among physics prospective teachers. Wu and Tsai (2006) demonstrate in their research that the university students’ level of self-efficacy about the educational use of the Internet is high. Bas (2011) also finds that the primary school teacher’s educational self-efficacy Internet use levels are high. Similarly, Abbitt and Klett (2007), Albion (2001); Chao (2003); Eroglu, Unlu, Eroglu and Yilmaz (2011); Gurol and Akti (2010); Oskay (2011) and Liang and Tsai (2009) find that the prospective teachers’ Internet self-efficacy beliefs levels are high.

A significant difference between students’ information search and commitments strategies and the department in which they study is found. The arithmetic average for “multiple sources” strategy is higher for students’ enrolled in verbal departments than it is for students’ enrolled in the numeric department. The arithmetic averages regarding the strategies “technical” and “match” on the Web are higher for the numeric students than it is for the verbal students.

A significant difference is found when differences between students' search and commitments information strategies within the Web environment and their grades related “content” factor. The arithmetic average of 4th grade students' "content" strategy is higher than 1st grade students' arithmetic average. Wu and Tsai (2007) examined the information search strategy of students who graduated from university and university students, and they found that 4th grade university student scores correlated with the "multiple sources" factor is higher than that for other groups, that is, 1st, 2nd and 3rd year students.

A meaningful difference is found between the students gender average scores related to “technical” advancements and to "elaboration". According to the students' Internet search and commitments strategies within the Web environment, as the arithmetic average of male students' “technical” strategy is higher than that of female students, but female students scored higher with respect to “elaboration” than did male students. The scale used in this study was the Wu and Tsai (2007)’s survey, which found that in comparison to male students regarding “match”, the female students had higher scores. Liang and Tsai (2009)'s survey found that the arithmetic mean of the strategies for male students with respect to “multiple sources”, “elaboration”, “authority” and “technical” was higher than those of female students. When frequency use of the Internet was examined, students who accessed the Internet for 4 or more hours per day scored higher with respect to “authority” and “technical” than did those students who failed catastrophically. İt is expressed that frequency of access to the

Internet is an important predictor of the student's inclination to use the "elaboration" strategy as dictated in Wu and Tsai (2007). "Elaboration" strategies are being developed for university students who use the Internet and who increase frequency of use. Liang and Tsai (2009)'s survey medical students' knowledge of research strategies in a Web environment, which is one of the sub-factors, "match", that uses the Internet to access students' scores and other outside factors. A relationship was found between the frequency with which one accesses the Internet and the scores obtained as students continued their engagement in the study.

Participants enrolled in programs within the numeric department demonstrated stronger and higher levels of Internet self-efficacy beliefs than did students enrolled in programs within the verbal department. The arithmetic mean of the Internet, indicates that students from one department scored much better than did those in the verbal department for verbal acquisition. Based on the previous findings, and on the verbal department's respect for the learning environments, students more frequently use the technological environments, as they are familiar with this environment, an opinion that can be expressed in these environments. More research, however, is needed to support this finding.

This research found that 4th grade level university student arithmetic means of educational Internet use self-efficacy is higher than it is for 1st grade level students. Similar findings found among the literature (Peng, Tsai & Wu, 2006; Tuncer & Ozut, 2012).

One's level of education may increase students' self-efficacy, especially when using using the Internet for educational purposes. This finding, however, is not consistent with the findings presented in the literature (Bozkurt et al., 2010; Wu & Tsai, 2006; Yenilmez et al., 2011). In Yenilmez et al.(2011), primary school mathematics teachers' educational use of the Internet to study their beliefs in conjunction with the study of self-efficacy. Furthermore, Yenilmez et al.(2011) conclude that there is no significant difference according to grade level.

It was found that the arithmetic mean of the students' level of Internet self-efficacy beliefs was found higher for those who engage on the Internet for or more hours per that is was for those who spend less than 4 hours per day on the Internet. These results are similar to those reached by other researchers (Bozkurt et al., 2010; Eastin & LaRose, 2000; Yenilmez et al., 2011). For example, Yenilmez et al. (2011), posits that there is a positive relationship between educational self-efficacy and students' Internet use, which can be assessed according to the duration of their time online, a factor that demonstrates a significant difference. Internet users who access the Web daily compared to those who access it only a few days per month and educational Internet use self-efficacy as it pertains to accessing the Internet was considered to be at a higher level.

Wu and Tsai (2006) found that Internet frequency and duration of use positively affect educational Internet use in their study of self-efficacy. According to these findings, Internet use frequency increases students' educational Internet, and it increases students' self-efficacy.

Male students' level of Internet self-efficacy beliefs, according to the arithmetic mean, is higher than that of female students. This result is consistent with conclusions presented in the literature. The gender variable identified in the studies is meaningful and tends to be in favor of male students (Durndeel & Haag, 2002; Li & Kirkup, 2007; Liaw, 2002; Torkzadeh et al., 2002; Wu & Tsai, 2006; Yenilmez et al., 2011). However, there are studies that have reached different conclusions regarding the role that gender plays. The studies of Bozkurt et al. (2010), Eroglu et al. (2011), Kilic and Coskun (2010), Tsai and Tsai (2010), and Tuncer and Ozut (2012) indicate that Internet use self-efficacy of teacher did not differ significantly by gender, while Bas's (2011) research regarding Internet use self-efficacy of primary school teacher found that female teachers' Internet use self-efficacy was higher than that of their male counterparts.

A positive and significant relationship was found between students' information search and commitment strategies within the Web environment and the sub-factors "elaboration" and level of Internet self-efficacy beliefs. There has been no significant association identified between the level of self-efficacy, information search and commitments strategies within the Web environment and other factors (except for "elaboration") with respect to students' commitment strategies to the Internet. Future research in this area may be useful for students at different educational levels. More research is needed in this area to better understand the complexities of students' information search strategies and their commitments in Web environments. Clearly we must improve our understanding of the skills required for information search strategies and their commitments on the Web environment and of the processes involved to help adequately prepare our students for life in the 21st century.
As a result, it would be more beneficial to generalize the results of this study than to conduct another study related to students' information search strategies and their commitments to the Web environment. In addition, it

is thought that it is important to provide students with training related to research activities and research strategies so they can more effectively and efficiently interact within the Web environment, more critically evaluate information found on various Web sites and employ more advanced information search strategies ("multiple sources", "content", "elaboration"). Future research should also examine the factors influencing students' information search strategies and their commitments.

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ASSISTIVE TECHNOLOGY IN SPECIAL EDUCATION AND THE UNIVERSAL DESIGN FOR LEARNING

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ABSTRACT
Using technology can help students with disabilities to enhance and improve their independence in academic and employment tasks, their participation in classroom discussions, along with helping them to accomplish some difficult academic tasks. This paper discusses the role and benefits of using assistive technology in the Universal Design for Learning (UDL), in academic skills, and in transition services. A summary of the important principles that need to be considered in the integration of technology in educating or training students with disabilities is provided.
Keywords: Assistive technology, universal design, technology, special education.

INTRODUCTION

"The world of education is currently undergoing a massive transformation as a result of the digital revolution" (Collins & Halverson, 2009, p. 1). Because of this "digital revolution," it is both important and practical to make use of the availability and accessibility of technology in designing educational or training programs. Technology has the potential to contribute to a better quality of life for students with intellectual disabilities, which is more than just a matter of convenience (Wehmeyer, Palmer, Smith, Davies, & Stock, 2008). The use of technology in education is inevitable; it is only a matter of time before schools will fall behind unless they try to catch up. Students spend long hours of their day outside school using technology, so is it reasonable to expect them to come to school and find themselves in the world of no technology and feel attracted to this world. In addition to the factor of attractiveness, there is also the effectiveness of using technology, which has been proven through some studies. For instance, Patton and Roschelle (2008) argue that digital textbooks offer a better alternative than traditional textbooks because they can provide instant feedback, interactive representations, and the system of universal design for learning (UDL).

Continuing to deliver education and training in the traditional way and using the same tools that have been used for decades is affecting these programs' outcomes and making them fall far behind what the labor mark demands. Thus, updating school programs with current technological tools and devices for both students with and without disabilities has become necessary.

It is very important to ensure that students with disabilities are prepared to meet the challenges of postsecondary settings (Stodden, Conway, & Chang, 2003); many technological tools could increase, as much as possible, the possibilities for students with disabilities to overcome these challenges with fewer difficulties. In many cases adapting the right assistive technology for students with disabilities could save time and effort. Ignoring the existence of devices and tools that can help students with disabilities facilitate and maximize their educational and academic gains can also prevent students from having opportunities to reach their maximum performance, or at least to make them more confident while undertaking some tasks that can be done easily using low-tech assistive technology.

ASSISTIVE TECHNOLOGY

Assistive technology is defined as "an item or piece of equipment or product system either acquired commercially, off the shelf, modified, or customized and used to increase, maintain, or improve functional capability for individual with disabilities" (Johnston, Beard, & Carpenter, 2007, p. 4). Special education teachers, especially in middle and high school, should be exposed to technological tools that can help students to bypass their academic weaknesses (Mull & Sitlington, 2003). Teachers will help students by training them to use portable and cheap tools that, in most cases, could make students live and behave more independently when they leave high school, which will increase their chances of maximizing their degree of achievement and independence, though it will still be behind their peers without disabilities (Blackorby & Wagner, 1996). For instance, training students to use a calculator can be more practical than beginning to teach middle and high school students basic math (like adding two numbers). Furthermore, if students can use the calculator but have difficulty saying numbers correctly, they can use more advanced tools, such as a talking calculator, which helps students to say numbers correctly and can be used whenever or wherever they need it (Lankutis, 2004).

Mull and Sitlington (2003) reviewed the literature regarding the use of technology to help students with learning disabilities succeed after leaving high school. Based on their comprehensive review of literature, they came up with these recommendations:

1. Because assistive technology can vary significantly in cost from one device to another and sometimes can be too expensive for families or schools to afford, the funding resources for assistive technology must be addressed in the transition process. Additionally, it is important to identify the necessary device early, so this device can be located, and the student can have time to be trained to use it.
2. The assessment of students' needs and the demands of the postsecondary environment should determine the appropriate selection of assistive technology.
3. Training students in using the assistive technology properly will help them to increase their educational gains.

Seven principles of universal design to be considered when designing an AT device are identified by The Trace Center in Wisconsin: 1) equitable use; 2) flexibility in use; 3) simple and intuitive use; 4) perceptible information; 5) tolerance for error; 6) low physical effort; 7) size and space for approach and use appropriate (Trace Center, 1995).

Mull and Sitlington (2003) found there are five obstacles that prevent the general use of technological accommodations by students with disabilities: "1) the use of assistive technology in the role of 'cognitive prosthesis' 2) the availability and high cost of assistive technology; 3) abandonment by students of purchased assistive technology devices; 4) training needs related to the use of technology and assistive devices; and 5) eligibility questions." (p. 29)

It is important to choose an appropriate and efficient device or tool, which does not necessarily have to be an expensive device designed just for educational purposes or for students with disabilities; Stodden et al. (2003) found that complex and expensive devices (e.g., high tech devices) have been used less and appeal to a smaller percentage of students compared to low tech devices. Sometimes it is much more efficient to look within the normal, existing technology to find useful devices or software for students with disabilities than to just focus on finding a specific technology designed specifically for people with disabilities. For instance, Skylar (2008) calculated the cost that can be saved by using an iPod Touch for students with disabilities to replace many devices such as 1) SMART Boards, which can cost 3,000 dollars even without the necessary computer, speakers, and scanner; 2) Kurzweil 3000 software (designed for readers who face difficulties, dyslexics, and students with attention disorders), which can cost around 500 dollars; 3) a laptop (capable of running Kurzweil 3000, calculators, electronic organizers, calendars, multiple alarms, and portable Internet access), which can cost from 800 to 2,500 dollars; 4) a flash drive data storage device, which can cost from 20 to 100 dollars.

Universal Design for Learning (UDL)

Assistive technology is important for students with disabilities, but there are those who say the system as a whole should be supported for all students, and this system or framework is referred to as Universal Design for Learning (UDL) (Wehmeyer, 2006). Also, the challenge that students with disabilities face in the context of inclusive education is the single-faceted presentation of the general education curriculum, which leads us again to think of Universal Design for Learning (UDL) as a solution to meet this challenge (Ludlow & Fosha, 2007).

The official definition of Universal Design for Learning (UDL) by the Higher Education Opportunity Act is as follows:

> A scientifically valid framework for guiding educational practice that (A) provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged; and (B) reduces barriers in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students, including students with disabilities and students who are limited English proficient. (Higher Education Opportunity Act, 2008, 4137—11)

Accessible Environments

Designing environments and educational settings that are accessible to everyone, with and without disabilities, will reduce the need for individual accommodations (Burgstahler, 2003). Wehmeyer (2006) argues that a difference should be distinguished between a universal design for a curriculum (which he advocates) and using assistive technology to enable students with disabilities to access to the general curriculum, in which the disadvantage comes from determining the needed assistive technology prior to choosing the curriculum and causes the teachers to have no choice, except a little flexibility in instructional strategies; consequently, there might be a need for certain expensive assistive technology devices that could help with the chosen curriculum.

Rose, Hasselbring, Stahl, and Zabala (2005) state that the purpose of UDL and assistive technology work is to overcome barriers and provide students with disabilities access to the general curriculum. Assistive technology is essential in the application of a UDL instructional design and, in return, a Universal Design for Learning (UDL) provides accessible Curriculum Content, helping to raise the value of Assistive Technology (AT; Basham, Israel, Graden, Poth, &Winston, 2010).

Examples of Accessible Technologies

Burgstahler (2003) pointed out three examples of accessible electronic and information technology and how it can be useful for students with disabilities in educational settings, based on the concept of universal design: 1) Accessible web pages such as those that allow students with low reading skills to access information and communicate with others; 2) Accessible instructional software, such as programs that allow students to work side-by-side and collaborate with their peers to complete assignments in the classroom; 3) Accessible telephones that make communication accessible to everyone, whatever their disabilities.

Assistive Technology for Academic Skills

Technology could play an important and significant role, in many cases, in helping students with disabilities overcome the academic difficulties that they face and helping them to develop their academic skills as well. Cullen, Richards, and Frank (2008) conducted a study to determine whether computer software would help students with disabilities improve their performance in writing. A multiple baseline design was used to study seven fifth grade students with mild disabilities in three phases: baseline, intervention using a talking word processor, and intervention using word prediction software in conjunction with a talking word processor. In the first week (Baseline) students handwrote all writing samples with no accommodations; in the next three weeks (Intervention one) Students used Write:Outloud, a talking word processor for all writing samples; in the last three weeks (Intervention two) students used Co:Writer, a word prediction software, in conjunction with Write:Outloud for all writing samples. The results showed that five students out of seven in the study improved the number of words produced in the two intervention phases, while the number of words produced decreased with the other two students in both intervention phases compared with the baseline phase. The group mean indicated that there was an improvement in the number of words produced. There were improvements in the number of misspelled words across phases, both individually and in the group mean. In general, the results showed that the impact on most of the seven students was positive.

Another example of the important role that technology can play in helping students to overcome their difficulties with academic skills can be found in the study conducted by Bouck, Doughty, Flanagan, Szwed, and Bassette (2010) to examine how effective a pentop computer (a FLYPen) and the writing software (specifically designed for the FLYPen) was in assisting students with disabilities in writing. This tool "resembles a typical pen, larger in size and includes a slot at the top where a software cartridge is inserted. When using special paper created for the FLYPen, the pentop computer produces voice output to provide directions, prompts, reinforcement, and hints to students for various activities" (p. 36). In this study, three high school students were chosen based on the following criteria: 1) high school students receiving special education services between 15 and 18 years old; 2) students with a mild intellectual disability or learning disability; 3) students having difficulty in written expression; 4) students who had received special education services since early elementary school. The results showed that all students experienced initial gains in the quality of written expression while using the FLYPen. They concluded that technology-enhanced procedural facilitators not only can benefit the quality and quantity of written expression in students with mild disabilities, but it can also enhance students ability to plan their writing and help them complete these tasks more independently.

Examples of Projects With Hearing Disabilities

Mclnerney, Riley, and Osher (1999) examined six projects that have been conducted on students with hearing disabilities, and they found that text highlighting and supportive captions with digital instructional materials were helpful to and demonstrated consistent academic gain for students with hearing disabilities. Wehmeyer, Smith, Palmer, Davies, and Stock (2004) found that exposing students with intellectual disabilities to flexible technologies helped increase their functional skills, take advantage of their strengths, and compensate for their weaknesses. In the same context, Anderson-Inman, Knox-Quinn, and Horney (1996) found that students with learning disabilities have shown increased academic gain when exposed to technology- supported concept mapping strategies. Elbro, Rasmussen, and Spelling (1996) found that students with language-related disabilities showed positive effects for word recognition, comprehension, and fluency when using digital texts with synthetic, syllable- or letter name-level synthetic speech transformations.

Assistive Technology in Transition Services

Technology has the potential to enhance schools' outcomes and to help prepare students with disabilities for life after school (Burgstahler, 2003); also, it could add some enjoyment to these students' academic experiences and might be more practical in some cases. Mitchem, Kight, Fitzgerald, Koury, and Boonseng (2007) qualitatively investigated the usability and perceived effectiveness of an electronic performance support system designed for secondary students with mild disabilities. This software contains 39 strategy tools to support learning, behavior, and transition in high school and beyond. Two special education teachers used the software with their high school students for one semester. The results show that the usability features were rated very high by both teachers and students. Students indicated that the tools had been useful in helping them to recognize their inappropriate responses, along with identifying the more appropriate responses.

Teachers

It is vital that teachers are exposed to and have knowledge of the available technologies that could support students in their academic tasks (Raskind, 1994). Logically, teachers who do not realize and have not been exposed to the usefulness and applications of technology in education in general, and special education specifically, will be more reluctant to use them. It is therefore important that technology is included in preparation programs for special education teachers; in these programs, technology should be used as part of the preparatory program for teachers and cover technical applications at the classroom level. In this way, special education teachers will have the knowledge and experience in using technology that will contribute to the widespread of the use of technology in special education programs.

Course Management System (CMC)

Basham, Lowrey, and deNoyelles (2010) examined the Universal Design for Learning (UDL) framework using an online course management system (CMC) as the basis for a collaborative project between two universities. This study included 78 students from two special education programs enrolled in teacher education courses. Starting with the UDL framework, various online and collaborative instructional components were established between two pre-service education courses at two distinctly different universities.

It was demonstrated that UDL is a practical framework for planning a collaborative CMC project for teacher candidates in special education preparation courses. In addition, it was concluded that it helped teachers gain understanding, share experiences, and express course knowledge in authentic ways. Nevertheless, this study address the need for more research concerning designing elements that provide flexible ways for students to gain and express knowledge and engage with others, which will be important for the integration of CMC in the learning framework.

Examples of Useful Technologies

Raskind (1994) suggested a number of technologies that may be helpful in assisting students with disabilities overcome their difficulties: word processors, spell-checking programs, proofreading programs, outlining (Brain Storming), speech recognition, abbreviation expanders, speech synthesis, proofreading programs, optical character recognition systems, Free-Form Databases, and talking Calculators. Cutler (1990) concluded that spell-checkers were useful in helping students with disabilities compensate for their spelling difficulties. Collins (1990) found that the use of word processors helped in improving the writing skills of students with disabilities. Brown (1987) found that speech synthesis in conjunction with word processing was useful in enhancing students' written language production.

CONCLUSION

In conclusion, technology has changed and continues to change the way people manage things in their lives, both in private and in practical life, so the natural extension of that is to see the impact and the integration of technology in education for students with disabilities in the same way it has been in other areas of life. Using technology can help students with disabilities to enhance and improve their independence in academic and employment tasks and their participation in classroom discussions, along with helping them to accomplish some difficult academic tasks (Burgstahler, 2003). (See Table 1 for Burgstahler's list of advantages of using technology for students with disabilities).

Table 1: Technology Advantages for Students with Disabilities

Advantages	Examples
1. Maximize independence in academic and employment tasks	A student with mobility impairment uses a hands-free keyboard and mouse to operate a computer to take class notes, access library resources, and complete papers rather than have an assistant write for her.
2. Participate in classroom discussions.	A student who cannot speak uses a computer-based communication device to deliver speeches and participate in class discussions.
3. Gain access to peers, mentors, and role models.	In a supported Internet community, a student who is deaf uses email to chat with other teens, gain support for college and career transition from mentors, and meet role models.
4. Master academic tasks that they cannot accomplish otherwise.	A student with a learning disability uses a set of software tools to support her management of reading, writing, and study demands in a postsecondary setting.
5. Gain access to the full range of educational options.	A student who is blind and uses speech output technology fully participates in an Internet based distance learning course that employs universal design principles to assure access to people with disabilities.
6. Participate in experiences not otherwise possible.	A young man with no functional use of his arms and legs experiences completing a chemistry experiment through a computer simulation and observing sea life while swimming in the ocean through virtual reality.
7. Succeed in work-based learning experiences.	A student who has no use of his hands independently operates a computer to draft and edit articles in a journalism internship at the local newspaper office.
8. Secure high levels of independent living.	A young person who has a developmental disability uses a cell phone to maintain regular contact with caregivers as he participates in community activities.

Note. Burgstahler, 2003, pp. 10-11.

There are a few points that summarize the important principles that should be considered in the integration of technology in educating or training students with disabilities: 1) low tech tools should be the first option when looking for assistive technology that will help promote students' learning (Johnston et al., 2007); 2) educators must search among the available tools and devices first before looking for tools that were specially made for educational purposes, which could be very costly (Skylar, 2008); 3) the most expensive tools or devices are not always the best choice, which will be determined based on the student's needs and prior skills ; 4) small adjustments to existing technologies, often, will make a difference for students with disabilities (Johnston et al., 2007); for example, the highlight and enlarge functions, and programs that color important words in the text or buttons on websites will be helpful (Mclnerney et al., 1999).

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COLLABORATION FACTORS AND QUALITY OF LEARNING EXPERIENCE ON INTERACTIVE MOBILE ASSISTED SOCIAL E-LEARNING

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ABSTRACT
This study (n=52) examined mobile assisted in-class course using collaborative learning theories over an 18-week semester in a college level course. A self-evaluation survey containing 50 closed-ended items with two open-ended questions about participants' collaboration experience through the mobile techs was conducted during the last week of the semester. Results from the quantitative data based on linear regression analysis revealed that individual accountability significantly predicted quality of teamwork learning experience in an interactive mobile assisted social e-learning (iMASE) module, as did social skills, quality of feedback, and perceived ability. Finally, based on the qualitative data, perspectives on past experiences, interaction with peers and instructor of the learning community, prompt feedback behavior, authentic group activities were examined and analyzed based on grounded theory. The findings provide useful information for educators or curriculum designers to consider of significant factor when implementing mobile tech as part of the course curriculum in order to rich the quality of learning.
Keywords: mobile techs, social networking apps, cooperative learning, social constructivist

1. INTRODUCTION

A new generation of mobile wirelessly networked technologies, such as Web 3.0 technologies or social media has led to an increasingly prevalent among college students. Learning to learn may be considered to have greater impact on future experiences than the mere construction of domain-specific knowledge itself. Consequently, the learning environment is no longer considered to be the precondition for but an outcome of learning. The new wave of Internet technologies is contributing to new forms of learning in this generation of learners. "Many schools are beginning to implement sound and effective mobile device policies and frameworks so that teachers, administrators, and most importantly, students have 24/7 access to recourses and a 21st century learning environment" (Pierco et al., 2011, p. 3). According to O'Reilly (2005), innovative curriculum integrated with multimedia and technology involvement has changed the ways people create in terms of how teachers teach, and how students learn. Anderson (2008) also indicates "education is not only about access to content. The greatest affordance of the Web for education use is the profound and multifaceted increase in communication and interaction capabilities that is provides" (p. 42). In today's collaborative Web, users can share information and create new knowledge collaboratively. Pedagogically, engaging learners in cooperative learning involving cooperatively working in groups to achieve their shared/common goal or helpfully completing group projects is one of the major pathways to scaffold learning development (Effandi & Zanaton, 2007; Johnson & Johnson, 1994) as learning is a social activity (Chen & Bryer, 2012; Vygotsky, 1978).

Without a doubt, applications of social software technology support constructivist. In this way, the learner develops collaboration, negotiation, reflection, constructivist criticism, selection and information analysis (Grodecka, Wild, & Kieslinger, 2009). While working in groups online, learners gain knowledge and build their skills based on peer-to-peer networks and share experience with others. Although several studies have evaluated the relationship between collaboration learning factors and e-learning experience, very few have examined learners' learning quality in relation to Web 3.0 courses. In addition, not many teachers bring Web 3.0 technologies into their classrooms as Gersten (2013) states "many educators are doing Education 1.0; talking about doing Education 2.0; when they should be planning and implementing Education 3.0" (p. 1). The evaluation of quality of learning experience would thus appear to determine whether mobile assisted social e-learning is suitable that can respond to students' needs and enrich their learning.

2. THEORETICAL BACKGROUND

2.1 Collaboration Learning Theory

According to Bruner (1987), learning is an activity process in which learners acquire new knowledge based on their prior knowledge that had been developed by experiences. Therefore, the social constructivism turns the focus to the importance of the learners rather than instructors. In addition, instructional methods have been shifted to a variety of student-oriented approaches that engage student work together in groups (Bauersfeld, 1995; Effandi & Zanaton, 2007; Kan, 2011). Learners benefit most from actively engaging in learning activities through social interaction with the immediate learning environment (Vygotsky, 1978, Woo & Reeves, 2008). They are encouraged to discover their own solutions and try out ideas and hypotheses. The instructor's primary

role is to assist the students' learning process as a facilitator so that students can exercise their capabilities in knowledge formation (Doolittle & Hicks, 2003).

Most social constructivism models stress the need for collaboration among learners. Studies (Hassan, Fong, & Idrus, 2011; Minocha, 2009) state that applications of social software technology support and increase students' engagement and enrich the learning process. Studies (Nam & Zellner, 2011; Tsay & Brady, 2010) also show that students improve their academic achievement through collaborative tools. In addition, results from Johnson and Johnson (1975) study reported positive outcomes from cooperative learning including increasing higher level reasoning, increasing generation of new ideas and solutions, and enhancing transferring of learning between situations. Johnson et al. (1991) further state that collaborative learning is different from having students work in groups, instead, it is to be structured and managed cooperation among groups. Five essential components in small-group collaborative learning include positive interdependence, face-to-face promotive interaction, individual and group accountability, group processing, and social skills (Johnson & Johnson, 1994).

2.2 Collaboration Learning Process

Feedback is a critical part in collaboration learning process in online or traditional classroom. Based on the core concept of socio-cultural theory, reflection is formed through the process of social interaction and semiotic mediation (Vygotsky, 1978; Wells, 1999). Feedback measuring to what extent learning outcomes have been achieved embeds potential impacts on learning (Gayton, 2005; Hounsell, 2007). The feedback can motivate students by providing positive reinforcement, help students to correct their performance by identifying where could be improved, and inform educators to measure effectiveness of teaching (Yorke, 2003). It fosters motivation, improves self-esteem (Nicol & MacFarlane-Dick, 2006; Sadler, 1989), empowers students as self-regulated learners (Nicol, 2010), and impacts general academic experience (Gielen et al., 2010; Shute, 2008). Timing is also important. Feedback should be provided promptly as needed as Brinko (1993) from social cultural theory suggested. Furthermore, social constructivists suggest that feedback should be given frequently (Gielen et al., 2010) and constantly (Pokomy & Pickford, 2010).

In collaboration projects, perceived ability and learning goals are positively correlated with each other. For example, an individual student's contribution might impact students' level of self-value for the learning output in a collaborative activity (Kirschner et al., 2006). Perceived quality and perceived learning may impact group collaborative learning process in an online environment (Caspi & Blau, 2008; Guo & Stevens, 2011).

2.3 Quality of Learning Experience

Quality of experience particularly with the cooperative learning activities has been conceptualized in several different ways, including satisfaction (Strokes, 2003), engagement (Chickering & Gamson, 1987; McGowan & Graham, 2009), self-regulation and positive affect (Kempler, Linnenbrink, Zusho, & Maehr, 2002), and feedback (Chickering and Gamson, 1987; Zerihun, Beishuizen, & Os 2012). When students are engaged in a quality experience, they increase their level of enjoyment, happiness, self-esteems, concentration, strength, and intrinsic motivation (Covington, 2000; Csikszentmihalyi & Schneider, 2000; Libert, 2010).

3. RESEARCH METHODOLOGY

3.1 Purpose of the Study and Research Questions

This study sought to promote an interactive mobile assisted social e-learning (iMASE) module as an alternative avenue for improving learning quality of fostering collaboration among students themselves and between students and instructors and enhancing learning satisfaction. The purpose of this study was to access students' experiences and perceptions of the emergence used of mobile apps as part of educational and social interaction tool and better understand what students like/dislike about using mobile apps in learning. In addition, student grades were examined as a desired outcome factor as the result of the evaluation of the proposed iMASE module. The following research questions were examined: the first 3 questions were closed questions followed by two open-ended questions.

1. Does the iMASE module effectively help the participants learn the content in an iMASE module in this course?
2. What is the relationship between learners' quality of learning experience and the online collaboration factors?
3. How much of the variance in quality of learning experience can be explained by the significantly correlated online collaboration factors?
4. What are student attitudes toward working in an iMASE module?
    - 4.1. What do you like most about the iMASE module in this course?
    - 4.2. What do you dislike most about the iMASE module in this course?

3.2 Interactive Mobile Assisted E-Learning Module (iMASE)

This course integrated with the assisted mobile techs led the students into such a social learning environment, called iMASE module in this study (Figure 1). Obviously, all the social networking Web apps were interchangeable. Students selected the app(s) they felt best suited to their needs.

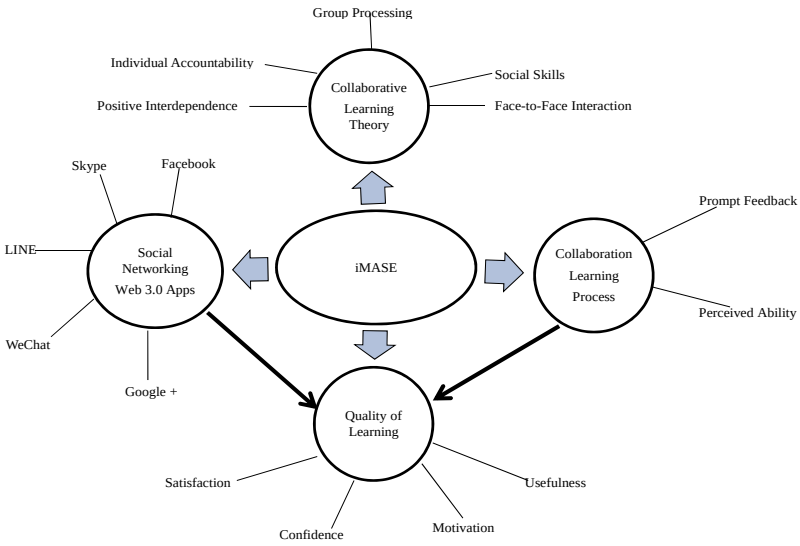

Figure 1: Interactive mobile assisted social e-learning module

3.3 Profile of Participants

Convenient purposeful sampling procedures were used. The sample included 55 undergraduate enrolled in a speech and debate course with 52 return at National Formosa University, Taiwan. Males (22%) and females (78%) with a mean age of 22 years were all full-time students. The study was conducted during regular class periods.

3.4 Procedure

Students participated in the module activities including online discussion, processes of peer feedback or instructor feedback, collaborative group projects via mobile apps. At the beginning of the study, a private Facebook group was established for this particular class. During the second week of the study, the participants were introduced to a variety of mobile apps which most of the students have been used, including Facebook, LINE, WeChat, Skype, and Google+ Hangouts. To ensure everyone knows how to use each of the apps, one-hour training session was given. During the training session every of the students was invited to the private Facebook page of this particular class that the instructor created before the class started. In addition everyone formed his/her own group, set up a private group under each app, tested file uploading, and exchanged information through different mobile apps. Every student also added the instructor to her/his contact in all suggested mobile apps. Every student was informed to have an opportunity to contact with the instructor and peers using any of the mobile apps at their convenience between classes. Students were encouraged to use Facebook for assignment file uploading, Skype and Google+ Hangout for oral presentation and teleconferencing, LINE, and WeChat for audio communication, and Facebook, LINE and WeChat for Q & A and announcements among the group members.

Under the group function of mobile apps, each group member accessed to apps for sending or receiving message, posting or linking resources, and uploading and sharing files as part of assignment delivery methods. Each group (size of 4-5) worked on projects altogether, providing feedback to and received feedbacks from peers constantly on the apps. After that, the drafts were uploaded and posted on class Facebook page where everyone in the class could be able to download and view. Each group revised and improved their projects based on the feedback they received from the instructor and/or from other groups' members. Within an 18-week study, the students completed two group projects and received the review scores given by the instructor alongside the average review score given by the rest of the class. During the study, 3 exams regarding the course content and lesson materials were conducted in hard copy in class in week 6, 12, and 18. Each exam contained less than 50 questions comprised of a combination of multiple-choice, Tue/False, and complete sentence types of questions.

Students completed a survey voluntarily at the end of the module. The student attitudes and quality of teamwork learning experience were printed on a 3-page survey. Data were collected during the final week of an 18-week long semester. The questionnaire was also available through the apps in case any student was absent during the survey distribution class section. It took an average 20 minutes to complete and all participants completed the surveys.

3.5 Data Collection (instrument, questionnaire)

A self-report questionnaire that measured the quality of learning experience of the course was used. The questionnaire consisted of 3 major parts, including a portion for the participants' demographics, a quantitative portion of the learning module aspects, and a qualitative portion that asking participants overall comments. The second portion of the quantitative assessment was consisted of 33 scale responses covering 7 factors of collaborative learning and 1 learning quality scale as shows as follows. All scale responses are measured via a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

(1) positive interdependence, PI (4 items, e.g.: "I felt recognized for what I know"; "I felt recognized for what I need to learn");
(2) individual accountability, IA (3 items, e.g.: "Using mobile apps increased my ability to learn from others"; "I felt working with other more easily using the mobile apps");
(3) group processing, GP (3 items, e.g.: "achieving the group goals through the online apps"; "encouraged the group learning");
(4) social skills, SS (3 items, e.g.: "effectively work with diversity via communication management"; "contributed more to class discussion through the mobile apps";
(5) face-to-face interaction, FF (3 items, e.g.: "prefer face-to-face with my instructors"; "would be happier doing this course without any technology");
(6) prompt feedback, PF (2 items, e.g.: "always get a prompt feedback from my instructor"; "like the feedback on my work that I received from my classmates");
(7) perceived ability, PA (2 items, e.g.: "believed my efforts benefited my group toward to the group project"; "my efforts helped my group reach the goal");
(8) learning quality (13 items from 4 subscales including usefulness, confidence, motivation, and satisfaction).

With regard to the qualitative aspects, the following 2 items were listed for collecting students' overall comments. These 2 open-ended questions guided the researchers to what they need to know most, insights into the effectiveness and ineffectualness of the module.

(1) What did you like most about the iMASE module in this course?
(2) What did you dislike most about the iMASE module in this course?

Once the initial questionnaire was developed, the content validity was yield through an interactive personal interview process with e-learn experts, instructors, and students from mixed learning courses. After proofread, when necessary, revised descriptions for clarity and completeness, the survey instrument were then printed. Internal consistency reliability using Cronbach's α was conducted on the overall 33 items and on the each of the factors. Results indicated that the internal reliability for the overall scale was good; Cronbach's α= .85. Alpha coefficients for the factor IA (.90), FF (.90), PF (.85), and learning quality (.83) were found to be high, apart for the GP (.64), PI (.62), PA (.46), and SS (.34).

4. ANANYSIS AND RESULTS

The collected data consisted of a review of the student academic examination results in the learning contents. In addition, gathered from participants' responses to the survey. Quantitative data (closed-ended questions) and qualitative (open-ended questions) from the survey were analyzed using statistical analysis and a grounded theory method described in the following sections.

4.1 Descriptive Statistics

A majority (79%) of the respondents had 3-4 years of Facebook experience (mean= 3.39, SD= .11). One-third (38%) of them reported that they had 1-2 year of LINE experience (mean= .99, SD= .12). Almost everyone (98%) of them reported that they had less than a year of WeChat (mean=.64, SD= .04) and Hangouts experience (mean=.41, SD= .00) prior to the class. Most (82%) of the respondents reported that they used smart phones to access data while only a few students accessed data through their iPod touch (7%), and tablet (9%). The most popular place where students used mobile apps was home, with 75% accessing data frequently. Many (76%) of the respondents also reported that they used mobile apps outside classroom at campus frequently. Similarly, more than half (69%) of the respondents reported that they used mobile apps during commuting to and from school. The least popular place was shopping stores or restaurants. Among the key applications, respondents

had more friends on Facebook (mean= 503.78, SD= 57.49) than they do on LINE (mean= 53.91, SD= 7.75), WeChat (mean=35.11, SD= 8.45) and Hangouts (mean= .70). Regarding the frequency of mobile apps usage, Facebook was used frequently by most the students (95%). More than half of the respondents (60%) used LINE frequently. WeChat (14%) and Skype (27%) were the least used in their daily lives.

4.2 Research Question 1(closed-ended question): Evaluation of the iMASE Module

The learning assessments that participants carried out during the activities were evaluated. The following means of the three exams were found as follows. With the total score of each exam 100, the first exam scored 73.85, the second scored 82.45. At the end of module, all students completed the final exam: the mean was 80.92 out of 100. The results indicate that the module was successful.

4.3 Quantitative Research Question 2 (closed-ended question): Collaboration Factors

Research question two examined whether quality of teamwork learning experience is related to the online collaboration factors. The results revealed that five collaboration factors were positively correlated with each other and all five collaboration factors were significantly correlated with quality of learning experience. The highest correlation was found between IA and PA (r= .76), followed by GP and SS (r= .51) and IA and SS (r= .45). In addition, the highest correlation was found between quality of teamwork learning experience and SS (r= .59), followed by quality of teamwork learning experience and IA (r= .49), quality of teamwork learning experience and PF (r= .44). Table 1 illustrates the bivariate correlations between quality of teamwork learning experience and the online collaboration factors.

Table 1. Intercorrelations of the collaboration factors with quality of teamwork learning

Factors	IA	GP	SS	PF	PA
IA	--				
GP	.22				
SS	.45**	.51**			
PF	.29*	.28*	.25		
PA	.76**	.13	.27	.17	
Quality of Teamwork	.49**	.43**	.59**	.44**	.32*

*p< .05; **p< .01

The findings were coherent with Buraphadeja & Kumnuanta (2011) who indicate that interaction between students in online learning environments provides an affective support for a sense of connectedness. To better understand the student attitudes toward online collaboration, each statement on the survey was examined. The mean scores and standard deviations of 7 factors of collaboration scale were ranked in Table 2. In terms of collaboration learning, the overall mean score across the 7 factors was 3.88, indicating positive agreement regarding their experience about class learning process. The top-ranked factor on the scale was PI (mean= 4.72), while the SS (3.50) was rated the lowest (mean= 3.50). The two highest-rated statements on the survey were “I felt recognized for what I know.” (mean= 4.80) and “I felt recognized for what I need to learn.” (mean= 4.77). On the other hand, the two lowest-rated statements were “I shared personal information through the mobile apps.” (mean= 3.45) and “My team members shared their cultural information through the mobile apps.” (mean= 3.50).

Table 2. Collaborative learning scale scores

Rank	Factors	Mean	SD
1	PI	4.72	.39
2	PF	4.36	.75
3	PA	3.66	.92
4	GP	3.65	.71
5	IA	3.63	.60
6	FF	3.61	.71
7	SS	3.50	.71
Overall		3.88	.68

4.4 Quantitative Research Question 3 (closed-ended question): Quality of Learning Experience

Hierarchical regression analysis was conducted to answer research question 3, exploring the explanation of quality of teamwork learning experience through the online collaboration factors. The results revealed that 5 extracted significant collaboration factors (IA, GP, SS, PF, and PA) contributed significantly to the explanation of quality of teamwork learning experience and accounted for 68% of the variance, $F(5, 50)= 22.04$, $p< .001$,

effect size (f^2)= .71, indicating that the linear combination of all 5 variables significantly accounted for variance in the dependent variable.

In addition, particularly, results showed that IA (β= .26, p< .05) significantly predicted quality of teamwork learning experience, as did SS (β= .40, p< .001), PF (β= .55, p< .001), and PA (β= .46, p< .05). Table 3 shows the summary of regression analysis for variables explanation quality of teamwork learning experience.

Table 3. Hierarchical regression analysis summary for variables predicting quality of learning experience (N= 52)

Variable	B	SEB	β
PI (positive interdependence)	.11	.19	.07
IA (individual accountability)	.28	.14	.26*
GP (group processing)	.15	.12	.17
SS (social skills)	.36	.13	.40**
FF (face-to-face interaction)	.08	.11	.10
PF (prompt feedback)	.44	.10	.55**
PA (perceived ability)	.31	.14	.46*

*p< .05; **p< .001

The mean scores and standard deviations of the subscales of learning quality scale were ranked in Table 4. The overall mean score across the 4 learning quality subscale was 3.74, indicating positive agreement about their quality of learning in a collaborative online activity. The highest-rated subscale on the survey was confidence (mean= 4.28). In contrast, the lowest-rated one was satisfaction (mean= 3.20). To better understand how students perceived their learning quality, each item on the survey was examined. The highest-rated statements on the survey was "I felt confident using the mobile apps on this course" in subscale confidence (mean= 4.29), and "Overall, I felt this experience in this course was useful" in subscale usefulness (mean= 4.08). On the other hand, the lowest-rated statements on the survey was "I felt excited using the mobile apps on this course" in subscale motivation (mean= 3.45) and "Overall, I'm very satisfied using Google+ Hangouts for my group project" in subscale satisfaction (mean= 3.00).

Table 4. Learning quality scale

Rank	Subscale	Mean	SD
1	Confidence	4.28	.92
2	Usefulness	3.83	.76
3	Motivation	3.64	.85
4	Satisfaction	3.20	1.20
Overall		3.74	.88

4.5 Qualitative Research Questions 4 (open-ended question)

When students were invited to provide comments for what they liked or disliked about the learning module on this course, they listed a wide range of comments as the qualitative data for this study. Glaser and Strauss' (1967) grounded theory was followed as a method for coding the qualitative data. Grounded theory method is the most powerful qualitative method in the social sciences. As defined by Glaser (1978), grounded theory methodology explicitly involves "generating theory and doing social research (as) two parts of the same process" (p. 2). The key idea of this method is to discover a phenomenon by conceptualizing and categorizing the key elements of the phenomenon, and then generating and forming a theoretical explanation of that phenomenon (Strauss and Corbin, 1990). Thus, the researcher analyzed and categorized the similar data from the open-ended questions into different phenomenological themes.

After carefully read the answers several times, 192 and 47 discernibly different answers were scanned and coded for the positive and negative aspects respectively. The answers were then categorized into different themes as reported in Figure 2 (positive aspects) and Figure 3 (negative aspects). In the phenomenological process, five themes emerged which were interpreted by the researcher as: peer interaction, motivation, computer skills, prompt feedback, and relationship with teacher for the positive aspects; four themes emerged which were interpreted by the researcher as: peer interaction, motivation, computer skills, and privacy for the negative aspects. In the categorization process, the similar answers were sorted together and 15 categories formed for the positive aspects (Table 5) and 10 for the negative aspects (Table 6). There were nine missing answers for the negative aspects and many short answers from the participants when asked what they disliked about it. For this reason, there were less answers and categories for the negative aspects. Table 3 and Table 4 also described the frequency of these answers mentioned by each participant.

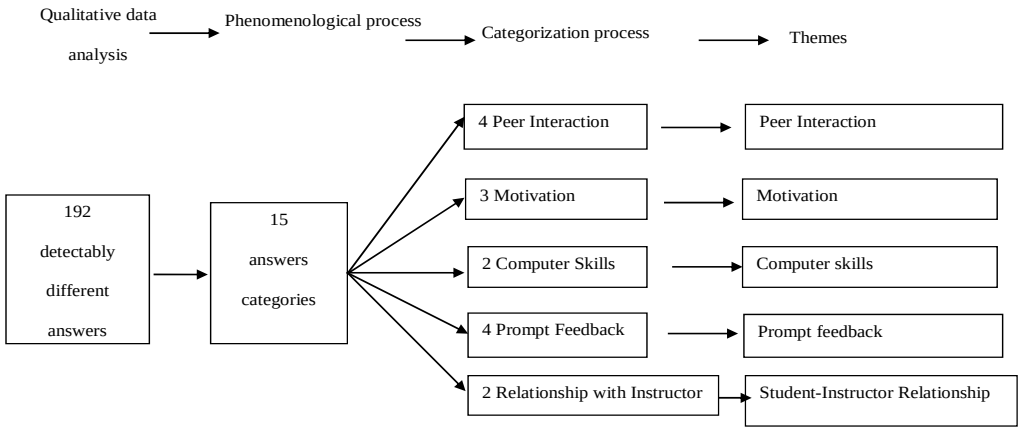

Figure 2. Diagram of the ground theory of analysis for the qualitative part of the positive aspects of the learning module

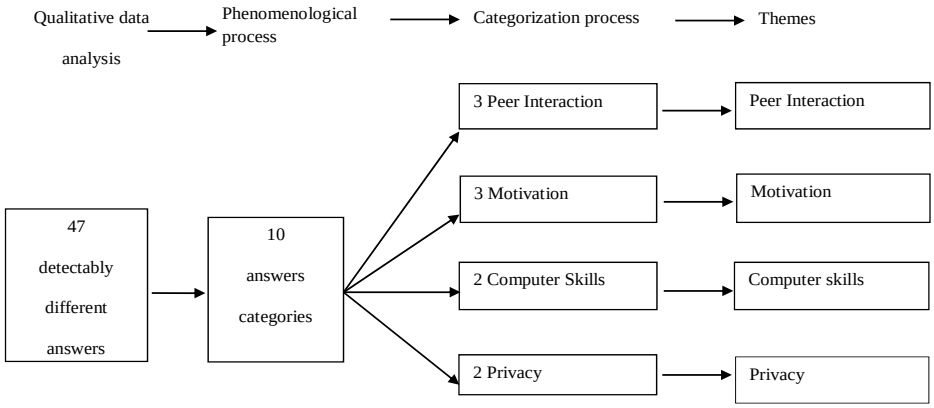

Figure 3. Diagram of the ground theory of analysis for the qualitative part of the negative aspects of the learning module

Table 5. Qualitative data of the positive aspects of quality of teamwork in iMASE activities

	Category	Participant	Frequency %	Total %	Theme
1.	Interacting	4	2.08	42.71%	Peer Interaction
2.	Information sharing	35	18.23		
3.	Project collaborating	30	15.63		
4.	Interpersonal relations	13	6.77		
5.	Useful	9	4.69	12.50%	Motivation
6.	Cares from others	7	3.64		
7.	Self-esteem	8	4.17		
8.	Free calls	22	11.46	17.19%	Computer Skills
9.	Stickers sharing	11	5.73		
10.	Productivity	17	8.85	21.35%	Prompt Feedback
11.	Peer feedback	7	3.65		
12.	Teacher feedback	9	4.68		
13.	Punctuality	8	4.17		
14.	Link with teacher	7	3.65	6.25%	Student-Teacher
15.	Appointment making	5	2.60		Relationship

Table 6. Qualitative data of the negative aspects of quality of teamwork in iMASE activities

	Category	Participant	Frequency %	Total %	Theme
1.	Different levels of engagement	3	6.38	44.68%	Peer Interaction
2.	No common agreement	4	8.51		
3.	Too much time spent on social	14	29.79		
4.	No confidence in communication	2	4.26	12.77%	Motivation

5.	Lack of mutual motive	2	4.26		
6.	No respect	2	4.26		
7.	Difficulties of setting up groups on apps	2	4.26	6.38%	Computer Skills
8.	No tutor teaching apps	1	2.13		
9.	Lack of privacy	15	31.91	36.17%	Privacy
10.	More spam	2	4.26		

Positive comments from students

In the qualitative section of survey, when asked about what students liked most in an iMASE module, their comments include (1) peer support, (2) instructor encouragement, (2) self-esteem, (3) clear communication, (4) prompt feedback from both peers and instructor, (5) high frequency of communication, (6) use of free VoIP calls over the Internet, and (7) information and resources sharing. Obviously, participants enjoyed working together with a group, sharing with opinions and experiences through the communication on mobile apps. For example, S3 commented, "I can hand in a decent quality of homework while working in a group. My group members always help to correct and check before we hand in our assignment"; S24 also stated, "communicating with others while working in groups help me to think more broadly"; S38 reported, "It's more efficient working with my classmates than by myself". More importantly, many participants (S7, S11, S18, S40) reported that they felt great when their ideas helped contribute to the group's shared goal. In addition, positive relationship between student and instructor was also built in online collaborative activities. Interestingly, participants stated that in this learning module, they could get to know their instructor and build a positive link which they never thought about to get such close to a college professor in reality. For example, S5 said, "I've never imaging that I can chat with my professor on Facebook"; S8 mentioned, "having a conversation with my professor on LINE is just so cool".

Mobile apps provide immediacy and one-on-one contact in an active learning cycle. Students appreciated for the prompt feedback they received both from their peers and instructor. S2, and 15 others delivered their greatfulness to their peers and instructor for solving their problem immediately. Twenty-one students stated that they can use free voice call feature on Facebook, LINE or WeChat which save a lot on phone bills. Among the positive aspects from the qualitative data, regarding the seen feature of the apps in Facebook and LINE, the participants stated that they can be able to track whether their peer(s) have read that message or not, which left their peers(s) no excuse for not attending the meeting or any missing tasks. S18 reported, "with the seen feature, it's more convenient to arrange a group meeting". Similarly, S29 stated, "… now no one can have an excuse saying that they did not see the meeting announcement".

Negative comments from students

In contrast, when asked about what students disliked most about the iMASE module, their comments included (1) lack of common agreement, (2) different levels of participations, (3) much time spent on social, (4) lack of respect from their peers, (5) technical problems, and (6) lack of privacy. Some students (S28, S31, S43) commented working in groups just gave some particular people a free ride, similarly, some other students (S37, S41) reported that it took too much time to achieve a common goal. While mobile apps give people power to share and keep each other connected, they can turn themselves from a helpful tool to a time waster. Students (S9, S21) mentioned that they waste a lot of time on unnecessary conversation with their peers on LINE. Besides, S14 and S47 commented that they spend too much time on surfing Facebook. Student 6 commented, "I'm addicted to texting and surfing my friends' status on Facebook. I cannot help myself to get away from it. I have to check it so many times a day which really wastes a lot of my time". Furthermore, regarding the seen feature, a lot of students (S1, S25, S36, S38, S21) complained that Facebook and LINE's seen feature dropped them in trouble when they were trying to ignore someone and he/she knows about it.

5. DISCUSSIONS AND CONCLUSION

The current research provided the participants perspectives of an iMASE module, proposing collaborative activities in an online mobile e-learning environment. The overall results indicated that the participants improved their learning achievement through a high frequency of communication with peers and instructor in an iMASE module which support findings of previous study of Tsay and Brady (2010). Based on this current research, 5 collaboration factors should be simultaneously considered in the development of current e-learning system: individual accountability, group processing, social skills, prompt feedback, and perceived ability. Results indicated that students' sense of community and connectedness in the learning environments enhanced their learning which provided positive supports for previous study (Buraphadeja & Kumnuanta, 2011). In addition, the sense of own value to the learning community created an important characteristic link to the perception of the learning experience. Specifically, individual accountability (as students feel their efforts can help their group achieve their common goal), as well as social skills (as student feel they are able to enhance

their interpersonal communication skills) provided the best explanation to predict the quality of learning experience. These two variables accounted for a 38% of the variance. The results were consistent with the previous studies that technology-based learning environments play an important role in supporting social skills (Hassan, Fong, & Idrus, 2011; Minocha, 2009; Woo & Reeves, 2008) and individual accountability (Caspi & Blau, 2008; Guo & Stevens, 2011; Resta & De Hoyos, 2005). In fact, the results also indicated that in addition to individual accountability, students also needed to perceive that they were competent to their group. That is, because Web social setting where students' abilities can be recognized and their beliefs about their self-worth can be promoted. This finding supported self-worth motivation theory (Covington, 2000; Csikszentmihalyi & Schneider, 2000), in which the degree of self-worth learners possess motivate learners to do well and success on tasks at hand.

Learning is a social activity (Chen & Bryer, 2012; Grodecka, Wild, & Kieslinger, 2009; Vygotsky, 1978) and interaction is the primary element in social activity as the process of learning (Woo & Reeves, 2008). The true alternative for foster interaction with others in the class is a small class lecture. The Web 3.0 has afforded individuals the opportunity to connect and communicate at almost no cost at anywhere and anytime (Borovik, 2011; Libert, 2010). The results from qualitative data also indicated that they indeed liked the prompt feedback they received from the peers and instructor which was also consistent to the results from quantitative data. The results indicated that the quality of students' learning experiences could be predicted by the quality of feedback students gave and received. This finding corroborated the previous study (Gaytan, 2005) which indicated that "immediate, ongoing, and detail-oriented feedback assists students in better understanding the material and more effectively applying what they have learned" (p28). Feedback should be given frequently as Brinko (1993) from social constructivism suggested.

The results of this study aligned with other studies conducted in online collaborative environments (Buraphadeja & Kumnuanta, 2011; Nam & Zellner, 2011). The results of the current study also corresponded to conclusion by other researchers that the social skills (Chickering & Gamson, 1987; McGowan & Graham, 2009) and motivation (Csikszentmihalyi & Schneider, 2000) were significant factors to predict quality of learning in technology-mediated instruction. Furthermore, the qualitative data revealed that students liked the information sharing and the collaboration in group-projects via mobile apps. This finding was in concert with previous studies (Caspi & Blau, 2008; Guo & Stevens, 2011; Resta & De Hoyos, 2005), which advocated that students' information sharing influences their perceived quality of learning outcomes. One negative aspect from the qualitative data to be noted for further course design was the privacy of the Web. Participants reported a lot about their privacy concern about the processes experienced during the use of mobile online activities.

Evaluating the learning module in this study was undoubtedly useful, but complex. While some participants felt the seen feature in Facebook and LINE was useful, some felt this seen feature put them in a no privacy box. The participants often mentioned being seen as situation of negative aspects of Facebook and LINE. Actually, the seen feature can be removed, but obviously, the students did not know how. If this is the primary reason for the students as a privacy concern, it is likely to be solved easily and efficiently. Therefore, the researchers can decide whether to release this knowledge ahead of the study for future research.

As a result of this study, mobile social networking apps in collaborative learning appear valued by students. Results suggest that e-cooperative learning with mobile networking apps promoted a social constructivist learning environment in which makes the need for the newly acquired knowledge evident and perceived as useful to the students. Apart from learning, they developed their technology skills and confidence in the usage of multimedia and Web apps that is one of the important elements in this 21st century learning environment.

5.1 Limitations

While this study provides importance guidance toward a more holistic framework for the integration of collaborative activities in a mobile assisted learning environment that is based on constructivism knowledge, it must be noted that this study is just one preliminary investigation. All students voluntarily completed the survey were enrolled in the same class, so the students represent a distinct population within the university. As such, the sample was very homogeneous and may not be representative of all the university students. To be able to extract further, similar studies need to be done in different classes across semesters or academic years and across different colleges/universities involving different demographics. Another limitation is the instructor's computer skills and characteristics. The high level of degree instructor involved with the students after school hours may be the major cause for strengthening the link between students and instructor. The instructor's passionate and high abilities in designing a set of mobile learning activities may be the cause for fostering learning engagement and enhancing learning engagement.

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DEVELOPING OF INDICATORS OF AN E-LEARNING BENCHMARKING MODEL FOR HIGHER EDUCATION INSTITUTIONS

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ABSTRACT
This study was the development of e-learning indicators used as an e-learning benchmarking model for higher education institutes. Specifically, it aimed to: 1) synthesize the e-learning indicators; 2) examine content validity by specialists; and 3) explore appropriateness of the e-learning indicators. Review of related literature included textbooks and research paper and its content was synthesized until 7 indicators were obtained: institute/organization, curricular program/teaching and instructional design, resource/technology/information technology, teaching/learning, learner, faculty and supporting personnel, and measurement/evaluation. Then, the obtained indicators were assessed by specialists based on content validity and appropriateness for further competency comparing.
Keywords: e-learning indicator, benchmarking, e-learning, e-learning benchmarking model

INTRODUCTION

There is continual expansion of e-learning operation and development in many higher education institutes. All of these institutes have been accelerating on the e-learning operation to cope with competition and rapid changes. This is influenced by the report on university ranking of various organizations. In fact, on-line educational institute ranking and quality e-learning assurance are a driving force for higher education institutes to compete one another both at an international and local level. It can be said that the advantage on institutional reputation, research achievement, motivation of students, service users, concerned personnel, public recognition, competency comparison are ways for the development of quality in operation of an organization (Robare, 2000). This can lead to changes of innovation and advantage in competition. Competency comparison is one method employed for self-assessment of general educational institutes for development in order to cope with satisfaction, expectation, and needs of the public (Jackson and Lund, 2006: p.5).

The comparison of e-learning competency is a continual and systematic development process and quality examining on e-learning operation of an organization. It aims to find an operational method and an operational guideline from famous organizations recognized by others. This can be done through learning form excellent practice methods by the standard determination of indicators (benchmark). Then, it is compared with the last indicators and obtained results are improved on quality of e-learning operation based on process, product, and service. This method is employed in the European Union, Australia, U.S.A., and New Zealand. The researcher investigates concepts, competency comparison, e-learning operational process, quality e-learning assurance, and an e-learning benchmarking models abroad, i.e. ACODE (Australia), BENVIC CHIRON MASSIVE and E-xcellence (The European Union), eMM (New Zealand), etc.

The comparison of e-learning competency can be understood as an exploration of operational outcomes of a successful e-learning agency of e-learning leaders. An important thing for the investigation of the operational method by comparing an institute or our agency with others is the construction of e-learning indicators (benchmark). This aims to obtain all standard criteria related to the e-learning operation in which it consists of two main parts: 1) comparison (benchmark) based on a specific aspect and 2) learning exchange on best practices of those who perform better than us. It is a process arisen after the comparison aiming at the improvement of our agency or organization. Indeed, it is the development of indicator (benchmark) which will serve as empirical basis for the standard of e-learning competency comparison for higher education institutes (Office of Strategies Management, 2003).

The obtained e-learning benchmarking model in this study can be used for developing and improving e-learning operation in higher education institutes. Besides, higher education institutes can indicate its strengths and weaknesses on strategic planning for operation, quality assurance, scope of success, convenience facilitation in organization, increased efficiency in managerial administration as well as service improvement (Smith, 2011; Choy, 2007).

LITERATURE REVIEW

E-learning Indicators Based on a synthesis of e-learning indicators, it was found that there are 7 indicators of e-learning as follows:

1. Institute and Organization This refers to an institute or organization having e-learning operation with clear e-learning management in terms of: operational policy and strategy; clear e-learning management; continual e-learning strategy management and development; good organization culture supporting its task operation; and, importantly, continual quality improvement and development (WCET, 2001; IHEP, 2000; ACODE, 2007; CHEA, 2002; Thapanee, 2009; Lockhart & Lacy, 2002; Khan, 2001; Haroff & Valentine, 2006; EADTU, 2001). In addition, the institute and organization have organizational management which includes clear role/function facilitation as well as responsibilities of personnel in various sections which all of these are included in the operational manual. Also, there is the integration of collaboration among various agencies in the organization (Bates, 2000; Lockhart & Lacy, 2002; Khan, 2001; Haroff & Valentine, 2006; Bacsich Paul, 2006; Deepwell, 2007). Importantly, the organization must have a management system to assist decision-making of administrators. Besides, they must possess leadership with the concentration in e-learning management of their organization. Lastly, it must have a law supporting the e-learning management (CHIRON, 2006; Frydenberg, 2002; The United Kingdom's education. 2003).

2. Curricular Program and Instructional Design Importantly, curricular programs and instructional design must always be improved, focusing on up-to-date learning content and consistency with learning objectives. Besides, teachers and learners should take part in curricular program improvement/development which must meet needs of learners. It must have clear curricular structures, goals of the curricular program, and course outline covering all learning content which is consistent with outcomes of educational facilitation (IHEP, 2000; Frydentberg, 2002; Lockhart & Lacy, 2002; CHEA, 2002; Osika, 2004; CHIRON, 2006; CHEA, 2011; Sloan C, 2009; The United Kingdom's education. 2003). Aside from curricular program, the indicators also concern with teaching/learning design. Hence, to design a child-centered teaching/learning program based on individual differences and co-task working, concepts and theories related to learning of a learner and flexibility must be taken into consideration (Bates, 2000; Lee & Dziuban, 2002; Khan, 2001).

3. Resources, Technology, and Information Technology This indicator is essential since it concerns with learning resources, basic technological structures, and provision of information technology services. Thus, an e-learning institute needs to have enough modern basic structures which cover services (Bates, 2000; CHEA, 2001; Moore & Kearsley, 2005; Bacsich Paul, 2005; Thapanee, 2009). In addition, it must have a resources center supporting effective teaching/ learning facilitation. Learners can access services rapidly, conveniently, and with flexibility, (Bates, 2000; Osika, 2004; Moore & Kearsley, 2005; Khan, 2001; European Association of Distance Teaching Universities, 2001; Bacsich Paul, 2006; Thapanee, 2009). This includes data reservation and good security (Lockhart & Lacy, 2002; Bacsich Paul, 2005 Deepwell, 2007).

4. Teaching/Learning Process This process occurs when a learner is learning through e-learning. In fact, it should have agreements and suggestions about teaching/learning methods before learning through e-learning (WCET, 2001; IHEP, 2000; Bates, 2000). Besides, it should have diverse learning sources (Sloan C, 2009b; Johnstone, 2005; The United Kingdom's education, 2003) in order that a learner has an alternative of learning sources. Not only this, teacher and learner should always have interaction to each other with rapid responses. The teaching/learning process should place the importance on individual differences in learning potential (WCET, 2001; IHEP, 2000; Bates 2000; CHIRON, 2006). Also, it needs to always have research on e-learning teaching/learning (Haroff & Valentine, 2006; Institute of Learning and Research Technology, 2003).

5. Learner A learner is essential to e-learning. It is a question how the institute supports a learner to have the occurrence of learning and be able to finish his course. The indicators have the following details: Training a learner on various aspects and guidance before learning (Lockhart & Lacy, 2002; ACODE, 2007); support a learner on information technology using for effective communication and learning (WCET, 2001; Frydenberg, 2002; CHEA, 2011; Osika, 2004; Channey et.al., 2009; European Commission DG Education and Culture, 2002; Modeling Advice and Support Services to Integrate the Virtual Component in Higher Education, 2004; Johnstone, 2005; Thapanee, 2009). Moreover, giving advice, academic/professional assistance, and provision of convenience to learner are important (Lockhart & Lacy, 2002; Moore & Kearsley, 2005). This also includes motivation and learning concentration of learner (Sloan C, 2009a; Osika, 2004). All of these can help learner be successful in learning.

6. Faculty (Teachers) and Supporting Personnel They are indicators promoting effective learning through e-learning. They often attend training for an increase in knowledge about new technology and effective

operation (Lee & Dziuban, 2002; CHEA, 2011; OBHE, 2006; Bacsich Paul, 2006). Nowadays, the standard on e-learning practice of faculties and supporting personnel (Sloan C, 2009a; Bacsich Paul, 2006) places the importance on the problem of academic knowledge copying and it should have legal measure prevention.

7. Measurement and Evaluation This indicator should have diverse learning achievement tests and learning evaluations in accordance with: 1) the learning standard (WCET, 2001; IHEP, 2000; Lee & Dziuban, 2002; Lockhart & Lacy, 2002; Institute for Learning and Research Technology, 2003; Bacsich Paul, 2006); 2) curriculum evaluation in accordance with the standard of curricular program and operation of the curricular program (Bacsich Paul, 2006; Haroff & Valentine, 2006; Thapanee, 2009); 3) evaluation of faculties and supporting personnel (WCET, 2001; IHEP, 2000; Lee & Dziuban, 2002; Bacsich Paul, 2006); 4) evaluation of communication and provision of technological services (Osika, 2004; CHIRON, 2006; OBHE, 2006); and 5) evaluation and revision for the system improvement (WCET, 2001; IHEP, 2000; Bates, 2000; Institute for Learning and Research Technology, 2003; OBHE, 2006; Bacsich Paul, 2006; Johnstone, 2005 Thapanee, 2009.

MATERIALS AND METHODS

Instrument

In this study, research instruments included: 1) item objective congruence (IOC) value consideration form; 2) questionnaires from experts to explore content validity of e-learning indicators.

Population and Sample Group

There were three IOC experts, 12 content validity experts, and 12 experts considering appropriateness of the e-learning indicators. All of them were university lecturers and doctor's degree holders. Besides, they had 10 years of services and above on teaching, research, and e-learning services.

Data analysis

The statistical tools used in this study were mean and standard deviation.

RESULTS OF THE STUDY

It was found that the IOC value of the questionnaire was equivalent to 0.85. Table 1 shows content validity examined by 12 experts and appropriateness of e-learning indicators (Appendix A)

Table 1. Levels of content validity and appropriateness of e-learning indicators

Indicator	Content validity	Appropriateness	Description	No. of indicators
1. Institution and Organization	0.93	4.63	Very highly appropriate = 12 Highly appropriate = 3	15
2. Curriculum and Instructional Design	0.93	4.68	Very highly appropriate = 14 Highly appropriate = 4	18
3. Resources Technology and Information Technology	0.90	4.70	Very highly appropriate = 12 Highly appropriate = 1	13
4. Learning and Teaching	0.92	4.73	Very highly appropriate = 11	11
5. Learner	0.68	4.79	Very highly appropriate = 7	7
6. Faculties and Supporting personnel	0.80	4.71	Very highly appropriate = 5	5
7. Measurement and Evaluation	0.94	4.88	Very highly appropriate = 8	8

DISCUSSIONS

Based on the development of e-learning indicators used as a measuring standard (benchmark) by exploring concepts, theories related to distance learning, online learning, and quality of online teaching, the relationship and consistency of the 7 e-learning indicators which could support results of the study were as follows:

1. Institute and organization were important in e-learning. It was supported on policy preparation by the administrative section for clear operation. There was a guideline for concrete management and clear task determination of all concerned personnel. The institute or organization received operational budgets and institutional support could help the e-learning operation be successful. Besides, the institute should seriously support and place the importance on e-learning operation continually (Lockhart & Lacy, 2002; IHEP, 2000). This conformed to a study of Shelton Kaye (2010) on a quality scorecard for the administration of online education programs. He found that the indicator on institutional support comprises 4 sub-indicators. Kanokporn, Chanthana, and Rungpak (2010) stated about the success indicators of the e-learning instructional

process for higher education institutes in Thailand that variables on success of the e-learning instructional system consists of institute and management comprising indicators, philosophy, vision, mission, student admission, system of faculty/supporting personnel support, support and development system, learner service, budget, basic structure, and management/design system.

2. Curricular program and instructional design The improvement of curricular program was clear, modern and based on learners/learning content which was consistent with the standard as set by the supervision agency. Besides, it must conform to an idea of the Institute for Higher Education Policy (IHEP, 2000) which focuses on course development as the determiner of quality online curricular program. The course structure indicated quality of data, e.g. readiness of a curricular program. For instructional design, all aspects of e-learning must be taken into consideration, e.g. screen design and content which must be consistent with the instructional design concept (Khan, 2001). Instructional design/course included convenient technology and assessment (Lockhart & Lacy, 2002). This conformed to a study of Shelton Kaye (2010) based on two indicators: course development and instructional design. It consisted of 12 sub-indicators and the course structure consisted of 12 sub-indicators, too. This conformed to a study of Chanthanarungpak (2010). She made a conclusion of success indicators of e-learning which places the importance on instructional design. It comprises course indicators which are consistent with goals of the institute, learning interaction, care-taking system instructional strategies.

3. Resources, Technology, and Information Technology Provision of adequate and modern resources as well as readiness of technological basic structures and information technology to faculty and learners helps smooth communication, assistance, information retrieval, and other supports. Therefore, resources, technology, and information technology can be an indicator making e-learning be successful. In other words, technology is essential for the assurance of quality, appropriateness, and reliability. Besides, the Higher Education committee emphasizes on the readiness of basic structures, equipment, and instructional system (Higher Education committee, 2005). This is particularly on the dimension of e-learning technology and basic structure planning of both hardware and software (Khan, 2001). Thus, it conformed to a study of Chanthanarungpak (2010) and Shelton Kaye (2010) which found that indicators on media and technology comprise structure and instructional media system, instructional quality, media production and development, teaching and learning and indicators of technology support.

4. Instructional Process e-learning is a learning from in a learner must learn by himself. A systematic instructional process helps reduce problems in learning. The following were included in e-learning: suggestions before learning through e-learning; interaction between teacher and learner; construction of online society; and continual development of instructional research for effective instructional process. This conformed to an idea of Bates which focuses on teaching and learning in e-learning (Bates, 2000). In addition, Institute for Higher Education Policy (2000) claimed that teaching and learning activities needs to have responses between teacher and learner during the instructional process and together with on-time reflection. It also conformed to a study of Shelton Kaye (2010) which found that the instructional process comprises 5 sub-indicators.

5. Learner Learner was important in e-learning. Besides, support, training, assistance, counseling as well as motivation and attempt could help learner complete his education. The learner support was the consideration of data type form which the learner obtained from learning, needs for learning, learning behavior control, and various services. Online program should be a tool corpus which could be accessible by learner, e.g. frequently asked question in order that the learner could find an answer. This was because online learners wanted to be successful in learning (IHEP, 2000). It confirmed to a study of Shelton Kaye (2010) which found that the learner support comprises 17 sub-indicators.

6. Faculty and Supporting Personnel Both of them were important in e-learning because they needed to be knowledgeable and skillful in e-learning operation. It was essential that they always attend a training for new technology perception. Having an operational standard of faculty and supporting personnel had an effect on effective e-learning operation. The faculty support which included prepared data sources for e-learning development and training were important (IHEP, 2000; CHEA, 2011; Osika, 2004; Chaney et.al. 2009). This conformed to a study of Shelton Kaye (2010) which found that the faculty support comprises 6 sub-indicators.

7. Measurement and Evaluation It was an important component of e-learning used for the assessment of e-learning operation and measurement of learning achievement. Results of the assessment were used as empirical basis for the improvement and development of e-learning. This conformed to the concept of evaluation and assessment of e-learning in which there was the assessment of learning achievement, instruction, and learning environment (Khan, 2001; IHEP, 2000). This included a survey on satisfaction with field of study, basic structures, and e-learning environment (The Sloan Consortium, 2009b; Chaney et.al. 2009; Shelton Kaye, 2010).

This also conformed to a study of Shelton Kaye (2010) which found that the evaluation and assessment indicator comprises 11-indicators. Besides, Chanthanarungpak (2010) found that the indicator on successful e-learning in the assessment indicator comprises the curricular program assessment indicator.

CONCLUSIONS

Regarding outcomes of the development of an e-learning benchmark model for higher education institutes based on opinions of the experts, it was found that there were 7 indicators: 1) institute and organization (15 sub-indicators); 2) curricular program an instructional design (18 sub-indicators); 3) resources, technology and information technology (13 sub-indicators); 4) instructional process (11 sub-indicators); 5) learner (7 sub-indicators); 6) faculty and supporting personnel (5 sub-indicators); and 7) measurement and evaluation (8 sub-indicators). The experts perceived that all indicators had a high to highest level of appropriateness. All of the obtained indicators could be used as a criterion (benchmark) in the form of an e-learning benchmark model for higher education institutes.

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Appendix A: An assessment of the appropriateness of e-learning indicators

E-learning indicator (ITEM)	Mean	SD	Description
1. Institute and Organization			
1.1. The institute has a clear policy and strategy on e-learning	4.92	.28	Very highly appropriate
1.2. Operational planning on e-learning of the institute is clear	4.83	.38	Very highly appropriate
1.3. The structure of organization management related to e-learning of the institute is clear	4.83	.38	Very highly appropriate
1.4. The institute receives e-learning standard certificate	4.58	.66	Very highly appropriate
1.5. The e-learning management system and decision-making of administrators	4.58	.66	Very highly appropriate
1.6. Computation of the effectiveness of operational expenses	4.58	.66	Very highly appropriate
1.7. Good organizational culture supporting the organizational operation	4.00	1.20	Highly appropriate
1.8. The policy on right reserve law related to e-learning	4.66	.49	Very highly appropriate
1.9. Leadership and attempt of e-learning administrators	4.41	.79	Highly appropriate
1.10. Clear roles, duties, and responsibilities of organization personnel	4.92	.28	Very highly appropriate
1.11. Continual institution support on e-learning	4.75	.45	Very highly appropriate
1.12. Continual improvement of quality of e-learning operation	4.58	.51	Very highly appropriate
1.13. Continual strategy management and development	4.58	.51	Very highly appropriate
1.14. Integration of coordination within the institute	4.66	.49	Very highly appropriate
1.15. Process design and networks for business outcomes	4.16	.93	Highly appropriate
2. Curricular Program and instructional design			
2.1. Continual curricular program development	4.75	.62	Very highly appropriate
2.2. Clear curricular program structures	4.75	.62	Very highly appropriate
2.3. Curricular program has goals and objectives	4.75	.62	Very highly appropriate
2.4. Content details of curricular program cover competency and were consistent with outcomes	4.75	.62	Very highly appropriate
2.5. Course description	4.92	.28	Very highly appropriate
2.6. Curricular program is appropriate with learners	4.92	.28	Very highly appropriate
2.7. Instructional design meets quality based on process and principles of instructional design	4.66	.88	Very highly appropriate
2.8. There is a standard of curriculum program design	4.66	.65	Very highly appropriate
2.9. Curricular program design is based on learner-centered	4.66	.65	Very highly appropriate
2.10. Instructional design is based on individual differences of learners	4.75	.62	Very highly appropriate
2.11. Instructional design focuses on collective learning (co-working)	4.41	.66	Highly appropriate
2.12. Learning content is developed so as to be up-to-date and consistent with learning objectives	4.92	.28	Very highly appropriate
2.13. Faculty and learners participate in the construction and development of curricular program	4.75	.45	Very highly appropriate
2.14. Curricular program design is consistent with needs of learners	4.75	.62	Very highly appropriate
2.15. Easy assessment to documents of curricular program	4.75	.45	Very highly appropriate
2.16. Screen design is based on concepts and theories related to learning	4.33	.88	Highly appropriate
2.17. Curricular program is flexible	4.41	.79	Highly appropriate
2.18. Curricular program provides new experiences for learners	4.33	.77	Highly appropriate
3. Resources, Technology, and Information Technology			

E-learning indicator (ITEM)	Mean	SD	Description
3.1. Basic structures of information technology are modern, adequate, and it cover all services	5.00	.00	Very highly appropriate
3.2. Supporting resource center on instructional management is effective	5.00	.00	Very highly appropriate
3.3. Continual planning on technological development for teaching and learning	4.83	.38	Very highly appropriate
3.4. Planning on technology development and security system	4.83	.38	Very highly appropriate
3.5. Having data reservation	4.92	.28	Very highly appropriate
3.6. Data reliability and technology	4.50	1.00	Very highly appropriate
3.7. Having the center of construction , support, and maintenance	4.50	1.16	Very highly appropriate
3.8. Technological support for faculty, supporting personnel, and learners	4.58	.90	Very highly appropriate
3.9. Service using and flexibility	4.33	1.23	Highly appropriate
3.10. Application of information technology for teaching and learning	4.75	.62	Very highly appropriate
3.11. Convenient and rapid assessment of learning resources all the time	4.75	.62	Very highly appropriate
3.12. Potential in techniques and services	4.66	.65	Very highly appropriate
3.13. Learning materials are modern and adequate	4.50	.67	Very highly appropriate
4. Instructional Process			
4.1. Learning agreements and suggestions	4.92	.28	Very highly appropriate
4.2. Diverse learning sources	4.75	.45	Very highly appropriate
4.3. Appropriate and clear communication in instruction	4.75	.45	Very highly appropriate
4.4. Rapid response of faculty when learners have any problem	4.75	.45	Very highly appropriate
4.5. Effective interaction between faculty and learner and without limitations	4.75	.45	Very highly appropriate
4.6. Continual development of research on teaching and learning	4.75	.62	Very highly appropriate
4.7. Reputation of faculty is a strategy used for creating reliability	4.50	.67	Very highly appropriate
4.8. Socialization and participation of learners	4.83	.38	Very highly appropriate
4.9. Online community supports instructional activities	4.75	.45	Very highly appropriate
4.10. Continual development of instructional forms for effective learning	4.50	.79	Very highly appropriate
4.11. Instructional activities focus on individual difference based on learning performance	4.83	.38	Very highly appropriate
5. Learner			
5.1. Training on various aspects and guidance before learning through e-learning	4.92	.28	Very highly appropriate
5.2. Support learners on information technology using for communication and learning	4.92	.28	Very highly appropriate
5.3. Giving advices and academic/professional assisting as well as convenience providing for learners	4.92	.28	Very highly appropriate
5.4. Having appropriate documents used for learning	4.92	.28	Very highly appropriate
5.5. Learners have motivation and attempt to learn	4.58	.90	Very highly appropriate
5.6. Having support on data service for learners	4.58	1.16	Very highly appropriate
5.7. Learner participation with school and study program	4.66	.65	Very highly appropriate
6. Faculty and Supporting Personnel			
6.1. Training for development and perception of new technology	4.92	.28	Very highly appropriate
6.2. Faculty support on teaching equipment resources, and convenience facilities	4.58	1.16	Very highly appropriate
6.3. Assistance on techniques of faculty	4.58	1.16	Very highly appropriate

E-learning indicator (ITEM)	Mean	SD	Description
6.4. Placing the importance on the problem of academic copying and the legal measure to prevent the academic copying	4.66	.65	Very highly appropriate
6.5. Having operational standards and clear tasks of faculty and e-learning supporting personnel	4.83	.38	Very highly appropriate
7. Measurement and Evaluation			
7.1. Learning achievement and outcomes of diverse learners	4.92	.28	Very highly appropriate
7.2. Efficiency measuring on standard learning facilitation	4.92	.28	Very highly appropriate
7.3. Assessment of curricular program in accordance with the curricular program standards	4.92	.28	Very highly appropriate
7.4. Assessment of faculty and supporting personnel	4.92	.25	Very highly appropriate
7.5. Assessment of the curricular program operation	4.83	.38	Very highly appropriate
7.6. Collection of learners' opinions	4.92	.28	Very highly appropriate
7.7. Measuring communication and technological service outcomes	4.66	.65	Very highly appropriate
7.8. Assessment and revision for improving the whole system	4.92	.28	Very highly appropriate

DEVELOPMENT OF A RESPONSIVE LITERACY PEDAGOGY INCORPORATING TECHNOLOGY FOR THE INDIGENOUS LEARNERS IN MALAYSIA

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ABSTRACT
The aim of this study is to develop a literacy pedagogy to facilitate literacy learning among the Indigenous community in Malaysia. The Developmental Research Approach method was used and thus various groups of people participated in the study. They included subject matter experts, English language teachers from schools with indigenous students, indigenous community as well as indigenous learners in the context of the study. Insights gained from these participants were used as content for the design and development of a literacy pedagogical module. The module encompassing a digital story was implemented in two schools for indigenous students situated in Peninsular Malaysia. Findings from the study indicated that the literacy pedagogy in the module was a successful intervention which enabled the indigenous learners to respond and engage in the lessons. Evaluation of the module also revealed that literacy initiatives for the indigenous learners should be culturally responsive and relevant to the community. Central to this study is the underlying principles on designing of pedagogical efforts for the indigenous people while underlying these principles are experiences and practices recorded through interviews as well as observations.
Keywords: Responsive Pedagogy; Indigenous Learners; Literacy pedagogy; Developmental Research Approach.

INTRODUCTION

It has been noted that the literacy level and learning achievement among the Indigenous children is low in Malaysia (UNICEF Malaysia, 2008). The illiteracy rate among the Indigenous children is also alarming. Redzuan and Gill (2008 reported that the illiteracy rate among this group is 49.2% compared to 6.4% at the national level. Another serious problem of the Indigenous people is the high dropout rate. About 62% of Indigenous children drop out of school every year and 94.4% do not complete secondary school (Kamarulzaman Kamarudin & Osman Jusoh, 2008). The percentage of passes among the Indigenous children in Year 6 is between 43% to 59% compared to 78% at the national level. This calls for serious attention and the government of Malaysia has taken several initiatives in addressing the issue. The Ninth Malaysia Plan for example focuses on the effort to address gaps in access, equity and quality of education especially among vulnerable groups such as the Indigenous children. The National Education Blueprint or NEB has specified various efforts to provide equal facilities and education to both rural and urban schools. It is crucial that steps are taken to improve the standard of education among the Indigenous students. One such effort is to look at ways to increase their literacy by making reading materials effective and relevant to their context. The present study is an initiative to design a literacy pedagogy to facilitate literacy among the indigenous learners. To this end, this paper will present data collected during the design and development of a literacy pedagogical module. Implications of the study for literacy development for the indigenous community in general will also be discussed.

In a literacy pedagogy, there are two important dimensions to be given serious consideration; text and its content as well as how it is connected to the learners' context. The following sections will highlight these two dimensions and subsequent section will discuss features of pedagogical practices or better known as Responsive Pedagogy in other countries. It should also be noted that the design for the literacy pedagogy described in this study is based on the principles and practices adopted in countries with indigenous communities. The following discussion will present some of the principles and experiences in such contexts.

Text plays a significant role in reading comprehension. With the increasing impact of multimodality on literacy, it is necessary to pay serious attention to the structure and content of the text so that it matches with learners' experiences in their context. At the same time, learners' prior knowledge, reading instructions and the difficulty of the reading material are important aspects that affect comprehension (Israel & Duffy, 2009). It is therefore necessary that material production and in this sense the reading text, takes into account learners' experiences in their contexts and their cultural practices are important aspects as well.

Rushton (2007) argued that most models of reading used in syllabus and curriculum acknowledge the fact that reading is a sociocultural practice. The context and situation influence the meaning individuals make from a text.

Rushton also noted that each individual brings prior knowledge and understanding to a text. Rushton's contention is that text plays a significant factor in the teaching of reading especially in the early years. Working with several communities across Australia, Rushton focused specifically on Indigenous groups who were showing poor performance in literacy; this under-achievement in literacy was a barrier to educational success.

Rushton worked with the indigenous community using texts written in the indigenous language. She argued that engagement in reading among young readers can be achieved if the types of texts chosen are relevant to the young readers in the classroom. These texts provide opportunity for young readers to participate with some understanding. The texts reflect the subject matter, wordings and grammatical features of the oral or written text that the child encounters in the community (Rushton, 2007). Rushton concluded her multi-case study by stating that text which reflect the social and linguistic resources of the local community can provide strong support to the young reader's literacy development. In line with this view, the literacy pedagogy developed in this study attempted to include the indigenous students' life experience and context as major part of the content. Technology played a role in the literacy pedagogy by providing a multimodal approach to generate interest in the young readers.

Responsive Pedagogy

A Responsive Pedagogy (RP) has the learners' context as a central role in the classroom. Such a pedagogy has long been advocated for learners from diverse cultural groups. In countries like Canada, New Zealand and Australia, RP has resulted in many positive pedagogical implications. The following section is an account of several cases where RP had proved effective in students' engagement and achievement in learning. However, first it is important to discuss RP to understand the concepts and elements that comes with it.

RP is often related to culture and context of learners from diverse cultural and linguistic groups. The Indigenous or the Aboriginal groups belong to such groups. A culturally responsive pedagogy focuses on 'literacy teaching and learning that draws from and builds upon the student's background and experiences they bring to the classroom' (Fairbanks, Cooper, Masterson & Webb, in Israel & Duffy**,** 2009, p. 590). Fairbanks et al. stressed that Responsive Pedagogy (RP) is not only about integrating student's cultural, historical, social and linguistic experience in the teaching and learning process. RP also entails the belief that students from diverse background can participate in learning experience which encourages higher thinking skills in response to text. The role of the teacher therefore is of paramount importance in initiating effort to integrate students' cultures into school learning experience (Fairbanks et al., 2009). In relation to this, Gay (2000) in Israel and Duffy (2009) discussed the role of a teacher in a "culturally responsive teaching" as extending beyond cultural relevance. The teacher, Gay argued, has to respond to the daily lived experience of the students with emphasis on their prior experiences, frames of reference, and styles of performance.

Te Kotahitanga for example is a research and professional development project aimed at improving education achievement of Maori students in the mainstream in New Zealand (Bishop, 2009). Maori, the indigenous people in New Zealand have a history of low academic achievement, high rate of suspension from school, low rate of enrolment in pre-school programs and over-represented in low stream education classes (Hood, 2007, in Bishop, 2009). It was also reported that approximately 50% of Maori students leave school without any qualifications and only 18.4% achieve university entrance compared to 67.9% of the non-Maori students (Hood, 2006, in Bishop, 2009). To address this issue, Te Kotahitanga was an initiative to improve education among the Maori through uncovering their experiences and cultural aspirations (Bishop, 2009). The project focused on students' voices, their stories about their experiences in class and the meanings they made of these experiences. These stories were collected based on a series of in-depth conversations with 70 Maori students, their families, and teachers.

Three major findings emerged from this project. First, it uncovered the discursive position in the classroom which reflected deficit theorizing among the teachers. Teachers had low expectation on students' ability and this was reflected in the traditional classroom practices, remedial programs and behavior modification programs. Second, the narratives provided opportunity for critical reflection among teachers on their discursive positions in the classroom and how this affected students' learning. Thirdly, the narratives proved the relevance of a culturally responsive pedagogy for the Maori students where learning is interactive and culture is important.

In short, Te Kotahitanga is a pedagogical effort to reform the teaching and learning condition in the Maori classroom. It is a responsive pedagogy developed with the context and needs of the Maori people in mind. Bishop (2009) reported that the project was a success as there was significant improvement in Maori students' engagement and achievement in learning. Similar initiatives were reported in Canada (Epstein & Xu, 2003), New Zealand (Franken & McComish, 2003) and America (Johnson, 2011).

In Malaysia similar issues arise with the education of the minority ethnic group, the Orang Asli community. This indigenous community has diverse cultures and languages which are not addressed in the national curriculum. Their academic performance is lower compared to the national standard while their dropout rate is also very high. Efforts towards developing a responsive pedagogy known as 'Kurikulum Asas Penan (KAP)' or 'The Integrated School Curriculum for pupils of the Indigenous People' were initiated by the government. The aim of this curriculum is to increase proficiency in reading, writing and arithmetic among the Indigenous pupils. The curriculum was designed based on the needs, environment and socio-cultural aspects of the Orang Asli and Penan (an indigenous group in east Malaysia). The curriculum was piloted in 2006 in six schools throughout the country. Preliminary findings on the effectiveness of the curriculum showed that the content was still not appropriate for the Orang Asli students in term of level and needs (Mohd Aziz, Mohamad Shamsuddin, & Noor Akbari, 2008). The findings revealed that the content level was too high and the students could not follow it. At the same time teachers did not have exposure on the lives and cultures of the Orang Asli students. As a result the curriculum had to be reviewed to make it more responsive to the Orang Asli students.

A culturally responsive pedagogy has the potential to motivate students to read (Saedah Siraj, Zaharah Hussin, Melati Sumari, Habib Mat Som, & Kamaliah Siraj, 2010). In developing a module to faciliate reading, Saedah et al. incorporated elements from the culture and life experiences of the Temuan students (a sub-ethnic indigenous group in Malaysia) in the reading activities. Findings of this study revealed that the students enjoyed reading and carrying out the activities especially when the activities involved technology. The study also indicated that the reading style of the Temuan students were different and thus they needed a different pedagogical approach.

Based on the discussion on RP, it is evident that teaching can be relevant and effective when the context of the learners is given priority in the curriculum and pedagogy. The present study looked into ways of integrating indigenous learners' context and life experiences in the literacy pedagogy. Specifically the study concentrated on designing a digital reading text and the teaching instructions to utilize the text in a literacy lesson. The next section presents the methodology of the study.

The Aim of Research

The aim of this research is to develop a literacy pedagogy to facilitate literacy learning among the Indigenous community. Content for pedagogy was sought from experts and the indigenous community. Specifically the study concentrated on strategies to integrate indigenous learners' context and life experiences as integral part in their literacy learning. The design and development of the pedagogy was based on the finding in phase which involved the needs analysis. In sum, the study aimed at answering the following research question:

RQ: What is the most appropriate design for the development of a literacy pedagogy for the indigenous learners?

SIGNIFICANCE OF THE STUDY

This study has made some pertinent observations and recommendations for the further enhancement of literacy programs for young learners from the indigenous context in the ESL classrooms. For example, the study builds on knowledge of how a Responsive Pedagogy can be developed to facilitate reading among the indigenous students. Thus, for practitioners as well as policy makers, this study serves as a framework for planning and implementing reading pedagogy that is responsive to the indigenous students in term of their needs.

Secondly, the study utilized the developmental research method in producing the reading text. This methodology which involved the use of different sources and techniques of data collection has resulted in the design and development of the DS pedagogical module and the digital story as reading text specifically. This methodology can be replicated for other type of material development not only within the scope of ESL; other contexts of learning can also benefit from this methodology.

Finally, this study is significant for the enhancement of research on the indigenous community. The diverse cultures of the indigenous people should be observed through ethnographical studies which can inform the pedagogical needs of the students. There is a need to record indigenous knowledge and their cultural context to guide education planning such as effective literacy programs. Here, technology plays its role by creating an environment conducive to learning; for the young learners of today who are familiar with the online environment, literacy is not just limited to words but also visual literacy.

Scope and Limitations

There are various sub ethnic groups of indigenous people in Malaysia. However the present study concentrated on one group, the Temuans. Findings from the context of this study may not reflect the conditions and

experiences of other sub ethnics in other parts of the country. Furthermore, the study focused on the development of reading while writing was integrated.

Methodology

The research is designed based on the Developmental Research Approach (DRA). Development research is the systematic study of design, development and evaluation processes aimed at establishing an empirical basis for the creation of instructional and non- instructional products and new or enhanced models that govern their development (Richey & Klein, 2007). The three phases in this study included needs assessment (phase 1), design and development (phase 2) and evaluation (phase 3). These three phases and the procedure will be explained next. This paper will discuss findings from phase 2 where the literacy pedagogy was designed and developed.

1. Phase 1: finding out the needs of the indigenous learners in literacy learning.

The research question for phase 1 was: What are the issues and needs of the indigenous learners in literacy learning? A total of twelve participants including teachers, parents and officers in the education field related to the Indigenous community were interviewed. The interview focused on gathering of issues and needs concerning the indigenous learners in literacy. The data were recorded, transcribed and coded according to themes. Curriculum document for Year 5 was also analyzed to ensure the pedagogy was designed in line with the skill. Findings and conclusions from the analysis phase were used to design the content in phase 2.

2. Phase 2: designing the literacy pedagogy.

Data were collected from two sources; Interview with experts in the field and observations of daily events at the context of the study. A total of twelve experts from various fields such as in English language teaching, material development in ESL, curriculum development and expert knowledge base of the indigenous community participated in the interview. Data from the interviews were analyzed, coded and categorized. The emerging themes were collated according to content for the module and cross checked by the experts for reliability. Data from observation involved the students, parents, and village community in two particular indigenous settings. Video camera recordings of daily events in the two settings were made and later analyzed for the content. Events that captured the cultural background, distinct daily experiences and natural sites were selected to be included in the module.

Based on the insights from the interviews and observations, content for a reading unit was designed. Later the design was translated into a pedagogical module comprising a reading text and the teaching instructions. The reading text, a story about an indigenous boy was written and designed as a digital story which was presented in the form of a video. Participants in the story were taken from the context of the study which included mainly the indigenous community. The final product that emerged from the design and development phase was a digital story pedagogical module which was implemented as well as evaluated in two primary schools for the indigenous learners.

THEORETICAL FRAMEWORK

The present study was guided by the schema theory which emphasized learners' background knowledge. Brown (2001) describes two types of schema; content schema and formal schema. Content schema includes knowledge about people, the world, culture and the universe. Formal schema is knowledge about the discourse structure. Content schema refers to understanding of the text and the cultural elements needed to interpret it. This cultural element is a major aspect that influences the understanding of a text (Carrell, 1983, in Ahmad, 2006). Carrell suggests that reading teachers should ascertain that the reading text matches the student's culture. The reading material should activate the student's schema and this leads to understanding of the text.

In view of the schema theory, Coady (1979) in Carell et al. (1996) describes reading as an interpretive process. Coady explains how readers' background knowledge interacts with their conceptual abilities and process strategies in comprehending the text. Conceptual abilities refer to the general intellectual ability while processing strategies refer to language processing skills including lexical meaning, syntactic information and contextual meaning. Background knowledge according to Coady will help the reader to comprehend better and involve the reader in the text. Readers are able to understand better because they can take the text beyond its graphic representation and assign the task to the knowledge and concepts already stored in the memory. This is further supported with the attitude and beliefs the readers bring to the text. Therefore, Coady suggests that the linguistic ability together with the knowledge of the world enables the reader to comprehend the text. This interaction can be seen in Figure 1.

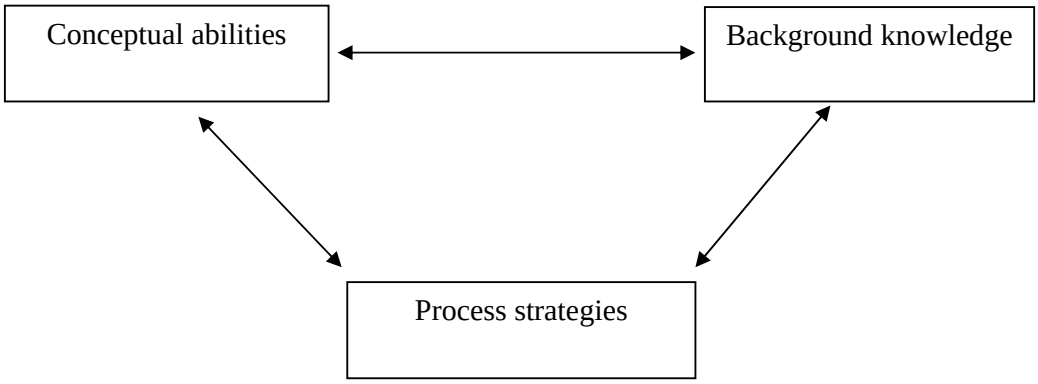

Figure 1. Coady's (1979) model of the ESL Reader.

Content knowledge of a second language learner is often culture-specific (Carrell & Eisterhold, 1983). Thus, it is important to provide text familiar to the learner and one with which they can relate. One method of maximizing learners' cultural schema is by using the students' own ideas and words in the reading text as proposed by the Language Experience Approach (Rigg, 1981, in Carrell & Eisterhold, 1983). The other method is by developing reading material with the local settings and specialized low frequency vocabulary. This method is important for learners with low proficiency who need facilitation in vocabulary. McVee, Dunsmore, and Gavalek (2005) reviewed the influence of cultural perspectives on learners' schema. In explaining the origin of schema, McVee et al. stressed that schemas or cognitive structures emerge or transform as a result of transactions with the world through material and ideational means. Thus, culture and social aspects of the learners are important elements that constitute the schema of the individual learner. The present study which was aimed at developing a literacy pedagogy was designed based on principles related to the schema theory. Context of the learners which included tneir experience and culture was important elements in the literacy pedagogy. The content of the text was based on insights from the context of the learners. The activities were also designed based on the context and experiences of the learners. This was to enable the students to draw on their background knowldege or schema when responding to the text.

RESULTS AND DISCUSSION

The findings presented in this section were gained as a result of data analyzed from the interviews and observations during the design stage in Phase 2.

Insights from Interviews with Experts

Table 1 gives the suggestions by experts regarding the context and instructions for the proposed digital story taking into account the environment of the Orang Asli.

Table 1: Findings on Suggestions for Context and Instruction from Interviews with Experts

1. Content of the text	Findings
Theme	Should be based on life experience of the Orang Asli people. Nature, forest, animals and fishing activities should also be built in as important part of the content.
Plot	Experts suggested that life of Orang Asli and their experience with nature specifically the importance of the forest be used as the plot for the text. It should also include aspects that the Orang Asli were familiar with such as the trees, the plants, the river and their home. Entertainment such as music and song were other elements suggested for the plot.
Setting	Setting for the text as suggested by the experts includes mainly the Orang Asli context, and familiar surroundings to the Orang Asli students (e.g., animals, trees, river, forest, village and mountain).
Character	The experts suggested that character should be the Orang Asli community itself.
Language	Where language is concerned, the experts indicated that the native language was used to explain meaning. Sentences should be simple while vocabulary should be simple and context based.
2. Instructions	
Comprehension strategy	The experts suggested the following strategies to be included in the module. 1. Repetition and oral practice of drilling.

<table>
<tr><td></td><td>2. Reading aloud.
3. Translation (using the first language)
4. Providing support structures such as illustrations and narration to facilitate comprehension.</td></tr>
<tr><td>Task/ Activities</td><td>Task/ activities suggested were:
1. Context specific task.
2. Art work.
3. Hands on activities.
4. Song based activities.
5. Online interactive activities.</td></tr>
<tr><td>Design of classroom instructions</td><td>All the experts felt that the instruction should be simple and behavioral in nature. Therefore Gagne's nine step instruction was chosen to guide the structure of the pedagogical instruction. The nine steps are structured as can be seen in the following table.
<table>
<tr><th>Step</th><th>Event</th><th>Task</th></tr>
<tr><td>1</td><td>Gaining attention</td><td>Language games, songs, retelling.</td></tr>
<tr><td>2</td><td>Informing objectives</td><td>Inform the students of the task.</td></tr>
<tr><td>3</td><td>Recalling prior knowledge</td><td>Clips of previous chapter.</td></tr>
<tr><td>4</td><td>Providing stimulus</td><td>Present the story according to chapters.</td></tr>
<tr><td>5</td><td>Providing learner guidance</td><td>Vocabulary discussion.</td></tr>
<tr><td>6</td><td>Eliciting performance</td><td>Reading comprehension task.</td></tr>
<tr><td>7</td><td>Providing feedback</td><td>Oral feedback on responses.</td></tr>
<tr><td>8</td><td>Assessing performance</td><td>Comprehension questions based on the story.</td></tr>
<tr><td>9</td><td>Enhancing retention and transfer</td><td>Reflection on the story.</td></tr>
</table></td></tr>
</table>

Insights from observations

A close look at the buildings revealed that the school paid a lot of attention to the Orang Asli culture and the students' interest. The mural paintings in most of the school buildings were based on nature and environment. Images of animals such as elephants and tigers were painted on the classroom walls. Small fish ponds and man-made waterfalls were also built between the classrooms. Figure 2 is an example of mural painting on the school wall.

Figure 2: One of the murals in the school.

The mural paintings as can be seen in Figure 2 reflected the students' interest in animals and the forest. The school had a small canteen located opposite the computer lab. During recess, the students were seen playing some traditional games. There was a special court drawn beside the canteen and the students play after their meal. One of the games observed was called 'galah panjang' which literally meant 'long bamboo' in English. The students explained that they make their own court using long bamboo when they play the game at home. The school had taken the effort to provide space for the students to play the game in school. The court was drawn with paint on the cement floor beside the canteen. The court had two sections and there were four dividing lines. The students divided themselves into two groups and each group had to try and cross the lines without

being touched by any of the members from the opposing team. One observation made during the game was the language used by the students. The students spoke in the Temuan language and they called each other using nick names. Later, from the conversation with the teacher, it was learnt that the students have different names as they were referred to in the village. Some of the names were associated with animals, names of fishes and plants. For example, one of the students was called *Ungkak* which meant 'dog' and another student's nick name was *Tawil* which referred to the name of a fish. The game called 'galah panjang' and the nick names were reflective of the *Temuan* culture in the context of the study and as such it would be relevant to include them in the digital story.

Observations in the village

Most of the students in the school were from the village nearby. It was a small village with mostly wooden houses. The houses were very close to each other and most were similar in structure. Most obvious was the kitchen section of the houses; these were built separately and could be viewed from outside. Figure 3 is an example of the house observed in the context of the study.

Figure 3: An Orang Asli house in the village.

Stacks of wood could be seen near the kitchen and the stove was made of bricks arranged in a triangle shape. Tapioca and rice were the staple food for the people. They also depend a lot on hunting for food. During one of the trips to the village, a group of men were seen busy at work. They were preparing the blowpipe and the quivers. When enquired, the men described how the blowpipe was made and how it was important for their hunting. Figure 4 is the scene where one of the men was making the blowpipe.

Figure 4: An Orang Asli man making a blowpipe.

The blowpipe was made from bamboo. The handle was carved with a kind of blade which, according to the men, had to be done very slowly so that the shape was beautiful. This carving of the handle was done by one person while the quivers were made by a few men. Different types of bamboo shoots were used to make the quivers. Making the quivers needed a lot of time as they have to be really sharp. The men also described how a special kind of poisonous glue was spread on the quivers at the final stage. This glue can only be handled by

experienced men because it can cause immediate death on contact. A hut was built outside the house for the men to gather and make the blowpipe.

Making the blowpipe was a cultural experience for the Orang Asli community in this village. The skill was passed on to the younger generation as could be seen in the village. This experience was valuable as it reflected the lifestyle of the people in the context of the study. Thus this event of making the blowpipe was chosen for inclusion in the digital story.

The village was surrounded by bamboo and rubber trees. There was also thick jungle behind some of the houses. Apart from hunting, the people also collect bamboo and rubber to be sold. Figure 5 is the scene of the surroundings of the village.

Figure 5: The village surroundings.

Another observation from the people in the village was the special interest they had in fishing. From the conversation with some of the villagers it was noted that they loved to fish whenever they had the time. They make their own fishing rod with the bamboo and they fish at the river nearby the village. During one of the conversations with the students in the school, it was noted that most of the students mentioned fishing as their favourite pastime.

As this experience also conveyed part of the cultural practices of the Indigenous community in the context of the study, it was also selected as part of the plot for the digital story.

IMPLICATION AND CONCLUSIONS

This paper has described the process of how a literacy pedagogy for a group of Indigenous learners was designed based on the principle of a responsive pedagogy. Findings from this study showed that surrounding and life experiences of the Indigenous learners are different from the students in the mainstream. Their life is so rich with culture and there is a great importance given on family relationships. Environment and animals are of great value for this people. Their daily experiences revolve around their home and village. These aspects from the context of the indigenous people became the major content in the pedagogy. The text and the teaching module were designed and developed based on the content.

The reading text

Based on the insights from the interviews and observations, a digital text was developed. The genre was a story and the content was about an indigenous boy who undergoes a conflict between going to school and helping his parents at home; a prominent issue among the indigenous community as highlighted in the interviews. The story was edited by a novelist, an indigenous himself who had worked with the various groups of indigenous people in the country. Later the text was digitalized with videos of people acting out the scenes in the story. All the people and the scenes in the story were based on the indigenous context. The reading text was further presented to a panel of experts for validation in the areas of language and content. Figure 6, Figure 7 and Figure 8 show examples of the products prepared for the pedagogical module.

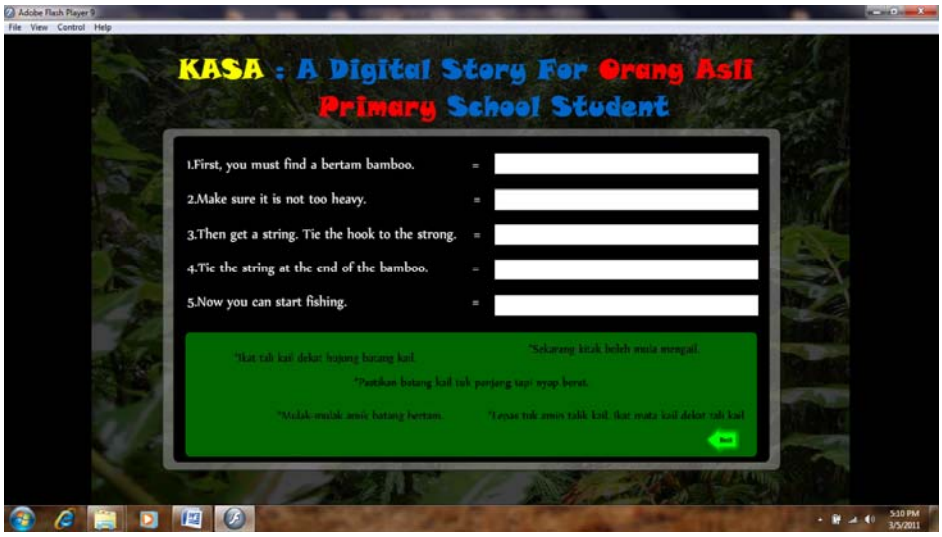

Figure 6: Screen shot of instructions for creating a bamboo fishing rod.

Figure 7: Screen shot of a drag-and-drop activity in the module.

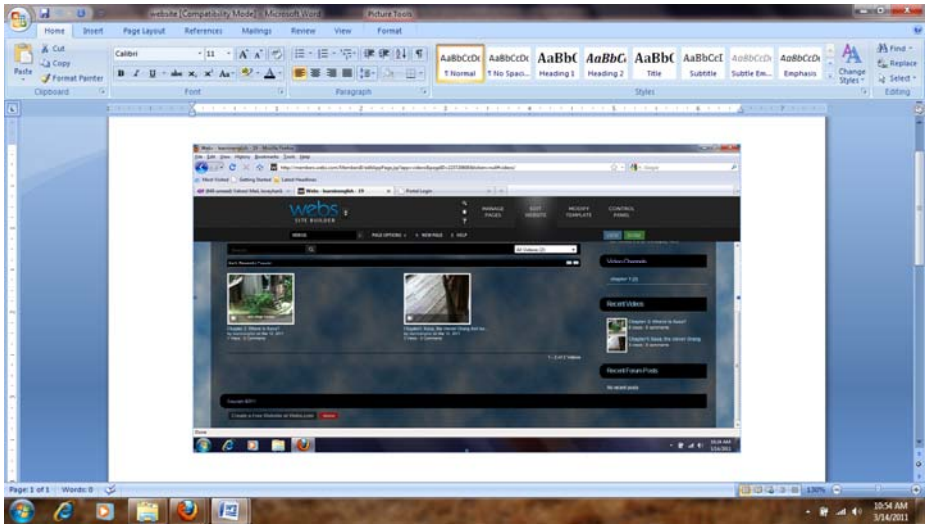

Figure 8: Screen shot of the pedagogical module.

The teaching instructions

Insights from the interviews and observations have revealed that the indigenous learners have very poor memory and thus face problem in learning. So the experts have suggested that a lot of drills and repetition are necessary. In relation to these issues, the teaching instructions for the literacy pedagogy were designed based on Gagne's nine events of instruction. The digital text was divided to six sections and each section has a set of instructions.

In conclusion, a culturally responsive pedagogy recognizes cultural knowledge, prior experiences and values of the community concerned. It has the learner's context and experience playing a central role in the learning process. Research in this area has proven that instruction through responsive pedagogical model has positive impact on students' knowledge and skill. The present study had the involvement of the indigenous learners and community as major part of the content. This participation has created excitement and motivation among the learners. As in the other parts of the world, this study has added to the knowledge base of literacy development that the indigenous population require literacy initiatives that are grounded on responsive pedagogy.

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DEVELOPMENT OF THE INFORMATION SOCIETY AND ITS IMPACT ON THE EDUCATION SECTOR IN THE EU: EFFICIENCY AT THE REGIONAL (NUTS 2) LEVEL

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ABSTRACT
Information and communication technology (ICT) is one of the most important driving forces promoting economic growth in the economy. However, one puzzling question concerns the efficient and effective impact of ICT on educational outputs and outcomes. Therefore, the purpose of the paper is to discuss and review some previous research studies on development of the information society and its impact on educational outputs/outcomes at regional level. Respectively, a definition, measurements and the empirical application of the efficiency and effectiveness of the ICT at the regional (NUTS 2) level in the EU is considered (based on 2007–2011 average data). The research findings suggest that a wide range of NUTS 2 regions is characterized by a relatively low efficiency rate of transforming information society progress into educational outputs/outcomes, particularly in Eastern and Southern Europe.
Keywords: information technology; education; efficiency; DEA; EU; NUTS-2 regions

INTRODUCTION

Widespread use of the information and communication technology (ICT) and also the Internet and the Word Wide Web (WWW) have led to the development of what is often referred to as the information society. One puzzling question concerns the effective impact of information society development on educational outputs and outcomes. As ICTs are being increasingly used in education, indicators to monitor their impact and demonstrate accountability to funding sources and the public are ever more needed. Indicators are required to show the relationships between technology use and educational performance. There is also a need to show that education should be seen as using technology not only as an end in itself, but as a means to promote creativity, empowerment and equality and produce efficient learners and problem solvers. Many academic researchers have tried to answer this question at theoretical and empirical levels. They have faced two main difficulties. On one hand, student performance is hard to observe and there is still confusion about its definition. On the other, ICT entails evolving technologies and their effects are difficult to isolate from their environment. Consequently, the relationship between the development of the information society and educational performance is unclear, and contradictory results are presented in the literature (Youssef & Dahmani, 2008). Recently, there have been several initiatives to assess and monitor the efficiency of ICT sector indicators and their impact on education. Some studies conclude that the information society's development has a positive impact on education outcomes (see Balanskat et al., 2006; Yusuf, & Afolabi, 2010; Shaikh, 2009; Jayson, 2008; Shaheeda et al., 2007, Iqbal & Ahmed, 2010; Hameed, 2006; Amjad, 2006; Khan, and Shah, 2004; Aristovnik, 2012). Conversely, others point out that the impact is unclear (see Trucano, 2005; Cox, and Marshall, 2007; Machin et al., 2006; Leuven et al., 2004). Nevertheless, the existing literature reveals a gap in the empirical knowledge of the information society and its impact and efficiency on educational outputs/outcomes at the EU regional level. Therefore, this paper seeks to fill this gap.

The paper is structured as follows: first, a brief review of the methodology and data is presented and the specifications of the models are defined. The next section outlines the results of a non-parametric efficiency analysis in order to assess the impact of information society development on educational performance. The final section provides some concluding remarks.

METHODOLOGY AND DATA

We adopted the mathematical development of Data Envelopment Analysis (DEA) by Charnes et al. (1978) who built on the work of Farrell (1957) and others. DEA is a linear programming-based methodology that has proven to be a successful tool for measuring efficiency. It computes the comparative ratio of outputs to inputs for each unit, with the score expressed as 0–100%. It is used to identify best practices and is increasingly becoming a popular and practical management tool. DEA was initially used to investigate the relative efficiency of non-profit organizations but now its use has spread to hospitals, schools, banks and network industries, among others (Avkiran, 2001). DEA empirically identifies the best producers by forming the efficient frontier (composed by efficient producers) based on observed indicators from all producers. We refer to the producers as decision-making units (DMUs). A DMU with a score of less than 100% is inefficient compared to other units. Consequently, DEA bases the resulting efficiency scores and potential efficiency improvements entirely on the actual performance of other DMUs, free of any questionable assumptions regarding the mathematical form of the

underlying production function. We use the DEA methodology to evaluate the relative efficiency of each region as it converts, for instance, Internet use into tertiary educational attainment. In our analysis we focus on the NUTS classification (Nomenclature of territorial units for statistics), which is a hierarchical system for dividing up the economic territory of the EU for the statistical, regional and other purposes. Indeed, we identify the regions (NUTS 2) as the DMUs. The Level 2 of the nomenclature (NUTS 2) has 271 regions in the considered period. Let n (=271) be the number of (EU NUTS 2) regions in the data set. Let X_{ij} be the amount of input i consumed by Region j, for i = 1 and j = 1, 2, …, 271. Let Y_j be the number of patent applications by Region j, for j = 1, 2, …, 271. We are now ready to present the output-oriented DEA model for Region k, k = 1, 2, …, 271. We must solve one such linear programming model for each region. Mathematically, the technical efficiency of each DMU is computed as:

$$Max \quad \phi_k \tag{1}$$

subject to

$$\sum_{j=1}^{271} \lambda_j X_{ij} \le X_{ik} \quad for \quad i = 1,2,3 \tag{2}$$

$$\sum_{j=1}^{271} \lambda_j Y_j \ge \phi_k Y_k \tag{3}$$

$$\sum_{j=1}^{271} \lambda_j = 1 \tag{4}$$

$$\lambda_j \ge 0 \quad for \quad j = 1,2,...,271 \tag{5}$$

$$\phi_k \ge 0 \tag{6}$$

We observe that setting λ_k=1, λ_j=0 for $j \neq k$ and $\emptyset_k$=1 is a feasible but not necessarily optimal solution to the linear program for Region k. This implies that $\emptyset_k$*, the optimal value of $\emptyset_k$, must be greater than or equal to 1. The optimal value, $\emptyset_k$*, is the *overall inverse efficiency* of DMU k, which represents one plus the proportion by which Region k can increase its patent applications. For instance, if $\emptyset_k$*=1.10, then Region k can increase its output by 10% without increasing any of its inputs. We refer to E_k*=1/$\emptyset_k$* as the *overall efficiency* of region k. Thus, if $\emptyset_k$*=1.10 then E_k*=0.91 and we can say that Region k is 91% efficient overall. The left-hand side of Equations (2) and (3) are weighted averages because of Equations (4) and (5), of the inputs and output, respectively, of the 271 regions. At optimality, that is with the λ_j replaced by λ_j*, we call the left-hand side of Equations (2) and (3) the *target inputs* and *target outputs* respectively, for Region k.

In the majority of studies using DEA the data are analysed cross-sectionally, with each decision-making unit (DMU) – in our case a region – being observed only once. Nevertheless, data on DMUs are often available over multiple time periods. In such cases, it is possible to perform DEA over time where each DMU in each time period is treated as if it were a distinct DMU. However, in our case the data set for all the tests in the study includes average (available) data for the 2006–2009 period (for inputs) and for the 2010–2011 period (for outputs) in order to evaluate long-term efficiency measures as the effects of information society are characterized by time lags in selected EU (NUTS 2) regions. The inputs utilized are households that have Internet access at home (% of households with at least one member aged 16 to 74) (*HIA*) and the percentage of households with broadband access in relation to households with Internet access (% of households with at least one member aged 16 to 74 and Internet access) (*HBA*). As the total efficiency score also comprises contributions from the non-discretionary (i.e. uncontrolled) variables, we included selected non-discretionary variables. In our case, regional gross domestic product (PPS per inhabitant in % of the EU-27 average) (GDP) and population density (inhabitants per km²) (*POPDEN*) were included in the model. In the analysis, the output/outcome can be in the form of pupils and students in upper secondary and post-secondary non-tertiary education (ISCED 3-4) (% of the population aged 15–24 years) (*SECED*), students in tertiary education (ISCED 5-6) (% of the population aged 20–24 years) (*TERED*), pupils and students at all levels of education (ISCED 0-6) (% of total population) (*EDTOT*), tertiary educational attainment (% of the population aged 25–64) (*TERAT*) and employment rate (of the age group 15–64, in %) (*EMPLOY*). Based on data availability, up to 146 (out of 271+2 (from Croatia)) EU (NUTS 2) regions are included in the empirical analysis. Eventually, due to limited data availability, most NUTS

2 regions from Germany, Greece, France, Poland and the UK are not included in the analysis. The data come from the Eurostat database.

Table 1: Correlation coefficients among the inputs and outputs

	HIA	*HBA*	*GDP*	*POPDEN*	*SECED*	*TERED*	*EDTOT*	*TERAT*	*EMPLOY*
Inputs (discretionary)									
HIA	1.000								
HBA	0.456	1.000							
Inputs (non-discretionary)									
GDP	0.375	0.138	1.000						
POPDEN	-0.054	0.104	0.039	1.000					
Outputs									
SECED	0.235	0.062	0.161	-0.098	1.000				
TERED	0.264	0.198	0.228	-0.086	0.102	1.000			
EDTOT	0.519	0.104	0.141	0.016	0.424	0.595	1.000		
TERAT	0.473	0.458	0.248	-0.007	0.162	0.600	0.569	1.000	
EMPLOY	0.577	0.308	0.252	-0.053	0.083	0.205	0.263	0.390	1.000

Source: Eurostat, 2013; own calculations.

The degree of correlation between inputs and outputs is an important issue that has a great impact on the robustness of the DEA model. Thus, a correlational analysis is crucial to establish appropriate inputs and outputs. On one hand, if very high correlations (higher than 0.95) are found between an input variable and any other input variable (or between an output variable and any of the other output variables), this input or output variable may be thought of as a proxy for the other variables. On the other hand, if an input variable has a very low correlation with all the output variables (or an output variable has a very low correlation with all the input variables) this may indicate that this variable does not fit the model. In our correlation analysis we could not find any evidence of a very high correlation between the input variables (nor between the output variables) (see Table1). Accordingly, this is a reasonable validation of the presented DEA models. Different inputs and outputs/outcomes are tested in three models (see Table 2). The program used for calculating the relative efficiency scores is the Frontier Analyst 4.0 software.

Table 2: Input and output/outcome set for the DEA

Model	Inputs	Outputs/Outcomes
I	o Households that have Internet access at home (% of households) (*HIA*)	o Pupils and students in upper secondary and post-secondary non-tertiary education (ISCED 3-4) % of the population aged 15–24 years (*SECED*) o Students in tertiary education (ISCED 5-6) (% of the population aged 20–24 years) (*TERED*)
II	o Households that have Internet access at home (% of households) (*HIA*) o Percentage of households with broadband access in relation to households with Internet access (% of households) (*HBA*)	o Pupils and students at all levels of education (ISCED 0-6) (% of total population) (*EDTOT*) o Tertiary educational attainment (age group 25–64, in %) (TERAT)
III	o Households that have Internet access at home (% of households) (*HIA*) o Percentage of households with broadband access in relation to households with Internet access (% of households) (*HBA*) (Non-discretionary) o Regional gross domestic product (PPS per inhabitant in % of the EU-27 average) (*GDP*) o Population density (Inhabitants per km²) (*POPDEN*)	o Pupils and students at all levels of education (ISCED 0-6) (% of total population) (*EDTOT*) o Employment rate (age group 15–64, in %) (*EMPLOY*)

Source: Eurostat, 2013; own calculations.

In addition, to evaluate the impact of selected information society indicators on education we calculate partial correlation coefficients for different information society (independent) and education (dependent) variables (see Table 3). To see whether, for instance, Internet accessibility has any impact on educational outputs and outcomes, we calculate the partial correlations between different variables while controlling for the other variable(s). We identify that all selected educational output and outcome variables show a moderate and positive (statistically significant) correlation with the share of households that have Internet access at home (*HIA*) when controlling for the percentage of households with broadband access in relation to households with Internet access (*HBA*). Indeed, the impact of the share of households with Internet access at home is moderate and positive as the partial coefficient ranges from 0.198 (with *TERED*) to 0.413 (with *EDTOT*). The important information society variables that also influence the selected outputs/outcomes are the share of pupils and students at all levels of education (*EDTOT*) and the share of tertiary educational attainment (*TERAT*) as the partial coefficient reached 0.214 and 0.309, respectively. Nevertheless, the single most important related variable is the share of households that have Internet access at home (*HIA*). Therefore, Internet access seems to be a crucial information society variable in order to improve education, training and employment at the regional level within the EU-27. However, in order to achieve these educational and employment improvements, it will be necessary to maintain existing efforts to provide affordable access to the Internet via broadband and to educate people with the necessary skills to enable them to access and exploit the riches of the Internet also for educational and training purposes.

Table 3: Partial correlation coefficients (n=146)

Output/outcome variables	Input variables	
	Households that have Internet access at home (% of households) (*HIA*)	Percentage of households with broadband access in relation to households with Internet access (% of households) (*HBA*)
Pupils and students in upper secondary and post-secondary non-tertiary education (ISCED 3-4) % of the population aged 15–24 years (*SECED*)	0.233***	0.053
Students in tertiary education (ISCED 5-6) (% of the population aged 20–24 years) (*TERED*)	0.198**	0.091
Pupils and students in all levels of education (ISCED 0-6) (% of total population) (*EDTOT*)	0.413***	0.214**
Tertiary educational attainment (age group 25–64, in %) (*TERAT*)	0.335***	0.309***
Employment rate (age group 15–64, in %) (*EMPLOY*)	0.515***	0.063

Source: Eurostat, 2013; own calculations.

EMPIRICAL RESULTS

The results of the output-oriented VRS formulation of the DEA analysis (based on Models I–III in Table 2) suggest a relatively high level of inefficiency in transforming the benefits of the information society into educational outputs/outcomes in selected EU (NUTS 2) regions and, correspondingly, that there is significant room to improve educational outputs and outcomes. Indeed, the empirical results show that the total number of efficient regions varies significantly from one model to another. There are only six technically efficient EU regions in Model I (see Table 4). However, with only 21.0% of households that have Internet access at home Severozapaden (BG) (which is also one of the least developed regions within the EU) has the lowest level of Internet accessibility among all regions in the sample. Consequently, only Rég. Bruxelles/Brussels Gewest (BE) and Prov. West-Vlaanderen (BE) can serve as a good benchmark for the other regions as they both have above-average input (% of households that have Internet access). The least efficient regions come from cohesion countries, such as Spain and Slovakia, mainly as a result of their relatively low educational outputs, for instance, students in tertiary education, ranging from 34.2% (Illes Balears (ES)) to 77.7% (Cataluna (ES)) (for instance, the regional sample group average is around 60%). In order to enhance the reliability of the findings, additional inputs and outputs/outcomes were introduced, resulting in models II and III (for details also see Table 2).

Table 4: Relative Efficiency (Model I)

121 regions			
The most efficient regions		The least efficient regions	
Bucuresti – Ilfov (RO)	100.0	Illes Balears (ES)	28.3
Praha (CZ)	100.0	**Cataluna (ES)**	**38.6**
Prov. West-Vlaanderen (BE)	**100.0**	Ciudad Autónoma de Melilla (ES)	40.6
Rég. Bruxelles / Brussels Gewest (BE)	**100.0**	Canarias (ES)	41.5
Severen tsentralen (BG)	100.0	Aragón (ES)	42.2
Severozapaden (BG)	100.0	Comunidad Foral de Navarra (ES)	42.8
Prov. Oost-Vlaanderen (BE)	**98.6**	**Západné Slovensko (SK)**	**43.0**
Prov. Limburg (BE)	**98.3**	Ciudad Autónoma de Ceuta (ES)	43.1
Bratislavský kraj (SK)	**95.5**	Cantabria (ES)	43.9
Yuzhen tsentralen (BG)	94.8	**Východné Slovensko (SK)**	**44.3**
Average Efficiency Score	65.5		
Standard Deviation	17.8		
No. (%) of Efficient Regions	6 (5.0%)		

Note: The regions in bold have an above-average number of households that have Internet access.
Source: Eurostat, 2013; own calculations

Adding another input and two different outputs in the form (Model II) of the percentage of households with broadband access in relation to households with Internet access (% of households) (*HIA*) and pupils and students at all levels of education (% of total population) (*EDTOT*)/tertiary educational attainment (age group 25–64, in %) (*TERAT*), respectively, the results again show that those regions from Belgium, i.e. Rég. Bruxelles/Brussels Gewest and Prov. Brabant Wallon seem to be the technically most efficient EU regions (see Table 5). Not surprisingly, increasing the number of outputs/outcomes in a relatively small sample leads to a higher number of efficient regions. In general, the rankings among efficient regions remain relatively stable in comparison to Model I (with some new efficient regions from Bulgaria, Romania, Spain and Italy, primary as a result of the low levels of additional input (% of households with broadband access) included in the model).

Table 5: Relative Efficiency (Model II)

133 regions			
The most efficient regions		The least efficient regions	
Bucuresti – Ilfov (RO)	100.0	**Burgenland (AT)**	**47.3**
Molise (IT)	100.0	**Niederösterreich (AT)**	**51.2**
Nord-Est (RO)	100.0	Střední Cechy (CZ)	53.1
País Vasco (ES)	100.0	Valle d'Aosta/Vallée d'Aoste (IT)	54.4
Prov. Brabant Wallon (BE)	**100.0**	Lombardia (IT)	54.6
Rég. Bruxelles / Brussels Gewest (BE)	**100.0**	**Kärnten (AT)**	**55.9**
Severen tsentralen (BG)	100.0	Piemonte (IT)	57.3
Severozapaden (BG)	100.0	Közép-Dunántúl (HU)	57.7
Sud-Vest Oltenia (RO)	100.0	Illes Balears (ES)	57.8
Yugozapaden (BG)	100.0	Sredisnja i Istocna Hrvatska (HR)	58.0
Average Efficiency Score	76.9		
Standard Deviation	12.8		
No. (%) of Efficient Regions	10 (7.5%)		

Note: The regions in bold have above-average number of households that have Internet access.
Source: Eurostat, 2013; own calculations

However, among the least efficient regions, surprisingly, some regions from Austria are included (such as Burgenland and Niederösterreich). We can find the main reason for this relative inefficiency in the comparatively highly developed information society and well-below-average educational outputs/outcomes in both mentioned regions (for instance, in Burgenland and Niederösterreich they have only 15.0% and 17.6% of tertiary educational attainment, respectively).

Model III includes two additional (non-discretionary) inputs (GDP and POPDEN) and one additional output/outcome variable to the *EDTOT* variable, i.e. employment rate (age group 15–64, in %) (*EMPLOY*). According to this model, even 31 regions are efficient (see Table 6). The average output efficiency score is relatively high at 94.9, meaning that with the same inputs the average region is producing about 5 percent less than it should if it were efficient. The worst efficiency performers are regions from Italy (e.g. Sardegna, Puglia and Basilicata), Spain (e.g. Principado de Asturias, Cantabria and Canarias) and Croatia (Jadranska Hrvatska and Sredisnja i Istocna Hrvatska), all having an underdeveloped information society and also appearing to be highly inefficient as they have educational results that are 15–20% lower than those under efficient conditions. However, development of the information society, together with its improved efficiency (in terms of educational results), which could significantly contribute to a country's stronger development and growth should remain a top priority in the near future for most EU regions, particularly for catching-up regions.

Table 6: Relative Efficiency (Model III)

126 regions			
The most efficient regions		The least efficient regions	
Aland (SE)	**100.0**	Sardegna (IT)	77.8
Bratislavský kraj (SK)	**100.0**	Principado de Asturias (ES)	79.2
Bucuresti – Ilfov (RO)	100.0	Jadranska Hrvatska (HR)	81.5
Centro (PT)	100.0	Puglia (IT)	81.7
Ciudad Autónoma de Ceuta (ES)	100.0	Sredisnja i Istocna Hrvatska(HR)	82.3
Ciudad Autónoma de Melilla (ES)	100.0	Basilicata (IT)	83.1
Dél-Alföld (HU)	100.0	Sicilia (IT)	84.4
Flevoland (NL)	**100.0**	Cantabria (ES)	84.5
Midtjylland (DK)	**100.0**	Canarias (ES)	85.1
Molise (IT)	100.0	Abruzzo (IT)	85.7
Moravskoslezsko (SK)	100.0	Illes Balears (ES)	86.9
Niederösterreich (AT)	**100.0**	**Közép-Magyarország (HU)**	**87.3**
Average Efficiency Score	94.9		
Standard Deviation	5.2		
No. (%) of Efficient Regions	31 (24.6%)		

Note: The regions in bold have above-average number of households that have Internet access.
Source: Eurostat, 2013; own calculations

On the other hand, regions from Belgium (e.g. Rég. Bruxelles/Brussels Gewest, Prov. Oost-Vlaanderen), Netherlands (e.g. Flevoland, Utrecht), Sweden (e.g. Aland, Stockholm, Smaland med öarna), Denmark (e.g. Midtjylland) and even Slovakia (Bratislavský kraj) are among the most efficient performers as they all are among the best output/outcome educational performers with a relatively high share of households that have Internet access at home and also broadband access. Therefore, these regions could all serve as a good benchmark for the other EU regions in terms of their information society development and their efficiency.

CONCLUSION

This paper joins the efforts of other scholars in investigating information society efficiency by applying a non-parametric methodology at the regional level in the EU. In this respect, the Data Envelopment Analysis (DEA) technique was presented and then applied to a wide range of EU-27 (NUTS 2) regions to evaluate the technical efficiency of harnessing information society riches also for educational and training purposes. The research findings suggest that Rég. Bruxelles/Brussels Gewest, Prov. Oost-Vlaanderen (Belgium), Flevoland, Utrecht (Netherlands), Aland, Stockholm, Smaland med öarna (Sweden), Midtjylland (Denmark) and Bratislavský kraj (Slovakia) belong to the best performing NUTS 2 regions located on the regional efficiency frontier. These EU regions could also serve as peers to improve the efficiency of the less efficient ones. The results confirm the idea that regions with a mature information society generally enjoy better educational outputs and results compared to regions still developing their information society pattern. In contrast, a wide range of NUTS 2 regions from Eastern and Southern Europe is characterized by an extremely low rate of information society development (most of the regions in Bulgaria and Romania) and efficiency in terms of educational outputs/results, particularly in Spain (e.g. Illes Balears, Canarias), Italy (e.g. Sardegna, Sicilia), Czech Republic (e.g. Střední Čechy) and Hungary (e.g. Közép-Dunántúl), suggesting there is still significant potential to develop the information society and improve educational results in many EU regions, particularly those from catching-up EU member states.

Nevertheless, a few limitations of the presented empirical study should be pointed out. Firstly, the application of the presented techniques is hampered by a lack of suitable data. Quality data are called for because the techniques available to measure efficiency are sensitive to outliers and may be influenced by exogenous factors. Secondly, the precise definition of inputs, outputs and outcomes may significantly influence the results. Finally, it seems important to bear in mind that by using a non-parametric approach, and in spite of DEA being an established and valid methodology, differences across countries are not statistically assessed and this may be considered a limitation of the methodology. Hence, further research is clearly needed to eliminate the above deficiencies, in particular to test the influence of environmental factors on ICT efficiency.

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DEVELOPMENT OF VISUAL LITERACY LEVELS SCALE IN HIGHER EDUCATION

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ABSTRACT
The aim of this study is to develop a scale determining the visual literacy levels of university students. After reviewing the relevant literature a 75 item draft scale was prepared. The scale was applied to 3rd and 4th year students of Education Faculty of Amasya University. Non-functional items have been excluded from the scale as a result of the factor analysis and 41 items have been included. It has been determined that the statements in the scale are gathered in 7 dimensions. These dimensions consisted of: "Identification of the need for visual", "Finding and accessing visual sources", "Analyzing and interpreting the visuals", "Evaluation of visuals and visual sources", "Effective usage of visuals and visual media", "Designing and creating visuals" and "Taking ethical and legal issues into consideration". The General Cronbach Alpha internal consistency of the scale has been determined as α =.947.
Keywords: Visual Literacy, Higher Education, Competency, Performance, Evaluation Instrument

INTRODUCTION

In alignment with the rapid development and change of the information, radical and swift changes take place in the educational process at the level of higher education. These changes increase the quality of the teaching and learning processes by new regulations in higher education, including contemporary methods to the process, so students are prepared for the modern world (Foster, 2008). Also, the formation and the alteration speed of information development have caused substantial changes in the transfer of information from one person to another. The most important change is the way that information is spread. Presently, it is visualized, rather than written or pressed (Tillmann, 2012). Pictures and visuals have almost taken the place of writing in terms of conveying data, information and emotions (Meyer, 2010). Pictures and visuals in the scientific realm have become a medium of self-reflection and analysis. Visuals appear to be both as proposition and as evidence; on the other hand, they are used to document, to design, to model, to experience virtually and to show the visible and non-visible.

VISUAL LITERACY DEFINITIONS

One of the most important considerations in the process of developing an assessment instrument is the correct identification of the characteristics to be measured. Visual literacy is a multi-layered concept. Since it contains many skills, the definition should be formed correctly. Another characteristic of this concept is "trying to express a skill verbally which cannot be basically realized verbally" as Pettersson (1998) stated. As visual literacy contains a number of skills, it is necessary to review definitions that have been given so far. From the review of literature, it is concluded that the visual literacy concept was first defined by Debes (1969):

"Visual Literacy refers to a group of vision-competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences. The development of these competencies is fundamental to normal human learning. When developed, they enable a visually literate person to discriminate and interpret the visible actions, objects, symbols, natural or man-made, that he encounters in his environment. Through the creative use of these competencies, he is able to communicate with others. Through the appreciative use of these competencies, he is able to comprehend and enjoy the masterworks of visual communication." (Debes, 1969:27)

Many researchers were interested in visual literacy concept after Debes (1969) and tried to make definitions from different angles.

The table below presents the skills and the researchers who use these skills in their definitions.

Table 1: Skills expressed in visual literacy definitions
(Adopted from Ko Hoang, 2000:11)

Skills	People who used the skill in their definition
Recognition	Lacy, 1987
Understanding	Ausburn and Ausburn, 1978; Braden and Hortin,1982, Considine,1986
Using	Ausburn and Ausburn, 1978; Braden & Hortin,1982
Producing	Heinich, Molenda and Russell, 1982; Braden & Hortin,1982; Considine,1986; Lacy, 1987
Connecting	Ausburn and Ausburn, 1978
Interpretation	Heinich, Molenda and Russell, 1982
Analyzing	Lacy, 1987
Evaluation	Lacy, 1987

The definition of the International Visual Literacy Association (IVLA) is still considered to be valid today. Visual literacy is defined by the IVLA as follows:

- "Visual Literacy" is a number of visual competencies with which a human can improve by visual and other sensual experiences.
- "Visual Literacy" is a skill that is learnt in order to make interpretation communication made by visual symbols (pictures) and to produce messages with visual symbols.
- "Visual Literacy" is a skill to convert pictural to verbal and vice versa.
- "Visual Literacy" is a skill to detect and evaluate visual information in the visual environments.

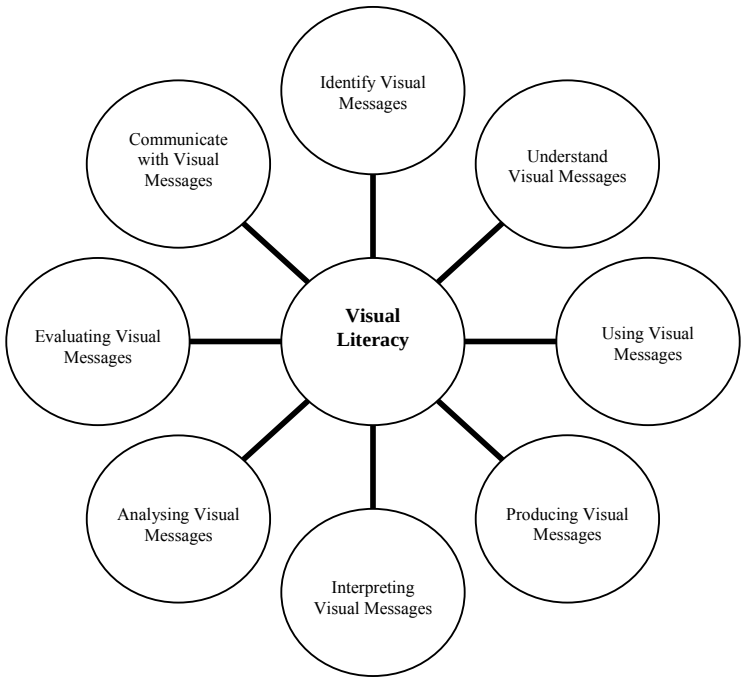


Figure 1: Fields of Visual Literacy

It's rather hard to express all the skills that visual literacy consists of in one definition. Another difficulty is the perpetual increase of visual innovation. In particular, identifying the needed visuals, producing them, producing a new visual from the existing or making changes in the visuals, realizing the changes and not violating the intellectual property rights are the new skills that the digital age requires. Along with this, according to Hattwig (2013), visual literacy intersects with digital technology and digital literacy concepts.

Because digital media has become more extensively used in recent years, some other remarkable definitions have been developed by Philip Yenawind (1997), Larry Johnson (2006) and Susan Metros (2008). According to Yenawind (1997), visual literacy is to determine the meanings of images and to display a set of skills in this process. These skills, in the simplest term, can be varied until the ability to make contextual, metaphoric and philosophic interpretation level which are more complex than identifying an image. In this context, many

cognitive processes, such as association of ideas, investigating, stating opinions, analyzing, determining the situation and classification, take part in the action. Once again, according to Yenawind (1997), fundamental to this literacy is an objective understanding of the visuals. Yet, subjective and affective approaches are also important. In his definition, Larry Johnson (2006) stated that visually literate individuals have an imaginative ability to see and understand the messages communicated with images, as well as to create, modify, and use visual cues and images. According to Susan Metros (2008), visual literacy is the ability to decode and interpret visual messages and also to be able to encode and compose meaningful visual communications. This skill includes the ability to visualize internally, communicate visually, and read and interpret visual images. Also, the skills of deliberative critiquing and ethically evaluating for accuracy and validity of information are within this scope.
In conclusion, the definition adopted by The American Association of College and Research Libraries *(*ACRL) is stated as follows:

"Visual literacy is a set of abilities that enables an individual to effectively find, interpret, evaluate, use, and create images and visual media. Visual literacy skills equip a learner to understand and analyze the contextual, cultural, ethical, aesthetic, intellectual, and technical components involved in the production and use of visual materials. A visually literate individual is both a critical consumer of visual media and a competent contributor to a body of shared knowledge and culture." (ACRL, 2011)

VISUAL LITERACY COMPETENCY STANDARDS IN HIGHER EDUCATION

Students in higher education can create and share visual contents by means of new digital technologies. However, that prevalence of widely distributed visuals and wide-spread visual media does not mean that all individuals are able to create visual content, use or criticize visuals. Individuals should improve these skills in order to keep up with the visually focused society. Visual literacy skills will enable full participation of individuals in the visual culture.

Visual Literacy Competency Standards in Higher Education has been published by *The American* Association of College and Research Libraries*,* ACRL. In March 2010, ACRL Information Literacy Standards Committee suggested a proposal to Image Resources Interest Group's*,* IRIG in order to form visual literacy standards. After this, members of Visual Literacy Standards Task Force*,* VLTF, gathered information about visual literacy standards by conducting a review of the available literature and sharing the results with an advisory group consisting of librarians, technicians, curators and different managers, as well as arranging meetings with people from different sections of society and different foundations. As a result of the study, the Visual Literacy Task Force text has been created based on the Information Literacy Standards and a first draft was published in 2011.
The Competency Standards have been developed with an interdisciplinary approach, filling in the gap of visual literacy in higher education. Presently, even students can utilize visuals for class, projects and academic studies; yet, there is no standard that can be taken as a reference. With realized studies, visual skill fields have been developed. It has been stated in the learning outcomes that it is by education and training that students will learn to perform these skills.

In all scientific fields, students come across images and visual materials in every lecture they take during the education process. Although students are expected to understand, use and create images in academic studies, it is not possible to say that they meet these expectations all the time. Using visuals in scientific studies requires research, interpretation and evaluation skills particular to the visual materials. It's unthinkable that all students have attained these skills. Thus, the mentioned skills should be gained by including visual literacy education in higher education programs. In particular, higher education standards should include visual literacy skills which are necessary to be successful in the contemporary society. In the arguments of transliteracy, metaliteracy and multimodal literacy, it's emphasized that visual literacy is important for the modern-day student (Hattwig, 2013). There are also many resources on visual literacy and visual research. But until now, the visual literacy concept has been approached from an interdisciplinary perspective. Competencies and student learning outcomes pertaining to it have not been stated.

The Visual Literacy Standards in Higher Education guide professors who want to help their students by forming a scientific framework in order to ease and improve their visual literacy skills by using and creating the visual media with a critical approach in their professional lives. With the help of standardized fields, performance indicators and learning outcomes, students who study in different disciplines can presently be observed, measured, compared and discussed using a common language. In this study, seven different standard fields have been determined. In an interdisciplinary, higher education environment, a visually literate individual is able to:

- Determine the nature and extent of the visual materials needed

- Find and access needed images and visual media effectively and efficiently
- Interpret and analyze the meanings of images and visual media
- Evaluate images and their sources
- Use images and visual media effectively
- Design and create meaningful images and visual media
- Understand many of the ethical, legal, social, and economic issues surrounding the creation and use of images and visual media, and access and use visual materials ethically.

Based on the Competency Standards published by the Visual Literacy Standards Task Force, twenty four performance indicators have been determined. For the formation of these indicators, student learning outcomes have been stated in the visual literacy trainings.

Standard One: The visually literate student determines the nature and extent of the visual materials needed.
Performance Indicators:

1. The visually literate student defines and articulates the need for an image.
2. The visually literate student identifies a variety of image sources, materials, and types.

Standard Two: The visually literate student finds and accesses needed images and visual media effectively and efficiently.
Performance Indicators:

1. The visually literate student selects the most appropriate sources and retrieval systems for finding and accessing needed images and visual media.
2. The visually literate student conducts effective image searches.
3. The visually literate student acquires and organizes images and source information.

Standard Three: The visually literate student interprets and analyzes the meanings of images and visual media.
Performance Indicators:

1. The visually literate student identifies information relevant to an image's meaning.
2. The visually literate student situates an image in its cultural, social, and historical contexts.
3. The visually literate student identifies the physical, technical, and design components of an image.
4. The visually literate student validates interpretation and analysis of images through discourse with others.

Standard Four: The visually literate student evaluates images and their sources.
Performance Indicators:

1. The visually literate student evaluates the effectiveness and reliability of images as visual communications.
2. The visually literate student evaluates the aesthetic and technical characteristics of images.
3. The visually literate student evaluates textual information accompanying images.
4. The visually literate student makes judgments about the reliability and accuracy of image sources.

Standard Five: The visually literate student uses images and visual media effectively.
Performance Indicators:

1. The visually literate student uses images effectively for different purposes.
2. The visually literate student uses technology effectively to work with images.
3. The visually literate student uses problem solving, creativity, and experimentation to incorporate images into scholarly projects.
4. The visually literate student communicates effectively with and about images.

Standard Six: The visually literate student designs and creates meaningful images and visual media.
Performance Indicators:

1. The visually literate student produces visual materials for a range of projects and scholarly uses.
2. The visually literate student uses design strategies and creativity in image and visual media production.
3. The visually literate student uses a variety of tools and technologies to produce images and visual media.
4. The visually literate student evaluates personally created visual products.

Standard Seven: The visually literate student understands many of the ethical, legal, social, and economic Issues surrounding the creation and use of images and visual media, and accesses and uses visual materials ethically.
Performance Indicators:

1. The visually literate student understands many of the ethical, legal, social, and economic issues surrounding images and visual media.
2. The visually literate student follows ethical and legal best practices when accessing, using, and creating images.
3. The visually literate student cites images and visual media in papers, presentations, and projects. (ACRL, 2011)

Among all studies, the Visual Literacy Competency Standards is the most comprehensive study that can be used as a basis for measuring the competencies of the university students in this field.

In this study, a survey has been developed in order to measure visual literacy levels of the university students by taking standards, performance indicators and learning outcomes identified by ACRL (2011) into consideration.

PURPOSE OF THE RESEARCH

The purpose of this research is to develop a new, valid and reliable Visual Literacy Scale that will measure the visual literacy levels and skills of university students.

METHOD

This study has a descriptive quality. A scale has been developed and utilized by examining the related literature. In-line with the data gathered, a new and useful scale has been developed by subjecting scale items to factor analysis, excluding non-functional items and determining the extent of the scale.

STUDY GROUP

The research sample is composed of 414 students, 254 women and 160 men, studying at Amasya University's Faculty of Education. The study was conducted in the fall semester of the 2012-2013 academic year. In forming the study group, a random cluster sampling was taken from 3rd and 4th year students of the group. The reason for choosing this grade level is the assumption that the students have become more experienced in using visuals during their time at university and will have given at least one presentation by the date of this research. The distribution of the study group according to age and gender is shown in Table 3.

Table 2: Distribution of the Study Group According to Age and Gender

Departments of Instructor Candidates	Gender		
	Female	Male	**Total**
School Teaching	121	53	174
Psychological Counseling and Guidance	9	7	16
Social Sciences Teaching	26	34	60
Pre-school Teaching	29	6	35
Science Teaching	24	8	32
Physical Training and Sports Teaching	17	24	41
Turkish teaching	28	28	56
Total	254	160	**414**

FORMING A DRAFT ASSESSMENT INSTRUMENT

Before developing an assessment instrument, related literature (Debes, 1969; Yenawind, 1997; Tillmann, 2012; Foster, 2008; Meyer, 2010; ACRL, 2011, Avgerinou, 2011; Brumberger, 2011; Felten, 2008; Hattwig, 2013; Yeh, 2010) was examined by collecting publications of related individuals and foundations. This was the basis for the theoretical framework this study establishes trustworthy in regards to visual literacy. Included in the review of the literature was "Visual Literacy Competency Standards in Higher Education" (ACRL, 2011), a contemporary and comprehensive study which has already been referenced. In this study published by ACRL (2011), seven standard fields and twenty-four performance indicators-with a total of one hundred learning outcomes,-have been identified. In the preparation of the scale, the item pool of these 100 items was formed by using both learning outcomes and performance indicators. Then, the items were reduced to 75. Insight into the breadth and scope was obtained by subjecting the prepared scale to the opinion of an assessment specialist and a linguist, and corrections have been made in line with the suggestions. The scale, which the specialists examined, received approval and is ready for implementation. Every item in the survey consisted of 5 Likert Type scale. The answering method of the questions is "(1) absolutely disagree, (2) disagree, (3) neutral, (4) agree, (5) absolutely agree". The maximum points that can be received from the visual literacy skills scale is 375, while the minimum grade is 75. The high grades indicate that the visual literacy skills are high; whereas low grades indicate that the visual literacy skills are low.

DATA ANALYSIS

The prior condition in the scale development study is to have an adequate number of samples. There are different ideas about the number of samples, but it is commonly accepted to keep the sample size five or ten times of the number of items (Büyüköztürk, 2002). With this in mind, 414 higher education students could be adequate. The Higher Education Students Visual Literacy Scale with 75 items was applied to the study groups during one class period with help from the respective professor. Gathered data has been entered into SPSS 20.00 software in order to ensure validity and reliability of the scale analysis statistically. In order to determine the suitability of the gathered data, the factor analysis Kaiser-Meyer-Olkin (KMO) and Bartlett Test analysis were performed and KMO= 0,944; Bartlett x^2=16865,082: sd=2775 (p=0,000) was determined. After producing a sufficient KMO value, a factor analysis was performed in order to determine the factorial structure. Exploratory factor analysis was performed based upon the gathered data. The scale break down was determined by a principal components analysis. Then, factor loads were examined by using the Varimax rotation technique. Analyses were renewed by eliminating the items for which factor loads were less than .30. The coefficient of internal consistence was determined by using the Cronbach Alpha (0.947) technique for reliability study of the scale. The item-total test correlations were examined in order to identify the items in the Visual Literacy Levels Scale in Higher Education and eigenvalue calculations were made in identifying scale factors.

FINDINGS

In this part of the study, findings and interpretations are offered regarding the validity and reliability studies of the ultimate scale pertaining to the 41 items that remained from the factor analysis of the items in the Visual Literacy Scale in Higher Education. The Kaiser-Meyer Olkin (KMO) coefficient was calculated in order to test the structure validity of the scale.

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,940
Bartlett's Test of Sphericity	Approx. Chi-Square	8009,827
	df	820
	Sig.	,000

As Table 4 shows, the KMO value has been found to be 0,94. According to Büyüköztürk (2009), this value is a perfect value. Yet, according to the Barlett test result (x^2=8009,827, p.=.000), it was understood that the factor analysis can be made because it was determined that the data reveals a meaningful difference. The Cronbach Alpha value of the scale was calculated α= .947 in the reliability test. It was noted that the factor loads of the 41 items left in the scale (without rotation) varied between 0,436 and 0,736. In addition, these factor loads varied between 0,419 and 0,787 with rotation after implementation of the Varimax Rotation Technique.

Table 4: Communality

Item No.	Factor Load	Item No.	Factor Load	Item No.	Factor Load	Item No.	Factor Load
m1	,690	m16	,477	m44	,580	m69	,582
m2	,736	m21	,534	m47	,688	m70	,660
m3	,680	m22	,699	m48	,582	m71	,612
m4	,456	m23	,724	m52	,455	m72	,600
m9	,436	m24	,655	m58	,471	m73	,561
m10	,521	m25	,532	m59	,477	m74	,609
m11	,627	m30	,462	m60	,670	m75	,517
m12	,631	m31	,552	m61	,599	m65	,553
m13	,584	m33	,535	m62	,535		
m14	,554	m34	,572	m64	,503		
m15	,539	m35	,550	m66	,451		

In the analysis of Table 6; total variance explained gives the eigenvalues before and after rotation and indicates 7 factors. The number of factors was determined as eight in the first implementation of the analysis and the total variance explained was 59,774%. However, only seven aspects have been taken into consideration. In the second

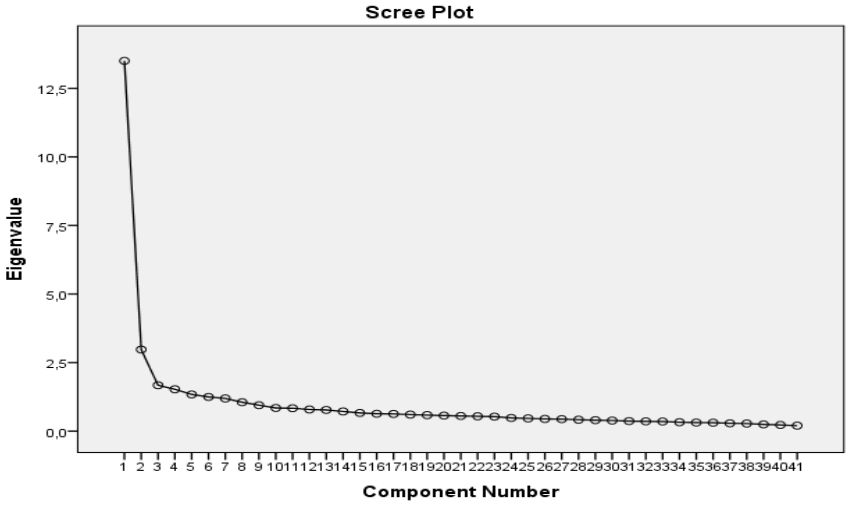
analysis, the number of factors manually entered was 7. As a result of this, it has been determined that the items are in accordance with the considered aspects. Because of this, the number of factors has been restricted. The first factor explains 10,43 %, the second factor explains 9,378 %, the third factor explains 8,366 %, the forth factor explains 7,625 %, the fifth factor explains 7,597 %, the sixth factor explains 7,355 % and the seventh factor explains 6,45 % of the variance. The cumulative variance, which eigenvalues have revealed, is 57,201% of the total variance. It has been accepted that factor loads of more than 0.30 and % 40 total variance explained are adequate in the behavioral sciences. In this case, the quantity explained by the seven factors indicates that the scale is more than adequate (Büyüköztürk, 2009).

Table 5: Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13,501	32,930	32,930	13,501	32,930	32,930	4,276	10,430	10,430
2	2,974	7,255	40,185	2,974	7,255	40,185	3,845	9,378	19,808
3	1,673	4,081	44,265	1,673	4,081	44,265	3,430	8,366	28,174
4	1,527	3,725	47,990	1,527	3,725	47,990	3,126	7,625	35,799
5	1,338	3,263	51,253	1,338	3,263	51,253	3,115	7,597	43,396
6	1,247	3,041	54,295	1,247	3,041	54,295	3,016	7,355	50,751
7	1,191	2,906	57,201	1,191	2,906	57,201	2,644	6,450	57,201
8	1,055	2,573	59,774						

The number of the scale aspects is decided by examining the "Total Variance Explained" table and "Scree plot" graphic. As is seen in Graphic 1, there is a sharp decline until the 3rd point. From the 3rd to the 8th point, the decline continues. But, as the decline becomes horizontal in other factors, their contribution to the variance gets closer to each other (Büyüköztürk, 2002). Based on this analysis and the aforementioned reasons, it can be concluded that the scale should have 7 dimensions.

Graphic 1: Scree Plot



In table 7, it can be seen that the scale consists of 41 items and 7 aspects as a result of the analysis of the calculated rotational factor loads of the items. The dimensions which were obtained by using rotational factor loads are as follows:

1. Dimension: Taking ethical, legal and social issues about visuals into consideration and implementing them.
2. Dimension: Designing and creating meaningful visuals and visual media contents.
3. Dimension: Finding visuals and visual media contents, accessing them efficiently and effectively.

4. Dimension: Evaluating visuals and resources where visuals are.
5. Dimension: Identification of the quality and the scope of the needed visuals.
6. Dimension: Analyzing and interpreting the visuals and visual media.
7. Dimension: Using visuals and visual media effectively.

Table 6: Factor Loads of the Items in the Rotated Principal Components Analysis according to Principal Axis of Visual Literacy Scale in Higher Education

Rotated Component Matrix [a]

Items	Factor Loads before Rotation	Component			Item-Total Test Correlation	Items r	Factor Loads before Rotation	Component				Item-Total Test Correlation
		1	2	3				4	5	6	7	
m71	,612	,693			,554	m31	,552	,640				,543
m72	,600	,691			,555	m33	,535	,616				,533
m74	,609	,673			,516	m34	,572	,608				,570
m75	,517	,673			,472	m30	,462	,590				,454
m70	,660	,662			,513	m35	,550	,582				,566
m69	,582	,648			,539	m2	,736		,787			,506
m73	,561	,625			,587	m3	,680		,767			,486
m60	,670		,780		,516	m1	,690		,752			,475
m61	,599		,682		,567	m4	,456		,571			,445
m65	,553		,572		,607	m23	,724			,738		,604
m62	,535		,565		,579	m24	,655			,729		,528
m59	,477		,533		,585	m22	,699			,681		,563
m58	,471		,490		,576	m25	,532			,505		,622
m64	,503		,473		,597	m21	,534			,498		,597
m66	,451		,444		,580	m47	,688				,748	,485
m11	,627			,692	,574	m48	,582				,663	,525
m12	,631			,624	,541	m44	,580				,556	,601
m13	,584			,617	,524	m52	,455				,419	,528
m14	,554			,596	,567							
m10	,521			,591	,540							
m16	,477			,453	,554							
m9	,436			,437	,360							
m15	,539			,428	,559							

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

When Table 7 is analyzed, it can be determined that the factor loads of items composing the Visual Literacy Scale in Higher Education before rotation varies between .436 and .670 where factor loads after rotation varies between .419 and .787. In order to determine the distinctiveness of the items in the Visual Literacy Scale, an item-total test correlation has been examined. As is seen in Table 7, the item-total test correlation values of the scale vary between .360 and .622. According to Büyüköztürk (2009), the factor load value being 0.45 or higher is a good criterion for the selection. It should be mentioned that the distinctivenesses of the items in the Visual Literacy Scale are high, as item-total test correlation values in the scale are higher than .30. Reliability coeffients related to the Visual Literacy Scale, eigenvalues and explained variance ratios are shown in Table 8.

Table 7: Data belong to the Evaluation of Visual Literacy Skills in Higher Education

Sub Aspects of Scale	Working Items	Excluded Items	Reliability Coefficients of Factors α	Explained Variance Ratios of Factors
1. Identification of needed visuals	1,2,3,4	1	.811	7,597
2. Finding and accessing the visual resources	9,10,11,12,13,14,15,16	4	.823	8,366
3. Analyzing and interpreting the visual	21,22,23,24,25	7	.844	7,355
4. Evaluating visuals and their resources	30,31,33,34,35	7	.781	7,625
5. Using visuals and visual media effectively	44,47,48,52	12	.753	6,45
6. Designing and creating visuals	58,59,60,61,62,64,65,66	3	.861	9,378
7. Taking ethical and legal issues about visuals into consideration	69,70,71,72, 73,74,75	0	.861	10,43
General	41	34	α =.947	57,201

CONCLUSION

Universities ultimately follow and implement technology in education and training as they are the pioneers of social and technological developments. The increasing application of technology in educational and training environments leads to a greater usage of visual materials. This requires students to obtain necessary information through visual materials. In higher education, both students and lecturers share the information more efficiently via digital technologies in e-learning, distant learning and face-to-face learning methods. In this context, students in higher education should be able to both correctly analyze the visuals and pictures they receive and create visuals. Additionally, students in higher education should be able to access existing visuals through information and communication technologies. Besides, they should have knowledge on different topics about the accessed visuals and behave accordingly. Because of this, the aptitude of the students in this field should be determined by taking different aspects of visual literacy skills into consideration. Skill levels of students should be elevated in the light of information achieved by this way. In line with these considerations, a need to develop a new assessment instrument related to visual literacy for students in higher education has arisen. In this study, the aspects of the scale have been determined by reviewing the literature, and item expressions suitable for these aspects have been developed. A draft scale, which is subjected to different textual examinations, was analysed with validity and reliability tests after factor analysis. The Kaiser–Meyer–Olkin (KMO) test was performed in order to identify the suitability of collected data for factor analysis. As a result of the test, the KMO value was determined as .94. Non-functional questions were excluded from the scale as a result of the factor analysis, and factor loads were created into a 41-item scale varying between .436 and .736. As a result of the rotation process, it was determined that the statements in the scale can be grouped into 7 factors. These factors consist of: "Identification of the need for visual" 4 items, "Finding and accessing visual sources" 8 items, "Analyzing and interpreting the visuals" 5 items, "Evaluation of visuals and visual sources" 5 items, "Effective usage of visuals and visual media" 4 items, "Designing and creating visuals" 8 items and "Taking ethical and legal issues into consideration" 7 items. The General Cronbach Alpha internal consistency ("reliability") of the scale has been determined to be α =.947. The explained total variance value of the scale was calculated as 57,201%. Therefore, a valid and reliable scale has been developed which can help measure the visual literacy levels of students studying in universities.

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EVALUATION OF COMPUTER BASED FOREIGN LANGUAGE LEARNING SOFTWARE BY TEACHERS AND STUDENTS

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ABSTRACT
The aim of this study is to evaluate Computer Based Foreign Language Learning software called Dynamic Education (DYNED) by teachers and students. The study is conducted with randomly chosen ten primary schools with the participants of 522 7th grade students and 7 English teachers. Three points likert scale for teachers and five points likert scale for students are used for data collection. The findings show that the software has partly sufficient qualities from the point of teachers; the students have indecisive views about the software.

INTRODUCTION

The fast development of current science and technology leads humanity to the economic and social competition. The developing societies are conscious about the possibility of progress with the quality of education in this process. It is explicit that technology should be used in the education and growth of individuals having the ability of solving problems and free and creative views.

Alkan (2005) refers that teachers have to facilitate infinitely teaching to more students in less time. It should be required to develop new educational techniques and methods. Teachers and students have to improve their ability of searching and using the information on their own. It should be developed that new equipment is often searched in order to provide better and faster learning and teaching in this course. The systematic studying of learning has more importance.

Yalın (2000) defines the computer based education as the usage of teaching a subject and concept by courses which are put into the system of computer in order to consolidate the behaviors got before. There are three subjects which are frequently used in the computer based education: private lesson, exercise and simulation.
Seferoğlu (2006) suggests that the computer based education has some advantages;

- Offering individual and interactive learning,
- Providing the students the possibility of repetition,
- Using the difficult teaching techniques which was impossible in the classroom,
- Taking advantage of computer's color sound and graphics,
- Guiding students to think and search,
- Encouraging students to increase their self-confidence.

We have to learn a foreign language at least in our country like other countries because its importance increases day by day. It can be especially thought that it is certainly true of teaching English as a foreign language in the 4th grade of primary school in view of the importance and place of English between other World languages.

Warschauer and Liaw (2010) address that many adult students have had difficulties with traditional education and face substantial barriers to learning. The emerging technologies described above provide nontraditional means by which literacy and language skills can be developed through authentic communication, collaboration, networking and scaffolding. They think that these technologies give learners vast opportunities to use English on a daily basis in meaningful contexts in and out of school.

Witt (1999), Marimuthu & Soo (2005) and Springer (2012) argue that one of the most essential subjects in teaching English is the computer based language learning and the students will become more creative when they find practicing areas referring to creativity themselves in learning foreign language. They suggest that the learning gained in the classroom reach to the practicing areas thanks to computer based application by students.
Gündüz (2005) suggests that recent years have shown a boom of interest in using computers for foreign language teaching and learning. The use of computers in the language classroom was of concern only to a small number of specialists in western countries a decade ago. However, with the advent of multimedia computing and the

Internet, the role of computers in language instruction has now become an important issue confronting large numbers of language teachers throughout the world.

Sarıçoban (2006) talks about some advantages of computer based language learning, and rows them as follow;

a. CALL increases students' motivation.
b. CALL programs present the learner the novelty, to teach the language in different and more interesting learning conditions, and present language through games and problem-solving techniques.
c. They also provide immediate feedback for error correction.
d. Using the computer in teaching languages can offer various types of activities with considerable potential for learning situations. For instance, recent computers have DVD drives for audio-visual input for discussions on a certain story/topic in speaking, listening, and writing skills.
e. CALL programs, besides teaching a foreign language, will provide the learner with some sort of computer literacy, which is becoming essential in our modern society and which could be of great help in future training programs.
f. It improves the students' scientific thinking anility,
g. It supports group work activities through network,
h. It improves individual learning abilities,
i. It provides the students with the opportunity to revise,
j. It forces students to investigate and search,
k. It increases individual's self-confidence,
l. It provides teachers with the opportunity to deal with their students' problems closely and improve (overcome) them.

The Ministry of National Education pays attention to computer based language learning areas which are thought to be helpful for teaching English. In our schools, The Information Technology (IT) classes have been established, some software have been sent and computer education about the softwares has been given to the teachers. Also, The Ministry of National Education continues the setting of interactive boards into schools as a part of FATİH Project and educational programmes about this subject to the teachers. The Ministry of National Education aims to provide contemporary and constructivist education to the students.

Taşcı (1994) suggests that it can be possible if these devices can be adapted to this education and advantages of computers are attained in education. Another saying, the success of computers in education is directly related to the success of teaching softwares. The developments of computer hardware provides that these equipments have unique potential. The informative softwares provide the usage of this unique potential.

DynEd was founded in 1987 by a team of language teachers, engineers, and artists. It produced and brought to market the world's first computer-assisted language teaching CD-ROM and received a patent for its innovative design. Now, after more than 20 years of experience, DynEd has the world's most comprehensive lineup of award-winning computer-based English Language Teaching (ELT/ESL) solutions (http://www.dyned.com/us/about/).

For Petrie (2003) currently, a few educational software packages for English language learners have some advantage of speech recognition technology. DynEd has produced New Dynamic English (2001) for adult learners and Let's Go (2001) for child learners. The children's version allows the user to orally produce a single word at a time, while the adult version allows the user to produce either a single word or an entire sentence in response to video or graphic cues and then receive feedback on the pronunciation of the user's production. If a minimum level of understandability is not reached, the program encourages the user to try again. One current drawback of New Dynamic English is that if the uttered sentence is very close in sound to the intended answer, the program may not catch an error. For example, if the learner uttered a sentence with "is" instead of "isn't" - a serious difference in meaning - the learner may not be alerted of the difference.

Baş (2010, p.14-39), suggest that "One of the recent educational technology for language teaching, more specifically English Language teaching, is the Computer Assisted Language Learning (CALL) method. In recent years, some of the countries such as China, France, Malaysia, Korea, Miyanmar, and Turkey are using an English Language teaching software named DynED, which stands for Dynamic Education. In these countries, this software is used in a way that it assists English language teaching process at schools."

DynEd's courses cover all proficiency levels and include a range of age-appropriate courses, for kids in school to adults in leading corporations, airlines, and vocational schools. In addition, DynEd courses are supported by an

award-winning Records Management System, Mastery and Placement tests, extensive teacher-support materials, including lesson plans, teacher-training, mentoring, and a newly released Teacher Training Course that helps teachers blend technology into their teaching (http://www.dyned.com/us/about/).

Brown, Campbell & Weatherfor (2008, p.37-53), say that "DynEd's New Dynamic English (NDE) consists of audio, video, flash animations, record and listen buttons, and voice recognition technology, all of it integrated to give the user a more engaging, high context experience. DynEd gives students a better sense of having learned something with its records manager (showing completion rates), study score (indicating good study habits), mastery test scores (implying a mastery of the material), and placement tests (which can show improvement in overall level if administered at the beginning and the end of the course). Furthermore, DynEd provides a wealth of assessment information for teachers via the Records Manager, including time spent, completion percentages, scores on individual tasks, Study Scores, and Mastery Test scores. The Records Manager also provides detailed data on information such as the number of times the student used each of the control buttons."

Lares, Asis & Yudelmo (2008, p.36-44), believes that "This program helps students to improve their English proficiency and it gives a new way of learning process which is totally different from the conventional ones as teachers and learners no longer have to rely on printed materials for their language drills as well as their examinations, but which are directly provided by the software."

The researches show that the computer based courseware DYNED software has an active role in the learning foreign language. (Bas and Kuzucu, 2009; Bas, 2010; Meri, 2012; Kagaoan, Muya, Tibayan & Tenorio, 2012; Bingham and Larson, 2006), but Yiğit (2012) suggests that there are some difficulties, too.

THE STUDY

The aim of this study is to evaluate Computer Based Foreign Language Learning software called Dynamic Education (DYNED) by teachers and students. The two research questions to be answered for this study listed below;

1.What are the views of teachers of English about DynED software?
2.What are the views of 7th grade students about DynED software?

Survey model has been used in order that the research aims to assess the current subject and it is descriptive research. The research involves 522 of 7th grade students and 7 teachers of English in Kozan, Adana. In the sample, ten schools were chosen randomly among the primary schools in Kozan between 2009 and 2010 education years. When performing this research, we make use of DynED which is computer based language learning used in primary schools in order to make the essential indication and teaching software evaluation form (1998, p.205-219) and student examination form (1998, p.103) belonging to Şimşek.

The assessment of survey presented to the teachers to determine the educational qualifications of software is three point likert scale. When evaluating the data, we use arithmetic average (X) and standard deviation (Ss) of questions are looked in the survey to comprehend whether the software has the educational quality or not. In the software evaluation survey for teachers, for every question, we get the information like INADEQUATE, PARTLY ADEQUATE and ADEQUATE. The answer codes change between 1.00 and 3.00. In the software evaluation survey, the score interval is stated at below by regarding every question which is 0.67 point and three units (2/3);

1.00 – 1.67 INADEQUATE
1.68 – 2.35 PARTLY ADEQUATE
2.36 – 3.00 ADEQUATE

To evaluate the educational qualification of software, five points scale is used. When evaluating the data, we use arithmetic average (X) and standard deviation (Ss) of questions are looked in the survey to comprehend whether the software has the educational quality or not. The answer codes of each question in five point scale for students. change between 1.00 and 5.00. In five point scale for students, the score interval is stated at below by regarding every question which is 0.80 point and five units (4/5);

1.00-1.79 I don't agree
1.80-2.59 I don't partly agree
2.60-3.39 I am indecisive
3.40-4.19 I partly agree

4.20-5.00 I agree

FINDINGS

In this session, we put emphasis on findings which were gained from data in the end part of method stage.
In the evaluation of software by students, there are some findings of evaluation of survey related to software. The findings were acquired by basing on students' opinions.
The evaluation survey performed to the students consists of 5 items. At Table 1, the arithmetic average (*X*) and standard deviation (Ss) of the answers and also group based average of general qualities of software are given.

Table 1. The students' views about the software general qualities

	Software general qualities	N	*X*	Ss
1	I don't have any problem when using this software	522	2,71	1,57
2	I like using this software	522	2,72	1,62
3	I learn something when using this software	522	2,74	1,55
4	I think this kind of software will help other lessons	522	2,83	1,65
5	I want these softwares to use at other lessons	522	2,95	1,73
Main average of the group			2,79	

1.00-1.79 I don't agree
1.80-2.59 I don't partly agree
2.60-3.39 I am indecisive
3.40-4.19 I partly agree
4.20-5.00 I agree

Table 1 presents, the group's main average is 2,79 which is about the general qualities of software. It is seen that 1st matter (2,71) relating to software general qualities has the least main average (I don't have any problem with using this software) and 5th matter (2,95) has the highest average (I want to use this kind of software in other subjects). Accordingly; in accordance with the students' views, an indecisive aspect about software general qualities comes out.

In the part of teachers' software evaluation; there are some findings about drawing teachers' attention to the software, providing invariability, informing the students about learning targets, reminding the essential data for lesson, presenting data and helping, exercise and feedback, evaluation of success, remembering, developing the transition and evaluating the software from the point of success.

Table 2. Range of students' attractions

	Students' attraction and providing of continuation	N	*X*	Ss
1	The beginning of software draws the students' attraction and recesses for new data in their minds.	7	2,42	0,53
2	The whole or a part of the subject software is planned to draw students' attention and care	7	2,71	0,48
3	Students are often given the opportunity to form an interaction with the software.	7	2,00	0,81
4	The duration of lesson is convenient with the duration of their attention.	7	3,00	0,00
5	Colours, graphics and sound effects don't prevent the students to reach their educational targets.	7	2,95	1,73
6	Colours, graphics and sound effects draw the attention of students	7	2,71	0,75
7	Colours, graphics and the sound qualities are practical and suitable for education psychology.	7	2,71	0,75
8	The course software is close to the user and student likes using the programme.	7	2,57	0,53
9	The course software is attractive for student.	7	2,71	0,48
10	Thanks to course software, students are interested in the subject of course software.	7	2,57	0,53
11	The formal structure of software promotes the students to do best and well.	7	2,42	0,78
12	Students are satisfied with studying with the course software.	7	2,42	0,78
Main average of the group			2,50	

At Table 2; the main average of the group is determined as 2,50 when evaluating ranges according to drawing attentions of students. In the group, the 4th matter has the least main average with 1,85 (This is suitable for the

duration to which students will give their attention; the 5th matter has the most main average with 3,00 (Colors, graphics and sound qualities don't prevent students to reach their targets).
In accordance the teachers' views, it appears that the matters of survey, which are related to students' attraction and ensure its continuity, are at qualified level as educational.

Table 3. The range of students according to informed about learning targets

	Informing the students about the learning targets	N	*X*	Ss
1	The learning targets are told students in a clear way.	7	1,85	0,69
2	The learning targets are described as students' behaviours.	7	2,28	0,75
3	The content of course software is matched with the educational targets.	7	2,14	0,89
The main average of group			2,09	

The Table 3 shows; the main average of the group is determined as 2,09 when evaluating ranges according to informing the students about the learning targets. In the group, the 1st matter has the least main average with 1,85 (The learning targets are told students in a clear way) the 2nd matter has the most main average with 2,28 (The learning targets are described as students' behaviours).

In accordance with teachers' views, it appears that the matters of survey, which are related to informing students about learning targets of survey, are at partly qualified level as educational.

Table 4. Reminding the essential data for course

	Reminding the essential data for course	N	*X*	Ss
1	The requested foreknowledge, the preparedness situation of students and ability are appropriate for the target students.	7	2,00	0,81
2	Reading level is appropriate for target students.	7	2,28	0,75
3	Software branches out to the parts of repetition and retrieval when needed.	7	2,00	0,81
4	Essential foreknowledge and abilities are stated in order that students can communicate with software.	7	1,85	0,69
5	Foretest is performed in order that students can communicate with software and can specify essential fore skill.	7	2,00	0,81
6	Course links the old data with new data which will be learned.	7	2,14	0,89
7	Cognitive learning equipments are provided in order that students can remember new data and contact new data with old data.	7	2,28	0,75
Main average of the group			2,07	

It is seen at the Table 4; the main average of the group is determined as 2,07 when evaluating ranges according to reminding the essential knowledge for the course. In the group, the 4th matter has the least main average with 1,85 (Foreknowledge and abilities are stated in order that students can communicate with software) the 2nd and the 7th matter have the most main average with 2,28 (The reading level is appropriate. Foreknowledge and abilities are stated in order that students can remember the new data and communicate the new data with the old data by cognitive learning equipment).

In accordance with teachers' views, it appears that the matters of survey, which are related to reminding the essential data for the course, are at partly qualified level as educational.

Table 5. Presenting the data and helping

	Presenting the data and helping	N	*X*	Ss
1	Data is presented logically.	7	2,42	0,78
2	Before teaching difficult, complicated concepts and rules, the easier ones should be taught.	7	2,71	0,48
3	Essential explanations and instructions are clear and comprehensible to complete each one of course.	7	2,00	0,81
4	Essential explanations and instructions are clear and comprehensible to complete each one of course.	7	2,28	0,75
5	New data, concepts and rules are suitable and sufficient examples, imitations and presentations are presented.	7	2,28	0,75
6	Examples, explanations and imitations are comprehensible and related to real life.	7	2,42	0,78
7	Course software, uses the screen actively and it can express a certain concept. It avoids from crowd and unnecessary data.	7	2,42	0,78

8	Students can control the imitation which they want to learn, examples or the number of explanations in so far.	7	2,00	0,81
9	Student can form an interaction with the whole or a part of course software in accordance with the ability of students.	7	2,71	0,48
10	In course software, the chances are provided like practising during lesson time or testing themselves.	7	2,71	0,48
11	To explain the important concepts, there are methods and different testing possibility more than one.	7	2,00	0,81
12	Illumination or underlining is used as clue in order that main concepts can be better understood.	7	2,57	0,78
13	The strategies like summary, revision and giving the main details are provided in order that students can take the main ideas.	7	1,85	0,89
Main average of group			2,33	

The Table 5 presents, the main average of the group is determined as 2,33 when evaluating ranges according to presenting the data and helping. In the group, the 13rd matter has the least main average with 1,85 (The strategies are provided like summary, revision and giving the outline to help students get the main ideas), the 2nd, 9th and 10th matter have the most main average with 2,71 (Before teaching difficult and complicated concepts, the easier and more simple ones should be taught. In accordance with the ability of students, they can form an interaction with the whole or a part of course software. In course software, the opportunity like practising during lesson time or testing themselves are provided for students).

In accordance with teachers' views, it appears that the matters of survey, which are related to presenting the data and helping, are at partly qualified level as educational.

Table 6. Practise and feedback

Practice and feedback		**N**	***X***	**Ss**
1	Students are provided opportunities like exercise, practising with questions sufficiently to consolidate the new learned data.	7	2,71	0,48
2	For students, some question forms (multiple choice, completing true or false) are developed.	7	2,57	0,78
3	Course software proceeds in a flexible way about accepting the different answers/synonmys, capital-small letter) of students and evaluating.	7	2,14	0,89
4	When students answer wrongly, the right answer is provided feedback.	7	2,57	0,78
5	The suitable data is given for the correct and wrong answers of students.	7	2,57	0,78
6	Feedback are suitable and related to students' answers.	7	2,42	0,78
7	Encouraging is effective for students positively.	7	1,85	0,89
8	Feedbacks are given immediately.	7	2,57	0,78
9	Feedbacks have several forms	7	2,28	0,95
10	Feedbacks provide the repetition.	7	2,42	0,78
11	Course software gives the number or percent of right answers for students.	7	2,57	0,78
Main average of the group			2,42	

As seen at Table 6; the main average of the group is determined as 2,42 when evaluating ranges according to practicing and feedback. In the group, the 7th matter has the least main average with 1,85 (Encouraging is positive and effects students positively), the 1st matter has the most main average with 2,71 (The opportunities like exercise and practicing with problems and questions fairly are provided for students to reinforce the new data).

Accordingly, in accordance with teachers' views, it appears that the matters of survey, which are related to practising and feedback, are at qualified level as educational.

Table 7. Range according to evaluating the success

Evaluating the success		**N**	***X***	**Ss**
1	There is a pretesting for determining the level of student.	7	1,71	0,75
2	The opportunities, like testing on their own ad feedback, are placed into the course.	7	2,28	0,75
3	Course software records the errors which the students make at the end of the software or another course.	7	2,57	0,78
4	In course software, there is an ending test for measuring the success of learning.	7	2,57	0,53

5	There is a consistency between the content of courses, abilities and aims of the software.	7	2,42	0,53
Main average of the group			2,31	

At the Table 7, the main average of the group is determined as 2,31 when evaluating ranges according to evaluating the success. In the group, the 1st matter has the least main average with 1,71 (There is a pre testing for determining the level of student), the 3rd and the 4th matters have the most main average with 2,57 (Course software records the errors of students and errors found in the test at the end of course or course software. In course software, there is an ending test to measure the success of learning).
In accordance with teachers' views, it appears that the matters of survey, which are related to evaluating the success, are at partly qualified level as educational.

Table 8. Range according to the condition of developing transition and remembering

Developing transition and remembering		**N**	***X***	**Ss**
1	Important concepts are differently identified and explained in order to support the learning of student.	7	2,57	0,53
2	When the course software is needed, the level of problems are obstructed.	7	2,14	0,69
3	Course software encourages the students to develop their abilities and data by providing several of different activities and helping sources.	7	2,14	0,89
4	Students can find the data of software in their real life.	7	2,14	0,69
5	Software students prepare themselves for the experience which they will meet in the future.	7	2,57	0,53
Main average of the group			2,31	

As seen at Table 8; the main average of the group is determined as 2,31 when evaluating ranges according to evaluating the success. In the group, the 2nd, 3th and 4th matters have the least main average with 2,14 (When the course software is needed, the level of problems are obstructed. Course software encourages the students to develop their abilities and data by providing several of different activities and helping sources. Students can find the data of software in their real life), the 1st and the 5th matters have the most main average with 2,57 (Important concepts are differently identified and explained in order to support the learning of student. Software students prepare themselves for the experience which they will meet in the future).

Accordingly, in accordance with teachers' views, it appears that the matters of survey, which are related to the condition of developing transition and remembering, are at partly qualified level as educational.

Table 9. Range according to the success of course software

Range of course software success		**N**	***X***	**Ss**
1	Course software practice its teaching targets (book, subject, area tours) less expensively and more successfully than other teaching ways.	7	2,28	0,75
2	I think this course software is educational.	7	2,28	0,75
3	Software needs some supportive materials and areas for students' learning the subject.	7	2,71	0,48
4	The packet of course software contains essential supportive areas and materials in order that teachers and students can use.	7	2,28	0,75
5	There are proofs that software reaches to its aim.	7	2,14	0,69
Main average of the group			2,33	

At the Table 9, the main average of the group is determined as 2,33 when evaluating ranges according to the success of course software. In the group, the 5th matter has the least main average with 2,14 (There are proofs that software reaches to its aim), the 3th matter has the most main average with 2,71 (Software needs some supportive materials and areas for students' learning the subject.).
In accordance with teachers' views, it appears that the matters of survey, which are related to the success of course software, are at partly qualified level as educational.

CONCLUSIONS

The findings show that software has partly adequate qualities from the side of teachers, but students has an indecisive manner against the software.

With this research, it appears that there are some suggestions for users can be listed;
1) Course software can be improved in the side of reminding the essential data for course and informing the student about the course targets.

2) Students can use the software when finding the main ideas with the strategies like giving the main details, revision and summary.
3) The activities, which can strengthen the creativity of student, can be increased.
4) A pretesting can be improved for determining the level of students.
5) The duration for courses can be increased when regarding the time to which students can give their attention.
6) The activities which are prepared with computer based teaching softwares need to be searched its practicability with contemporary theory of learning and contribution to the success of students.

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GIFTED' TEACHERS STAGES OF CONCERNS FOR INTEGRATING E-LEARNING IN THE GIFTED SCHOOLS IN JORDAN

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ABSTRACT
No study has investigated the gifted' teachers stages of concerns for integrating e-learning in their teaching. Thus, this study was conducted to explore these concerns. Mixed methods were used to gather data around the research questions. A number of 22 gifted' teachers participated in this study. The Arabic version of the Stage of Concern Questionnaire (SoCQ) was used and followed by interviews. The results showed that the participants' scores of self-concerns (Stages 0, 1, and 2) are relatively high, the task concern (Stage 3) is lower, and the impact concerns (Stage 4, 5, and 6) are low as well. Results revealed a low interest of the participants in the e-learning relative to other activities. Females have positive concerns towards e-learning and higher interest in e-learning than males, while negative concerns towards e-learning found in males' profile.
Keywords: E-learning, Gifted' Teachers, Gifted Schools, Stages of Concerns, Concerns Based Adoption Model (CBAM).

INTRODUCTION

E-learning as a term is now used in order to capture the general intent to support a broad range of electronic media such as Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV and CD-ROM and this will give more flexibility in learning. Stockley (2004) defines e-learning as the delivery of a learning, training or education program by electronic means. Learning has changed to become more attractive with animations, visuals and sounds, playing games and full of other activities that are available any time and any place. Ballard (2000) claims that technology rearranges the system of education. It offers new ways of learning for students in addition to new ways for the teacher to present and provide knowledge in the teaching process.

Computer technology is changing the whole process of teaching and learning globally (Embi, 2007). Additionally, the teacher's roles, the student's roles and the educational management have also been changed according to the new changes in the educational environments and in designing, performing and introducing the educational performance under such circumstances. Therefore, the roles of teachers have been changed from dictator to organizer for educational programs.

E-learning serves as an alternative to traditional classes, so learning is no anymore related to a specific location but it can be taken anywhere outside the class. The process of learning is concerned with attitudes, values, skills and knowledge, and has the ultimate goal of effecting a change in performance and behavior which achieve the objective of adding value to an organization or individuals. In this kind of settings, the true potential of e-learning lies principally in its ability to provide on-tap learning which is available anytime, anywhere and with the necessary network to enable collaboration. Therefore, the potential for an organization like a school or any educational institute engaged in e-learning is that it can be in a state of continuous learning or continuous change. In other words, e-learning can be a force or enabler for changing the process of teaching and learning.

Mackenzie-Robb (2004) mentioned that e-learning and changes to an organization must be seen against a broader background of often conflicting issues and dynamics. In other words, an organization does not change simply by implementing the change as e-learning projects go but requires also a consideration for individual needs during the initiation, implementation and institutionalization of change in an organization.

The theoretical framework for this study lies in Hall and Hord's (1973) Concerns Based Adoption Model (CBAM). Originally developed in 1973, the model is primarily concerned with describing, measuring, and explaining the process of change experienced by teachers attempting to implement new curriculum materials and instructional practices. CBAM describes how individuals develop as they learn about an innovation or a new application and the stages of that process (Horsley & Loucks-Horsley, 1998).

Horsley and Loucks-Horsley (1998) defined CBAM as a set of tools for understanding and managing change in people. CBAM is considered a parallel process of change that each individual goes through whenever he/she engages in something new or different. CBAM has become a change model widely used by those individuals planning for staff development accompanying any educational innovation (Rakes & Casey, 2007). The concerns

model identifies and provides ways to assess seven stages of concern (Horsley, 1996). These stages show how an innovation moves through sequentially (Ensminger, Surry, Porter, & Wright, 2004).

According to Newhouse, Trinidad, and Clarkson (2002), CBAM examines the process of development of a new innovation in three different ways namely: (1) Stages of concern, (2) Levels of use, and (3) Innovation components as shown in figure 1. The first two are explanatory in nature, while the third is considered diagnostic in nature.

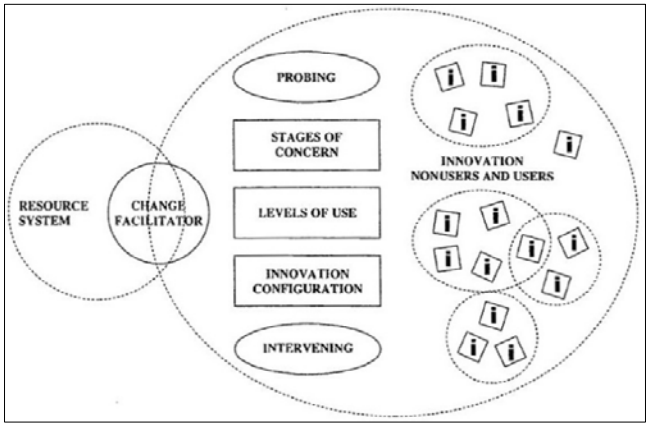

Figure 1: The Concern Based Adoption Model (Adapted from Hall & Hord, 2001)

STAGES OF CONCERN (SOC)

Stages of Concerns (SoC) describe the effective dimension of change: how people feel about doing something new or different, and their concerns as they engage with a new program or practice (Horsley, & Loucks-Horsley, 1998). It is used to measure teachers' concerns about an innovation they are expected to implement (Hall & Hord, 2001). According to Hord, Rutherford, Huling, Austin, and Hall, (1987) stage of concern is a tool which identifies teachers concerns in different stages during a change process. Hall, George, and Rutherford (1986) identified seven kinds of concerns which reflect early self (concerns about how the innovation personally affects the individual), task (concerns about how the innovation is managed), and impact (concerns about how the innovation impacts others as shown in Table 1. Moreover these concerns which may present itself as emotions, perceptions, attitudes and feelings appear to be developmental in that the earlier concerns are lower in intensity while the later concerns are more intense (Hall & Hord, 2001). For the purpose of the current study, stages of concerns are used to understand and describe to what extent the gifted' teachers are concerned about using e-learning in teaching and learning process.

Table 1: Stages of Concern Resource (Adapted from Horsley, & Loucks-Horsley, 1998)

Dimension	Stages of Concern	Expressions of Concern
Self	Awareness	I am not concerned about it.
	Informational	I would like to know more about it.
	Personal	How will using it affect me?
Task	Management	I seem to be spending all of my time getting materials ready.
Impact	Consequence	How is my use affecting clients?
	Collaboration	I am concerned about relating what I am doing with what my co-workers are doing.
	Refocusing	I have some ideas about something that would work even better.

Gifted' Schools in Jordan

They are public co-education schools for academically gifted students called King Abdullah II Schools of Excellence. The first school was established in Zarqa city by the beginning of 2000 /2001 (with 553 students), then the JMOE build a school every two years to be six schools by the year 2010 with a total number of (1935) students. The other five schools where in Irbid (with 551 students), Salt (327 students), Tafielah (81 students), Aqaba (198 students), and Ajloun (225 students) (Al-Shabatat, 2011).

The objectives of these schools were to help gifted students develop their abilities, skills and personalities, and develop their leadership and self-learning skills to be innovative leaders in their society. The students are selected based on four fundamental criteria, namely, the general aggregation for the students should be 95% and above, test for the Academic readiness, IQ test (135 and above), and personal interview. On the other hand, JMOE selects the best teachers who show high levels of teaching and personal competencies to work in these (JMOE, 2010).

RELATED LITERATURE

Alfieri (1998) conducted a study to identify the stages of concern of Defense Systems Management College Faculty about Technology-Based Education and Training. His results showed that the scores of self-concerns (Stages 0, 1, and 2) are relatively high and close to each other (within 2%), the task concern (Stage 3) is much lower, and the impact concerns (Stages 4, 5, and 6) are even lower with tailing-up of the participants' profile at Stage 6. Further results showed that 42% of the participants expressed their highest concerns at Stage 2 while 26% chose State 0 as their highest stage. Also 17% participants chose Stage 1 as the highest while 85% had their highest Stage of Concern in either Stage 0, 1, or 2.

Alshammari (2000) conducted a study to identify concerns that teachers experienced when implementing the Information Technology curriculum in all intermediate schools in Kuwait and to examine the differences among teachers' reported stages of concern based on gender and experience. He found that teachers had four high concerns related to personal, collaboration, informational, and refocusing stages, while low concerns were found at the awareness and management stages. Further, results indicated that most of teachers were at the mixed-concern level. Collaboration stage was the greater concern for both females and males. However, males had higher refocusing concern while females had higher concerns about management.

Alias and Zainuddin (2005) explored the concerns of a group of International Islamic University Malaysia (IIUM) lecturers regarding a technological innovation. Their results showed that the participants had high scores at Stage 0 (Awareness), Stage 1 (Information), and Stage 2 (Personal). They referred these results to low interest of the participants in the innovation relative to other activities, a lack of understanding of what the innovation involves, and the participants were very concerned over the impact of the innovation on their professional duties and responsibilities. They also examined the highest scores for the participants and found that the Stage 2 concerns are almost as high as Stage 1 concerns and a tailing-up of the participants' profile at Stage 6. They anticipate these results to the changing slope of the stages of concerns' profile pointing that the relative intensity of Stage 6 (Refocusing) is greater than the relative intensity of Stage 5 concerns. Finally, they reported a positive concern towards collaborating and working with others in adopting the innovation and most participants were not concerned about the management (stage 3).

Overbaugh and Lu (2008) investigated the effects of a teacher professional development program funded by a No Child Left Behind (NCLB) grant on program participants' (teachers') stages of concern toward instructional technology integration into curriculum. They also explored differences in the concern levels among the participants from different school levels, age groups, and gender. They implemented pre-post-follow-up survey on 377 participants. Their results revealed that the program was successful in reducing participants' self-based concerns while increasing their impact-based concerns about technology integration. Awareness concern was very low at the pretest point and the management concerns were relatively low. Further, they found high impact-based concerns - Consequence, Collaboration, and Refocusing - at the presurvey point. Regarding the concerns' results by gender, males were found to have higher concerns at the Personal and Management stages than female teachers.

Rakes and Spaulding (2009) explored teachers' learner-centered beliefs and concerns regarding instructional technology. They analyzed the concern profile for learner-centered teachers (n=43), non-learnercentered teachers (n=7) and for all respondents (N=66). The results showed that all three profiles were similar and referred to as non-user profiles. Self-concerns (Stages 0 - Awareness, 1 - Informational, and 2 - Personal) were high and the impact concerns (Stages 4 - Consequence) regarding students were much lower, stages 5 - Collaboration, and 6 - Refocusing were lower than self-concerns with the exception of the Stage 6 - Refocusing for the learner-centered respondents.

AL-Rawajfih, Fong, and Idris (2010) conducted a study to examine teachers' stages of concerns in the discovery schools in Jordan and the level of the integration of e-learning into their teaching. They found that discovery schools' teachers are dominantly at the stage of 'personal' on the different stages of concerns. Further, no differences were found in teachers' concerns due to gender. However, teachers in the 1-5 years of teaching experience were placed at the stage of 'collaboration' while the rest were at the 'personal' on the different stages

of concerns. It was found that teachers' stage of informational, stage of management and stage of consequence explains most of the variance of the integration of e-Learning.

Zamani, Abedi, Soleimani, and Amini (2011) investigated teachers' Stages of Concern toward Information and Communication Technology in Secondary Schools of Isfahan. Their results indicated that most of the teachers were in the personal stage of concern (Stage 3). They interpreting this by noting that there is no special plan for using ICT in the Iranian schools and then to integrate it in the schools' curriculum programs. Also they mentioned that there was a lack of teachers' knowledge and skills in using computers which kept them in the third stage. However, there were no significant differences among participants' stages of concern according to their genders.

In very recent times, Jordan embarked on an ambitious plan to make full use of the information technologies potential in order to maximize its ability to compete in local, regional, and global markets. This kind of initiatives was also extended to the educational system when e-learning began to be integrated in Jordanian schools as a part of its national modernization and development plans (Al-Fayoumy, 2003). The ministry of education in Jordan invests in gifted education in the gifted schools (King Abdullah II for Excellence). Much support was being pushed to these schools; in terms of infrastructure and human resources. These schools supplied with various equipment, computer and science laps, libraries, and sport materials. E-learning tools were among these equipment including computers, smart boards, data shows, and internet. Yet, there is no sufficient and clear data available based on empirical research to identify teachers' concerns and beliefs toward integrating e-learning in their classes neither what concerns do they have in e-learning integration? Thus, these issues embark the need for investigating such concerns and shed the light on an important spot in gifted education; integrating e-learning in their classes. The current research was guided by the following research questions:

1. What is the concern profile most associated with the gifted' teachers in Jordan?
2. What are the predominant stages of concerns for the gifted' teachers in Jordan?
3. What concerns do gifted' teachers have in e-learning integration?

METHODS

Mixed methods were used in this research to analyzed gifted teachers' stages of concerns (awareness, informational, personal, management, consequence, collaboration and refocusing) based on the Concerns-based Adoption Model (CBAM).

Participants

According to Hall, George, and Rutherford (1986) in SoCQ manual, concern analysis can be used either for individuals or groups. This justifies using a small sample size especially when qualitative methods are being employed. Therefore, a total number of 22 teachers (12 males, 10 females) were selected from three major schools of King Abdullah II for Excellence which are dedicated for gifted students in Jordan.

Instrument

The Stages of Concern Questionnaire (SoCQ) was developed to detect the concerns of individuals during the change process (Hord et al., 1987). Self-concerns consist of awareness, information, and personal; task concern is management; and impact concerns include consequence, collaboration, and refocusing. Each stage of these seven subscale concerns is represented by five statements on a 35-item Stages of Concern Questionnaire (SoCQ). For the purpose of examining gifted teachers' concerns about the implementation of the E-learning in gifted' schools in Jordan, the Arabic version of Stages of Concern Questionnaire (SoCQ) was used. This version was translated into Arabic and checked for validity and reliability by AL-Rawajfih (2010). He reported that the translated questionnaire is reliable with internal consistency of (0.87). SoCQ reflects a respondent's concern about the adoption of an innovation, a new program, or instructional approach. Respondents were asked to circle a number between 0 to 7 on a Likert-type scale to reflect their present concerns about their involvement or potential involvement in integrating e-learning in teaching gifted students. The number 0 means that the given statement is irrelevant as a concern at this time; number 1 reflects an untrue concern statement; number 4 indicates that the given statement is presently somewhat a true concern; and number 7 represents a very true concern at this time.

FINDINGS

For research question #1*"What is the concern profile most associated with the gifted' teachers in Jordan?"* The total score for each stage and percentile tables have been established which readily convert raw stage scores to percentile figures (see Hall & Hord, 2001). From these percentile figures, stages of concern profiles can be plotted that identify the peak or predominant stages of concern and the relative intensity of other concerns. Since

change is a developmental process, the concerns of any one individual adopter (user) about an innovation will not be static; instead, they will shift in time (assuming continued use of the innovation). A concerns profile may represent the user at different stages of concern such as that of a nonuser or very early user. The mean raw stage scores for the entire group of participant determines the composite stages of concern profile for the teachers. Table 2 below displays the raw scores of all the participants at each stage of concern. The lowest mean (20.91) was for Stage 0 (Awareness) while the highest (27.36) was for Stage 3 (Management). Both males and females reported their lowest concerns at Stage 0 (Awareness) with means of (22.42) and (19.10) accordingly, while they reported their highest concerns at Stage 3 (Management) with means of (27.08) and (27.70).

Table 2: Raw scores, means, and percentiles of participants' stages of concerns

Participants	Gender	Stage 0	Stage 1	Stage 2	Stage3	Stage 4	Stage 5	Stage 6
		awareness	informational	personal	management	consequence	collaboration	refocusing
1	Male	28	27	28	31	33	26	29
2	Male	29	29	23	31	26	26	31
3	Male	28	29	28	28	22	25	31
4	Male	17	15	12	17	11	9	17
5	Male	12	11	16	24	13	17	20
6	Male	23	21	32	28	25	29	27
7	Male	28	22	29	29	19	29	25
8	Male	21	21	25	26	18	25	25
9	Male	24	23	26	31	28	26	18
10	Male	13	29	26	23	22	28	20
11	Male	23	20	23	28	30	28	28
12	Male	23	26	27	29	29	29	33
13	Female	23	25	28	25	25	23	27
14	Female	17	26	26	26	28	28	26
15	Female	14	19	16	16	23	16	20
16	Female	24	20	26	27	20	35	35
17	Female	14	28	27	35	29	28	35
18	Female	22	29	27	31	26	28	33
19	Female	18	25	24	27	21	25	22
20	Female	18	18	28	32	16	28	20
21	Female	17	27	28	28	30	28	20
22	Female	24	27	27	30	26	25	33
Means (Males)		22.42	22.75	24.58	27.08	23.00	24.75	25.33
Means (Females)		19.10	24.40	25.70	27.70	24.40	26.40	27.10
Percentiles (Males)		97	97	98	99	97	97	98
Percentiles (Females)		96	98	99	99	98	99	99
Means (M&F)		20.91	23.5	25.09	27.36	23.64	25.5	26.14
Percentiles (M&F)		89	93	92	83	66	76	87

Interpretations of the participants' profiles are derived from SoCQ guidelines by Hall & Hord (2001) and its Stages of Concerns' theoretical framework. Figure 2 represents the participants' percentiles at the vertical axis

and the stages of concerns at the horizontal axis. The scores of self-concerns (Stages 0, 1, and 2) are relatively high and within (9 %) of each other, the task concern (Stage 3) is lower, and the impact concerns (Stage 4, 5, and 6) are also low. Tailing-up of the profile appears at Stage 6.

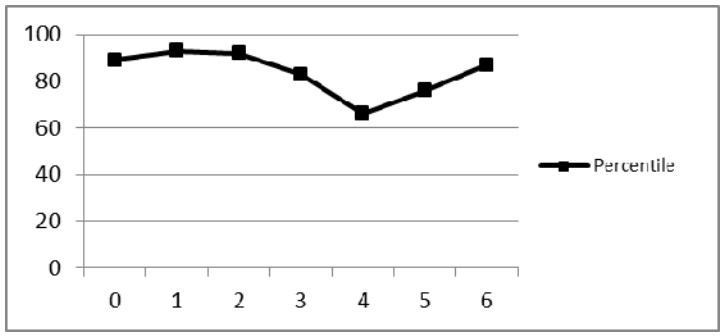

Figure 2: Stage of concern profile (One group profile)

The scores of self-concerns (Stages 1, 2, and 3) for females are relatively high and within (2 %) of each other, while low Stage 0 (Awareness) and the task concern (Stage 4) is relatively high. Females are as concerned with the personal changes that e-learning may bring to them as they are with understanding more about the change itself. A smooth tailing-up appears in Stage 6 for females' scores as they have stable and positive concerns towards e-learning. The scores of self-concerns (Stages 0) for males are relatively higher than females. The highest scores for males were in Stage 3 (Management), while their lowest score were in Stage 4 (consequence) shows that concerns related to student outcomes were low comparing to females. However, a strong tailing-up appears in Stage 6 for males as shown in figure 3.

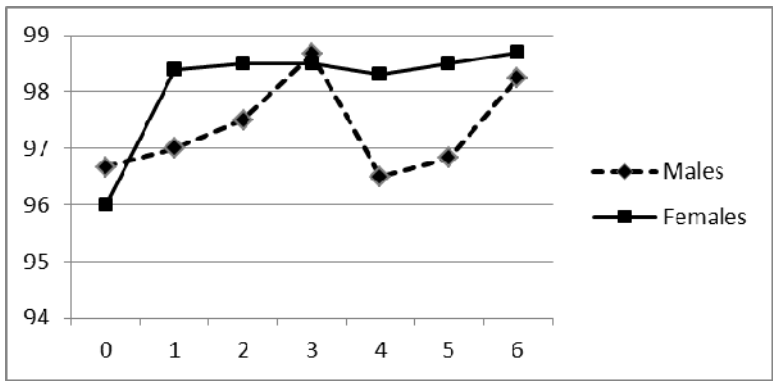

Figure 3: Stage of concern profile (Two groups' profile)

For research question #2 "*What are the predominant stages of concerns for the gifted' teachers in Jordan?"* The High Stage Scores were also examined for the participants. These scores are important primary indicators in the interpretation of the participants' concerns. Figure 4 shows that 7 out 22 (32%) of the participants expressed their highest concerns at Stage 3. Also, 6 (27%) chose State 6 as their highest stage, one participant (0.05%) chose stage 1, another one (0.05%) chose Stage 5, another 4 (18%) chose Stage 4, and another 3 (14%) chose Stage 2 as the highest. Since 77% of the participants had their highest Stage in either Stage 3, 4, or 6, this may reflect a "positive" nonuser profile. It also shows the participants' concern about the consequences of the innovation for the students. Most participants are not concerned about the collaboration (Stage 5).

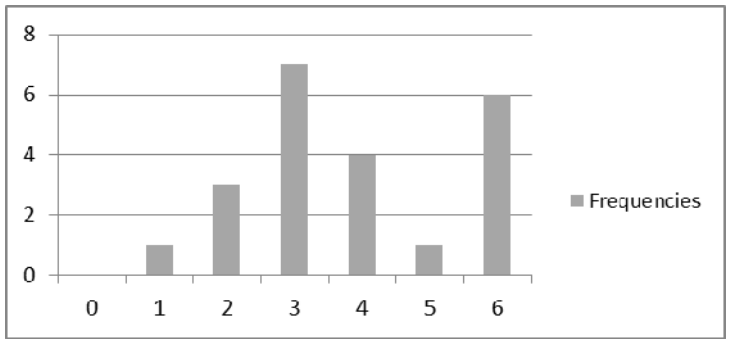

Figure 4: High stage scores of participants

For research question #3 *"What concerns do you have in e-learning integration?"* In order to have a better and more comprehensive understanding of gifted teachers' concerns about integrating e-learning in gifted' schools in Jordan, interviews with the participants was conducted and analyzed using an inductive qualitative approach. Many interviewees' responses centered on the management (stage4) as they will be spending all of their time getting materials ready. Many others concerned about accessibility to technology resources: they either did not have sufficient hardware and/or software, or the equipment was too old or slow. Typical comments included: "the only concern I have is the availability of technology so that the students and teachers can use the resources as often as needed and possible;" "We have no sufficient printers, no video cameras, no laptops, and no necessary software;" "Our school doesn't have the resources to facilitate the use of some technologies. Many interviewees were concerned about e-learning concept and tools. Some commented: "I like to know more about e-learning tools, applications, and experiments;" "I'm interested to read more about e-learning;" "I'm aware of the importance of e-learning in the schools nowadays". Time management was another big concern for teachers. Most interviewees expressed that they loved to use technology, but to design a technology-integrated lesson took significantly more time because they had to search for appropriate computer programs and software, schedule the use of labs or devices, assemble/set up equipment, and guide students in the mechanics of operating the technology. Several teachers were also concerned about the availability and efficiency of technical support staff. They complained that hardware and software problems could not be resolved in a timely manner, which caused interruption to their normal instruction. Finally, many interviewees expressed their concern about students' use of e-learning tools. They shared the belief that guiding students to use technology in learning appropriately and effectively must be taken into consideration when exposing students to technology. Typical comments were: "Sometimes I'm worried that students are too fascinated with the effects of technical tools and ignore what should be the real issues of interest;" "there are too many inappropriate sites and materials for students…. Maybe teachers should help students locate helpful, credible, and appropriate materials". However, many participants were not interested in collaboration to work with others in integrating el-learning; "I would rather work on using technologies in teaching by myself". Other teachers don not like to collaborate in using technologies in the school". These results are consistent with the quantitative findings and more explanations for the participants' responses.

DISCUSSIONS

The current study was conducted to capture a detailed picture of the gifted' teachers concerns about integrating e-learning in their schools. The low Stage 0 (Awareness) score indicates a high interest in the e-learning relative to other activities. On the other hand, the high Stage 1 (Information) score reveals a lack of understanding of what the e-learning involves, and the high Stage 2 (Personal) score gives an indication that the group is very concerned over the impact of the e-learning on their professional duties and responsibilities. The Stage 2 concerns are almost as high as Stage 1 concerns indicating that the personal concerns are essentially the same as the informational concerns. The participants are as concerned with the personal changes that e-learning may bring to them as they are with understanding more about the change itself. The tailing-up of the profile at Stage 6 is an important finding which refers to the changing slope of the SOC profile, specifically, the condition where the relative intensity of Stage 6 (Refocusing) is greater than the relative intensity of Stage 5 concerns. This characteristic in a nonuser profile is interpreted by Hall and Hord (2001) as indicative of a resistance to the innovation, or possibly a desire to re-direct or modify the innovation which is the e-learning in the current study. Moreover, Hall and Hord (2001) describe individuals with this type of profile (nonuser with tailing-up Stage 6) as they seem to be negative toward the innovation. These results are consistent with Alfieri (1998), Alshammari (2000), Alias and Zainuddin (2005), Overbaugh and Lu (2008), Rakes and Spaulding (2009), AL-Rawajfih, Fong, and Idris (2010), and Zamani, Abedi, Soleimani, and Amini (2011).

Females are as concerned with the personal changes that e-learning may bring to them as they are with understanding more about the change itself. The smooth tailing-up in Stage 6 indicates a little resistance to the e-learning or possibly modify their implementation of the e-learning. In other words, females have stable and positive concerns towards e-learning. This indicates that males have lower interest in e-learning than females. The highest scores for males were in Stage 3 (management) which reveals task concerns that include logistics and efficient use of resources. a strong tailing-up appears in Stage 6 for males indicates a strong resistance to the e-learning or possibly modify their implementation of the e-learning. In other words, males have negative concerns towards e-learning. These results contradict with Zamani, Abedi, Soleimani, and Amini (2011), Overbaugh and Lu (2008), and Alshammari (2000) as they reported no differences among males and females in their concern profile.

CONCLUSION AND RECOMMENDATIONS

The Concerns-Based Adoption Model (CBAM) has been used for the first time only in this study to explore gifted' teachers stages of concerns for integrating e-learning in teaching-learning processes. The results of this study would be beneficial for educational policy makers, teachers' training centers, and curriculum planners. Furthermore, e-learning should be included in the pre-service and in-service teachers' training programs. Increasing teachers' knowledge and skills about e-learning will make them more interested in using the new technologies. However, the results of this study revealed that teachers experienced collaboration concerns, thus, the administrations and the principals of the gifted schools are recommended to develop a policy that encourages peer collaboration and coaching. Classroom visits and teachers meetings are highly recommended to help teachers learn from each other. It is recommended to provide both in-site and on-Web support for teachers during the implementation process. Further studies should include a longitudinal research to follow the changes in teachers and concerns over time. Also, further research should address the relationships between stages of concern and other factors, such as school district, age, and teacher qualifications and experiences. An emphasis on innovation, rather than the technology should be adopted which gives opportunities for teachers to try new teaching and learning methods, and that encourages them to support each other and share knowledge and skills. Finally, the findings discussed would provide avenue and references for future studies.

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IMPACT OF COLLABORATIVE TOOLS UTILIZATION ON GROUP PERFORMANCE IN UNIVERSITY STUDENTS

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ABSTRACT
Nowadays the growth of technology influences the changes in group collaboration's process either for the professional or for the students. The requirement of interaction in group collaboration while doing task forces the students to schedule their meeting in order to finish the task given. So the technology starts to influence the process of group collaboration as a communication and interaction media between students in doing their tasks. The purpose of this research is to analyze factors from technology characteristics that drive the students to use collaborative tools, and the implication of using collaborative tools in group collaboration to the group performance. Our research model was validated using Structural Equation Modeling (SEM) technique with LISREL 8.8 tool on 196 respondents from undergraduate and postgraduate students of Faculty of Computer Science, Universitas Indonesia. Our findings showed that the ease of use and perceived usefulness of the collaborative tools drive the students to use collaborative tools when doing their tasks. The existence of collaborative learning is also a driving factor for the students to use collaborative tools. In addition, the use of collaborative tools also showed a positive influence to the team performance.

INTRODUCTION

Good quality education is one key to improve the human resource capacity. Data from Human Development Index (HDI) placed Indonesia at rank 121 out of 185 countries in 2013 (United Nations Development Programme, 2013). This shows the level of quality of human resources in Indonesia is still far from the expected. One of the efforts made to improve the human resource is the transformation of education, shifting from teacher-centered learning to student-centered learning. One of the student-centered methods applied in many universities in Indonesia is collaborative learning which requires students to work in group.

Doing the task in group requires an ability to manage and adjust time each other, so they can do the discussion which lead them to solve the problem in the assignment. Process of communication, coordination, and other factors like trust, understanding each other, cohesion, and conflicts will become concerns in a group collaboration that separated by location and time (Naik & Kim, 2010). With the existence of information technology, students will not need to think about how to adjust physical meeting schedule. They can do the discussion even from different location. Information technology tools that support student's collaboration activities to accomplish the task are called collaborative tools (Munkvold, 2003).

There are various collaborative tools available to use. Becker & Cline (2005) showed that collaborative tools type that commonly used in the organizations activities such as videoconferencing (47%), personal communication devices (45%), project management software (33%) and remote dial-up devices (31%). Bajwa & Lewis (2003) also stated various collaborative tools used, among of them were e-mail system, audio teleconferencing, video conferencing, data conferencing, web-based tools, proprietary groupware technology, and electronic meetings system. More than 90% organizations reported that e-mail and audio teleconferencing were available and utilized by employees, but less than 40% organization using nor provide EMS technologies. There were also many attempts to use collaborative tools for learning activities, such as Wiki (Aaltonen & Kallinikos, 2012; Engstrom & Jewett, 2005; Wagner, 2004). The collaborative tool can also be combined with Learning Management Systems (LMS) to enhance the student's ability, for example to improve the programming skills (Cavus & Ibrahim, 2007).

Collaborative tools help group activities by providing ease of communication and coordination among members of the group. Results of previous studies showed a variety of benefits from the use of collaborative tools. Cavanaugh (2001) showed that collaborative tools can be useful to equip, develop, and expand educational options for students. The use of collaborative tools in the group learning also gave a positive impact on cognitive processes and effective results when compared to individual learning (Lou, Abrami, & d'Apollonia, 2001). The use of collaborative tools also proved to improve the quality of social interaction between students and students, and students and teachers. This is caused by the interaction between users are becoming more visible, so as to improve understanding of each other (Ma, 2009). In addition, the use of collaborative tools also allowed for

interactive process, where learners are able to build new knowledge in a social level (Kreijins & Kirschner, 2002).

Although previous researches stating the benefits and popularity of collaborative tools, there were only few researches concerning adoption factors of collaboration tools as well as their impact to group performance. Considering this, our research was conducted to answer the following research questions: (1) what are the technology-related factors that influence students to adopt collaborative tools for their group work? (2) does the use of collaborative tools influence the group performance among students?

This study was conducted at the undergraduate and master's students in the Faculty of Computer Science, Universitas Indonesia. Considering their field in the computer science, they are used to using a variety of information technology tools to assist their activities, so that we considered them as suitable respondents for our study.

COLLABORATIVE LEARNING AND COLLABORATIVE TOOLS

Collaborative learning is an activity that involved a process where a group of students collaborate to accomplish problem solving task given as learning activities requirement (Alavi, Wheeler, & Valacich, 1995). A collaboration involve two peoples or more who interact each other, at certain period, working together to achieve the same goal (Patel, Pettitt, & Wilson, 2012). Collaboration activities in group can be done without physical meetings of its member by using collaborative tools. Collaboration technology is a technology artifact that supports collaboration activities and coordination between related part to achieve certain business and organization goals (Munkvold, 2003). Collaborative tools is usually web-based, it can be accessed by user easily. Web-based tools can support group collaboration activities with no requirement to pay at high price, it just need to use internet access, there is no requirement to have other additional hardware (Dennis, 1996). Some examples of collaborative tools are e-mail, audio conferencing, collaborative presentation software, conference room video-conferencing, desktop video conferencing, discussion database, document management software, electronic whiteboarding, group authoring, GDSS, group scheduling and calendaring, knowledge management systems, one-way bulletin boards (BBS), personal communication tools like laptop, mobile phone, pagers, and so on (Becker & Cline, 2005).

RESEARCH MODEL AND HYPOTHESES

Davis (1989) has explains TAM model that describes technology characteristics that influence people's intention to adopt the use of a technology. TAM model has proved that technology-related factors that influence the intention to use a technology were perceived ease of use (PEOU) and perceived usefulness (PU). Perceived ease of use variable stated a feeling when someone feels easy to use and also operate a system. In this research context we can say PEOU as a feeling when students can operate the collaborative tools easily. On the other hand, perceived usefulness variable stated the feelings when someone belief the performance will improve by using an information system. Collaborative tools are expected to help students to communicate, convey ideas related to the tasks to be completed, as well as manage all documents generated from the group assignments so that progress can be monitored by all members of the group. Perceived ease of use provided by the collaborative tools that can be accessed anytime and anywhere would be expected to affect the perceived usefulness of collaborative tools, so that we outlined our first hypotheses as:

H1: Perceived ease of use of collaborative tools positively influences the perceived usefulness of collaborative tools.

Besides, TAM model also explains the relationship of PEOU and PU variables with intention to use that stated someone's will or intention to use a technology. In this research context, intention to use collaborative tools can be described as a students who can feel the easiness of collaborative tools utilization and understand the usefulness they will got by using collaborative tools to perform group assignment, they will have intention like "If I have access to use collaborative tools, then I will accomplish the group's assignment by using collaborative tools" (Venkatesh & Davis, 2000). Thus, we outlined our second and third hypothesis as:

H2: Perceived ease of use of collaborative tools positively influences students' intention to use collaborative tools in doing group's assignment.
H3: Perceived usefulness of collaborative tools positively influences the students' intention to use collaborative tools in doing group's assignment.

If two hypotheses above are proved, TAM model has further explanation about the positive correlation between students' intention to use collaborative tools and the actual use of collaborative tools. According to TAM theory,

intention to use collaborative tools should be able to predict the actual use. TAM also stated that the actual use of technology is influenced by the ease of use, usefulness, and intention to use a technology (Davis, 1989). In our case, we expect that students who have intention to use collaborative tools in doing their assignment will lead to the actual use of collaborative tools as a media to accomplish their group's assignment. Thus, it leads us to present our hypothesis as follow:

H4: Students' intention to use collaborative tools positively influences the actual use of collaborative tools as supportive tools to complete the group's assignment.

Group discussion and collaboration activities between group's members drive the student to practice their communication skill to others and to think critically (Kreijns, Kirschner, & Jochems, 2003). The importance of collaborative learning activities for students underlies the need of information exchange between group's members. This will be a problem because of the time needed to distribute information, information complexity, and the quality of communication channel. Network and information technology are able to be a solution to produce effective and efficient collaboration activity (Line, 1997). Meanwhile, Munkvold (2003) stated that current collaborative work practices give positive impact to its users and also to collaboration technology. Bratteteig (1998) also showed that collaborative work practices should be there first before knowing the technology. Thus, we stated our fifth hypothesis as follow:

H5: Collaborative learning activities positively influence the actual use of collaborative tools as supportive tools to accomplish group's assignment.

Group's effectiveness defined by the existence of planning and managing meeting schedule, monitor and evaluate performance, and the presence of information exchange between each other (Becker & Cline, 2005). The various features offered by collaborative tools can support and simplify the process that has to be done in a group to do collaboration, so we expect that the use of collaborative tools will be able to improve group's performance.

Some previous research that discuss about the relationship between actual use of technology and group's performance is Majumdar & Krishna (2012) that stated about rapid growth of web 2.0 technology capabilities which positively impacted the interaction in a group. There was also a result from research by Elie-Dit-Cosaque & Pallud (2012) that showed the use of collaboration system positively impacted the performance of collaboration. Thus we expect that the use of collaborative tools will impact to the group performance that yields the following hypothesis:

H6: The use of collaborative tools positively impacts performance of the group that utilizes collaborative tools to complete the assignment.

The complete conceptual model of our research can be seen in Figure 1.

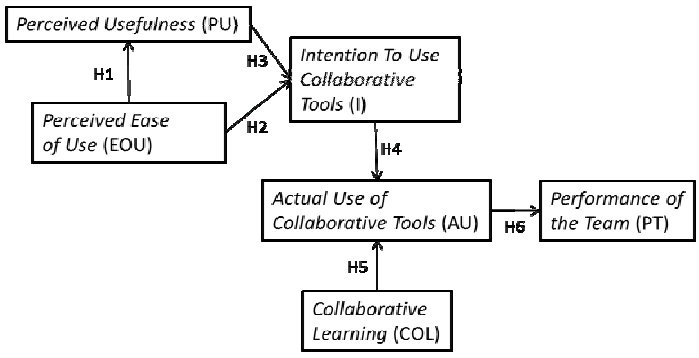

Figure 1: Research Model

Research model shown above is a result of combining TAM model with other variables like collaborative learning, in accordance with the theory that say that collaboration activity will need the use of collaborative tools to support exchanges of information and communication between group's member (Line, 1997). This model also portrays the relationship between the use of collaborative tools and performance of group that use it.

Table 1: Variables and indicators of research instrument

Variable	Indicator	References
Ease of Use (EOU)	EOU1. Learn how to operate collaborative tools feels easy for me.	Legris, Ingham, & Collerette (2003), Davis (1989), Subramanian (1994)
	EOU2. I can use collaborative tools' feature to produce the result I want.	Legris, Ingham, & Collerette (2003), Davis (1989)
	EOU3. I can remember how to do the task with collaborative tools.	Davis (1989), Agarwal & Prasad (1999)
	EOU4. Overall, I can operate the collaborative tools easily.	Davis (1989)
Perceived Usefulness (PU)	PU1. Use of collaborative tools increases my productivity in doing group's task.	Legris, Ingham, & Collerette (2003), Davis (1989), Subramanian (1994)
	PU2. Use of collaborative tools makes the collaborative learning easier.	Davis (1989), Subramanian (1994)
	PU3. Collaborative tools make the collaborative learning process more effective.	Legris, Ingham, & Collerette (2003), Lederer et al. (2000)
	PU4. Use of collaborative tools increases group's performance.	Legris, Ingham, & Collerette (2003), Davis (1989), Lederer et al. (2000)
Intention to use collaborative tools(I)	I1. If I have group task in class, I intent to use collaborative tools to complete it.	Davis (1989), Venkatesh & Davis (2000)
	I2. If I have internet access, I intent to use collaborative tools to accomplish group task.	Dennis (1996), Venkatesh & Davis (2000)
Actual Use (AU)	AU1. I use collaborative tools to discuss and share opinions with group's member, to complete group's task.	Bajwa & Lewis (2003), Lanubile et al. (2010), Kittle & Hicks (2009), Davis (1989), Beal & Rogers (1960)
	AU2. I use collaborative tools to monitor the progress of group's task.	Kittle & Hicks (2009), Davis (1989), Beal & Rogers (1960).
	AU3. Overall, I use collaborative tools to complete group's task.	Davis (1989), Beal & Rogers (1960).
Collaborative Learning (COL)	COL1. I collaborate with friends to finish group task from the lecturer.	Patel, Pettitt, & Wilson (2012)
	COL2. I share informations and knowledges when collaborating with my group.	Singh & Avital (2007)
	COL3. Collaborative activities involve task distribution between group's members.	Singh & Avital (2007)
Performance of the team (PT)	PT1.Collaborative tools utilization helps the process of task schedule planning to become easier.	Becker & Cline (2005), Majumdar & Krishna (2012), Serce et al. (2011), Gress et al. (2010)
	PT2. Collaborative tools utilization make the monitoring of task's progress activities easier.	Becker & Cline (2005), Majumdar & Krishna (2012), Gress et al. (2010)
	PT3. Collaborative tools utilization makes the process of task compilation and task alignment easier.	Nikas, Poulymenakou, & Kriaris (2007), Bajwa & Lewis (2003), Kittle & Hicks (2009)
	PT4. Collaborative tools utilization become the media to share information within group.	Becker & Cline (2005), Gress et al. (2010), Hoegl & Gemuenden (2001)
	PT5. Overall, collaborative tools utilization facilitate me to contribute in completing group task.	Lanubile et al. (2010), Hoegl & Gemuenden (2001).
	PT6. Other group members and I can support each other by using collaborative tools.	Hoegl & Gemuenden (2001)
	PT7. Collaborative tools become communication media to give feedback of task's result between me and group members.	Serce et al. (2011), Hoegl & Gemuenden (2001)

METHODOLOGY

Our research uses quantitative research approach (Creswell, 1994) in order to prove our hypotheses. We used survey method which is conducted to describe specific aspect from a population quantitatively (Kraemer, 1991). Survey is also conducted to obtain generalization of findings resulted from sample population, but with a random error constraints (Bartlett, Kotrlik, & Higgins, 2001). As a case study for our research, we conducted survey to undergraduate and postgraduate students in the Faculty of Computer Science, Universitas Indonesia. The Faculty of Computer Science, as the pioneer institution offering computer science program, offers a set of degree program from bachelor to PhD program in Computer Science and Information Systems. Currently, we have around 1.700 students in all degrees.

Population, Samples and Data Collection Procedures

Population in this study was the bachelor and master students in the Faculty of Computer Science, Universitas Indonesia. We selected students from 2007-2012 classes of bachelor program and from 2011-2012 classes of master program. The population was chosen by considering that the respondents are still actively attending learning activities and doing group tasks. We used convenience sampling to draw samples of our study, which is a technique used to take non-probability samples, where the sample chosen from population is the sample that can access the questionnaire easily, read the post of questionnaire link, and that can be contacted directly (Ross, 2005). We prepared the questionnaire in online and offline mode. We sent the softcopy and link (URL) containing our questionnaire to student mailing lists. We also asked directly to students we met to fulfill the questionnaire. In total, we obtained 196 respondents returning the questionnaire. Number of our respondents has meet the minimum requisite of data to be analyzed with SEM procedures using Maximum Likelihood estimates that need 100-150 samples (Hair et al., 2010).

Instruments

Our questionnaire was divided into two parts. The first contained respondents' profile such as gender, education, classes, and collaborative tools that have been used to complete their group task. Second part was questions which were derived to reflect our latent variables and their indicators. Variable' indicators were obtained from theory and previous research results. Variables and indicators that we used to develop our questionnaire can be seen in Table 1.

RESULTS

Respondent Demographics

Respondent's profile in this paper gained from the results of questionnaire distributed, consist of gender, education, and various collaborative tools that has been utilized. 62% from total respondents are male (122 respondents), and 38% of total respondents are female (74 respondents). For education level, 55% comes from master degree (107 respondents) and 45% from bachelor degree (89 respondents). Meanwhile, base on respondent's answer about what collaborative tools they have used to complete their group task, the distribution of collaborative tools used are: e-mail (182 respondents), Google Drive (163 respondents), instant messaging (160 respondents), Whatsapp, KakaoTalk, and Line (153 respondents), Skype (145 respondents), and Dropbox (121 respondents). Considering the same point of view between author and all respondents (as a student), all collaborative tools mentioned for this research are those that have been used by respondents to complete group task given by faculty. Table 2 summarizes the demographics of respondents in this study.

Table 2: Respondent demographics

Age	%	Collaborative Tools	%
Male	62	Email	93
Female	38	IM	62
		Dropbox	82
		Skype	74
Education Level	**%**	Whatsapp, Kakautalk, Line	78
Bachelor	45	GDrive	83
Master	55	Others	11

Measurement and Structural Model

We processed the collected data by using LISREL. LISREL is a statistical tool that support for covariance based Structural Equation Modeling (SEM). First, we checked classic statistical assumption, which includes the accomplishment of minimum total sample needed, normality test, and multicollinearity test.

Table 3: Results of validity and reliability test

Variable	Indicator	Loading Factors	CR	VE
Ease of Use (EOU)	EOU1	0.77	0.83	0.55
	EOU2	0.64		
	EOU3	0.68		
	EOU4	0.75		
Perceived Usefulness (PU)	PU1	0.76	0.87	0.62
	PU2	0.76		
	PU3	0.77		
	PU4	0.77		
Intention to Use (I)	I1	0.86	0.83	0.72
	I2	0.83		
Actual Use (AU)	AU1	0.70	0.77	0.53
	AU2	0.69		
	AU3	0.71		
Collaborative Learning (COL)	COL1	0.70	0.82	0.60
	COL2	0.78		
	COL3	0.84		
Performance of the Team (PT)	PT1	0.60	0.87	0.49
	PT2	0.73		
	PT3	0.72		
	PT4	0.76		
	PT5	0.56		
	PT6	0.61		
	PT7	0.74		

Next, we tested the model fitness that consists of measurement model test and structural model test. We conducted confirmatory factor analysis (CFA) for measurement model tests that comprise both validity and reliability test. Table 3 presents results of validity and reliability test of our model produced by LISREL. According to (Wijanto, 2008), the minimum value of loading factor is 0.5. Our results showed that all questionnaire items had loading factor value ≥ 0.5, so that we concluded all questionnaire items were valid. Reliability test was performed by using the criterion value of Construct Reliability (CR) and Variance Extracted (VE). Results of reliability test in Table 3 show that the value of CR and VE are already exceeded 0.7 and 0.5 respectively. So that it can be concluded that the model is also reliable. The VE value of Performance of the Team (PT) is 0.49, however this value is close to 0.5 so that we still considered it reliable.

We also tested the model fitness based on Goodness of Fit (GOF) criteria as can be seen in Table 4. We used fitness values recommendation according to (Schermelleh-Engel & Moosbrugger, 2003). The CFA column represents the goodness indices values of measurement model. Except SRMR and GFI, other fit indices have better actual values than the recommended values. Thus it indicates good fitness and we concluded our measurement and structural model are acceptable.

Table 4: Results of measurement and structural model fitness test

Fit Indices	Recommended Value	CFA	Structural Model	Conclusion
RMSEA	≤ 0.05	0.032	0.022	Good Fit
SRMR	≤ 0.05	0.057	0.094	Acceptable Fit
GFI	≥ 0.90	0.85	0.86	Marginal Fit
NFI	≥ 0.90	0.96	0.97	Good Fit
AGFI	≥ 0.80	0.81	0.83	Marginal Fit
CFI	≥ 0.90	0.99	1.00	Good Fit
PGFI	≥ 0.60	0.66	0.68	Good Fit
AIC	Saturated = 552.00	374.97	353.39	Good Fit (closer to saturated)
CAIC	Saturated = 1706.17	630.06	595.94	Good Fit (closer to saturated)

Note: chi2/df is the ratio between Chi-square and degrees of freedom, RMSEA is the Root Mean Square Error of Approximation, SRMR is Standardized Root Mean Square Residual, GFI is the Goodness of Fit Index, NFI is the Normed Fit Index, AGFI is the Adjusted Goodness of Fit Index, CFI is the Comparative Fit Index, PGFI is Parsimony Goodnes Of Fit Index, AIC is Akaike Information Criterion, and CAIC is Consistent Akaike Information Criterion.

Outcome of path diagram can be seen in Figure 2.

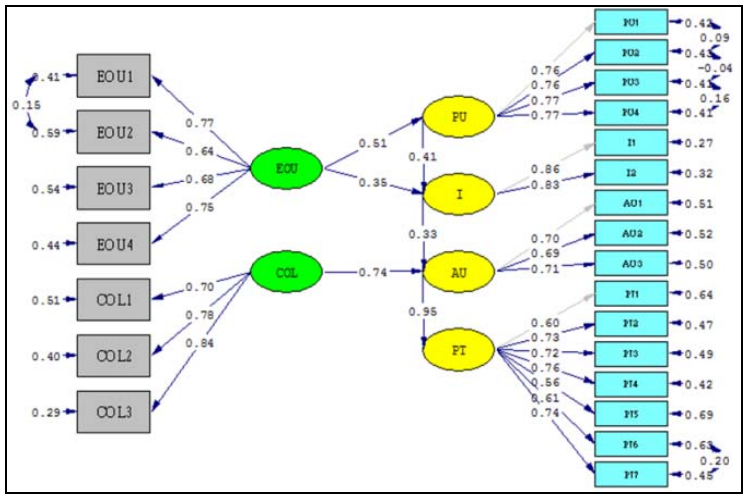

Figure 2: Structural model path diagram

Hypotheses Analysis

Summary of causal relationship test between structural model variables based on t-value produced by LISREL can be seen in Table 5. T-values should have ≥ 1.96 to indicate acceptance of a hypothesis. According to t-values in Table 5, all hypotheses in this study are accepted.

Our first hypothesis (H1) that says perceived ease of use of collaborative tools positively influences perceived usefulness of collaborative tools is accepted. It shows that students will find that collaborative tools are useful if they can use collaborative tools easily. Our second hypothesis (H2) that says perceived ease of use of collaborative tools positively influences students' intention to use collaborative tools in doing group's task is accepted. It means that if students can operate collaborative tools easily, it will drive the intention to use collaborative tools. For our third hypothesis (H3), perceived usefulness of collaborative tools positively influences student's intention to use collaborative tools in doing group's task is also accepted. This result indicates that when students believe that collaborative tools can improve their performance in the group, there will be the intention to use collaborative tools. Our fourth hypothesis (H4) is also accepted, the students' intention to use collaborative tools proved to give positive influence to the actual use of collaborative tools as supportive tools to complete group's task. It shows that the higher the intention to use collaborative tools in doing group tasks, so does the probability to actually use the collaborative tools. Whereas our fifth hypothesis (H5) shows that the collaborative learning activities significantly give positive influence to the actual use of collaborative tools to complete group's task. This imply that when students are given group's task which involve collaborative learning, they will utilize collaborative tool that supports communication and information exchange process in their group's collaboration. Our sixth hypothesis (H6) also shows significant correlation between the actual use of collaborative tools and performance of the group that use collaborative tools in doing their task. It means if students utilize collaborative tools to complete their task, then their group's performance will also improve.

Table 5: Hypotheses testing result

Hypotheses	T-value	Conclusion
H1: EOU → PU	5.29	Accepted
H2: EOU → I	3.28	Accepted
H3: PU → I	3.90	Accepted
H4: I → AU	5.04	Accepted
H5: COL → AU	8.26	Accepted
H6: AU → PT	6.74	Accepted

DISCUSSIONS

We conducted this research to find out which technology characteristic factors that will determine students' adoption of collaborative technology and also to see impact of collaborative technology to group's performance. Research result shows that TAM model developed by Davis (1989) can explain the use of collaborative technology in this research. The detailer explanation of the research results can be seen below.

The influence of perceived ease of use to perceive usefulness of collaborative tools
Data analysis showed that perceived ease of use positively influence perceived usefulness of collaborative tools. It is related to respondents' demography which came from Faculty of Computer Science UI students, who commonly use the technology in their learning activities, so they feel easy to operate collaborative tools. In this paper, perceived ease of use explains how the students feel easy to operate collaborative tools. Ease of use consists feeling of capable operating collaborative tools easily, for example the students can operate collaborative tools without being trained first. Other example is students feel they can use collaborative tools' feature to create the result they need, such as make a diagram, presentation visualization, etc. If students can remember how to do their task with collaborative tools easily, it means the tools are easy to use. When the student feels easy to use collaborative tools, they will also feel that collaborative tools are useful. Thus our result confirms the validity of TAM (Davis, 1989).

The influence of perceived ease of use and perceived usefulness to the intention to use collaborative tools
Hypotheses testing results showed that perceived ease of use and perceived usefulness of collaborative tools positively influence the intention to use collaborative tools in doing group's task. Perceived usefulness of collaborative tools represented by the increasing group's productivity, simplify group's collaboration, increase the effectiveness of collaboration process, and improve group's performance. Students' intention to use collaborative tools indicated by willingness to utilize collaborative tools in doing group's task, and willingness to use collaborative tools if they have internet access. This also implies that students will have intention to use the collaborative tools if they can operate it easily and if the tool is useful for them. Thus our results also confirm the validity of TAM (Davis, 1989).

The relationship between intention to use collaborative tools with the actual use of collaborative tools
Hypotheses testing result showed positive impact between intention to use collaborative tools and the actual use of collaborative tools. Actual use of collaborative tools indicated by utilization of collaborative tools to discuss and share opinion among group's member when doing group's assignment, and to monitor the assignment's progress. So the intention to use should be there first, before the students actually use collaborative tools. Again, we confirm the validity of TAM model (Davis, 1989).

The relationship between collaborative learning with the actual use of collaborative tools
Hypotheses testing result proved that collaborative learning positively influence the actual use of collaborative tools in doing group's task. Collaborative learning in this case is students' collaboration to accomplish coursework, also the information and knowledge sharing between group's members. Besides, a group is said doing collaboration if they distribute the task equally and then discuss each task's result together. Collaboration activity needs facilities which can support a collaboration such as to share information and knowledge, share references, etc. without being concerned by time, location and member's own activity. Because a coursework is obligatory and has deadline, students will have to use collaborative tools to finish their task on time, without the need to be presents in group's meeting and discussion physically. Various features provided by collaborative tools can help students to collaborate in a group, they can chat, upload files, edit documents simultaneously, and so on.

The relationship between the actual use of collaborative tools with performance of group who use it
Hypotheses testing results showed a positive correlation between actual use of collaborative tools and performance of group who use collaborative tools to complete their task. In this case, group's performance is measured by several indicators, such as make assignment planning first before actually doing the assignment, monitor the overall assignment progress even though each member has their own job, joining and coordination process conducted easily, and the presence of information sharing activity in a group. Other indicators is a state where each member give contribution to their group, supports each other when finishing the assignment, and communicate to each other well in a form of feedback for each other's task. Prove of positive correlation between actual use of collaborative tools and group's performance indicate that if students utilize collaborative tools in doing their assignment, then their group's performance will also improve. This result supports the research conducted by Majumdar & Krishna (2012) and Elie-Dit-Cosaque & Pallud (2012), about the use of collaboration technology will give positive influence to the group's performance.

IMPLICATIONS

Results of this study indicate that the use of collaborative tools have a positive impact on group performance. Therefore, students are expected to make use of collaborative tools in their group tasks as it is proven to improve the process of communication, interaction, and facilitate the exchange of information among members of the group. Students can make use of collaborative tools that have been equipped with a variety of features that support their group activities. In addition, lecturers are expected to also have a role to encourage students to use

collaborative tools, especially for professional programs in which students are mostly workers who certainly could not do face-to-face at any time. Collaborative learning is an option for lecturers to encourage the use of collaborative tools as it proved to be one of determinants of the use of collaborative tools. The use of collaborative tools may help the group to work together effectively and efficiently without any limitation of space and time.

The results of this study also showed that the ease of use and usefulness of technology are factors that determine the use of collaborative tools for the group tasks. Related to this, developers of collaborative tools are expected to continually evaluate their products to always be easy to use for students so that they will feel their usefulness. Although the features in existing collaborative tools now supports the collaboration process, there are still opportunities to add other features that provide more value for the benefit of students who use it.

The results also confirm the validity of TAM model related technology characteristics driving the use of technology. Perceived ease of use, usefulness, and intention to use a technology are all factors driving users to adopt the technology.

CONCLUSIONS

This research aims to study the determinants of collaborative tool adoption and its impact to group performance. Perceived ease of use and perceived usefulness of collaborative tools are two factors that drive the adoption of collaborative tools to accomplish group's assignment. In addition, group's collaboration activities that involve collaborative learning activity also proved as positively influence the use of collaborative tools in doing group assignment. This research also revealed that the use of collaborative tools to support the completion of group's task positively influences the group's performance. The utilization of collaborative tools in doing group's task can improve group's performance by being the media of communication, information and knowledge exchange/sharing, and media to give contribution for the group. Interaction between members of the group also becomes much easier. However, this paper still contains limitations as our research results only prove that collaborative tools utilization positively influence group's performance, which has not yet determine what kind of collaborative tools' feature actually could help to improve group performance. In the near future, it is still possible to conduct research which can overcome these limitations. For instance by further analyzing the collaborative tools and its varies features, to find out what kind of feature actually influence users performance in doing group collaboration. Other option is to find out the relationship between collaborative tools and team performance from user friendliness and user experience point of view.

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INTERACTIVE MULTIMEDIA LEARNING: INNOVATING CLASSROOM EDUCATION IN A MALAYSIAN UNIVERSITY

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ABSTRACT
This research study was conducted at INTI International University, and aimed at enhancing the quality of classroom learning for University students with three important emphases: Gagne's instructional model, multimedia, and student-centred learning. An Interactive Learning Module (ILM) was developed as the core component in forming the multimedia-mediated student-centred learning environment (MMSLE) to improve the quality of student learning. The impacts on student learning were investigated through pre-test and post-test, questionnaires, open-ended questions and interview. A significant improvement was found in the test results, and shows that this learning environment has enhanced the students' learning achievement. Students also show positive attitude change as they became more active and motivated in the learning process. A framework named MMSLE was proposed to provide a guideline for educators in Malaysian Universities to foster education innovations as alternatives to the conventional classroom teaching and learning methodology.

INTRODUCTION

In this 21st century media-suffused environment today, the advancement of technologies has stimulated the production of more interesting and effective approaches in teaching and learning context. The resulting educational innovations have driven more creative developments for the interactive technologies in various forms, such as computer-based instruction (CBI), intelligent tutoring systems (ITS), integrated learning systems (ILS), computer aided assessment and computer mediated communication. These new concepts and the developments show that the advances in the digital era have broadened the learning processes and enabled higher levels of learner interactions in order to make learning more meaningful for overcoming the insufficiency in rote learning (Dembo & Seli, 2012). In the 'Blueprint on Enculturation of Life-Long Learning for Malaysia 2011-2020', it states that in conjunction with the advances in technology and growth of information, the delivery of knowledge needs to be more flexible in linking the learners with the learning resources to support the independent and self-managed learning. It highlighted that in gearing toward the status of developed nation by 2020, Malaysian education system needs to build two elements: creativity and innovation, as the enablers to equip the citizens towards the high-income level (MOHE, 2011). As such, innovative teaching and learning design at university level is needed to empower the strength of 21st century learners, and it is this change that has directed many universities today to emphasize on innovative education and embed student-centered learning approach into the course design. Educators are trained to transform from the conventional teacher-centered approach to student-centered learning approach with technology-backed learning environment which can better motivate students to participate and interact with others in the learning process. According to Manson (2007), a well-planned learning environment can enhance the quality of learning and encourage students to demonstrate their understanding in the learning activities, so students are given more choices to determine their learning experience. This helps the students to strengthen self-esteem and develop high level thinking skills in a learning community (Suh, 2011). As multimedia-mediated content is incorporated into the learning environment, the information-rich presentations make the learning instructions more effectively than presenting through a single medium in rote learning, so the students can obtain the information more meaningfully and repeatedly through different media and choices (Reeves, 1998; Shank, 2005; Dembo & Seli, 2012). Studies show that with the use of instructional design model, it organizes media-rich information more systematically with the integration of various instructional strategy components (Qureshi, 2004). Robert Gagne (1985) proposed a computer-based instructional design theory which elaborates the organisation of the learning events based on prerequisite relationships. Based on Gagne's instructional design framework, there are nine events of instruction to guide the process of designing for learning contents (Green, 2003).

According to Tuparov, Tuparova and Peneva (2004), in the process of developing the computer-based learning program, the concern is not on "what technological tools are to be used during the development process of e-learning program", but it is on "how to design and plan an e-learning program that ensures the achievement of the learning objectives". This explains that the expanding growth and competitive advantages in the technologies can easily cause the negligence of the pedagogical methodology due to the duration for developing a complex e-learning program is usually shorter than implementing a pedagogical research and testing. In addition, many universities in Malaysia have been upgraded the teaching and learning facilities to further equip with multimedia and web technologies, high speed internet connections to facilitate student learning, as well as encouraging educators to incorporate innovative approaches to enhance the competence of Malaysian graduates. Therefore the purposes for this study are: 1) to enhance the effectiveness of learning content from the planning of the learning activities to reduce presenting contents disorderedly and students dropping out during the learning process; 2) to redesign the learning context at university level by employing a suitable instructional model as a guideline for improving the organization of the content in a student-centred learning environment instead of merely providing information in the learning program.

This paper presents three main parts: 1) the development of an interactive learning module (ILM) with its content focuses on delivering a part of syllabus. This ILM employs multimedia-mediated content and incorporates Gagne's nine instructional events as the design framework to be used in the student-centred learning environment at INTI International University; 2) the identification and discussion the student learning performance and their attitude change in the learning process; and 3) concludes with a conceptual framework for a multimedia-mediated student-centred learning environment (MMSLE) to provide insights to the educators in Malaysian university for developing a more effective learning environment, to complement the conventional learning environment and enrich students' learning experience. The outcomes of this study will be used to answer the research question, "**What are the impacts of Multimedia-Mediated Student-Centred Learning Environment (MMSLE) on student learning?"**

STUDENT-CENTRED LEARNING IN UNIVERSITY CLASSROOM

Due to the advantage of cost-effectiveness in conveying large amounts of information, conventional classroom learning is still being practiced frequently although this approach was found to be the least effective teaching method and less capable to support self-paced learning and interactions between the instructor and learners (Tinio, 2003; Griffiths, Oates & Lockyer, 2007). According to Dale (1969), learners can retain 5% of what is heard, 10% of what is read, 20% of what is obtained in audio-visual presentations and the retention rates can be increased to 70% and above when encouraging the learners to do hands-on practical work in learning process. This shows that learning environment is important in retaining the retention in the learning process (Dale, 1969). Therefore, it is not suitable for all learners to gain knowledge when presenting different levels of information with equal facility, such as learning complicated lessons with the classroom lecture (Booth, 2007). As a result, many learning environments today are moving towards student-centred learning approach which putting students at the centre of the learning process by focusing on their needs (Griffiths, Oates & Lockyer, 2007). This has transformed today's learners to be active participants with more alternatives in identifying the learning goal, obtaining necessary resources, and making some decisions in the learning process, rather than just passively receiving what was given or be controlled by the teachers (Dane, 2004; Griffiths, Oates & Lockyer, 2007). Recently, an increasing number of computer-based programs are designed with the concept of student-centred learning and placing increased responsibility and accountability on the student part (O'Neill & McMahon, 2005). By having the strategy of giving more controls and interaction, such as students can select the instructional activities based on the levels of difficulty, it can enhance students' interest and motivation. Especially, when hypermedia and interactive contents are used, it further broadens the learning setting and enriches students' learning experiences in a student-centred learning environment (Alessi & Trollip, 2001; Phillips, 2005).

USES OF MULTIMEDIA IN EDUCATION

In recent years, multimedia has introduced the pedagogical strength in facilitating student learning and supplementing learning with liveliness as it adds richness and meaning to the information presentation with the use of more than one medium (Shank, 2005; Asthana, 2009). Multimedia involves the synchronisation of media in producing the media-rich outputs and is arranged in some chunks which are linked by the hypermedia. Students can navigate to the source of information in a shorter time, build the connections between relevant topics, and construct their knowledge by associating to the meaningful information (Hede & Hede, 2002; Parekh, 2006). It is important for students to self-adjust the time and determine the information based on individual differences, so that when individual differences can be accommodated by having alternatives in learning, students will then be engaged at a deeper level and appreciate the student-centred learning approach with more sense of participation (Alessi & Trollip (2001; Ma, O'Toole & Keppell, 2008). In addition, Alessi and Trollip (2001) found that when multiple media contents are used to present information simultaneously, students can

learn more effectively with focused attention than those who studying with separate media where attention is split. This is because human brain will have more processing loads to integrate and re-arrange all different sources of information (SEG Research, 2008). Today, the use of multimedia-based educational program is getting more popular in many areas of learning and training as it stimulates new ways in information delivery with the concerns of accessibility, reusability and individualization to fulfil the needs for different types of learners, but not just limited to conventional teaching and learning methods. However, it is challenging to produce a good courseware as the development requires more studies and planning in incorporating multimedia-enabled learning methods into the existing practices without creating unnecessary frustration in the learning process (Mishra & Sharma, 2004; Mantin & Klein, 2008).

GAGNE'S MODEL OF INSTRUCTIONAL EVENTS FOR COURSEWARE DESIGN

Research shows that many e-learning programs have begun to use the instructional design theory as the development framework in guiding the design of learning contents and enhancing the quality of learning process, so that the learners' mental process and learned capability can be predicted and analysed more meaningfully (Alessi & Trollip, 2001; Martin, Klein, & Sullivan, 2004; Martin & Klein, 2008). There are a few instructional design models commonly applied for the development of educational or training program. Among them, Gagne's model of nine instructional events is one of the popular frameworks for designing learning contents, which contributed by Gagne (1985). Gagne (1977) identifies learning regards the process of growth and the best way to indicate that the learner has successfully learned is when the learner's capability has changed over a period of time and a noticeable change in performance. According to Gagne (1985), instructional events are also known as external events which can be controlled by the instructor and to support the internal learning processes, which are then controlled by learners, so effective learning processes should be facilitated by the external events. Table 1 below presents Gagne's events and the responding internal mental process.

Table 1: Association of Gagne's events and internal mental process (Gagne, Wager, Golas & Keller, 2005).

Gagne's Instructional Event	**Internal Mental Process**
1. Gaining Attention	- Activate the stimuli receptors
2. Informing Learners of Objectives	- Create level of learning expectation
3. Stimulating Recall of Prior Learning	- Retrieve and activate working memory
4. Presenting Content	- Perceive, recognize content and pattern
5. Providing Learner Guidance	- Rehearse and encode the knowledge to memory
6. Eliciting Performance	- Retrieve, respond and enhance encoding by responding to questions
7. Providing Feedback	- Reinforce and assess the learning performance
8. Assessing Performance	- Reinforce the content as the evaluation
9. Enhancing Retention & Transfer	- Retrieve and generalize the learned skill to the situation or case

Gagne's instructional model focuses on giving instruction but not directed for teaching, hence it covers all aspects of teaching and learning (Smith & Ragan, 2000). These events are also suitable to be applied into authoring environments that lack of proper instructional support and instructional principles (Nelson, 2000). Specifically, Gagne's instructional events can work in guiding the selection of appropriate media in the development of learning program, for better supporting the internal learning process of the learners (Gagne, 1985). The framework is also flexible as the instructor can alter the order of events based on the particular learning objective to support the needed learning processes (Martin & Klein, 2008). Since the formulation of Gagne's instructional events, many instructional technologists has incorporated his model into the development of educational research project or vocational program development (Catanese, 2008). For example, Tsai (2008) used Gagne's model in teaching the subject named 'Fog Index of Readability' to guide the students through the process of calculating the Fog Index of English Writing which has successfully enhanced the learning retention. Besides this, a radiologist, Belfield (2010) also used Gagne's model in teaching chest-x-ray interpretation for three years of learning session, she found that the instructional events make the teaching process more smoothly, whereas learners can learn effectively and be more prepared for the examination, additionally some students became more stimulated in pursuing a career of clinical radiology.

As a result, the current research design incorporates Gagne's model of nine instructional events to the development of this ILM, in which the learning contents are presented with the multimedia elements to provide more interactivity. The learning environment is also arranged based on the concept of student-centred learning to enable the learners to interact meaningfully with the learning contents and stay more focused during the learning process. The diagram below (see Figure 1) shows the details that involved in this research design.

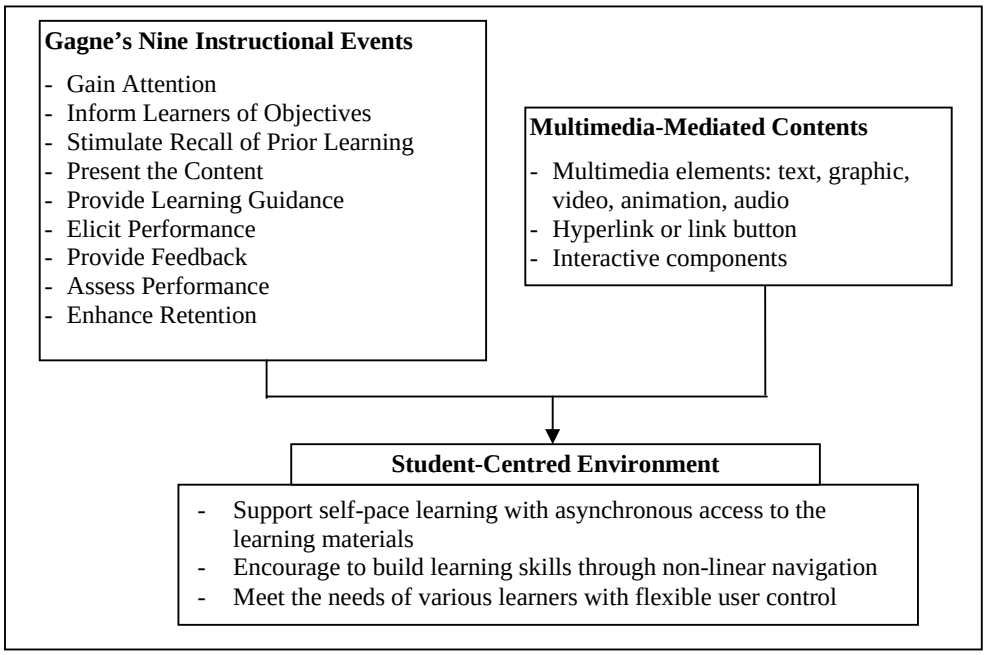


Figure 1: Student-Centred Environment with the Use of Multimedia and Gagne's Events.

METHODOLOGIES

Research Design

This research study comprised of IT program students as the sample participants who were selected from the multimedia classes which conducting 'Computer Graphic' topic at INTI International University. Based on some background study and academic records, all these students have some basic computing knowledge, university learning experiences, and proficient in English. However, these students were familiar with face-to-face classroom learning, but never experience learning with any web-based interactive learning program in higher education. During the learning process, the ILM was uploaded to the web server for students to access from any computer with Internet connection, hence providing a more flexible learning process to meet students' learning preference. There are three data collection instruments used in this study. Firstly, prior to learning with ILM, students' prior knowledge to the lesson was accessed by using pre-test. After students learned through the ILM, post-test which consists of same questions with randomized question sequence was conducted to identify the student learning outcomes from this learning environment. Secondly, after students experienced the learning process in this learning environment, 5-point Likert Scale questionnaires with 30 survey items was used to identify the change of student attitude by measuring the level of agree response with each survey item. The analysis of student perceptions are arranged in six categories: 1 - learner-centred environment; 2 - use of multimedia; 3 - understanding of content; 4 – motivation; 5 - content organisation; 6 - availability of feedback. Thirdly, 10 open-ended questions were set to collect students' opinion, suggestion and expression with more in-depth and meaningful details in regard to their perception on this ILM. All these qualitative and quantitative data were analysed by using mixed method research approach and specifically, combined with triangulation design to validate different sets of data and to complement each other for enhancing the completeness.

Development of ILM

The interactive learning module (ILM) was the core part of this student-centred learning environment. It is developed by incorporating Gagne's nine instructional events and multimedia-mediated content for the chapter "Computer Graphic", which is a common topic for interactive multimedia subject. In this ILM, it starts with an introductory animation, then proceed to a section named 'Refresh Your Mind' before presenting the Main Menu, which serves as 'Home' for students to navigate to the four main parts with different sub-topics. In each part, students were firstly directed to 'Objective' screen, lastly landed at 'Tutorial' and 'Review' screen. The table below presents how the instructional events were used in designing the instructional materials and activities in the ILM to facilitate students' learning. In addition, Figure 2 and Figure 3 presented the screen design of the ILM.

Table 2: Use of Gagne's nine events of instruction in developing the ILM.

Gagne's Events, Instructional Rationales and Features in the ILM
Event 1 - Gain Attention - To grab the attention and motivate the students to start learning
- Short animation clip with content-related story was presented as the introductory scene. - Content-related questions were added in the short animation clip to raise the curiosity. - Animated images were used in the lessons to direct the student's attention.
Event 2 - Inform the Learners of Objectives - To provide learning expectations to motivate students to complete the learning process
- Learning Objective section was presented at the start of each chapter. - Students could link back to Objective section from a particular chapter through hypertext.
Event 3 - Stimulate Recall of Prior Learning - To recall existing knowledge and correlate it to new knowledge
- 'Refresh Your Mind' section was presented before entering to the learning section. - Some words in the lessons were added with hyperlinks, to allow pop-ups for more explanation, or link back to 'Refresh Your Mind' section.
Event 4 - Present the Content - To meaningfully present new contents to the students
- Text explanations were arranged in paragraphs and point forms. - Extra details were available with the given hyperlinks. - Video clip was used to present the explanation with more visual details. - Audio was used to provide alternative, students could learn by listening to the speech.
Event 5 - Provide Learner Guidance - To rehearse the learned knowledge to enhance students' understanding
- User control and instruction were provided to navigate to different parts of contents. - Interactive activities were embedded to rehearse new learned knowledge. - Interactive diagram were used to reveal the information sequentially.
Event 6 - Elicit Performance - To respond to the practices and enhance the encoding of new knowledge
- Tutorial sections were prepared at the end of each part for self-paced practice. - Simple activities were added in the lesson for students to test their understanding.
Event 7 - Provide Feedback - To provide formative feedbacks to the result for practicing the new skills
- Provide feedbacks upon the completion of the tutorial - These feedbacks include showing the answer provided by the student; specific guidance; and the correct answer for incorrect attempts
Event 8 - Assess Performance - To evaluate the level of knowledge mastery for reinforcing new knowledge
- Performance test was given to evaluate students' performance after learning with ILM. - Student's performance summary was presented to reveal the students results. - Some suggestions were added according to level of achievement to motivate students.
Event 9 - Enhance Retention &Transfer to the Job - To retrieve and generalize new learned knowledge to other course assessment
- Review Section was added with some short video clips for knowledge enhancement. - Student coursework were designed and required students to apply new knowledge in the making process.

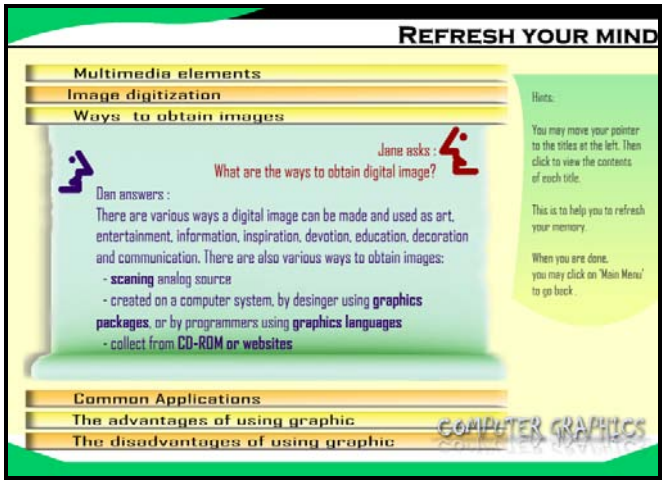


Figure 2: Screenshot of 'Refresh your Mind' in ILM to stimulate prior knowledge, Event 3 in Gagne's Model.

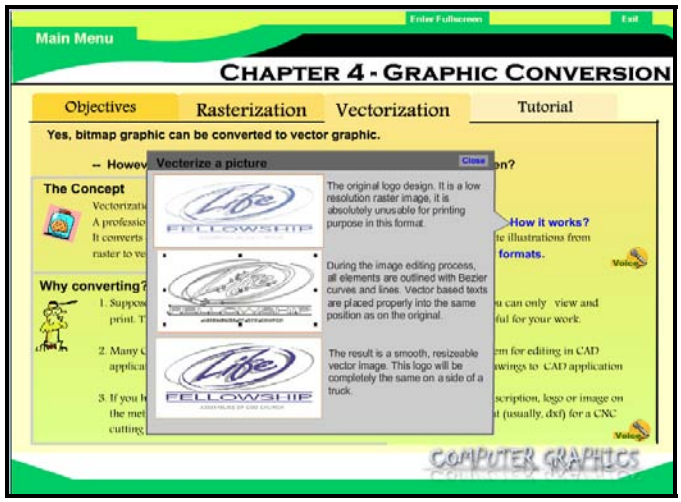


Figure 3: Screenshot of presenting learning contents with multimedia elements in ILM, Event 4 in Gagne' model.

FINDINGS

1. STUDENT LEARNING OUTCOMES

The student learning outcomes are assessed from the results of the pre-test and post-test by identifying the students' learning achievement in this learning environment.

Table 3: Mean scores and standard deviation from pre-test and post-test results

Test results (total=100)	Mean	STD
Pre-test	47.77	15.12
Post-test	63.39	11.56

Table 3 shows that the pre-test mean score (M) is 47.77 and standard deviation (STD) is 15.12, indicating that the student learning outcomes were below average as they did not have specified knowledge to answer the questions before they start learning. Later, the post-test result shows that the mean score is 63.39 and the STD is 11.56. The results suggested that students' learning outcomes was at the satisfying level as the mean score is at above-average grade. In a normality test, this sample was proved to have a normal distribution, where as in paired-samples t-test, a significant difference exists between the pre-test results and post-test results. Therefore, it is convinced that this learning environment has significantly improved student learning achievement.

2. SURVEY RESULTS AND STUDENTS' PERCEPTIONS

As the survey was proved as a very reliable survey based on Cronbach's Alpha test with the reliability score of 0.916, the student perceptions were analysed based on survey results, and these results were organized in six categories:

1. Learner-Centred Environment

The survey results show that 93.5% of students (see Table 4) agreed that ILM provides the chance for learner-centred learning, and many student prefer to have individualized learning way as they could self-direct their own learning process, student highlighted that *"…the opportunity to access the chapter, so I could study in my own pace"* and *"…it gives me enough freedom to think and learn on my own"*. There is 67.7% of students agreed that they did not face difficulty in doing the tutorials, and 71.1% students agreed that they were able to able the learning materials with no difficulty in ILM. They said: "*…tutorials can be done as many time as possible, also all the questions and options are in random mode, so I can try again and again, and identify my weakness and mistakes*" and *"I can repeat it for several times, because I have to learn slowly"*.

Table 4: Survey Results for Learner-Centred Environment

Survey Items	Mean	STD	%
1. The learning module generally gave me the chance to build up my own style and pace of learning.	4.26	.575	93.5
22. I had no problem going through the tutorials on my own.	3.87	.885	67.7
25. I was able to access the materials / resources without much difficulty.	3.77	.845	71.1
26. This module encouraged me to fully participate in every section.	3.77	.884	64.5

2. Use of Multimedia

There was 87.1% of students (see Table 5) agreed that the video clips had helped them to obtain more realistic information while 77.4% of students agreed that the use of media can deepen their understanding. These highly positive results show that the students found that media elements, like video or motion graphics can deliver more detailed information, they reported: *"I don't need to read the text so many times, the animation and pictures help me to understand"* and *"…multimedia elements help me learn faster than people teaching me"*. In addition, 80.6% of students agreed that it is adequate to use media in ILM as their memory was improved, some students said: *"…the animation and sound can attract me and I memorize better", "…last review session motivates me…know how graphics are used today"* and *"…narration in the tutorial session as if my lecturer is speaking and motivating me…"*

Table 5: Survey Results for Use of Multimedia

Survey Items	Mean	STD	%
2. After watching the video clips, I got to know some similar situations in real world.	4.26	.682	87.1
3. The last review helped me to deepen my understanding of the subject matter.	4.19	.873	77.4
6. The program included enough illustrations and examples.	4.06	.772	80.6
16. I felt it is better to present the concept / information using multimedia technology (e.g. animation, narration, interactivity).	3.94	.854	77.4

3. Understanding of Content

There was 87.1% of students (see Table 6) agreed that they were benefited from learning with ILM while 83.9% of student also agreed the ways of recalling their prior knowledge are appropriate. They commented that *"…it refreshed my mind and helped me to structure the old lessons, then it will be easier to learn" and "I like the design in the beginning, 1 person asks and another person answers him, it is like I am asking these questions again…"* On other side, a lower percentage, 67.7% of students agreed that it was helpful for recalling the existing knowledge in a lesson however, it was recorded that many students have more demands on it, such as: *"…wish more info in previous lessons can be included, because it is not enough for me" and "…contents are not enough, I recommend to add more pages at here, so it can be like the revision part before the new chapter is started…"*.

Table 6: Survey Results for Understanding of Content

Survey Items	Mean	STD	%
7. This learning module always helped me to tie my own knowledge with the new knowledge in current lessons.	4.03	.657	87.1
11. The ways of recalling my own knowledge used in this learning module are appropriate.	3.97	.657	83.9
23. The 'Refresh Your Mind' section helped me much in recalling the knowledge which I had learned previously.	3.81	.749	67.7
27. I can describe the scope of each lesson before I start learning.	3.74	.729	71.0
28. I knew what I was supposed to learn before the lessons start.	3.71	.938	58.1
30. I clearly understood what was expected of me.	3.65	.798	51.6

4. Motivation

There was 77.4% of students (see Table 7) agreed that they have had good experience for learning with ILM, and 74.2% of them prefer to continue and recommend this ILM to their peer. They reported that: "*…the colours and the stuff look so lively, I think it is better than some of the learning websites…", "It is like we are using the electronic book, it is very impressive to work… "*. On other hands, 83.9% of students agreed that they were motivated to learn in ILM and 74.2% of them agreed that their attention was held by the contents in ILM. The students commented that the motivation came from: *"…looking at the screen and like to pay more attention to it…", "…colours used in each page…I can easily recognize the parts and not get lost…"* and *"…can feed my curiosity with many features for the topics…"*. Another 77.4% of students agreed that they realized that learning through the ILM can be more enjoyable and interesting as they were impressed by: *"…examples look realistic…", "the review book can drag the thing…" and "…cute animated characters looks so interesting and makes me feel happy…"*

Table 7: Survey Results for Motivation

Survey Items	Mean	STD	%
4. I would enjoy using other computer-based learning modules like this one in future lessons.	4.10	.831	77.4
9. I would recommend this program to other students.	4.00	.816	74.2
10. This interactive learning module had motivated me in learning or exploring more knowledge.	3.97	.657	83.9
17. The content always held my attention.	3.94	.964	74.2
20. I found learning is interesting from this learning module.	3.90	.831	77.4

5. Content Organisation

As for the sequence of the content, 74.2% of students (see Table 8) agreed that feedback was presented timely in LIM, and 77.4% of students agreed that the learning materials are well-arranged, some comments include: "in ILM, *I know I can focus on the important part…"* and *"…information in each part is organized nicely… our learning process is much smoother…"*. With regard to content design and planning, 80.6% of students agreed that ILM has good content planning and make the lessons clearer and more understandable, they responded that the good organization is preferable: *"…arrangement of the information and some multimedia elements are good and neat…", "The information is separated in different tab…we can always stay on the right place"* and *"I like the way that the information is arranged in point form, very easy for me to understand"*.

Table 8: Survey Results for Content Organisation

Survey Items	Mean	STD	%
5. The comment is always presented at the right time.	4.10	.790	74.2
8. The learning materials in this learning module are well-organized or followed a suitable sequence.	4.00	.856	77.4
18. The content was clear and easy to understand.	3.90	.746	74.2
19. Questions are planned carefully and relevant to the content of the learning module.	3.90	.746	80.6
24. The arrangement of information in each screen provided me a comfortable learning experience.	3.77	.884	71.0

6. Availability of Feedback

As for providing feedback to support learning, 77.4% of students (see Table 9) agreed that feedback from the tutorial section enhance their learning while 83.9% of students agreed that the comments from the tutorial were acceptable as these could improve their understanding: *"I can think about the mistake from the feedback…", "…so we can know what we did wrong and the answer…", "…explanation make me easy to understand the chapter"* and *"…I was able to judge my ability and knowledge level"*. As for providing supporting examples, there was 74.2% of students agreed that the review section could strengthen their memory and they noticed that: *"…got many given in some of the page" and "last review can know more from examples…"*. However, 64.5% of students agreed they were able to gain more confidence through the supporting materials. The high undecided percentage is believed that student expected to have more improvement to better support learning, such as students reported that: *"…no Q&A session…we could not post a question because not all information is given in the program…"*.

Table 9: Survey Results for Availability of Feedback

Survey Items	Mean	STD	%
12. The feedback in the end of tutorial sessions enhances my learning process.	3.97	.657	77.4
13. The tutorials had given me enough opportunity to practice what I had learned.	3.97	.752	77.4
14. I was provided with enough information about tutorial results.	3.97	.752	77.4
15. I can accept the comment and it seems positive to me.	3.94	.629	83.9
21. The review at the end of each chapter helped me to strengthen my memory.	3.87	.806	74.2
29. Those supporting examples give me confidence in learning.	3.68	.748	64.5

DISCUSSION

In this study, the methodology was designed to enhance the quality of learning, which comes with three emphases: Gagne's model of instructional events, multimedia elements and student-centred learning. This study aims at answering the research question, and forming a useful framework to propose a systematic guide on improving the quality of student learning and enriching the student-centred learning experience. As for answering research question "What are the impacts of Multimedia-Mediated Student-Centred Learning Environment (MMSLE) on student learning", six important impacts were identified based on the results and analysis obtained from this study.

1. Multimedia-mediated content serves as important components in learning

The use of multimedia elements in creating the learning contents makes the learning experiences more meaningful. It becomes an important component in learning as it provides the students with an alternative means to have more choices when learning in the student centred learning environment. The learning attitudes changed as the students realised that learning with multimedia elements was more flexible in exploring and constructing new knowledge. This has engaged the students and boosted their learning interest in this student-centred environment.

2. Gagne's nine instructional events were a proper and sound pedagogy to use

Although over the years Gagne's instructional model has proven to be effective in different learning and training aspects, this study again proves that Gagne's model provides a proper and sound pedagogy to use in guiding the design of learning content for a student-centred learning environment. Besides, it also shows this model can flexibly accommodate the use of multimedia elements in presenting the information with non-linearity manner.

3. Student's retention and learning outcomes were improved

The increase of mean score (from 47.77, in the pre-test to 63.39, in the post-test) displayed a statistically significant difference in students' learning outcomes, which suggested that the majority of students progressed towards better learning outcomes This improvement shows when media-rich approach and systematic approach are employed in the development for assisting students learning , students' learning outcomes and their retention can be improved.

4. Student-centred learning approach was suitable for classroom learning environment

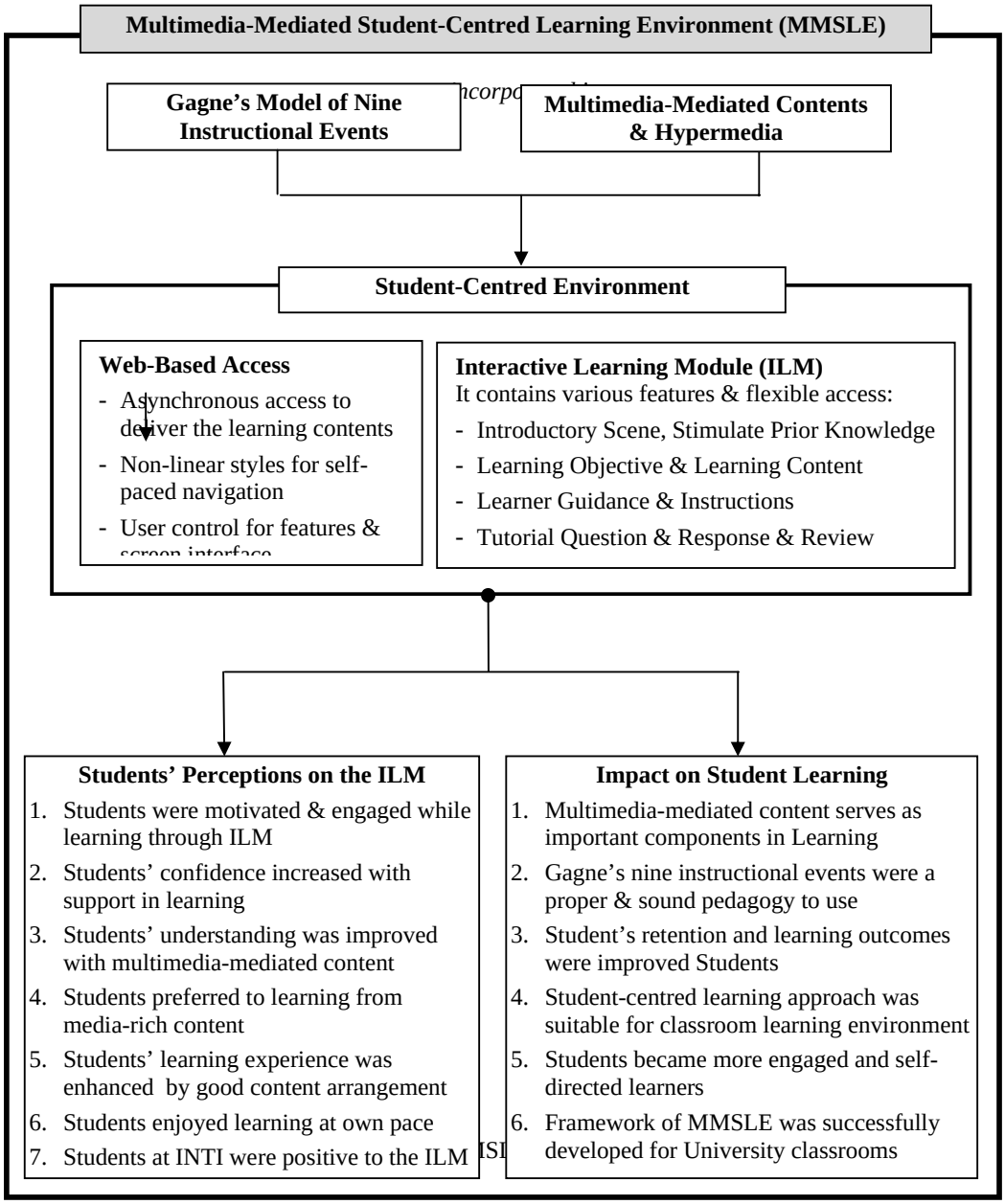
In this study, student-centred learning approach was used to focus on student's needs and interests to strengthen their motivation with more control in the learning process. It shows that with the encouragement, students were able to make full use of the learning program and benefit from the features in self-directing their learning process, and hence making the classroom learning experience more meaningful and feasible for different students.

5. Students became more engaged and self-directed learners

The change of students' learning attitude also came from engaging students in the learning process and being able to interact with the ILM. As more retention can be reinforced, the students become more engaged to the learning environment. Hence, students are transformed into a self-directed learner and become pro-active towards his or her entire learning process.

6. A framework for interactive multimedia learning was developed to effectively enhance student learning in a Malaysian university classroom

Based on the results in this study, a framework for effective interactive learning with multimedia was successfully developed to address and respond to the limitations of the teacher-led learning environment where the students were restricted from having a flexible learning process (see Figure 4). In this multimedia-mediated student-centred learning environment (MMSLE) framework, a sound pedagogy such as Gagne's 9 Events were effectively incorporated to provide students with interactive learning materials that engaged them and enhanced their learning process. This framework presents the combination of various components, with the ILM at the core of the learning environment and can serve as a guide to provide Malaysian academicians in higher education with a more practical alternative to move from the conventional approach of classroom teaching and learning in Malaysian classrooms.



CONCLUSION

Based on the research design and analysed results from this study, the research results were consistent with the literature review, where development of the Gagne-based ILM fulfilled the needs of supporting active learning and providing flexibility to enhance the quality for student learning in University classroom. In addition, a multimedia-mediated student-centred learning environment (MMSLE) framework was developed as a guideline for educators in higher institutions to employ. The framework proposed the incorporation of a sound instructional model, creative media content, embedded in a student-centred learning environment, in order to engage and motivate students in their learning process.

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MANAGEMENT TRAINEE PROGRAM OF TURKISH AIRLINES: GLOBAL DISTANCE EDUCATION

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ABSTRACT
It has always been a contested task to try to present a scientific base for the concept of 'management.' The concept of management, which has always been of great importance to the institutions and organizations, has gone through periodical changes both in terms of its structure and scope, and improved in a parallel fashion as the time goes by. Political, economic, social and cultural transitions at global scale in the second half of the 20th century uncovered the necessity for certain organizations to revisit their concepts of management.

As a result of the economic equilibrium, which was driven by globalization, technological developments and political trends, neoliberal tendencies started to be favored all over the world. Consequently, free market system has been adopted and the increasing level of competition, which is supported by the system, gave way to the idea that the only way for the organizations to dominate the market that they play in is to present a more institutionalized, holistic and innovative approach.

The organizations, which have been following a more traditionalistic approach to management in the previous periods, started to make modifications in their methods. The workers, who have been considered to be mere manpower in the past, started to be seen as 'value' and that came out to be important for the sustainability of the organization. This viewpoint gave way to the strategic management practices. Management trainee programs of the institutionalized units are a result of this understanding. Today, several organizations train their managers on their own or through different means.

This study aims at examining the management trainee programs in the latest technological level that they arrived at, by focusing on how practical and productive these measures are in the special example of the Turkish Airlines.

I- INTRODUCTION

The concept of management has been essential for the societies and civilizations to sustain their unities throughout the history. Although it has not been wholly conceptualized until the 17th century, significantly after the Industrial Revolution, as the establishment of the modern societies affected the process of questioning the concept of management. This also shed light on the necessity of rethinking the concept of management on a scientific basis for the institutions and organizations.

Through the end of the 19th century, management has started to be seen as an important unit, both conceptually and functionally, in any sections of society. Especially political, economic, social and cultural developments of the 20th century, which is also considered to be the longest century, have been effective in scientification and conceptualization of management. The reasons and results of the two world wars, which have left a great impact on the general outlook of the century, gave way to the polarization in the new world system. The influence of this polarization on the global economy has been vividly felt in all aspects of the life.

Globalization and the speed of technological developments caused the states modification on their economy policies. Significantly, as the iron curtain side of the Cold War went into a loss of power, the governments started to look for a solution to the economic crises by supporting liberal policies and the free market economy. This trend made the organizations feel the need for a change in their structures. Neo liberal policies and the trend of privatization in the second half of the 20th century, removed the international borders and several sectors found their places in the international competition. This increased the pressure over the organizations and necessitated a shift in their concept of management in order to preserve their existence in the market.

Since competition became the most important notion of this newly arising managerial style, quantity of workers, which have been a crucial element in the old system, is being replaced by the quality of the work. Thus, the organizations presented various methods to recruit qualified workers, to increase the qualifications of the present workers and to keep the qualified workers in their own systems. The concept of strategic management was based

on the qualifications of the workers and the organizations have gone through a process of privatization aiming at having highly skilled workers as well as supporting the professional development and corporate loyalty of their already qualified workers.

Corporate training is one of the most important ways to attract qualified workers to the organizations, to give them the sense of corporate loyalty and to benefit from these workers as much as possible. For this purpose, organizations came up with various training modules and began to use the ones that are most appropriate to the sector. Depending on technological developments, these modules enabled the organizations apply certain techniques to the effect of their international recognition. Web-based distant education programs, which have started to be widely used in recent years, are mostly preferred by the large-scale organizations.

Turkish Airlines, being a trademark in the aviation industry both in national and international arena, decided on to present special training to their managers and for this purpose, they preferred using Harvard ManageMentor, a world famous web-based distant management module. Harvard ManageMentor is consisted by diverse modules that were designed to improve the skills of future managers and other users, to help them with their weaknesses and defects, and to provide managerial solutions to possible problems that might face in the future. As the managerial trainee users fulfill these modules, they are considered to be qualified enough to start working as managers. Harvard ManageMentor, being one of the most successful we based management programs, is used by TA and the future managers are being trained with this.

II- FROM TRADITIONAL TO STRATEGIC MANAGEMENT

Although the phenomenon of management has been existent since the very early stage of humanity, defining the concept has always been dependent on the hierarchy of the branches of science. While the economists would define the concept on the basis of production types that are related to land, capital and labor; political scientists take management as a system of authority. According to the political scientists, management is conceptualized as a class and reputation system (Can & at all, 2003, p.141). As management is put in practice differently in various scientific traditions, the concept itself also has not been defined on consensus. However, all different definitions of management reconcile on the functionality of human being in the practice. Although “human being” became an important element of the general understanding of management only as a result of 20th century developments, it has always been impossible to talk about the phenomenon or the managerial process itself without taking human being into consideration.

Management as a phenomenon has different features. Yet, the basic ones are as follows; the centrality of human being, division of labor among the human beings and setting a common goal for them (Onal, 1982, p.7). Additional features of management, with respect to the process, could be given as follows; management is an activity of coordination, it is universal, it necessitates a human element, it is an activity of division of labor and specialization, it includes an authority figure and it is a gradual process.

Management is a favorable subject for the academics because it is known that the success scale of the organizations and institutions is highly dependent on managerial process. Since the institutions and organizations are mostly being affected by ideological and political practices, it is of increasing importance to preserve success and stability in managerial level under any kind of circumstances. The basis of managerial process is rooted in the historical reality of the phenomenon of management and managerial approaches that are being accepted.

Managerial approaches are generally classified as Classical\Traditional Approach, Neo Classical\Behavioral Approach, Modern Approach and Post-Modern Approach. Classical Managerial Approach is the first systematical approach to management and organizations, which arose in pre World War II period and has been used up to now (Koçel, 1998, p. 203). The most important innovation that it added to the managerial approaches is to show the necessity of specialization and division of labor for establishing institutionalization and professionalization in the organizations (Dalay, 2001, pp. 90-92). Although the classical approach is the first approach that bases the concept of management on scientific grounds, it had some defects along with its contributions. Neo Classical Approach arose as a challenge to the classical approach as well as a complement to its defects (Tengilimoğlu & at all, 2008, p. 87) and it put forth the human factor. The most important innovation of this approach is the focus on human being instead of the organization itself.

Technological developments following the World War II affected the management science and gave way to a new approach in management. Modern Approach is a synthesis of the classical and neo classical approaches and dominated the organizations as a more open system than the ones preceding it. Presenting two different viewpoints like systems and contingency approaches, Modern Approach aimed at explaining the organization on the basis of environmental dynamics and creating managerial skills accordingly (Koçel, 2001, p. 264). Systems

Approach cascades the systems in an organization and comments on the relations of those systems in determining the qualification of the management. The manager's task is to coordinate the connection among these systems (Koçel, 2001, p. 64). Contingency Approach was developed for fulfilling the goal that systems approach has failed in combining the managerial models (Can, 2002, p. 48). This approach incorporates several constituents that affect the structures of organizations. Two of the most important constituents here are technology and environment (Saruhan & Yildiz, 2009, p. 170).

These approaches had been successful in conceptualizing and systematizing management up until the 1980s however significantly after that because of the shift in relations of production and consumption, elimination of borders between the markets and devastating increase of competition gave way to flexible organizational structure instead of closed mechanisms. This led to the rise of Post Modern Approach. This approach does not aim at removing the organizational structure but creating those which can gain leverage on its competitors by making flexible and fast decisions (Tengillimoğlu, 2008, p. 38). This approach also works with the principle of diversity encourages creativity and it aims at presenting opportunities for people to use their free wills instead of dictating them the truths. Formal and bureaucratic structures should leave their places to individual-centric informal units (Koçel, 2001, p. 247).

From 20th to 21st century, the changing management understandings left impact on the managerial processes and the redefinition of the phenomenon. In this period, a number of contemporary managerial tendencies came into the picture and the organizations had to experience and adopt those tendencies compatible to their organizational structure for the sake of surviving through the conditions of competition. One of these tendencies had been favored over the others. It is the strategic management.

Strategic Management

Strategic management is a compilation of Systems Approach and Contingency Approach. The factors that necessitate the strategic management are the changing organizational environment and managerial activities trying to cope with the increasing commitments and uncertainty in the environment (Dalay, 2001, p. 165). It has taken the strategic management approach, which has started to be used in the second half of 20th century, more than fifty years to be get important. Strategic management anticipates every organization to adopt a suitable management model for them. For this reason, it does not differ strictly from other approaches. Nevertheless, strategic management approach has some distinct features. Those are as follows (Güçlü, 2003, p. 74):

- Strategic management should be taken as a function of the highest-level management of the organization. Strategic management is entirely directed to the fate of the business.
- It is oriented to the vision of the business; it develops long term strategies directed to future, it estimates what should be done to attain a certain result.
- Strategic management takes the business as a whole unit. It is also interested in the particle that constitute the unit. It takes particle-unit relationship into consideration in the decision making process.
- Business is an open system according to strategic management. Accordingly, the environment is a closely observed factor.
- Strategic management carries the social responsibility of looking out for the society against its environment.
- Strategic management carries out an effective distribution of resources for the sake of actualizing the basic aims of the business.
- In strategic management, aims are the common starting point for the sub units in decision making processes and activities.

Nowadays most of the successful organizations plan on their managerial activities according to requirements of strategic management approach. Thus they put strategic management process in practice. According to Hatipoglu (1986, p. 45) strategic management process consists of the phases of an analysis of the environment, determining the goals, analysis of the strategic options, making decisions among the strategic options, application of strategies, control and evaluation. Starting with an analysis of the environment, in this particular phase basic goals and mission of the organization and the means for attaining those is determined. This phase is seen as the beginning of the whole process. Environmental compliance is possible only after the goals were determined. The next phase includes an analysis of the strategic options. After making a decision among the analyzed options, there comes the phase of application. The last phase consists of an evaluation of the results reached after the application of the strategies. Documentation and reporting is done in this last phase.

The balanced and correct accomplishment of the elements of strategic management approach is only possible with the means and techniques that are used in strategic management. There are various techniques to be

conducted in this field but the most important of them is the SWOT analysis. The name SWOT is created as a combination of the capital letters of the words strength, weakness, opportunities and threats (Ülgen and Mirze, 2004: 160).

Table 1: SWOT Analysis

	Strengths	Opportunities	
Internal Factors	The organizations should be aware of their resources and capacities. They should respond to the threats coming from the environment being aware of their advantages and productivity in comparison to their rivals. They should take advantage of the opportunities by knowing their strengths.	These are the specific situations where the environment presents suitable conditions for the success of the organizations in pursuit of their goals.	External Factors
	Weaknesses	Threats	
	The obstacles that prevent them beating their enemies. These are the defects in their performances, resources or competences. These defects should be determined and eliminated.	These are the situations or instances that set as obstacles preventing the success of the organizations in pursuit of attaining their goals.	

Reference: Dinçer, Ö. (1998), *Stratejik Yönetim ve İşletme Politikası*, İstanbul: Beta Yayınları, pp. 205-208.

As the strategic management approach became important in the managerial processes, it has gotten clear that the managerial activities were not single instances related to the managerial level. Strategic management approach takes the organization as a whole unit and claims that success in creating an organizational identity would be achieved by only establishing division of labor among various ranks of the organization. This approach brought the element of human being, which has been ignored or not taken seriously in the previous periods, to the center of attention. With this approach, human resources management replaced staff management. The ever expanding concept of human resources management started to be used for the purpose of creating organizational identities with strategic human resources management applications, integrating the organizational strategies into the system and deciding about on what basis the organization culture would be established (Truss & Gratton, 1994, pp. 663- 664).

There are different approaches and schools that examine the strategic aspect of human resources. The most important of those approaches are Universalistic Approach, Contingent Approach, Configurational Approach and Contextual Approach (Bayat, 2008, p. 81). The latest addition to these approaches, which has become more important lately, is Resource-based View. Resource Based View highlights the importance of human power in intra-organizational structuring. The basis of this approach is to survive through the conditions of competition and preserve the superior position. So, it basically focuses on the qualification, instead of the quantity, of the staff in the organization. According to this approach, no matter what the market conditions are or to what extent the competitors are utilizing the technological developments, holding a superior position in the competition is only possible by depending on the distinct qualifications of the staff (Wright & McMahan, 1992, pp. 302- 303).

Nowadays the organizations wholly grasped the importance of qualified staff in the managerial processes as well as in achieving success and holding a strategically superior position against their rivals (Doğan & Demiral, 2008, p. 146). Resource-based View highlighted the importance of the qualifications instead of the quantity of the staff for the organizations. It also set as a grounds for certain practices that gave way to the recruitment of qualified workers in the organization, preserve their loyalty to the organization and help them improve their skills. One of the most important practices in that nature is the talent management application. These applications get more practical day by day and diversified with training and development activities. Distant education programs of the recent years came as a result of talent management applications.

Talent Management

Nowadays the qualification instead of the quantity of the workers is more important for the organizations to become different and superior to their rivals. The organizations that are in constant competition to each other, understood that the only way to respond to the global scale instability in such a changing and unpredictable environment is to rely on their managers as well as the talents of their workers (Keçecioğlu & at all, 2005, p. 25). Talent management came out as a result of this.

Talent management is a relatively new concept in managerial sciences. Thus, it is difficult to reach a consensus on the definition of talent management. However, in the broadest sense talent management is defined as a process of recruiting qualified workers, being innovative and creative to utilize their qualifications in the most effective way, having distinctness in competition and showing an effective performance (Doğan & Demiral, 2008: 151).

There are three different phases of talent management process. Those are output, process and input. Output is the phase of determining the true talents that could contribute to the organization in the right time and place. Process phase consists of efforts in placing the already recruited talents in to key positions in the organization. Input phase aims at carrying out the intra organizational talent management activities in compatible to the supply and demand management in the surplus of talent in the organization (Polat, 2011, p. 29). Functionality of these phases depends on the operations of various talent management practices.

Significantly in 1990s, with the unpredictable expansion of competition and lack of talented workers, gave way to a talent market in global scale and this led to the "Talent Wars" period of the world. In Talent Wars period, the existing managerial processes have been completed and replaced by new managerial activities. In 1997 and 2000 the Talent Wars survey of in the USA revealed the impact of talented workers on the performance of the organizations. McKinsey highlights the fact that although in the early 19th century only 17% of all business groups was in need of knowledgeable and talented workers; today it rose up to 60% (Handfield & Axelrod, 2001, p. 3). This situation gave way to constant reshaping in the human resources management practices and talent management strategies. The organizations expanded their functions in the processes of defining, analyzing, finding, recruiting and keeping the talented workers in the organizations by using strategic human resources management practices and this led to the emergence of talent management practices.

The most important talent management practices are on the managers. Management is the key position in creating an organizational culture by utilizing the talents in a right and effective way. Hence, the only way for the organization to cope with the conditions of the competition and to hold a strategically superior position is to educate the future managers in a properly. For this reason, the organizations tend to invest in the managerial candidates at first place. Management training practices are the most important means for this goal.

Manager training programs depends on the structure of the sector, market, socio-cultural networks that the organization is active in. The most commonly used manager training programs are as follows; coaching and mentorship, internship, teamwork, project work, work simulation, orientation and rotation methods, business academies and web-based distant education programs which have been of huge importance in the recent years.

Although the distant education programs have been used for a long time now (Kaya & at all, 2004, p. 167), it is relatively new practice to use these programs in educating managers. This has been possible only after the Internet technologies developed to the extent that distant education became accessible for everyone. People from different parts of the world got the chance to receive education at an institution from another part of the world. Several outstanding universities started web-based distant education programs in various departments and fields. One of the most popular departments that use web-based distant education programs is Business Administration. Utilizing web-based distant education facilities started out in the USA and they are being used in many parts of the world today. The most outstanding institutions of Turkey have recently prepared and started to use the manager training programs, as well.

Turkish Airlines, which has proved itself in aviation industry both in national and international scale, presents an example of the usage of manager training programs that have been used by successful organizations in bulky sectors in Turkey. Turkish Airlines is using ManageMentor, which has been created by Harvard. Harvard ManageMentor is a pioneer as a web-based distant manager training program in the sector and it has gotten highly famous in educating the future managers through certification programs.

Harvard ManageMentor

ManageMentor, which was initiated by Harvard University, is one of the most famous and successful programs through which the managerial candidates receive web-based distant education for more than twelve years now. This program, which is supposed to be used by more than five million people since the day it has been launched, consists of 44 modules. Harvard ManageMentor is competent enough to provide a secure background for the future managers with its interface that enables sharing seminars of the world leaders, visual presentations, comments of the users. This program is mostly preferred by the companies as an auxiliary facility to talent development applications because of its aim at improving the weak points of the users in a simple and fast way. The program helps in strategic planning, budgeting and conference management, handling interaction with

problematic workers and preparing presentations. Harvard ManageMentor principally aims at matching work related problems with solutions; organizations with world famous experts and trainee managers with experienced ones.

These principles are presented to the users in three module groups where 44 other modules are implemented in. These module groups are Managing Yourself, Managing Others and Managing the Business. Harvard ManageMentor anticipates improving the skills of the trainee managers and other users in six phases. In the first phase, key points of the subject and auxiliaries materials are presented. Then, the learning capacity is determined by using taught concepts that would present real scenarios and tests applicable to the taught concepts. The tips on how the taught concepts should be applied to the work environment are shared with the user. The users can share information on their experiences or acquire knowledge with the Harvard ManageMentor community.

Table 2: Harvard ManageMentor Program Elements

Managing Yourself	**Managing Others**	**Managing the Business**
Career Management	Change Management	Budgeting
Delegating	Coaching	Business Case Development
Goal Setting	Developing Employees	Business Plan Development
Managing Upward	Difficult Interactions	Crisis Management
Meeting Management	Dismissing an Employee	Customer Focus
New Manager Transitions	Feedback Essentials	Decision Making
Presentation Skills	Global Collaboration	Diversity
Stress Management	Hiring	Ethics at Work
Time Management	Laying off Employees	Finance Essentials
Writing Skills	Leading & Motivating	Innovation & Creativity
	Performance Appraisals	Innovation Implementation
	Persuading Others	Marketing Essentials
	Retaining Employees	Negotiating
	Team Leadership	Performance Measurement
	Virtual Teams	Process Improvement
		Project Management
		Strategic Thinking
		Strategy Execution

Reference: http://www.harvardbusiness.org/sites/default/files/17893_CL_HMM_Sheet_Feb2013.pdf

Harvard ManageMentor presents a wide communication network to the users and it enables every user to utilize this broad social network. For this purpose, knowledge sharing is promoted with the modules to all users. The users, who have already acquired knowledge, applied to their work environments and shared their experiences with the members of Harvard ManageMentor community, can test themselves on their own by using surveys and get further information through Harvard ManageMentor community or Harvard ManageMentor Business Review journal.

III- TURKISH AIRLINES: MANAGEMENT TRAINEE PROGRAM

Turkish Airlines has an important position in the sector as an ever expanding and developing company since it has been founded in 1933. The company has always worked through the best, kept up with the good work, and received several awards both at home and abroad. It has been active both in intra organizational and inter

organizational tasks and had human resources management practices as priority. The company has also started to utilize the competitive advantage focused strategic management tools effectively.
Turkish Airlines, having a distinct corporate culture, aims at becoming the most preferred airline in the global network despite the global competition. It also aims at expanding to the extent that it would beat the industrial parameters (http://www.turkishairlines.com/tr-tr/kurumsal/vizyon-degerler).Accordingly, Turkish Airlines plans on guaranteeing the accomplishment of its goals by using various manager-training programs. The first one of those manager-training programs is the Managerial School, which has been initiated in 2012. Managerial School intends to provide high or medium level managers and potential managerial candidates with equipment and qualifications that Turkish Airlines might need as a company. For this purpose, twelve in class sessions and ten conferences are given to the leadership program students.

Table 3: Education Courses of Managerial School

EDUCATION COURSES			
1	Education of Mentorship	1	day
2	Management Skills	3	days
3	Airline Industry Marketing	0,5	day
4	Financial Management	2	days
5	Operational Management	0,5	days
6	Risk Management	1	day
7	Globalization	2	days
8	Management of Change	1	day
9	Use of Personal Sources on p	1	day
10	Project Management	1	day
11	Education of Strategy Simulations	3	days
12	System of Business Management	5	days
13	General Sale Skills	2	days
CONFERENCES			
1	Culture of Management	01:30	hours
2	Legal Acts of Airline Industry	06:00	hours
3	Competitiveness and Leadership	02:00	hours
4	Law of Contract on Business Management	06:00	hours
5	No Excuse	02:00	hours
6	Introduction to Human Resource Management	03:00	hours
7	Leadership and Management	06:00	hours
8	Introduction on Crafts	06:00	hours
9	Leadership	03:00	hours
10	Innovation	07:00	hours

Reference: https://akademi.thy.com/en-en

Turkish Airlines founded the Turkish Airlines Aviation Academy that offers training programs for both national and international level such as, IATA trainings, personal development education, trade and land services training and staff technical training. Turkish Airlines put Manager Training and Development Program, which provides education and development programs that aims at high quality work and secures the sustainability of development, for raising organization managers, who own high performance culture and are able to actualize the corporate transformation. According to Karasar, the goal of this undertaking is “attaining real success in terms of career, to be ready when the opportunity arises” (2012, p. 17).

Management Trainee program consists of online educations for training potential managerial candidates, in class trainings, social activities and programs at abroad. This is implemented through a portal prepared by Turkish Airlines partnership. Along with this program, Turkish Airlines purchased the usage rights of Harvard ManageMentor, the web-based distant education program, for almost a thousand managerial candidates, in cooperation with Harvard University.

There is an important interaction between the Harvard ManageMentor that has been used by large-scale organizations which recruits managers out of its inner resources, and Turkish Airlines Management Trainee Program. These two programs, which have a common basis, are carried out by Turkish Airlines. Both of them will be analyzed in detail to find out to what extent their scopes are compatible.

Turkish Airlines Management Training and Development Program was put in practice by aiming at certain accomplishments. According to Karasar (2012, p. 19), these are as follows:

- Personal competence: time management, resource management, projects management, performance management, expressing oneself etc.
- Communication and management skills: change management, communications management, crisis management, employee management, reporting, etc.
- Task skills: MS Office, ERP, foreign language, online research, etc.
- Decision making skills: information analysis, process analysis, problem solving, etc.

The goals were determined so as they would be supported by several modules of Harvard Manage Mentor program:
-Personal Competence: It is supported by the following modules; career management, new manager transitions, time management, stress management and meeting management.

Career Management Module enables the development of relevant fields and values, utilizing opportunities and determining the means for these opportunities. Necessary skills for the transformation process are considered in the New Manager Transitions module. In Stress Management, Meeting Management and Time Management modules coping with stress effectively, making adjustments for successful meetings and effective time management is highlighted.
- Communication and management skills: Modules of Difficult Interactions, Leading and Motivating, Persuading Others, Team Leadership and Team Management.

All these modules, aiming at an effective utilization of communication and management skills, are helpful in the usage of communication techniques, selections of the tools for the motivation guidance of the community and revealing the leadership capacity in the group.
- Task skills: Writing Skills.

Writing skills module consists of tips for using writing tools in pursuit of accomplishing strategic goals. It could be said that Harvard ManageMentor is not quite enough for accomplishing the task skills that Turkish Airlines Management Training and Development Program anticipates.
- Decision making skills: Strategic Thinking, Ethics at Work, Process Improvement, Strategic Thinking.

Although some issues related to decision-making skills are being subject matters in various modules, Decision Making, Ethics at Work, Process Improvement and Strategic Thinking modules are the ones that specifically deal with the problem. These modules provide tips on determining and implementing strategies for the present situation and the future of the organization and decision-making skills with respect to these processes.

The skills that the managerial candidates are anticipated to acquire as they fulfill the program are divided into five categories. These categories are as follows: personality traits, personal skills, strategic view, operational skills and human resources management. The modules of Harvard ManageMentor contribute to development of these skills.

Table 4: Expected Skills on Manager Nominee at the End of Program

Personality Traits	Humanism	-Decision Making - Ethics at Work
	Strong moral values	
	Taking initiatives	
	Self-assessment (Self-criticism)	
	Dedication	
	Sense of justice	
Personal Skills	Educational background	-Meeting Management -Presentation Skills
	Work experience	

	Competence in information technologies	-Team Leadership -Team Management
	Being a good rhetorician	
	Fast learning-Speed reading	
	Being able to establish organizational and communicational networks	
Strategic View	Seeing the big picture	-Change Management -Strategic Thinking -Strategy Execution
	Analysis and Synthesis	
	Visionary	
	Prioritizing	
	Rational thinking/ Cause- effect relationship	
	Planning	
Operational Skills	Take action	-Crisis Management -Customer Focus -Decision Making
	Fast decision making	
	Being innovative/Adoption to changes	
	Being goal oriented	
	Effective time management	
	Division of authority and responsibility	
Human Resource Management	Management of diversities	-Diversity -Developing Employees -Leading and Motivating -Persuading Others
	Understanding of people's skills and potentials	
	Being a good listener	
	Setting as an example/ Being inspirational	
	Being persuasive/motivator	
	Being open and honest in relationships	

Having an in detail analysis of these manager training programs will make it clear that both have some strong and weak points compared to each other. Turkish Airlines seems to be successful by using Manager Training Program along with Harvard Manage Mentor in completing the defects of each program by using the other in training almost a thousand managerial candidates.

IV- CONCLUSION

Although the concept of management has been used in society and organizations since the very early ages on, scientification of the concept dates back to 19th century. Industrial Revolution, the increasing importance of industrialization and technological developments had their fare shares in the process. Significantly in the 20th century, globalization and the removal of national borders, global impact of the liberal policies and the development of communication technologies became important in every aspect of life. Organizations and institutions are the ones that have been affected by these trends. The major motive of the organizations in pursuit of questioning their institutionalized unities and managerial processes is the concern of preserving their existence in the field that they play in and their superior positions in competition.

For all these reasons, the organizations felt the necessity of changing their managerial policies and establishing strategic management practices. Strategic outlook in managerial practices brought the human element in the center of attention and the quantitative difference, which have mattered in the previous periods, were replaced by qualitative superiority. Especially the organizations and institutions of the sectors that had problems with recruiting qualified labor force intended to train and improve the qualifications of their current labor power. The main goal, here, is to recruit qualified labor power and to develop the skills of those already been recruited to the extent that they would acquire the skills to accomplish the predetermined goals.

Talent management practices and manager training program became the two most important techniques that enable the organizations recruit, educate and keep the qualified labor power in the organization. Although these practices may vary depending on the sector or the region, due to the rapid development of technologies web-based distant education programs have become the most popular of all in the recent years.

Harvard ManageMentor is one of the most successful and enduring web-based distant education program. It is quite effective in the training of future managers with its content and the audio-visual materials that it provides the user with. Harvard ManageMentor is produced by Harvard University and it has a worldwide fame and reputation with its program certificates.

Turkish Airlines, holding a pioneer position in the relevant sector in Turkey, is one the organizations that intends to train their own staff in order to preserve and develop their organizational unity. In that sense, Turkish Airlines trains its qualified staff as potential managers through its own leadership school and the Management Training Program in coordination with the Harvard ManageMentor. Both programs were designed to make up each other's deficiencies and train competent managers to accomplish Turkish Airlines' strategic goals for the future.

Following the international trends in the field, Turkish Airlines implements talent management practices according to the common tendencies in the world. Thus, Harvard ManageMentor supports the Leadership School of Turkish Airlines and it creates a holistic manager-training program for the company. Being a pioneer company and contributing to the further formation of the sector, Turkish Airlines sets as an instructive example in the aviation sector as well as in other fields, through its usage of Harvard ManageMentor and Leadership School.

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PRE-SERVICE SOCIAL STUDIES TEACHERS' PERSPECTIVES TOWARDS NETIZENSHIP[1]

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ABSTRACT
Nowadays, in technologically mediated discourses of citizenship, new kinds of political, social, economic and cultural forms of belonging are discussed. This study tried to formed a general frame for netizenship and civic virtues in views of pre-service social studies teachers because, social studies teachers are expected to be both model citizens and netizens and they must endeavor to guide their students to demonstrate civic competencies when using technology. Thus, in this study how technology effected pre-service social studies teachers' civic virtues is discussed and their opinions about netizenship are found out. In this qualitative study at hand, research group was formed of ninety pre-service social studies teachers who were enrolled in a state university in Turkey. The selection of pre-service teachers was based on purposeful sampling with no gender-specific selection. A data collection tool was developed based on qualitative means which included open-ended questions regarding the pre-service social studies teachers' views about netizenship. The data gathered in this study were analysed through content analyse technique. In conclusion, it was found that pre-service social studies teachers' views about netizenship were focused on technological common-wealth as fundamental to the exercise of policy, identity and the actualisation of humanity.
Keywords: Netizen, netizenship, social studies, millenial generation, pre-service social studies teachers

1. INTRODUCTION

Citizenship is a contested term and defined as a way of thinking about membership status and social belonging. It has always been a dynamic notion. The concept of citizenship and its' perception both by the governors and citizens have changed by technology during history. Technologies power as a crucial agent of change has prominent place in almost every governments agenda. For instance, the compass and other navigational instruments are followed by colonization while the printing press is a virtual cause of the reformation. According to Smith and Marx (1994) the belief in technology as a key governing force in society dates back at least to the early stages of the Industrial Revolution, but we can back it to first human beings and their efforts to use bone, antler and stone to survive. These first tools (technologies) gave people the opportunity to control over the natural environment and to specialise in different works. This caused social, economical and political changes in life. States and governments reformulated their structures and assumed new functions due to adapted themselves to these new technologies and to the technological change. War and transportation technologies especially have provided some societies new lands they needed to expand their boundries (Diamond, 2006). Technology is called as the "engine of the history" because of its' historical effect on cultural norms, political movements, local and global economies and daily life (International Technology Education Association, 2007). New technologies linked with the emergence of new political subjectivities (like cybersubjectivity), processes and territories.

Technology impacted almost every aspect of our lives, and the links between citizenship and new technologies are broad. Policies, rights, responsibilities and duties change in parallel with technological developments and societal changes relevant with technology. Technology also effect main values in citizenship and their priorities both in societal and governmental views. Moreover citizenship, especially the modern meaning of it is based on cannonball technology. Medieval empires are collapsed because of its' usage by armies and, democracy and nation states created the new form of citizenship. According to Cammaerts and Audenhove (2005) recent technological, economic and political transformations have led to the development of alternative notions of citizenship that go beyond the classic understanding of citizenship relating to nation states and rights. Nowadays, in technologically mediated discourses of citizenship, new kinds of political, social, economic and cultural forms of belonging are discussed because, from infancy new generation had grown up with electronic toys and games.
There is a distinctive Millennial Generation and this cohort is profoundly apolitical, as highlighted by a rejection of traditional citizen roles centered around civic duties such as voting. For example, 71 percent of British Millennials believe that voting makes no difference (Bennett, 2008). Young people's limited political participation is considered as a major problem in most Western European countries. This situation is perceived as a challenge for the future representative democracy. According to Bennett (2008) the Millennials are less guided by encompassing ideologies, mass movements, party and governmental support structures, and other

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factors that might help individuals focus on government and politics in times of strain. Today's children and youngs are the Internet generation, born and brought up with online technology at their fingertips, and with high expectations of content and delivery. To motivate young people to engage in civic life electoral communication is important which campaigns seek votes, a process that often excludes substantial voter blocs such as young people. Civic activists and public officials are often available to address the concerns of young citizens, whether through personal visits or participation in computer chats (Lei, 2011). Most policy makers form civic education based on the idea of "dutiful citizen" and expected them to about the basic workings of government, to understand the values of the national civic culture, to become informed about issues and make responsible voting choices. However, new "self-actualizing citizen" may see its' political activities and commitments in highly personal terms that contribute more to enhancing the quality of personal life, social recognition, self esteem, or friendship relations, than to understanding, support, and involvement in government. (Bennett, 2008).

Citizenship has transformed due to processes of globalisation, transnationalisation and the interactive potentials of information and communication technologies (ICTs). There are distinct shifts in the organisation of citizenship according to the re-articulation of rights to access, participation, education and freedom of association. As cited by Mosco (2000) "*citizenship in the new electronic age means treating cyberspace as a public space or new commons. Here, all people have rights of access and participation, reasonable expectations of privacy and security, and, along with these rights, civic responsibilities of active involvement and mutual respect for fellow cyber-citizens.*" The terms of netizenship and netizen (as illustrated in Figure 1) were introduced by Hauben (2007) and Hauben (2007) capture the emergence of "citizens of the Net" citizens who carry invigorated rights and obligations and are people who care about Usenet and the bigger Net and work towards building the cooperative and collective nature which benefits the larger world". Like cyber citizenship, netizenship re-prioritises rights of access and participation while positioning the individual within a 'technological common-wealth'. It is about recognition and legitimisation of a technologically bounded public and communities and, merges civil, political and social rights through new technologies. And, technological citizenship is another concept about technologically mediated discourses of citizenship. Philip Frankenfeld (1992: 470) defines technological citizenship as a general means for instituting protective measures against dangerous technologies (e.g. the atom bomb, genetically modified foods and pharmaceuticals like thalidomide). He is arguing that science and technology are pervasive forces capable of transforming everyday life, and without a system for regulating these forces, their capacities can invite threatening and negative consequences. According to him, humans must formalise new spheres of citizenship to account for and protect against such hazards.

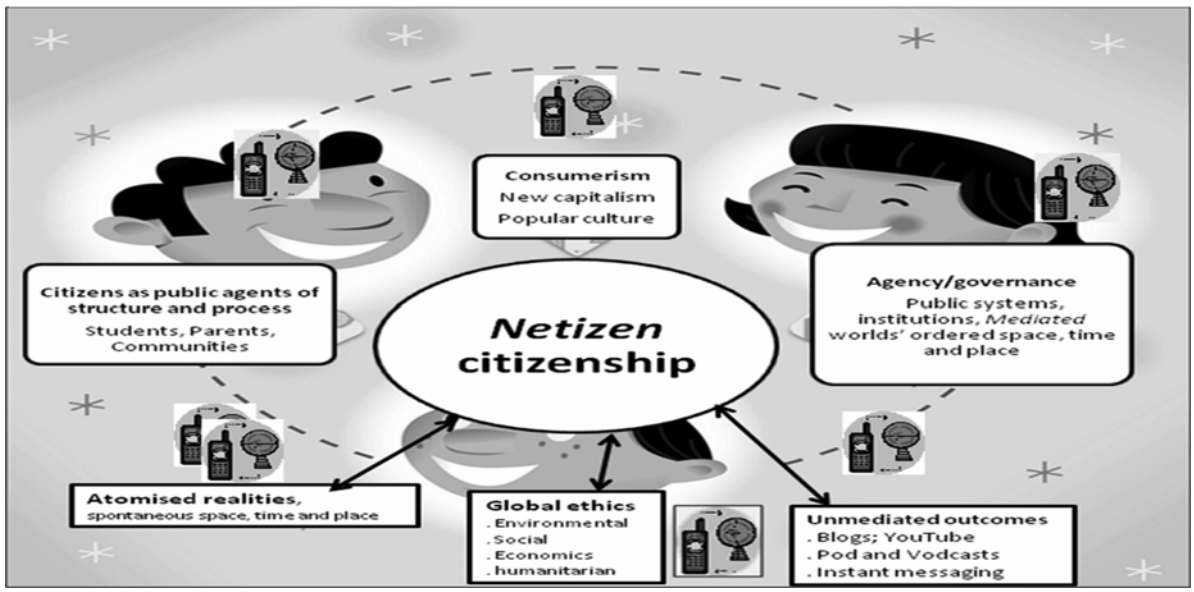

Figure 1. Netizen citizenship cited in Robertson, 2009

Access to information creates more informed citizens, and netizens are more likely to be politically opinionated. Netizenship was presented as net users who are empowered by collecting, creating, sharing information and knowledge with others, and who, help make the world a better place, by Hauben and Hauben in 1996 to represent the impact of Usenet in the US. In their view, abybody on the globe can access to the net to improve

the quality of the human life. Rebecca MacKinnon (2012) expresses the netizen as the citizens of a globally connected Internet, and argues that it is no longer sufficient for people to assert their rights and responsibilities as citizens of nation-states, they also need to assert their rights and responsibilities as netizens. The term of netizen refers to a citizen of the Internet and suggests that people in cyberspace are more than just users, that they are still citizens and their civic responsibilities in the real world are maintained (Milson and Wan-Chu, 2002). In their survey Keeter, Zukin, Andolina, and Jenkins (2002) termed the American Millennials as the "DotNEts", and discussed about their strong self identification and their willingness to see government play a larger role in their lives and the life of the country. Like their European counterparts, the American DotNets are turned off to conventional politics and government, but highly involved in issue activism, political consumerism, and protest activities. BBC can also be used as an example for netizenship because of its' experiment called iCan, which enables citizens to define and post their own issues, link to broad networks of similarly concerned individuals, find information about public actions and government responses, and, ultimately, push for BBC coverage of their concerns. Besides, in a research which was done in U.S. by Pew Research Center (2004), the information habits of netizens were propounded like this: 1) young people increasingly prefer their information in online, interactive environments, and 2) veteran internet users are among the most informed citizens.

As we have seen, technological developments change the nature of political communication and the character of citizenship (Neuman, Bimber and Hindman, 2011). In his study, Hartley (2000) described the radio as one of the pillars of civil society, combining entertainment and democracy, sound and citizenship. Besides, the Net facilitates social connections and opens a new life for people. Geography and time are no longer boundaries and, netizens are meeting other netizens from far-away and close by that they might never have met without net. People now have the ability to broadcast their observations or questions around the world and have other people respond. The computer networks allows the excluded sections of society to have voice. Each user contributes to the whole intellectual and social value and possibilities of the net and, netizens working together continually expand the store of information worldwide. The net brings people together and put them into connection with other people, it allows them to realize their power. The emergence of Internet does not merely mean an increase in the quantity of information, but different information and communication opportunities enhance democracy and contribute to a democratic culture. With access to the Internet, citizens can have more opportunities to speak out and be heard, so information, communication, and viewpoints become more diverse (Lei, 2011). Technology allows people to make the world a better place by making their unique contributions available to the rest of the world and, allows much more and public interaction over a much larger body of people than available before. Citizens of a country can learn about events in another country from the Net before the government decide to release the information to the public via the media. Thus, governments can no longer easily keep information from their people and this opportunity gives the power to citizens.

An excerpt from Hauben (1995)'s article about it follows:

> Welcome to the 21st Century. You are a Netizen (a Net Citizen), and you exist as a citizen of the world thanks to the global connectivity that the Net makes possible. You consider everyone as your compatriot. You physically live in one country but you are in contact with much of the world via the global computer network. Virtually you live next door to every other single Netizen in the world. Geographical separation is replaced by existence in the same virtual space.

According to Hauben (1995) net society differs from off-line society by welcoming intellectual activity. People are allowed to be intellectually inretesting and interested, and they are encouraged to have things on their mind and to present those ideas to the Net. Netizens work together continually expand the store of information worldwide. Every user adds her or his opinions and interests to the general body of specialized knowledge on the Net. It allows them to take control over their lives. Because of the information available and the new connections possible, people also have changed their lifestyles.

Netizens of 21st century are generally the members of Generation Z. There are different definitions about this term. For example, Hauben and Hauben (1997) defined it in the context of e-democracy, nationhood and national identity, and identified it as people born since 1995 (cited in Robertson, 2009). Malone (2007) identified the generation Z as children born after 1991, in the age of terrorism, mobile phones, internet and un-zoned schooling. However, Generation Z is defined by Jones, Jo and Martin (2008) as those born since 2000. That generation differs from past generations because of their socialisation in online spaces and, as mobile citizens they share ideas and react to public issues. They use online networks as intellectual spaces and build global bridges to the outside world within their local contexts. Cyberspace create possibilities for publishing their opinions on any topic at anytime. Blogs, podcasts, vodcasts, wikis and online sites like Facebook, My-Space, Second Life and digital games are among the myriad of ever expanding online tools to hand. This situation opens

up to the community the notion of e-democracy where counter-voices and other perspectives can gather momentum at local, national and global levels simply through the Internet.

Along with the rise of Internet, for example China has accepted the emergence of a new population called as netizens. Online commentaries, criticisms, and mockery of state policies have flourished in the relatively democratic and elusive cyberspace. A cyberpublic made up of millions of online Chinese uses the internet for accessing foreign news, spreading stories of injustice, and promoting alterative cultural forms (Ong, 2006). Despite the authoritarian state, technology has contributed to a more critical and politicized citizenry in China's cyberspace. China's netizens has constituted a new social force challenging authoritarian rule. Chinese state proactively uses the Internet to disseminate official views and ideologies, but through interaction with diverse points of view, citizens could become relatively free from manipulation of the state. Chinese netizens are more critical of the political conditions and the party-state, be willing to engage in politics, and they are also more likely to have experience in collective action (Lei, 2011). Youth of the post-1980s and 1990s express themselves online and people under thirty comprise sixty-nine percent of China's netizens, part of the world's largest online community. Young Chinese netizens are writing about themselves in blogs and online novels, breaching firewalls to connect globally, and posting clips on Tudou. Despite government efforts to control content, online users are exposed to freer media and opportunities for independent networking. The Net has also proven its value by providing an important medium for students in the Chinese Pro-Democracy movement. The Net provided an easy way to evading government censors to get new around the world about events in China and to receive back encouraging feedback (Lei, 2011). In a similar way, students in France used the French Minital system to organize a successful fight against plans by the French government to restrict admission to government subsidized universities (Hauben, 1995). Because, in cyberspace there is no central power, no real territory, and no hierarchical structure (Milson and Wan-Chu, 2002). Indians have also increasingly turned to the internet to construct a web-based 'global citizenship' (Ong, 2006).

Lee (2009) explains that, in Korea, by netizens some people refer to Internet-based protesters and for others netizens represent reform minded and participatory internet users. Besides, they define the term as amorphous and hybrid groups of Internet users who are aware of citizenship, participating in a variety of collective action in horizontally networked forms. South Korea's status as perhaps the world's most wired society makes it a fruitful case study for considering how digital culture may develop (Epstein and Jung, 2011). In the aftermath of the deadly incident in June 2002, South Korean Internet users constructed the girls' deaths as a "national tragedy" by situating it in the historical narrative of the U.S. presence in Korea, and created a collective identity of netizens by circulating affective responses to this tragic event. Based on this nascent collective identity, netizens became involved with the Presidential election in December 2002, transferring their newfound political agency at the vigils into participation within the dominant political realm (Jiyeon, 2009).

As we have seen above, participation has become easier and more attractive because of net. Internet offers a good opportunity for freedom of speech for political, social and critical aims (Vickery and Wunsch-Vincent, 2007), and provides a good opportunity for citizens to participate in various societal issues and discuss them critically. In particular, Facebook has provided an appropriate arena for political discussions. Besides, other social networking sites and blogs have increasingly been used for political purposes by both politicians and ordinary people. In election campaigns those social networking sites are used as platforms and, websites like YouTube are used to introduce canditates (Fersangi, 2010). People can use Facebook to create political groups to express their opinions about one specific issue and invite others to join. In discussion boards people discuss and express their agreeing or disagreeing viewpoints (Fersangi, 2010). Many people in the world tend the use internet and the social media for democratic purposes. Fersangi (2010) explained the Indonesian case as an example in her research to show the unique opportunities that Facebook has given to in 2009 presidental elections. She identified active citizenship with civility and, said that, in order to reach towards a democratic society, not only should citizens be well informed and actively participate in discussions, but they should also interact with others in a civil way. During the 2009 presidential election in Indonesia, Facebook was utilised as one of the possible ways of advertising and disseminating election news. There were some Facebook groups that provided people with general information about elections and tended to educate them about this event, as it was assumed a very significant event for Indonesia's democracy. As it is not possible for ordinary citizen to meet their popular candidates all the time to express their viewpoints, Facebook was an alternative for electorates during the presidential election and even afterwards. It also provided candidates with an informal forum to express their opinions. It was the first time that Indonesian candidates could provide such a participatory medium for both their supporters and opponents to converse directly (Fersangi, 2010).

In USA the post-9/11 border security and bordering practices are integral to contemporary citizenship because satellite technology and the Internet bring all media across national boundaries as if those borders did not exist.

Global processes run deep and wide, rendering problematic the figure of the citizen as a member of a national community (Poster, 2002). This emerging redesigned citizenship shares much with conceptions of 'netizenship' – a conception of the notion of citizenship and/in networks – raised in relation to the effects networks have on economy, society, and politics (Muller, 2010). As Luke argues in his discussion of how citizenship and networks meet, the netizen is more about 'bits' rather than 'atoms', reflecting distinctions between 'have nows' and 'have laters' rather than more conventional 'haves' and 'have nots' (Luke 1999). In South Australian case ICTs are being used by government agencies to engage citizens in interaction with the government (Alport and Macintyre, 2007). Online interactive arenas have created a new form of citizenship in Tanzania too, that is, 'Tanzanian netizenship', which is fluid and flexible enough to mobilize diverse people online to effect social transformation 'offline'. This form of citizenship becomes continuously plead for Tanzania to adopt dual citizenship so as to accommodate their dual nationality (Chachage, 2010).

Although involvement in discussions is a significant feature of active citizenship, the quality of online discussions is also an important issue that should be taken into consideration. Internet is capable of giving social, economic and political advantages to its users but, netizenship is associated directly with narrow accounts of technology and one's ability to use and access it. Thus, in countries like Indonesia where access to Internet technology is unequal, it is at best yet another index of inequality and, at worst, yet another impediment to equal rights of all individuals in a democracy (Hill and Sen, 2002). Besides, while Internet supports anonymity, for most users criminal activities such as hacking and piracy conduce to inhibition and disengagement (Milson and Wan-Chu, 2002).

While educating children for life and citizenship in the twenty-first century, educators are remiss if they ignore the impact of technology on our lives. Young people should learn acceptable use policies and guidelines. They must also learn to recognize when they might be vulnerable and what steps to take in problematic situations. Training in how to be a responsible netizen could come a part of teaching and especially the social studies teaching. Thus, social studies educators should expand their notions of citizenship to include netizenship. As teachers make use of technologies, they can model and practice virtuous netizenship. When modeling good netizenship through lessons and activities, teachers can also review and discuss issues of cyberethics (Milson and Wan-Chu, 2002). Thus, in this study how technology effected pre-service social studies teachers' civic virtues is discussed and their opinions about netizenship are tried to found out. Besides, social studies teachers have a ciritical role in establishing a strong foundation of skills for interaction in digital spaces that primes children as citizens who optimize the iterative functions of the Web for self-expression and participatory forms of citizenship (Berson and VanFossen, 2008). So, in this research a general frame was also tried formed about pre-service social studies teachers' netizenship virtues.

2. METHOD

In this study qualitative method has been applied. Qualitative research, broadly defined, means "any kind of research that produces findings not arrived at by means of quantification" (Strauss and Corbin, 1990) and that produces findings arrived from real-world settings where the "phenomenon of interest unfold naturally" (Patton, 2002). This means that qualitative researchers generally study a phenomenon in an open-ended way, without prior expectations, and they develop hypotheses and theoretical explanations that are based on their interpretations of what they observe (Johnson and Christensen, 2012). This kind of research research allows the researcher to familiarize him/herself with the problem or concept to be studied, and perhaps generate hypothesis to be tested (Golafshani, 2003).

Qualitative method starts with the assumption that social setting are unique, dynamic and complex. It provide means whereby social contexts can be systematically examined. Qualitative data are detailed descriptions that can not be reduced to numbers without distorting the essense of the social meaning they represent. Qualitative reports are detailed narratives that include the voices of the participants being studied (Hatch, 2002). This method has been chosen in this research due to capture participants views about the issue at hand.

This is a intrinsic case study which describes the pre-service social studies views on netizenship in depth. This design was used because of the researchers' attempt to learn about a little-known phenemenon by studying a single case. Here, the primary interest was in understanding a specific case. The aim was to understand the case as a holistic entity and a more general process.

2.1. Sample/Research Group

This study tried to formed a general frame for netizenship and civic virtues in views of pre-service social studies teachers because, social studies teachers are expected to be both model citizens and netizens and, they must endeavor to guide their students to demonstrate civic competencies when using technology (Bennett, 2008).

Besides, social studies teachers have a ciritical role in establishing a strong foundation of skills for interaction in digital spaces that primes children as citizens who optimize the iterative functions of the Web for self-expression and participatory forms of citizenship (Berson and VanFossen, 2008). Thus, in this study how technology effected pre-service social studies teachers' civic virtues is discussed and their opinions about netizenship are found out. Due to this, research group was formed of 90 pre-service social studies teachers who were enrolled in a state university in Turkey. The selection of pre-service teachers was based on purposeful sampling with no gender-specific selection. The cohort that began the citizenship course in 2013 consisted of 90 pre-service social studies teachers (42females and 48 males). Those are selected as participants of this research because; it was thought that if researcher understood participants' perspectives in natural context and spent enough time with those participants in those context, they might feel confident while the researcher was capturing their views (Hatch, 2002). Although 135 people took the course, the questionnaire, given to them, was completed in full by 90 of pre-service social studies teachers and, those people created the research group.

2.2. Data Collection Tool

A data collection tool was developed based on qualitative means which included open-ended questions regarding the pre-service social studies teachers' views about netizenship. These questions were formed due to determine the pre-service social studies teachers' conceptions of netizenship and civic virtues. Those questions were as following:

- Which tools do you use to get information about citizenship issues?
- Which are the websites that you use to get information?
- Do you test the reliability of the websites that you use? How do you test it?
- Are there any websites that you are among members?
- Do you use websites to share your political ideas?
- What do you think about the role of technology hearing people from different parts of the society and the world?
- According to you, how do technological developments impact people's citizenship perceptions?
- How can you define the citizen of the 21st century?

This questionnaire designed to assess the subjects' opinions about netizenship and how technology effected their civic virtues. It was a qualitative questionnaire that included mostly open-ended questions. It consisted of both open and close ended items to extraxt the approaches of this group of pre-service social studies teachers. Open-ended questions were used due to provide qualitative data. Closed-ended questions were used in case to determine the websites they used. Closed-ended questions exposed all participants to the same response categories and allowed standardized quantitative statistical analysis. Questions were designed according to the literature reviewed. Five specialists' views were taken regarding the questions. Questions were redesigned according to these views. Questionnaire was applied to ten pre-service social studies teachers that began to same course in an other state university in Turkey, due to validity concerns. After participants of the pilot test completed the test, researcher discussed the questionnaire with them in a group session and explained the purpose of the questionnaire and, asked them whether they believed anything important was left out and whether the instructions were clear. Participants also commented on the appearence and clarity of it. Incomprehensible questions were taken out from the questionnaire and it revised according to both participants' and specialists' views.

2.3. Data Collection

Participants of the research took a citizenship course during their fourth term in their program of study. Before giving the questionaire, reseacher gave a general information about citizenship, new citizenships (like digital citizenship, global citizenship, environmental citizenship and netizenship), impacts of technology on citizenship and civic virtues. During the course, participants had opportunities to analyze and discuss citizenship and netizenship. In this course, author also asked pre-service teachers to some specific readings both about technology's effects on citizenship and the term of netizenship. These readings also gave the participants a chance to rethink about these issues. After that process, 90 pre-service social studies teachers answered the questions in the questionnaire. It administered to the subjects to take their opinions about netizenship.

2.4. Data Analyse

Quantitative data were analyzed through content analyze technique. The written data obtained from interview questions were read to obtain a general sense of the information and to reflect on its overall meaning. Notes and general thoughts about data were written in margins at this stage. Similar topics were clustered together. Detailed analyses were begun with coding process. In open coding process discrete elements in the data examined, named and categorized. During axial coding the researcher developed the concepts into categories. Topics were

abbreviated as codes and codes were written next to appropriate segments of the text. Most descriptive words were found for the topics and they were turned into categories. Categories were reduced by grouping topics that relate to each other. Lines were drawn between categories to show interrelationships. Member-checking was used to determine the accuracy of the findings. Figures were used to convey the findings of analysis.

3. FINDINGS

3. 1. Pre-service Social Studies Teachers' Information Resources on Citizenship

Table 1. Pre-service social studies teachers' Internet usage as first tool in gaining knowledge about citizenship

Internet		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	28	31,1	31,1	31,1
	1	62	68,9	68,9	100,0
	Total	90	100,0	100,0	

As we have seen in Table 1 68,9% of the participants used Internet in gaining knowledge about civic issues. They explained its' reason as it made possible to receive the information they need. Besides they mentioned their opinions towards Internet has developed quickly and speeded up processes of news dissemination. It bridges public and private spaces. They said that they shared their opinions about public issues and received information about current events. Acording to them, internet was the best and quick way that you could use to get knowledge about every issue. It closed the gap between the governed and those who govern and, increased the level of civic engagement.

31,1% of the participants used other resources for the aim of get information about civic issues. They specified those resources as television, newspapers, textbooks and books. It was noteworthy that books were ranked as last. Moreover, majority of the participants who sourced books refered e-books. That situation showed us the power of Internet ones again. It is also important that the majority of the participants of the research (82,4%) answered the question about the reliability check for resources they used as "*no*". They explained its' reason as they didn't need it. Besides, participants who answered that question as "yes" were stated that they checked reliability through other websites about any issue. They said that if any information was same in different websites they were sure that it was reliable. This bad attitude unfolds the need for media and technology literacy cources for pre-service teachers one again.

When data were analysed it was sen that majority of the participants (89,7) were just pasif users of the net. They said that in citizenship context they only use websites to get information but they didn't share with or give any information to other netizens. Only a minority explained that they were active members of some blogs about civic issues and they tired to inform people about current issues. Participants expressed their civic experiments at Internet as they joined some groups and blogs and, they learned current issues especially by Facebook. We have seen from Table 2 the importance of Facebook in their lives.

Table 2. Pre-service social studies teachers' usage of Facebook

Facebook		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	26	28,9	28,9	28,9
	1	64	71,1	71,1	100,0
	Total	90	100,0	100,0	

71,1% of the participants have Facebook accounts and they are active. 28,9% who stated that thet were not users also had accounts but they presented their case as "no" because they haven't use it actively. We have seen from their answers that Facebook became the main tool in communication and, it have shaped new spaces for interaction between people from different parts of the society. The have met together on Facebook and shared their ideas about issues. Comments were also effective on their opinions. They mentioned that other peoples' comments on issues had an impact on their views.

Facebook give allow them to present themselves, and establish or maintain connections with others. They use this site to interact with people both they already know and new people. They also join virtual groups base on common interests and learn something about each other. This process gives them a power which they haven't when they are off-line. Thus, partipants highlighted that power and its' value. They stated that they felt themselves more self-confident, valuable and important. They like the opportunity to have a say in governmental issues and feel themselves as a real member of the state although it is virtual indeed.

Participant also had Twitter accounts although to a lesser extent. We have seen it from Table 3 and their cases about Twitter were peresented as follow:

Table 3. Pre-service social studies teachers' usage of Twitter

Twitter		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	52	57,8	57,8	57,8
	1	38	42,2	42,2	100,0
	Total	90	100,0	100,0	

42,2% of the participants have Twitter accounts and they are active users of Twitter. As we have seen in Table 3 Twitter is less popular than Facebook among them. They stated its' reason as the general predominance of Facebook among people in the world. They believed that you could reach to less people via Twitter. Twitter's character limit showed as the inadequacy of it. Twitter users tweet about any topic within the 140-character limit and follow others to receive their tweets. Being a follower on Twitter means that the user receives all the messages from those the user follows. Besides, the retweet mechanism empowers users to spread information of their choice beyond the reach of the original tweet's followers. Politicians and governers use Twitter more than Facebook on the contrary of our participants. Especially in the weeks leading up to elections politicians communicate with the electorate and try to mobilize supporters, and some of them utilize it as an indicator of political opinion (Tumasjan and et.al, 2010). So, this finding can be interpreted as participants of this research are not good at netizenship and majority of them can't follow governers' ideas and opinions in real. And, we can say that they couldn't use the power of Twitter.
YouTube was also among information sources of the participants. We have seen it from Table 4 and their cases about YouTube were peresented as follow:

Table 4. Pre-service social studies teachers' usage of YouTube

YouTube		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	60	66,7	66,7	66,7
	1	30	33,3	33,3	100,0
	Total	90	100,0	100,0	

33,3 % of the participants of this research expressed that they used YouTube to get knowledge about civic issues. YouTube provided a public access platform that allowed them to upload, view and share video clips. It is one of the most well-known and widely discussed sites of participatory media in the contemporary online environment, and it is the first genuinely mass-popular platform for user-created video (Burges and Green, 2009). Except two participants they used it for the aim of downloading and watching videos. Just two pre-service social studies teachers reflected that they used YouTube to upload videos. They said that they sometimes upload videos about current events to share them with vast majority. It was a positive case in means of active and participatory citizenship even they shared videos about citizenship only one or two times. We can relate it to anyone with Internet access can watch YouTube videos but user registration is required to upload a video and,

we can evaluate this finding as our participants are passive users of YouTube and they just download and watch videos instead of upload and share.

4. 2. Pre-service Social Studies Teachers' Views about the Role of Internet on Society

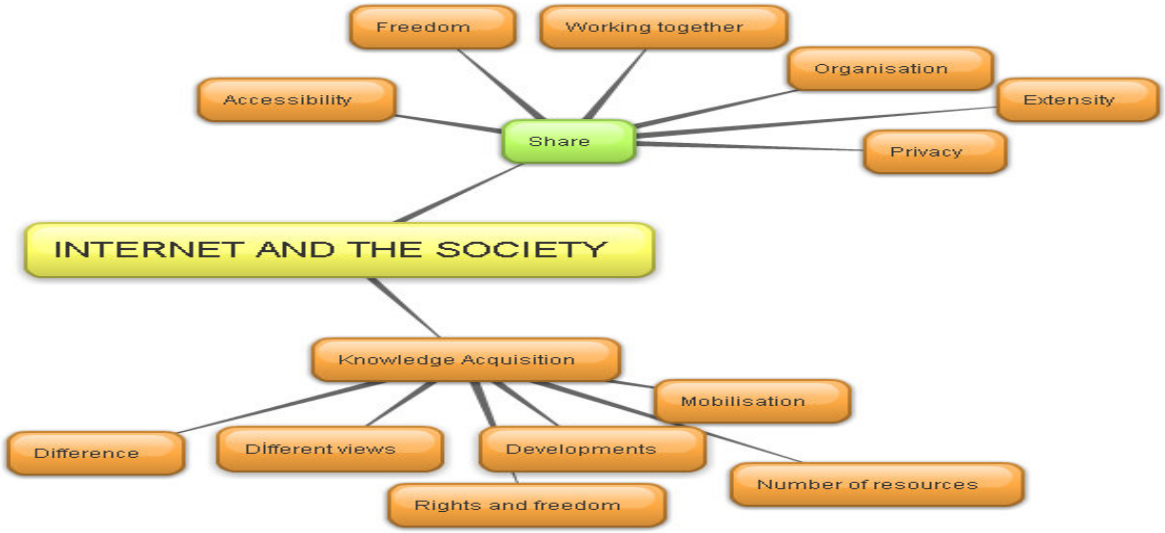

Figure 1. Codes and categories about Internet and the Society

In figure 1 codes and categories related with pre-service social studies teachers views' on the role of the Internet on society were presented. As shown in figure pre-service social studies teachers viewed the role of Internet within two categories as share and knowledge acquisition. It means that Internet is used for the aims of sharing and getting knowledge about society and public issues. It is clear that searching for information takes high priority in Internet time. It is also the duty of citizens to be informed participants. Majority of the participants mentioned that they used Internet to get knowledge because they met with different people and different views via Internet. It was the best and the easiest way for them in searching various issues because the content tends to be more diverse. Internet provided them opportunities for information, discussion, and mobilization of interest. They also got knowledge about current issues. While explaining their resources about public issues all of our participants stated that they read newspapers from net. Online news gave them the opportunity to be up to date. Especially those day this research was done, because of discussion about new constitution and its' content in Turkey and, Occupy Gezi in Taksim participants pointed out that they learned from social media and online news about the process. Besides majority of them expressed their views as they learned their rights and freedoms through columns and comments on Web. They explained the favorableness of Internet as they could reach to lots of resources with one click. Answers given by participants with codes 27, 69 and 82 supported those opinions as follows:

"According to me, today pc and the cell phones are becoming increasingly preferable than newspapers. People over the age of 45 read newspaper generally because their inability to use technological devices, however there is so many information and opinions in net, you can see all views from right wing to left wing and people can share their ideas without any difficulty. In newspapers and television programs information and opinions are according to the views of the general management." (P27)
"People learn many of their rights and responsibilities through net but citizens of this age are unaware of their rights and responsibilities, they live by chance. They don't do anything towards learning and investigating. They wait everything from others." (P69)
"Internet is our "outward opening door". We are informed about everything at the back of beyond". (P82)

It was seen from findings that they shared their opinions through e-mail, chat rooms and instant messaging. These varied opportunities enable them new forms of participation. Interpersonal and group discussions were also possible online and our participants thought that it was more heterogeneous with regard to race, gender and age. Net offers interactive opportunities for participation and political discussions. They clarified their preference on Internet with its' speed and feedback effects. They had opportunities to collaborate with people who they were inconsistent with them and to join organizations that reflect their opinions. Accessibility and freedom were other reasons that they use net to share their ideas. Internet mobilized their opinions and they reached all they need via Internet. Besides, according to them it is a chance for them to share opinions with fake accounts. They

thought that nobody can find you and judge because of your views. They said that all differences like race, gender, education disappeared. All things seemed them as possible in net environment. They also assumed that Internet allows ideas to circulate to a wide audience. It enhances offline relationships and provides a meeting place for people with common interests. According to our participants Internet promotes open discourses, allows for multiple perspectives and mobilizes collective actions in society.
Answers given by participants with code 11, 25, 73 and 74 supported those opinions as follows:
"Technology and especially net is very popular in our lives today. 90% of Turkish net users use Facebook. Besides, you can explain your ideas and feelings clearly with a fake account." (P11)
"... people can make the government heard their voices. With the access of Internet citizens can have more opportunities to speak out and be heard, so viewpoints become more diverse. Governments can no longer easily keep information from their people and this opportunity gives the power to citizens." (P25)
"Today people have protest through Facebook instead of open squares. They like or share something and protest some societal issues, so governments or other managing bodies are obliged to change their decisions. Politicians also exclude their voter blocs for youths. They address the concerns of young citizens." (P73)
"People can use Facebook to create political groups to express their opinions about one specific issue and invite others to join. It also provided candidates with an informal forum to express their opinions." (P74)

4. 3. Pre-service Social Studies Teachers' Views about Role of Technology Hearing People from Different Parts of the World

INTERNET AND THE WORLD

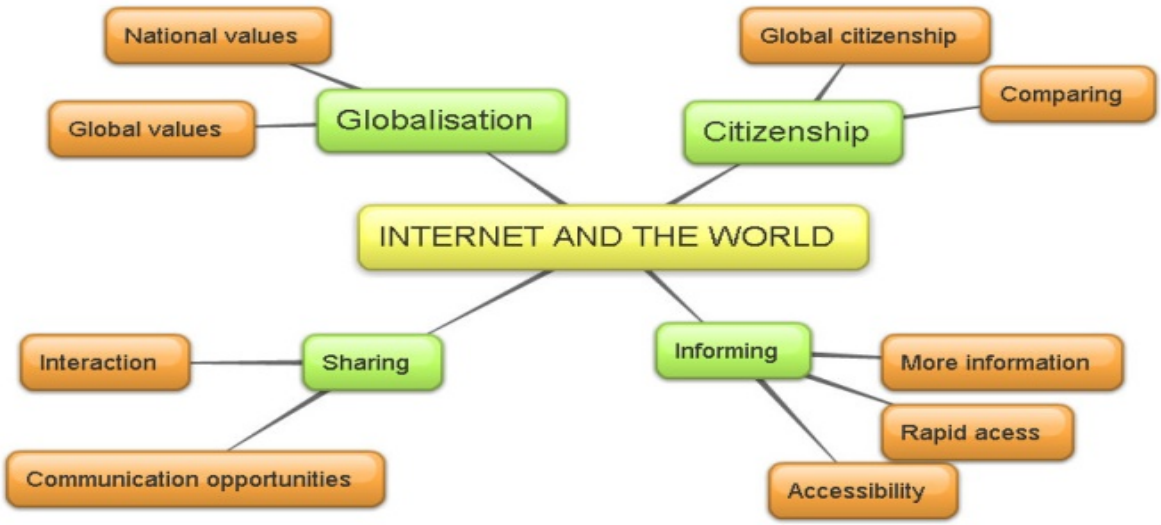

Figure 2. Codes and categories about Internet and the World

As shown in Figure 2, participants of this research analyzed the relationship between the Internet and the world in four categories. They explained their views on the role of the Internet on hearing people from different parts of the world in the context of globalization, citizenship, sharing and informing. They described the globalization in means of enhancing global values and decreasing national values. According to them it is a danger for national states and citizenship. They were aware of the dangers of the extreme nationalism and racisms but they don't want to lose their national identity and values. They were keenly interested in global issues and they said all citizens have to interest in them. However, they especially highlighted national issues and pointed national identities' importance out. They thought that even netizenship is related with globalization, any netizen don't forget their national roots.

Answer given by participant with codes 45 supported those opinions as follows:
"*Bond of national citizenship is in danger of collapsing, because netizens get everything they need, they have connections with other nations and other netizens. They are more informed and well-supported than previous citizens but they don't use their capabilities for their nationhood."* (P45)

Participants of this research explained the citizenship category in the context of global citizenship and comparing themes. They agreed that netizenship is same with global citizenship. Pre-service social studies teachers said that there was no limit on web and there was a global community from different parts of the world. You can

communicate, interact, collaborate and share something with people who you really don't know in real world. According to them, netizenship requires to be think more globally even you make your decisions about your country. In terms of comparing, participants mentioned their comparisons between Turkey and the other countries. They expressed that they acquired the opportunity to get information about other countries, governments, their practices, rules, constitutions, policies, what people do in other countries in civic issues and how they participate in the management process of their country. They explained their desires to know about issues like differences in wealth and poverty, child labor, health, religion and language. Besides, current global events were seen as important by our participants in the content of netizenship.

Pre-service social studies teachers also explained their views in the context of sharing. It means for them to interact with any others in the world and communicate with them. They said it was chance for them to share the governmental issues with people from other countries and see their comments about those issues. They also mentioned the importance of those sharing for demands on social justice and accountable governance.

Informing is the other theme that pre-service social studies teachers' mentioned in the context of netizenship and the relationship between Internet and the world. They supported their views as Internet has become a new tool and venue for all political groups. They use it to organize their supporters for online lobbying. People who have e-mail accounts have opportunity to join their activities. Thus, the participants believed that netizens are more informed about political issues and views of different groups. Besides, they explained their views as all netizens can inform others about their opinions and they can try to reach them. Impressing an idea on someone is easier than before although netizens have the opportunity to know about various opinions and ideologies. They thought that netizens are confused because of information overload and this makes imposition easier.

The last category of this section is sharing. Pre-service social studies teachers mentioned interaction and communication opportunities with the term of sharing. They thought that netizens have the opportunity to meet with the citizens of various countries and it is a big chance for them to share their views and events in their countries. They highlighted the importance of this case when they expressed the power of netizenship. One participant (P41) stated her views about this power as "*if you are a citizen it is just about one country and you have a power in one country, but if you are a netizen all of world is on your hands*." Besides it was understood from their explanations that pre-service social studies teachers were in contact with other netizens from other countries and they discussed political and civic issues together with them. We have seen that they used Facebook and Twitter in this process. So, the expansion of information in cyberspace has resulted in growth of knowledge networks that provide space of transnational and transcultural interaction.

4. 4. Pre-service Social Studies Teachers' Views about Technological Developments' Effects on People's Ctizenship Perceptions

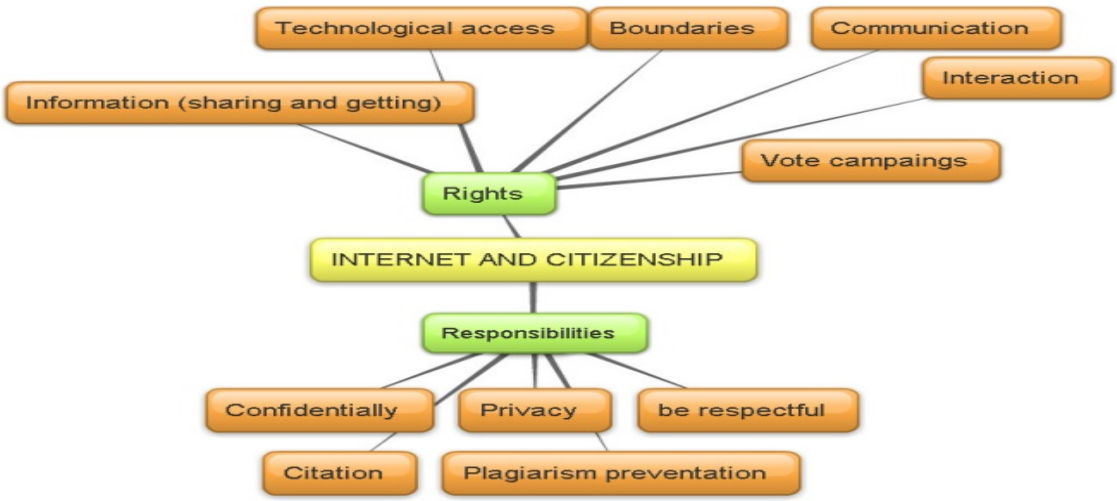

Figure 3. Codes and categories about Internet and the citizenship

As seen in Figure 3, pre-service social studies teachers explained their views on the relationship between Internet and citizenship in two categories. They asserted their rights and responsibilities as netizens. As we have seen in figure above they specified their rights as *get and share information, technological access, remove the*

boundaries, unlimited communication and interaction and give a voice in vote campaigns. Besides, they figured out their responbilities as netizens in terms of *confidentially, privacy, being respectfull, citation and plagiarism prevention*.

Participants mentioned that their first right as a netizen was getting and sharing information through Net. Here, access is not only right to have the tools, but it is also about the ways. It means socio-economic and cultural equility, and socio-economic inequlities makes people's engagement and participation levels different. They thought that Internet enabled a platform for freedom of expression and all governments had to offer and protect that freedom. According to participants there wouldn't be boundaries between netizens of various countrries. All people have to voice their opinions about political issues and, any government should respect and not intrude to this. They want unlimited communication and interaction opportunities. Netizens are parts of the vote campaigns. Candidates try to reach to them via net and especially through social networks. Starting form this, participants of the research mentioned their demands towards participate in elections and rulemaking processes directly via Internet. They have seen it essential for netizenship and specified it as a main item of net constitution. Net constitution is refered by them in the context of netizenship and they mean a constitution which is consisted in rules of a cyber government. They defined this governments as an international and supranational government that must function for all people in the world. Education, equality, information, participation, privacy and security were also emphasised by participants of this research. As we can see, they are not new but mention of old rights in a new manner.

They suggested the responsibility to netizens to be part of collectives. Besides, they specified other responsibilities like confidentially, privacy, being respectfull, citation and plagiarism prevention. Pre-service social studies teachers stated that netizens must share realiable and valid information. It is among their responsibilities to prevent the misinformation and provide a safe Internet environment. They said that netizenship is similar with citizenship in the context of responsibilities. Netizens have to obey the rules of Internet and they should not identify the freedom of cyberspace with lack of control. Besides, they thought that netizens must consider privacy issues. Privacy is in force in cyberspace like every part of our lives and netizens have to protect both their and others' privacy. They mentioned online shopping and social networks in this context. Participants stated that netizens should not share their personal information and be carefull when they were shopping. According to pre-service social studies teachers its' the responsibility of netizens to educate themselves about issues like hacking, online fraud, fake accounts and not to belive in all in cyberspace. Besides, they exemplified Facebook and Twitter accounts in the context of privacy and said that people shared all things about themselves through their social network accounts. According to our participants, it is netizens' task to discern general information from special issues. They must be carefull when they share photos and information about their lives. They also respect for others' privacy and should not interested in private lives. Participants of this research also referred to the importance of citation and plagiarism. They though that netizens have not to buy unlegal products and they have to consider copyright and patent rights' of the producers.

4. 5. Pre-service Social Studies Teachers' Views about Citizenship Sense in 21st Century

Figure 4. Codes and categories about the citizenship sense

Pre-service social studies teachers defined citizens of 21st century as "*problem solver, ciritical, free, participant, curious, objective, productive*" but "*individualistic, senseless, enjoyer, consumer, selfish, extreme and unaware*". We understood from those that their views about this issue were ensued both in positive and negative aspects. They thought that using the Internet means being alone. It diverts people from true community. Although, using the Internet generally means communicating and interacting with someone they stated their views as the time with others in real environment decreases. They said that this situation causes to asocialisation of individuals and increases their individuality sense. Acording to them people of 21st centruy use Internet both in their homes and workplaces, spend and manage money online, engage with public issues and fulfill citizenship duties on web environment and use email to enhance social relationships. They suggested that there has been a move from social communities to individualized comunities. Although people become more aware of each other, they also become more familiar with them and their concerns become ordinary rather than issues required to be consider.
Our participants also expressed their opinions as most people in todays' world live their lives in multiple communities and they drawed attention to dangers for national culture and identity. They thought that people no longer live in national boundries and together with globalisation national cultures and identities have became get lose. In the context of citizenship they said that young generation is unaware of national values and they have became a lost generation in means of national identity. According to them e-mail, cell phones and cars sustain ties among citizens instead of national values. They thought that netizens of this age cared about themselves rather than societal issues and, they are just active if any societal issue interest themselves. Internet is a place where people go to escape, take another identity and to be free.

Majority of the participants thought that Internet creates a digital divide among people because even majority of the population use the Internet, many don't make skilled or regular use of it. Besides, low-income users may discontinue most often because they lose the infrastructure that supports their usage.

However, participants of this research also mentioned the positive sides of netizenship during their statements. They thought that today people are more critical and problem solver than before because of the information flow. They have opportunity to access information easily and see different aspects of every event. This gives them the chance to be more critical and problem solver. This also makes them more objective. Besides, according to the participants people encounter with many problems both in national and global manner and it oblige them to solve those problems. And, technology makes them more creative, because of its' applications their usage are required to be creative. In addition, they thought that if any person wants to be survive in our technological world s/he would need to be creative. According to the participants, netizens are more curious than before because new technological developments increase their curiosity both about themselves and about the world they are living. Participants stated that netizens are more participant and productive. According to them, netizens participate in civic issues at least as online. They share their ideas and make comments on others' sharings. Internet makes citizen activism more easier and effective.

Answers given by participants with code 8, 11, 37 and 86 supported those opinions as follows:
"Citizens of new generation have antisocial behaviors. They know how they assert their rights and how they share their voices but, they do it just for themselves. Individualism is very popular among them. They are extremely senseless, devoid of national culture and traditions, and they look out for themselves instead of their nations". (P8)
"They only speak without doing something, we call them as free citizens but it is a dead freedom. People believe in all new in net they react to them." (P11)
"Access to Internet technology is unequal; it is at best yet another index of inequality and, at worst, yet another impediment to equal rights of all individuals in a democracy." (P37)
"Internet supports anonymity, for most users criminal activities such as hacking and piracy conduce to inhibition and disengagement." (P86)

5. DISCUSSION

People use Internet to deal with both their individual lives and civic issues not only in advanced societies but in most of the world. They are spending more time online and doing more types of things and, online interactions and possibilities affect whole community (Wellman and Haythornthwaite, 2002). Thus, it is time for researchers to to engage into new network society and analyse different aspects of it and, this research was done due to analyse netizenship perceptions of pre-service social studies teachers. Pre-service social studies teachers were our participants because of their subjects' importance in citizenship education.

The analysis showed us that the pre-service social studies teachers' views about netizenship were focused on technological common-wealth as fundamental to the exercise of policy, identity and the actualisation of humanity. Besides, they concerned about this kind of citizenship and thought that it might narrow citizenship by

organising rights through access to technology. Findings showed that our participants are more likely express their ideas in politics and government on Web.

We have seen from their answers that Facebook and Twitter became the main tool in communication. Participants use them to interact with people both they already know and new people. It gives them the power of reaching to governmental bodies and other citizens. They have opportunity to meet with people and to get information about their views and practices. According to Hirschorn (2007), "In early 2004 Facebook was started by Mark Zuckerberg, to digitize the legendary (Harvard) freshman-year 'facebook,' and allow students not only to gawk at one another's photos but also interact" (cited in Roblyer and et.al., 2010). Later, the Facebook phenomenon spread like wildfire when opened up to all college students. And, in 2005 Facebook opened its doors to people outside the university network. In our research it was seen that the most famous online network among our participants was Facebook. It may be interpreted as they use it because of its' popularity among young people. However, we can also say that they miss the power of Twitter in civic issues because politicians, writers, artists and other people who can influence people about political issues use Twitter generally. People belive that the rate at which messages are retweeted indicates whether information is considered being interesting. In 2009, after the election in Iran, cries of protest from supporters of opposition candidate Mir-Hossein Mousavi arose in all possible media, but the loudest cries were heard in a medium that didn't even exist the last time Iran had an election. This makes Twitter practically ideal for a mass protest movement, both very easy for the average citizen to use and very hard for any central authority to control (Time in partnership with CNN, 2009). We also see same case in Turkey, 2013 Occupy Gezi.

MySpace and YouTube have affected election campaigns in simple, but significant, ways. They have created benefits such as increasing the potential for candidate exposure at a low cost or no cost, providing lesser known candidates with a viable outlet to divulge their message, and allowing campaigns to raise contributions and recruit volunteers online (Gueorguieva, 2008). However, except two participants of this research use YouTube for the aim of downloading and watching videos but not for the aim of sharing.

The findings summarized above are showed us the impact of Internet and online news on civic issues in Turkey. While explaining their resources about public issues all of our participants stated that they read newspapers from net. Online news gave them the opportunity to be up to date. Especially those day this research was done, because of discussion about new constitution and its' content and, Occupy Gezi in Turkey, participants pointed out that they learned from online news about the process. Besides majority of them expressed their views as they learned their rights and freedoms through columns and comments on Web. It gave them new roles both as producers and actors in the news. Thus, citizens and government officials would be perfectly informed about each other via the press (Hermes, 2006). Pre-service social studies teachers also mentioned the importance of Internet and social media in voting process. The successful use of social media in the US presidential campaign of Barack Obama has established Twitter, Facebook, MySpace, and other social media as integral parts of the political campaign toolbox. Some analysts attribute Obama's victory to a large extent to his online strategy (Tumasjan and et.al, 2010).

The relationship between Netizens and states needs to be understood in the context of modes of governance that involve the complex networking among Netizen groups, commercial providers, governments and international institutions Within territorial boundaries it can enable communication and solidarity space for minorities and social movements, whether progressive or reactionary. Yet, cyberspace also supports trans-border identities and students, migrants, refugees living in global diasporas all over the world can use the internet to connect with others who share their identity (Paliwala, 2013). Social protests also comes to depend on networking capability on the Internet. People also form social relationships through Internet instead of face-to-face sociability.

People also learn about the world via net. Participants explained their views on the role of the Internet on hearing people from different parts of the world in the context of globalization, citizenship, sharing and informing. They described the globalization in means of enhancing global values and decreasing national values. According to them it is a danger for national states and citizenship. They were aware of the dangers of the extreme nationalism and racisms but they don't want to lose their national identity and values. They were keenly interested in global issues and they said all citizens have to interest in them. However, they especially highlighted national issues and pointed national identities' importance out. They also asserted their rights and responsibilities as netizens. They specified their rights as get and share information, technological access, remove the boundaries, unlimited communication and interaction and give a voice in vote campaigns. Besides, they figured out their responbilities as netizens in terms of confidentially, privacy, being respectfull, citation and plagiarism prevention.

Pre-service social studies teachers defined citizens of 21st century as "*problem solver, ciritical, free, participant, curious, objective, productive*" but "*individualistic, senseless, enjoyer, consumer, selfish, extreme and unaware*".

They thought that using the Internet means being alone. It diverts people from true community. They suggested that there has been a move from social communities to individualized comunities. Although people become more aware of each other, they also become more familiar with them and their concerns become ordinary rather than issues required to be consider.

In conclusion it can be said that pre-service social studies teachers thought that people are not only citizens but they also netizens of our technological world. Their views about this issues show us the need for teaching netizenship in civic cources and form a general framework for it. We must also determine a policy for netizenship and inform people about accurate usage of Internet.

According to a pool which was done in 2012 April in Turkey 47,2% of the population had Internet access at home (Research on Households' Usage of Information Technologies, 2012). This percentage is 55,5% in cities while 27,3% in rural areas. Internet access ratio is over than the Turkeys' average in districts like Marmara, Central Anatolia and West Anatolia. 59% of the males between 16 to 74 use computer and Internet while 38%5 of the females use them. We can call this people as netizens of Turkey and as it is understood from numbers that Internet has become the routine appliance of our country. So, there is need to research on netizenship in Turkey like the requisitiness in other countries of the world and Internet creates a need to understand and prepare for its impact.

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PRESERVICE TEACHERS' VIEWS ABOUT E-BOOK AND THEIR LEVELS OF USE OF E-BOOKS

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ABSTRACT
Currently, using technological tools in education has made it compulsory to learn about these tools. For preservice teachers, who are students at education faculties at universities, it seems very important that they make use of these tools in their professional lives and teach them to their pupils. The teaching materials designed and prepared in digital environments introduced the concept of e-books. The purpose of this study was to determine the views of preservice teacher about e-books and the level of their general knowledge about these kinds of technological tools. The subjects in this study consisted of 543 (310 females and 233 males) students. In line with the purpose of this study, both qualitative and quantitative methods were applied. The results demonstrated that the use of e-books increased in accordance with the students' levels. It was found out that the general knowledge levels of the social sciences students about e-books were lower when compared to the students from the departments of Science, Mathematics and Foreign Languages. It was seen that 19,15% of the students did not make any preference between e-books and conventional printed books while 54,88% of them preferred printed books and 25,97% them e-books.
Keywords: e-books, reading books, digital printing, e-book readers.

INTRODUCTION

Rapid developments in information and related technologies have influenced education. Printed books and materials are regarded as an indispensable component of education. Both delivering these materials to students and helping them use these materials as valuable resources are considered to supplement learning. Although printed books and materials are currently favored, the demand for e-books is increasing gradually in line with the prevailing use of the Internet. E-books decrease the cost for both the authors and publishers by saving space and time, and since it is easily accessible for the users, it is a new technology for us (Önder, 2011. p. 97).

Widespread use of computers and the Internet has also given rise to software development. Parallel to this, transferring books into the digital environment resulted in the birth of e-books. However, so far, there have been various responses to such questions as what e-book is and what the elements of e-books are. In a study evaluating e–book and digital broadcasting throughout the world, Önder (2010) defined e-book "as a digitalized form of some or all printed books or as one produced completely in the digital environment, which can be viewed and accessed on any portable device like computers or specially designed e-book readers". Furthermore, it is a software-based electronic form with its rich text features (including bookmarker, highlighting, focusing and so on) that allow all the functions of conventional book reading. In a different definition, it is stated that e-books are a combination of software and hardware allowing texts to be designed in electronic environments or texts in the formats of doc, txt and pdf, which can be viewed with other devices besides computers (Morgan, 1999: 36; Cliff & Dearnley 2003; Vidana 2003; Lam & Ark., 2009). As the early e-books were beyond meeting the needs of e-book readers, current devices are now more user-friendly, which has led to the spread of these devices with the developments in technology. Companies interested in these products have integrated the features of e-book devices and those of computers and initiated the production of tablet computers. These kinds of initiations facilitated the use of e-books on portable devices like mobile phones, PDA and tablet computers (Wilson, 2003; Moore, 2009).

Countries experienced in information technologies, especially with the spread of e-books technology, have started to produce convenient hardware and software for e-books (Önder, 2010. p.9). In order to improve e-book devices and to solve the problems experienced by e-book readers, feedback provided by e-book readers was taken into consideration. One of the main problems users mentioned was the illumination of the screen that especially hindered reading in dim light, and another problem was experienced by older readers who complained of small fonts causing eye fatigue. On other hand, headaches and pain in the neck were among the most common complaints of traditional book readers. Newly-developed e-books try to overcome these shortcomings to make reading easier. In user and product development surveys conducted by producer companies in recent years, it has been noticed that they mainly focus on solving the problems reported by users. The new retail products provide comfortable reading experience by trying to overcome the drawbacks of the traditional book readers by using led illumination at the background of the screen and adding font resizing functions for people with eyestrain problems (Segenthaler, Wurtz & Groner, 2010).

E-book Development and Its Advantages and Disadvantages

Books are defined as written texts used by humans for centuries (Bağtuş, 2007). These written texts first were carved on stones, then on animal leathers, later on paper made of wood, and now in digital environments. In this way, printing environments have developed in accordance with technological improvements. Technological improvements and an investigation of e-books and its future issues were first discussed by Alan Key's book "Dynabook" (Rukancı & Anameriç, 2003). In the following years, e-books created based on projects to maintain and preserve the books in libraries have increased its popularity since they are easily accessible and portable, which has also eliminated storage problems as well (Barnard, 1999; Morgen 1999). The first website to sell e-books on the internet was "BiblinBytes", which started to serve in 1993 (Anameriç & Rukancı, 2003). Parallel to these developments, the e-book titled "The Best Laid Plans" published by Publishing sold more than 6000 in 1999 (Hawkins, 2000: p.25). Despite this rapid development, it was seen that e-book readers were on the markets only after the year 1998 (Jan, 2009). Many texts prepared in digital environment can be read on specially designed devices. Sony Company dominated the e-book reader market by producing its first reader "eInk" in 2006, later the "Kindle", and "Kindle 2" in 2009 (Yıldırım et.al., 2011).

As these types of environments became popular and preferable by many, it led to discussions on its advantages and disadvantages. One of the main advantages is that it allows storing hundreds of books on a flash disk (Wittmann, 2000). Considering that students have to carry loads of books to school every day, it seems that it brings along a very profitable advantage (Poftak, 2001). In studies conducted, it was reported that carrying heavy school bags at early ages causes waist and joint disorders in the years ahead (Demirci et.al., 2012). Another important advantage of e-books is that it helps save a great deal of paper use (Rukancı & Anameriç, 2003). Both digitalizing books and storing them in digital environments help avoid cutting trees, which are the most crucial elements of national wealth. Proliferation of this technology may provide publishers with the opportunity to consider publishing books by unknown writers as well because publishing books in this way would minimize the costs (Day, 2001). Thus, the problem of delivering the printed books to large masses of readers could be eliminated. Preserving and exhibiting books for many years will be easier, and accordingly costs will be reduced (Palmer & Donaldson, 2001). Besides, since it allows changing the font of the written material, people with eye disorders are now able to read the texts more easily and comfortably (Day, 2001). In addition to this, with proper background illumination features of e-book devices, it is possible to read in dark and dim environments as well (Rukancı & Anameriç, 2003).

Besides these advantages, one of the distinct disadvantages of e-book devices is the complaints of readers who suffer from severe headaches and eyestrain because of using e-book devices with low screen resolution sold in the markets (Herring, 2001). Since e-book devices have security gaps, technology users with bad intentions are likely to distribute these devices free of charge (Palmer & Donaldson, 2001). As there are various types and brands of e-book devices in the market and because there is no standardization in e-book formats, it is a must for people to know the format of e-books supported by e-book devices (Rukancı & Anameriç, 2003).

This technology, which could change traditional reading habits radically, should be supported and improved. In the project supported by the Ministry of Education in Turkey, the goal is to make both students and teachers use this technology. Teachers' knowledge level and approach to e-book devices may influence transferring knowledge to their students regarding the use of e-books. Unfortunately, most teachers who experience difficulties and adaptation problems with technological devices get acquainted with them in the schools they are employed rather than during their school years at university (Yalman, 2013; Yalman ve Tunga, 2013). Therefore, it is important to determine the degree to which this technology is adopted and used by preservice teachers.

METHOD

Qualitative and quantitative research methods were applied in this study. To collect the qualitative data, the students were given a survey on e-books. In order to gather the quantitative data, the responses to the survey were evaluated, and the students were interviewed based on their responses.

Research Model

In order to determine the views of preservice teachers about e-books, a descriptive relational survey model was used in the study. The purpose of the present study was to determine students' level of knowledge about e-books, their preferences of traditional printed books and e-books and their views about e-books and to examine the related correlations based on the results with respect certain variables. After evaluating the survey results, in each part of the study, seven students who continued their education were interviewed, and their views were involved in the research results.

Sample

This study was carried out with university students who attended different departments such as Science Teaching, Mathematics Teaching, Pre-school Teaching, English Language Teaching, French Language Teaching and Teaching Religious and Ethical Issues in the Fall and Spring Terms of the academic year of 2012-2013. In the study, the method of "Simple Random Sampling", one of probability sampling methods, was used. In simple random sampling method, each member of a group has an equal possibility to be selected. The research sample to be included in the study was selected on random basis from a list (Çepni, 2010: 46). The research sample consisted of 543 students from different departments of the education faculty. Table 1 below presents information about the departments, classes and genders of the preservice teachers who participated in this study and responded to the questions in the survey.

Table 1: Demographical Backgrounds of the Participants

Variable	Property	f	%
Sex	Female	310	57,09
	Male	233	42,91
Class	Freshmen	333	61,33
	Sophomore	150	27,62
	Junior	57	10,50
	Senior	3	0,55
Deparman	Primary School Teaching	170	31,31
	Science Teaching	92	16,95
	Pre-school Teaching	52	9,58
	French Language Teaching	32	5,89
	English Language Teaching	68	12,52
	Primary School Mathematics Teaching	73	13,44
	Teaching Religious and Ethical Issues	56	10,31
Total		543	100,0

As can be seen in Table 1, 57,09 % of the participants were female, and 42,91% of them were male. With respect to their class distribution, 333 participants were freshmen (61,33%), 150 were sophomore (27,62%), 57 were junior (10, 50%), and three of them were senior students (0,55%). The distribution of the students in terms of their department was as follows: 31,31% of the participants were from Primary School Teaching departman; 16,95% from Science Teaching; 9,58% from Pre-school Teaching; 5,89% from French Language Teaching, 12,52% from English Language Teaching; 13,44% from Primary School Mathematics Teaching; and 10,31% from Teaching Religious and Ethical Issues.

Data Collection Tools

The demographical backgrounds and general knowledge levels of the students were determined via a survey. The survey was made up of two parts. In the first part, there were three items regarding their personal characteristics, and the second part included eight items questioning their views about e-book. The survey questions were prepared under the supervision of experts and piloted on 68 university students. The questions with an irrelevant and confusing content were excluded. After analyzing the data obtained, 49 students were interviewed in relation to their responses to the questions to determine their views about e-books. Different from scales, it is not possible at all to talk about a total score for surveys. Thus, from a technical point of view, it is not possible to discuss about the reliability and validity as in scales. Since the measurement tool used in the present study was a survey, reliability analysis was not performed.

Data Analysis

After administering the survey, the data collected were transferred into computer software. Percentage (%) and frequency (f) techniques were used to describe the data obtained.

FINDINGS

The data obtained in this study, which aimed at determining the students' general knowledge and views about e-books at the education faculty, are illustrated in tables below. Table 2 presents the data regarding whether the students made use of e-books for their lessons with respect to the variable of class-grade.

Table 2: Percentage and frequency distribution of the preservice teachers' use of e-books via the internet

Class	E-book benefit		E-books do not benefit		Total
	f	%	F	%	
Freshmen	53	15,92	280	84,08	333
Sophomore	30	20,00	120	80,00	150
Junior	17	29,82	40	70,18	57
Senior	2	66,67	1	33,33	3

As can be seen in Table 2, 15,92 % of freshmen, 20% of sophomores, 29% of junior, and 66,67% of the senior students made use of e-books. The students' responses to the question of "What is e-book?" are given in Table 3 below with respect to their departments.

Table 3: Percentage and frequency distribution of the students' responses to the question of "What is e-book?" with respect to their departments

Departments	Correct Answers		Wrong Answers	
	F	%	F	%
Primary School Teaching	89	20,51	81	74,31
Science Teaching	88	20,28	4	3,67
Pre-school Teaching	44	10,14	8	7,34
French Language Teaching	30	6,91	2	1,83
English Language Teaching	64	14,75	4	3,67
Primary School Mathematics Teaching	67	15,44	6	5,50
Teaching Religious and Ethical Issues	52	11,98	4	3,67
Total	434	100	109	100,0

As can be seen from Table 3 above, 434 students answered the question correctly, whereas 109 students gave wrong answers. With respect to the students' departments, their correct answers were as follows: 20, 51% (89 students) for Primary School Teaching; 20,28% (88 students) for Science Teaching; 10,14% (44 students) for Pre-school Teaching; 6,91 (30 students) for French Language Teaching; 14,75% (64 students) for English Language Teaching; 15,44% (67 students) for Primary School Mathematics Teaching; and 11,98% (52 Students) for Teaching Religious and Ethical Issues. Likewise, the distribution of the wrong answers in terms of the students' departments was as follows: 74,31% (81 students) for Primary School Teaching; 3,67% (4 students) for Science Teaching; 7,34% (8 students) for Pre-school Teaching; 1,83 (2 students) for French Language Teaching; 3,67% (4 students) for English Language Teaching; 5,50% (6 students) for Primary School Mathematics Teaching; and 3,67% (4 Students) for Teaching Religious and Ethical Issues.

Table 4: Frequency and Percentage Distribution of the students' responses to the question of "What is e-book?"

What is e-book?	n	%
I don't know	138	25,41
Electronic book	100	18,42
A book written and read on a computer	121	22,28
Virtual book	29	5,34
Books on the Internet	137	25,23
Touchscreen book	3	0,55
Technological, electronic tool	7	1,29
Portable device with screen	3	0,55
Devices for studying	5	0,92
TOTAL	543	100

The results obtained via the preservice teachers' responses analyzed in categories revealed that 25,41% of the students did not know what e-book is; 18,42% reported it to be a book written in an electronic environment; 22,28% considered it to be a book written and read on a computer; 5,43% regarded it as a virtual book; 25,23% said it is a book composed of texts on the Internet; 0,55% referred to it as a digitally designed book with

touchscreen; 1,29% said it is a technological and electronic tool; 0,55% thought it is a portable tool with a screen; and 0,92% defined it as a tool for studying.

Table 5: Frequency and Percentage Distribution of the students' responses to the question of "Where can you buy e-book from?"

Where can you buy e-book from?	n	%
I don't know	213	39,23
Via the computer	19	3,50
Via the Internet and web stores	250	46,04
Technology Stores	21	3,87
Provided by Ministry of National Education and Government	21	3,87
Bookstores	7	1,29
Download Websites	9	1,66
Schools	3	0,55
TOTAL	543	100

As can be seen in Table 5 above, 39,23% of the students did not know where to buy e-books from; 3,50% think they could buy it via the computer; 46,04% said they could buy it via the internet and web stores; 3,87% reported that they could find it in technology stores; 3,87% stated that the Ministry of National Education provided e-books; 1,29% said e-books were available in bookstores; 1,66% stated they could reach e-books from download websites; and 0,55% said that school administration could provide e-books.

Table 6: Frequency and Percentage Distribution of the students' responses to the question of "What are the formats of e-books?"

What are the formats of e-books?	n	%
I don't know	387	71,27
Pdf	84	15,47
doc, xls, ppt	57	10,50
Computer and webpages	6	1,10
html, mp3	3	0,55
Google and Mozilla	3	0,55
Facebook and Internet	3	0,55
TOTAL	543	100

The results obtained revealed that 71,27 % of the students did not know anything about e-book formats; 15,47% of them said pdf; 10,50 % said doc, xls, and ppt; 1,10 % of them said computer and webpage formats; 0,55% of them said html and mp3 formats; 0,55 % of them said Google and Mozilla file formats; and 0,55% of them said the file formats avilabile on Facebook and Internet.

Table 7: Frequency and Percentage Distribution of the Students' Preferences of Traditional Printed books and E-books

Preferences	F	%
E-Book	141	25,97
Traditional Printed Books	298	54,88
No preference	104	19,15
TOTAL	543	100

As can be seen in Table 7, 54,88% of the students preferred traditional printed books; 25,97% of them favored e-books; and 19,15% of them did not express any preference because of being indecisive. The results obtained via

the data collected from the preservice teachers' reasons for their preferences are presented in Tables 8 and 9 below.

Table 8: Frequency and Percentage Distribution of the Students' Reasons for Their Preference of E-book

Why E-book?	n	%
I don't know; I never thought about it	35	24,82
Easy, practical and fast	18	12,77
Fast and rapid access	25	17,73
Technological and up-to-date	14	9,93
Detailed, more choices, and it includes summaries	18	12,77
User friendly, visual and touch-operated	18	12,77
Useful and no waste of paper	2	1,42
Easy to carry (portable)	10	7,09
Cheaper	1	0,71
TOTAL	141	100,00

The analysis of the students' responses regarding the reasons for their preference of e-book revealed that 24,82% of the students did not know the reason or think about it; 12,77% said it was practical and easy to use; 17,73% reported it was easy to access the desired e-book on the Internet; 9,93% expressed that it was a new technological tool and easy to update; 12,77% said it not only included summaries but also provided details various options; and 12,77% said that it was user-friendly and visually more attractive and that they liked its touchscreen feature. In addition, 9,09% of the students stated that it was easier to carry compared to printed books; 1,42% said it was more useful as it helps avoid paper consumption; and 0,71% preferred e-books because of its low cost.

Table 9: Frequency and Percentage Distribution of the Students' reasons for their preference of Printed Books.

Why printed books?	n	%
I don't know; I never thought about it	77	25,84
Healthier, causes less eyestrain	33	11,07
Natural and traditional	20	6,71
I want to feel it	40	13,42
Long lasting, permanent	22	7,38
Habit	15	5,03
Enjoyable and nice	15	5,03
Easy to understand and use	15	5,03
I am bored of technological devices	13	4,36
I can always carry it with me	11	3,69
Easy to access	14	4,70
Better to concentrate	6	2,01
Printed; and respect to the author	10	3,36
Cheaper and more options	7	2,35
TOTAL	298	100

Regarding the reasons for preferring printed books, the results were illustrated in categories. As can be seen in Table 9, 25,84% of the students did not have any specific reason, yet they stated that they still preferred printed books. Moreover, 11, 07% of the preservice teachers preferred printed books because they were healthier and less eye-straining. Also, 6,7% of them considered it to be natural and valued traditional aspects, while 7,38% thought that they were easy to save permanently. Furthermore, 5,03% of the preservice teachers preferred printed books since they were more enjoyable to read, easy to use and more comprehensive. Additionally, 4,36% said they were bored of using technological devices, and 3,69% stated that they could carry them anytime and anywhere. Also, 4,70% said it was easy to access printed books, and 2,01% reported that it was easier to read

and helped concentrate. In addition, 3,36% of the students preferred printed books because they respected the authors, and 2,35% said printed books were cheaper and provided a great number of options.

Table 10: Frequency and Percentage Distribution of the responses to the question of whether to prefer e-books or printed books with respect to the variable of gender

	Females		Males	
	f	%	f	%
e-book	86	33,73	55	29,73
Printed books	169	66,27	130	70,27
TOTAL	255	100	185	100

Regarding the variable of gender, 33,73% of the female students preferred e-books, while 66,27% preferred printed books. Likewise, 29,73% of the male students chose e-books, and 70,27% preferred printed books. In this study, about 82,26% of the females and 79,40% of the males made a preference.

Table 11: Frequency and Percentage Distribution of the responses to the question of "What are the cost-ranges of e-book devices?"

Group	n	%
I don't know	152	27,99
Cheap	46	8,47
Reasonable	206	37,94
Expensive	110	20,26
Very expensive	29	5,34
TOTAL	543	100

The responses of the preservice teachers to the question related to prices of e-book devices revealed that 27,99% did not have any idea; 8,47% said they were cheap; 37,94% said the prices were reasonable; 20,26% stated that they were expensive; and 5,34% believed that e-book devices were very expensive.

DISCUSSION

In this study, which aimed at determining the knowledge levels and views of preservice teachers about e-book technologies, 57,09% of the participants were female (310) and 42,91% of them were male (233). Similar responses to the survey were categorized. Thus, it was found out that 25,41% of the students did not have any idea about e-books. Regarding the categories generated depending on the responses, it was found out that the preservice teachers did not have a realistic and signicative idea/knowledge about e-books. After completing and analyzing the survey, the interviews held with students who defined e-books as books designed and written in an electronic environment revealed that the number of the students who defined electronic environment was not higher than ten and that they described all the written materials on the Internet as e-books.

It was also found out that use of e-books changed and increased depending on the class-grades of the students (Table 2). The interviews held with the students demonstrated that they downloaded e-books from the Internet and used them as supplementary materials for their lessons.

Table 3 below presents the results regarding the responses to the question of "What is e-book?" with respect to the departments of the participants. In general, the number of the students who answered the question correctly was 434, while 109 students neither made any comments nor gave answers. It was found out that the students from the department of Primary School Teaching did not make any comments regarding the question, and the number of these students was almost the same as the number of those students who answered the question correctly. Likewise, the second highest (7, 34%) number of nonresponsive students was of those from the department of Preschool Teaching. Except these two departments, the rates of nonresponsive students from the other departments were low and quite close to each other.

After compiling the responses of the students to the survey, it was not possible to make a meaningful definition of e-book, yet parts of their responses might be acceptable. In general, the preservice teachers defined e-book as

"a book which could be found on a virtual platform or on the Internet and which is designed and written in an electronic environment that could be read on a computer."

It was found out in the present study that the participants did not have a clear idea about where to buy e-books from. The results revealed that 39,23% of the students did not know where to buy e-books from, while 14,73% of them without having a clear opinion made a generalization and responded as "*on computer, from technology stores, Ministry of Education, bookstores, and from download websites*." However, it was seen that about 46,04% of the students said e-books could be purchased via the Internet from web stores.

Also, it was revealed that 71,27% of the preservice teachers stated they did not have any opinion about e-book formats. However, the percentage of the students who gave acceptable responses like "pdf, doc, xls, and ppt," was 25,97%.

According to the responses regarding the students' preferences between e-books and printed books, it was found out that 25,97% of the students preferred e-books and that 54,88% of them preferred printed books. The rate of the students who did not want to express any preference was 19,15%. The interviews held with these students demonstrated that they did not have any idea about e-books and therefore they did not make any preference.
When the students were asked to state their reasons for choosing e-books, it was seen that 24,82% of them said they did not know the reason or thought about it and that the rest gave responses like "easy, practical and fast, easy to obtain, up-to-date and technological, detailed and offers more options and includes summaries." Of all the students, only 7,09% of them stated that it was portable and it allowed storing hundreds of books thanks to its high memory feature (Mallet, 2010). Besides, only two students reported that it prevented paper consumption (Marshall& Ruotolo, 2002). Depending on the responses of the students, it could be concluded that the students were not properly introduced to environments like e-books. Furthermore, it found out that none of the students mentioned the multi-language support (Nathaniel, 2010) feature of e-books in their responses. The interviews held with the students from the department of English Language Teaching revealed that one of the students said "*As opposed to most of my friends, I feel myself lucky because I attended a private high school, and I had the opportunity to use computers and access the Internet throughout my high school years. Also, in terms of computer use and Internet access, I got support and help from my classmates and family. I believe that learning a language will be very helpful. However, I don't have any experience in using e-books. I don't believe that my classmates at university are not competent in using e-books. Since I thought that e-books are articles and publications downloaded from websites, I have never thought about its multi-language support feature. Actually, I have read books on my computer, and I thought that I need third-party software for this feature."* When the students were asked about whether they used or bought an e-book device, one of the students stated that "*Are you talking about tablets? Yes, I have used a tablet computer, but if you mean something different, I haven't used it. Why should I buy an e-book device with a single feature when there are tablets and computers with more features? That doesn't sound logical to me."* In his response, he tried to explain that he did not read an e-book on an original e-book device and that instead, he tried to use e-books, or other similar materials, on the computer. When the students were asked to state their reasons for choosing printed books, 25,84% of them said "*I don't know, I didn't think about it*,", and the rest of the students preferred printed books because they were "*healthier and less eye-straining, natural, traditional, permanent, more enjoyable, easy to comprehend."* According to the survey results, 4,70% of the students preferred printed books because it was easy for them to select such books, and 2,01% stated that printed books helped focus and concentrate better. Additionally, 4,36% of the participants said that they got bored of using technological devices. Three of these participants were interviewed and asked the reasons for their choice. During the interview, one of the preservice teachers said, "*To be honest, I prefer e-books because I believe that I can buy them on the Internet. Also, buying by credit cards and in installments is a good opportunity especially for students. But, these types of technological devices frighten me because I am afraid of making mistakes while using it. And I don't have any friend or anybody else who would help me out with the mistakes I may make. And that's why technological devices depress me."* However, although e-book devices are user-friendly (Pattuelli & Rabia, 2010), it might be beneficial to conduct research to investigate the techno-pedagogical approaches of students. Besides, only 3,69% of the participants chose printed books as they respected the authors and their work.

According to the variable of gender, it was seen that the rates were almost equal between males and females in terms of their preference of e-books and printed books. It was found out that 66,27% of females and 70,27% of males preferred printed books rather than e-books. The students' views about the prices of e-book devices were examined with a single question in the survey. It was seen that 27,99% did not express any view about the prices of e-book devices; that 37,94% of the participants thought that the prices were reasonable; and that 25,60% of them believed that the prices were very high. During the interview, one of the participants who defined the Internet as an environment to purchase e-books from said *"I, actually, don't know where to buy an e-book*

device. I came across with some e-books while I was searching for the books on the Internet I could find in bookstores. But, since they were written in a foreign language, they didn't attract my attention. I saw that the prices of these books are in dollars and high. I don't think that e-books have Turkish language support or I haven't come across one yet."

RESULTS AND IMPLICATIONS

It was seen in the present study that use of e-books among the participants did not go beyond using written digital materials and documents on the Internet. It was also found out that although the students knew that they were supposed to use e-books and related tools in future, they did not make any efforts to improve themselves or overcome their deficiencies. The students tended to use technological devices only when they had to and as much as they needed them. In addition, it was revealed that more than the half of the participants still preferred printed books. During the interviews held with the participants who did not make any preference and with those who chose printed books, it was found out that the reason for their choice was lack of knowledge about e-books.

Knowing about the deficiencies of students regarding the use of the Internet and computer, which provides great opportunities for seeking and processing information and knowledge, would be helpful to cope with related issues. Considering the fact that preservice teachers who will be employed in future at a school where they will have to use tablet computers and e-books, which is a project executed by the Ministry of education, it seems of great importance to determine their views as well as their levels of knowledge about this subject. Students' deficiencies determined could be overcome with lessons to be included in the curricula of university programs.

In order to overcome the deficiencies of students, a project could be prepared in which students are required to obtain e-books and e-book devices. The use of e-books can be supported by establishing e-libraries at universities. In this way, students may have the opportunity to obtain and use multiple resources.

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THE EFFECTS OF COLLABORATIVE WRITING ACTIVITY USING GOOGLE DOCS ON STUDENTS' WRITING ABILITIES

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ABSTRACT
Google Docs, a free web-based version of Microsoft Word, offers collaborative features which can be used to facilitate collaborative writing in a foreign language classroom. The current study compared writing abilities of students who collaborated on writing assignments using Google Docs with those working in groups in a face-to-face classroom. The experimental research was conducted with students enrolled in EN 012 course in the first semester of academic year of 2013. Both groups were assigned to complete four writing assignments using different working methods: one group worked together outside class with Google Docs, while the other worked together in class. The instruments employed in the study were writing tests and two questionnaires. Data were analyzed by using means, standard deviations, percentages, and independent samples *t*-tests. The results indicate that a significant difference was found between the two groups' writing mean score after the experiment. Students in the Google Docs group gained higher mean scores than those working in groups in a face-to-face classroom. In addition, students reported that they had positive attitudes toward collaborative writing activity and high collaboration in their groups using Google Docs, while nearly all of them perceived that this learning tool is easy to use.
Keywords: Web 2.0, online collaboration, Google Docs, writing abilities, collaborative writing

INTRODUCTION

Learning in collaborative setting is a social interaction involving a community of learners and teachers, where members acquire and share experience or knowledge. Collaborative learning is, therefore, a significant factor in students' learning because it promotes active learning and student-reliance in classrooms (Foote, 2009). Learning is shifting from passive reception to active creation. Students tend to take more ownership of their material and to think critically about related issues when they work as a team. The collaboration process enhances students' learning and develops their social skills like decision-making, conflict management, and communication (Smith & MacGregor, 2009). According to Banerjee (2000), in the collaborative learning process, a student must formulate ideas about the material assigned to him, test his assumptions, clarify them, come to a conclusion and then assimilate that material within himself. Once he feels that he "owns" the material, he must explain it to his group so that his knowledge can be pooled together and shared among all his group members. Each student, thus, is a dynamic contributor to both the learning and the teaching process. When questions are raised, different students will have a variety of responses. Each of them can help the group create a product that reflects a wide range of perspectives and is thus more complete and comprehensive (p.1).

Undergraduate students at Bangkok University, in the nine faculties: Humanities, Business Administration, Accounting, Communication Arts, Fine and Applied Arts, Sciences and Technology, Laws, Economics, and Engineering, are required to take at least three English courses. Each course consists of four skills: speaking, listening, reading, and writing. It is found that most students always get low scores in the writing assignments and tests. As mentioned earlier, among various teaching methods, collaboration among students is an interesting alternative in terms of creating helpful and active learning environments. Our Language Institute decided to implement collaborative learning in many language courses to improve students' writing skills. In a collaborative learning environment, students help one another to compose a writing task. They can learn from each other through the editing process until they get the final product. In terms of learning motivation, students who work in collaborative groups appeared to be satisfied with their classes, and their learning motivation improved respectively (Kowal & Swain, 1994; Swain & Lapkin, 1998).

Nevertheless, there is a limitation of collaboration in classrooms. Students may not have much time to read and build on each other's work; however, in collaborative online environments, they are given this opportunity (Hewitt & Scardamalia, 1998). Having students working together is not restricted to in-class communication. Online collaborative writing improved fluency and accuracy (Elola & Oskoz, 2010) and valued the opportunity to share feedback with peers (Ware & O'Dowd, 2008). According to Black (2005), on-line discussions have the potential to motivate student inquiry and create a context in which collaborative learning occurs, promoting both

reflection and critical thinking. Many studies employed tools in a Computer Mediated Communication (CMC) environment such as discussion board, wiki, and blog to increase students' interaction and facilitate the peer feedback process. In online learning communities, students can create, share information, practice critical reflection, negotiate meaning, test synthesis, and build consensus as much as they wish. Through online, collaborative written assignments, group discussions, debates and critiques of arguments, students can enhance knowledge construction (Zhu, 2012). Research has shown that the use of constructive feedback can enhance the quality of student discussion responses (Ertmer & Stepich, 2004; Ciftci & Kocoglu, 2012). The use of peer feedback in a web-based learning environment provides a number of advantages such as increasing the timeliness of feedback, offering new learning opportunities for both givers and receivers of feedback, humanizing the environment, and building community through online interaction (Corgan, Hammer, Margolies, & Crossley, 2004).

Among many technologies, Google Docs is a learning tool which helps to implement the learner-centered approach in a collaborative learning environment. According to Oxnevad (2013), document sharing and comments provide students with opportunities to receive immediate feedback. While working together, students generate online materials that reflect what they have learned and show connections between their prior knowledge, the course content, and their personal experiences. Since Google Docs is stored online, students can work at school and at home from any computer with an Internet connection, and they are more likely to revisit their work if they know someone else will be commenting on it. To insert a comment, students just highlight some text in the body of the document and the comment will appear on the right side of the page. Then they can click on any comment and watch the highlighted text in the document change color to quickly pinpoint the suggested revision. Comments are smart and they disappear after the issue has been addressed by the author so students feel a sense of accomplishment as they work their way through the suggestions of their peers. In addition, Google Docs provides support for collaboration in real time so students and teachers can have a virtual mini-conference about the work in front of them from any location if the timing is right.

The focus of this study is moved from individual learning to collective knowledge and from in-class assignments to web-based applications on out-of class assignments. Therefore, it aimed at examining undergraduate students' writing abilities as a result of using Google Docs for collaborative writing in a fundamental English course and investigated their attitudes towards collaborative writing activity using Google Docs. The result of this study will provide an insight into how technology can be used to support students' mutual learning and how much collaboration on written assignments in an online learning environment had on students' writing abilities. If Google Docs is effective in facilitating writing skills, it will be a new choice for language teachers who are facing time limit. This study was guided by three research questions:

1. Was there a difference in the students' writing abilities between those working in groups in a face-to-face classroom and those using Google Docs to work collaboratively out of class?
2. How did the students respond to collaborative writing activity using Google Docs?
3. How much cooperation did the students have in collaborative writing activity using Google Docs?

LITERATURE REVIEW

Collaborative Learning

Haring-Smith (1994, p. 360) defines collaborative writing as involving more than one person who contributes to the creation of a text so that "sharing responsibility" becomes essential. Collaborative learning takes on a variety of forms in an active process including the use of technology as a medium and tool. The concept of teaching writing skills is shifting, and teachers are faced with adapting their teaching practices to integrate new technologies while redefining writing and learning for the 21st century (Oxnevad, 2013). With the development and advancement of computer networks, online collaborative learning becomes possible even if students cannot meet in a classroom (Macdonald, 2006). In a writing classroom, collaborative writing can also be encouraged with the use of the World Wide Web. Many institutions have attempted to make use of technology in collaborative activities. Apart from blogs, wikis, chat rooms, forum, learning logs, Google Docs is an online suite of digital tools that provides teachers with some powerful features to help 21st century students develop writing skills.

Google Docs

The era of Web 2.0 application brings about many useful Internet services and programs such as blogs, wikis, and Google. For a decade, blogs are usually used to share information while wikis allows anyone to edit, modify, or delete content (Lamy & Hampel, 2007). Google Docs is another digital tool that includes the functions of blogs and wikis. Google Docs is "a free, web-based word processor, spreadsheet, presentation, form, and data storage service offered by Google" (Wikipedia, 2010). It allows users to create, edit and store their

documents online (Thompson, 2008). An extensive revision history is maintained. It is possible to view the entire document as it appeared at any time past. An author can choose to revert to an earlier version. Google Docs includes four major options: Google Documents, Google Spreadsheets, Google Presentations, and Google Drawing, which all share similar functions. There are also tools to compare any two versions of a document. This review focuses on Google Documents and how this application can facilitate students' collaborative writing in the English language classroom.

Since Google Docs is easy and fast, the tool is well-suited for facilitating digital writing workshops that combine peer editing with cooperative grouping and small group fine-tuned writing instruction. Sharp (2009) suggests that this collaborative editing tools allow a group of individuals to edit a document simultaneously while they can view the changes made by others in real time. This special feature makes Google Docs a powerful program that can facilitate collaborative writing in the language classroom. By sharing documents and keeping them online, students can access them anytime. Chinnery (2008) states that Google Docs is a productive tool where learning activities can be designed differently and creatively. For instance, an instructor might post a text, intentionally replete with errors, for learners to correct. Likewise, learners can easily peer-edit, as this program leaves an editing trail. Another option is chain storytelling, where an instructor begins a story which each learner contributes to in turn. Moreover, this tool is useful in group projects in general. Google Docs allows individuals to work on a common task without restrictions often imposed by traditional face-to-face contacts (Conner, 2008; Perron & Sellers, 2011).

Previous Research Studies

Many studies compared student learning between online technology group and face-to-face group in second/foreign language classes, and findings were different. A number of studies have found that the use of online technology in the classroom can facilitate collaborative learning among students and promote learning outcomes (Chen, 2008; Chou & Chen, 2008; Raman, Ryan, & Olfman, 2005; Vaughan, 2008). Other findings suggest that students perceived Google Docs as a useful tool for group work (Brodahl, Hadjerrouit, & Hansen, 2011; Zhou, Simpson, & Domizi, 2012). Students believed that a document that was written collaboratively might have higher quality than a document written alone (Blau & Caspi, 2008). However, online collaborations might also lead to unpleasant learning experiences. For example, students and instructors might feel uncomfortable in sharing knowledge (Rick & Guzdial, 2006). Students believed it was not appropriate to change other students' written products, and they may not all contribute equally to the assignment (Coyle, 2007).

RESEARCH METHODOLOGY

Participants and the Setting

The population in this research study was 5,625 students enrolled in EN 012 course of 3 credits in the first semester of 2013 academic year at a private university in Thailand. During the first semester, they were assigned to 123 sections by the Registration Office. As this study was conducted in a university setting, it was difficult for each subject to be randomly selected and assigned to the control and experimental groups. Therefore, it was more feasible to adopt the quasi-experimental design, which provides reasonable control over most sources of invalidity (McMillan & Schumacher, 1997). So, the samples included two sections, each of which contained 40 students, got from cluster sampling since students were already assigned to their sections. One section was used for the face-to-face group; another one for the Google Docs group. Both groups were taught by the researcher. This course aimed at enhancing students' skills in reading and writing logical responses to texts. The students met in class once a week – two periods (70 minutes per period). The length of the semester was 14 weeks.

Instruments

The impact on students' learning was evidenced by three instruments including writing tests, a questionnaire surveying attitudes toward collaborative writing activity using Google Docs and a questionnaire asking them to report how collaboratively they work. The first instrument was the writing tests administered to assess students' writing abilities in both groups. One writing test was given at the beginning of the term functioning as the pre-test and the second one as the post-test at the end of the term. They were paralleled tests. In each test, students were required to write two kinds of paragraph comprising 1) a cause to effect paragraph and 2) a process paragraph, each of which contained not fewer than 150 words. Although students were required to write the same types of paragraph, the writing topics provided in the pre-test were different from those in the post-test. Time allotted for each test was 100 minutes with the total score of 20 points. For the second instrument, to learn how well collaborative learning through Google Docs was accepted by the students, a questionnaire containing 10 items with a choice of five rating scale responses (1= strongly disagree, 2= disagree, 3 = neither agree nor disagree, 4= agree, and 5 = strongly agree) was created. Some statements in the questionnaire were taken from Lin & Jou's research (Lin & Jou, 2013). It was designed based on the theoretical framework of Vygotsky's social constructivism with his emphasis on the role of social interaction in learning and on the concepts

underlying the communicative approach in L2 learning (Vygotsky, 1978). The draft questionnaire items were checked for content validity by three experts in the English teaching field. The items with IOC index higher than 0.6 are acceptable. All of the items passed the criteria, and the overall index of the questionnaire was .87. Then the questionnaire was piloted with 30 non-subject students and calculated for proper reliability value by using Cronbach's Coefficient Alpha. The reliability value was .85, implying that the questionnaire is reliable. The questionnaire was distributed to both groups after the posttest. In order to learn more about student working in groups, another questionnaire adapted from Zhou, Simpson, & Domizi (2012) was used to ask students to report about their collaboration, comprising three statements with five Likert-scale responses as follows:

- How collaborative was the group work? The replies were provided in five rating scales: 1= very low, 2=low, 3= moderate, 4= high, 5= very high.
- How would you evaluate your group performance? The replies were in five rating scales: 1= very bad, 2= bad, 3= moderate, 4= good, 5=very good.
- How difficult was this activity when it was done in groups using Google Docs? The replies were in five rating scales: 1= very difficult, 2= difficult, 3= neither difficult nor easy, 4= easy, 5= very easy.

Learning Procedure and Data Collection

This empirical study was carried out in two classes where different methods were employed for students' writing development. One class worked together to complete writing assignments using Google Docs while the other worked together in groups in a face-to-face classroom. The data collection was done for 14 weeks. For the pre-instructional period, students in both groups were pre-tested to determine their writing abilities on the first week. During weeks 2-5, students in both groups were taught about how to write four kinds of paragraph in the classroom with PowerPoint and supplementary sheets. On the sixth week, students in the Google Docs group were asked to form a team of 4 members for working together using Google Docs. Everyone was taught about how to use Google Docs in class and created Gmail accounts. Students invited the teacher and their writing buddies to be collaborators, by simply entering their email addresses and clicking "Invite Collaborators." Then they were asked to use Google Docs to do their assignments together. While working together, each collaborator will have a different color to distinguish what they contributed to the document. As students revised a document, the revision screen would show who worked on the document and when they worked on it. When students edited an essay, it could be easily seen who did what by comparing revisions or browsing through the revisions. Each team was to compose four kinds of paragraph writing with Google Docs starting from week 6 to week 13. The four assignments included a cause-to-effect paragraph, a descriptive paragraph, an opinion paragraph, and a process paragraph. The process started with a member's posting his/her writing, followed by sharing the file to other members who helped in editing or giving feedback for paragraph improvement. In each writing task, students would reach an agreement of a final product. Students in the other group performed the same writing assignments, but worked together in groups in a face-to-face classroom. Students in both classes would submit each writing assignment to the teacher for feedback and improved their work accordingly before they started working on the next assignment. The intervention was followed by the post-test, a questionnaire, and an interview on week 14.

Data Analysis

All of the data got from the tests and the questionnaires were computed by Statistical Package for the Social Science version 12. A customized rubric was created to score the test papers. For each piece of writing, students earned up to 10 points in total, with up to four points for presentation of a clear main idea; three points for well organization; and three points for correct language use.

Table 1: Rubrics for paragraph writing.

Category	0 point	1 point	2 point	3 points	4 points
Content	No supporting details and examples	The main idea is supported with inappropriate reasons and examples.	The main idea is well supported with appropriate reasons but incorrect or inappropriate examples.	The main idea is well supported with only one appropriate reasons and examples.	The main idea is well supported with some appropriate reasons and examples.
Language Use	A lot of grammatical mistakes or misspellings	Some grammatical mistakes or misspellings	A few grammatical mistakes or misspellings	No grammatical mistakes or misspellings	-

Organiza-tion	The paragraph includes some elements of paragraph (topic sentence, supporting details, and conclusion) but no or incorrect use of transitional words.	The paragraph includes some elements of paragraph (topic sentence, supporting details, and conclusion) with correct use of transitional words.	The paragraph includes all elements of paragraph (topic sentence, supporting details, and conclusion) but no or incorrect use of transitional words.	The paragraph includes all elements of paragraph (topic sentence, supporting details, and conclusion) with correct use of transitional words.	-

This study employed three examiners to mark the papers to ensure the fairness in scoring. One of them was the researcher and the other two were teaching this course at the Language Institute. In order to confirm the reliability of pre-and post-test scores, the inter-rater approach of reliability estimates was applied. The inter-rater reliability results of the three raters who rated the students' papers on the pre-test were 0.985 (1-2), 0.991 (2-3), 0.977 (1-3) meaning that the three raters had statistically significant inter-rater reliability. The inter-rater reliability results of the three raters who rated the students' papers on the post-test were 0.975(1-2), 0.977 (2-3), 0.967 (1-3) meaning that the three raters had statistically significant inter-rater reliability. The post-test mean scores of the two groups were compared using an independent samples t-test. P values < 0.05 were considered statistically significant. Data of attitudinal questionnaire got from the Google Docs group were calculated for mean and standard deviation and reported in a table based on the following ranges: 1.00-1.50 = very negative, 1.51-2.50 = negative, 2.51-3.50 = moderate, 3.51-4.50 = positive, 4.51-5.00 = very positive while data of questionnaire demonstrating how students worked in groups were assessed and shown in percentage.

RESULTS

The researcher checked the normality of the pre-test to see whether the samples were normally distributed or not. According to Table 2, the results were not statistically significant at the 0.05 level (df = 80, p > 0.05). This means the data of the sample came from normally distributed population. As the normality in the pre-test was normal, an independent samples *t*-test can be used to analyze the data.

Table 2: Normality of the pre-test.

	Kolmogorov- Smirnova			**Shapiro-Wilk**		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-test	.125	80	.053	.969	80	.057

To ascertain that the samples assigned to the face-to-face group and the Google Docs group were not initially different but homogeneous, an independent samples *t*-test was run to compare the pre-test scores of both groups. The Levene's Test for equality of variances shows F=.209 and p= .649, proving that the variance of the groups was equivalent. It was found that the pre-test mean score of students in the Google Docs group was a little bit lower than that of students in the face-to-face group (11.30, 11.48). The result showed t = .427, df = .78, and p =.670, indicating that the two groups did not differ significantly, but were homogenous (See Table 3). Therefore, it can be concluded that both groups were homogenous at the outset of the study.

Table 3: A comparison of pre-test scores between face-to-face and Google Docs groups.

Group	**X**	**S.D.**	**df**	**t**	**Sig (2-tailed)**
Face-to-face Group (n=40)	11.48	2.05	78	.427	.670
Google Docs Group (n=40)	11.30	1.78			
Mean Difference	0.18				

Research Question 1: Was there a difference in the students' writing abilities between those working in groups in a face-to-face classroom and those using Google Docs to work collaboratively out of class?

Before running the *t*-test, the researcher checked the normality of the posttest to see whether the samples were normally distributed at each group or not. According to the table, the results were not statistically significant at the 0.05 level (df = 80, p >0.05). As the sample in the post-test was normal, the *t*-test can be further used.

Table 4: Normality of the post-test.

	Kolmogorov- Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Posttest	.085	80	.200	.987	80	.605

Before the intervention, the mean scores of students in both groups were 11.48 and 11.30, and those scores increased to 14.54 and 15.56 respectively. This means that the students' writing abilities could be improved by the two treatments after 14 weeks of intervention.

This research question explored students' writing proficiency after the intervention. To test the hypothesis and to see the efficacy of the intervention, students' writing scores obtained from the post-test of the two groups were compared to see if there was a statistically significant difference using an independent samples *t*-test as shown in Table 5. However, the result from a *t*-test analysis revealed the Levene's Test for equality of variances (F = 2.440 and p = .122) with a difference between the face-to-face group and the Google Docs group at a significance level of .05 (t = 2.253, df = 78, p=.027). So, the null hypothesis stating that no significant difference existed in the writing scores of the students who were controlled to receive the face-to-face learning environment and those in the Google Docs group was rejected.

Table 5: A comparison between post-test scores between the face-to-face and Google Docs groups.

Group	X	S.D.	df	t	Sig (2-tailed)
Face-to-Face Group (n=40)	14.54	1.87	78	2.253	.027
Google Docs Group (n=40)	15.56	2.15			
Mean Difference	1.02				

Research Question 2: How did the students respond to collaborative writing activity using Google Docs?

According to Table 6, the overall mean score indicated students' positive attitudes towards collaborative writing activity using Google Docs (Mean = 3.70). The three highest scores of the students' attitudes fell on statements no. 6, 10, and 8 respectively. That is, the students had very positive attitudes towards sharing ideas with the other students (Mean = 4.70). Moreover, they expressed positive attitudes towards Google Docs' promoting collaborative learning environment (Mean = 4.20,) and on the increase of interaction with other students (Mean = 4.00). The lowest mean score of the questionnaire was statement no.7 showing that collaborative writing with Google Docs was perceived to promote knowledge information at a moderate level (Mean = 3.05).

Table 6: Means and standard deviations of student attitudes toward collaborative writing activity using Google Docs.

Statement	Mean	S.D.
1. I liked to see my peers interact with the content I had posted on Google Docs.	3.22	1.00
2. I felt comfortable to see other students edit the content I had posted.	3.98	.77
3. My group was able to come to a consensus by using Google Docs.	3.25	.82
4. I learned to exchange information with other students via Google Docs.	3.48	.78
5. The feedback and editing from peers were useful in improving my writing skill.	3.98	.80
6. Google Docs helped me share ideas with the other students.	4.70	.61
7. The use of Google Docs promoted knowledge information.	3.05	.78
8. The use of Google Docs increased interaction with other students.	4.00	.82
9. The use of Google Docs increased my motivation to study this course.	3.18	.93
10. The use of Google Docs promoted collaborative learning environment.	4.20	.69
Total	3.70	.25

Research Question 3: How much cooperation did the students have in collaborative writing activity using Google Docs?

Students in the Google Docs group were asked to report how collaborative the group work was and how they evaluated their group performance. The findings revealed that students rated only two responses high (75%) and very high collaboration (25%) while they evaluated their group performance rather differently: moderate (22.5%) good (45%) and very good (32.5%). When asked about how difficult this activity was when it was done in groups out of class using Google Docs, nobody reported difficulties. The replies were classified into two types: easy (82.5%) and very easy (17.5%).

DISCUSSION

This study was undertaken to assess, via a pretest-posttest using a quasi-experimental design, the effect of collaborative writing activity using Google Docs had on students' writing abilities. The result of the independent samples *t*-test analysis from the post-test administration indicated that the Google Docs group had a better performance than the face-to-face group. This might be because of three main reasons: the collaboration method, special feature of Google Docs which motivated students to learn more efficiently, and more contribution to work. As for the collaboration method, students were provided with opportunities to read, review, and correct other members' writing. With constructive feedback they got from the student readers, the student writers are able to learn about their writing problems such as inappropriate language use, misspellings, wrong mechanics, not understandable text, and illogical organization. Comments from peers which can be used for reconsidering both ideas and organization can lead to meaningful revisions for the student writers. It can be said that collaborative revisions can improve language defects such as vocabulary, organization and content. The findings were found to be in accordance with many previous studies in that the use of constructive feedback can enhance the quality of student discussion responses (Ertmer & Stepich, 2004; Ciftci & Kocoglu, 2012). Second, in this study, it is clear that Google Docs plays an important role in student learning. It is the tool that supports students to help one another in learning without restriction of time and place. Students can gain knowledge by comparing two versions of a document hence, increasing understandings of how sentences should be corrected. While working together, students generate online materials that reflect what they have learned and show connections between their prior knowledge, the course content, and their personal experiences (Oxnevad, 2013). The tool helps students collaborate on written assignments more efficiently, finish more quickly as compared to Microsoft Word (Apple et al., 2011). A great number of edited texts and comments appearing in Google Docs proved that students did not hold a sense of private ownership. They were comfortable when their texts got edited or deleted. The finding of this study confirmed the effectiveness of web-based writing in the previous studies which found that online technology was more useful for improving students' learning outcomes (Chen, 2008; Chou & Chen, 2008; Raman, Ryan, & Olfman, 2005; Vaughan, 2008). Lastly, contribution to do the writing tasks which can be seen by the team members and teacher was one factor to put more effort in their work. Although students in the face-to-face group also received collaborative learning, working together in a classroom may not be as vivid as working with Google Docs. It is rather difficult to investigate how much effort students in a face-to-face environment put in terms of equal contribution. Individual contribution given to assignments may not be equal. For Google Docs, the students know that their teacher can check who works less or more throughout the learning process. As such, students in the Google Docs group were more serious about collaborating and willing to follow the group conventions and practices. This may affect the improvement of the two groups' writing abilities.

The constructive finding is also supported by a positive attitudes students had towards collaboration on writing assignments out of class using Google Docs (M = 3.70). This is probably because Google Docs makes collaboration easier. It is accessible to the general public, regardless of location, as long as the Internet is available (Oishi, 2007). The high level of attitude also supported the possibility of the adoption of Google Docs-based learning in other classrooms. When the items were considered, the emphasis was mostly placed on sharing ideas with the other students, promoting a collaborative learning environment, and having interaction with other students. This suggests that students placed a lot of importance on relationship among peers. The finding was consistent with previous studies in that students perceived Google Docs as a useful tool for group work (Brodahl, Hadjerrouit, & Hansen, 2011; Zhou, Simpson, & Domizi, 2012). However, other responses such as "promoting knowledge information" which was rated at a moderate level should not be ignored. Students thought that gaining knowledge through collaborative working with Google Docs was not that much. The finding was found to be in contrast with the higher scores which students gained in the post-test. This is probably because students were not well-informed about the goal of mutual web-based learning. So, the teacher should emphasize on how the collaborative writing activity using Google Docs will benefit their writing. Furthermore, providing enough comments and suggestions during the process of collaborative revisions is highly required to make students feel like gaining knowledge and going to the right way. Without this, they may have less confidence in editing other members' texts. Moreover, there might be some possible confounding variables that could affect the students' improvement such as inconvenience of using computers and expertise in using Google Docs. Even though in the present study students did not report any difficulties in using Google Docs at all, real understanding about how to work with Google Docs is necessary if similar activities are used again in the future courses. Students should be trained and practice on it frequently before the actual use. In addition, the finding showed how responsible the students were for their written assignments. Their collaboration was rated at high and very high levels. Students learned how to work together in team. In this study, Google Docs was seen as a kind of friendly user that they used to complete the tasks. This increased students' learning motivation and supported what Swain & Lapkin (1998) stated in that students who work in collaborative groups appeared to be satisfied with their classes, and their learning motivation improved respectively.

The implications from the findings of this study support that Google Docs is a useful tool that makes online learning environment possible. Language learners can gain knowledge in a democratic and relaxing atmosphere where they can judge whether the mistakes should be corrected and learn to accept the comments from others. This is very different from the conventional teacher feedback pedagogy which does not provide any choices for learners. However, this study was restrained by some limitations. Since this research was conducted in a classroom setting, the sample size was rather small. The low number of students and the fact that all of them were studying at a private university might not allow us to generalize across other contexts. Therefore, with limited samples, the generalizability of the findings should be interpreted with caution and may extend only to this immediate population. In addition, while participating in the treatments, students enrolled in this English course were required to develop other skills comprising, speaking, and reading as well. Thus, students were also exposed to other types of input besides writing skill. The time constraint may cause different effects on findings in the study. So, this issue should be taken into account.

SUGGESTIONS FOR FUTURE STUDIES

Further research studies can be conducted to compare the effects of collaborative writing between face-to-face and Google Docs methods on students' writing motivation. If students are satisfied with learning through technology, assigning students to work together outside class can help language teachers save time and facilitate students' learning. Apart from this, students' autonomy and critical thinking skills may be investigated when other educational technologies are used to compare with Google Docs. Students can gain a lot of benefits of blended learning when technology is applied more in language classrooms.

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THE RELATIONSHIP BETWEEN ATTITUDES OF PROSPECTIVE PHYSICAL EDUCATION TEACHERS TOWARDS EDUCATION TECHNOLOGIES AND COMPUTER SELF-EFFICACY BELIEFS

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ABSTRACT
The aim of research is to investigate the relationship between attitudes of prospective physical education teacher towards education technologies and their computer self-efficacy beliefs. Relational research method has been used in the study. Study group consists of 337 prospective physical education teachers (M_{age}=21.57±1.72) in total, as 169 girl (50.1%) and 168 male (49.9%) students who get their education in the physical education department of four university. As tool of collecting data, "Technology Attitude Scale" and "Computer Self-Efficacy Belief Scale" have been used. In analysis, deductional statistics such as t-test belong to arithmetic mean differences, one-way analysis of variance, and correlation and regression analysis in independent groups alongside descriptive statistics. In research, it has been specified that attitudes towards education technologies has a medium level effect in on self-efficacy belief. It has also been seen that variables which constitute the sub-dimension of attitude towards technology explained 11% of total variance. In addition, it has been established that attitudes of prospective physical education teacher towards education technologies and their computer self-efficacy beliefs are in high level. While it has not been seen a meaningful difference in attitude towards technology depending on level of using computer and gender, it has been seen a meaningful difference according to having computer and class. On the other hand, it has not been seen a meaningful depending on gender in belief of computer self-sufficiency, it has been meaningful differences according to having computer variables and computer using level.
Keywords: Computer Self-Efficacy Beliefs, Attitudes Toward Educational Technology, Prospective Physical Education Teachers

INTRODUCTION

Advancements in science and technology are among the primary factors that affect structure of societies and, in particular, educational systems. Through rapid developments in technology, new equipment is being added to ones that would be able to use in education-learning process. The most important of these technological tools in education-learning activities in our day has been seen as computer (Akkoyunlu, 1998). With increasing function of computer in learning-teaching process, schools implement different applications with the aim of benefiting from computer technologies; all these studies express the importance of computer using skills (Askar & Umay, 2001). But Gawith (1995) has stated that one has the possibility not to that job if s/he has not got self-confidence even if s/he has ability to do. Bandura has expressed that success does not only depend on necessary skills to do a specific job, but it also requires effectively safe use of a skill (Qtd. in: Kurbanoglu, 2004). From this information, the effect of self-efficacy belief has got importance in revealing skills.

The concept of self-efficacy has been described as an individual's own judgement on himself about his/her capacity to organize and make successfully necessary activities to show a certain performance and a quality which is effective in constituting of behaviours (Bandura, 1997; Kear, 2000; Zimmerman, 1995). The belief of self-efficacy is a concept not about how an individual competent but his/her belief on his/her own abilities. This belief states how individuals feel themselves about a subject, what they thought, how they motivated themselves and how they behave (Akkoyunlu, Orhan & Umay, 2005). There are four basic sources determining self-efficacy. These resources: a) knowledge that individuals get their experiences, b) observations about other people's successful or unsuccessful practices, c) the effect of society on if s/he can be successful and d) psychological state regarding expectation achieving or being unsuccessful. Each source effects individuals' self-efficacy belief and self-efficacy belief has effect on performance by determining student's duty choice, strategy using and study insistence in relevant study (Bandura, 1994; Sewell & George, 2000).

The concept of self-efficacy has been adapted to many domains and has been used in different disciplines (Ekici, 2009; Kear, 2000; O'Leary, 1985; Schunk, 1985). A lof of studies have been carried out about computer self-efficacy belief which is one of the study fields (Sam, Othman & Nordin, 2005; Khorrami-Arani, 2001; Zehir-Topkaya, 2010; Karsten & Roth, 1998). Computer self- efficacy belief has been described as individual's own judgment regarding on him/her (Karsten & Roth, 1998). This belief effects expectation towards individual's computer using. Because individual whose self- efficacy belief is low will not find himself/herself efficacy in using computer and, therefore, will tend to use computer less. On the other hand, while high computer self-

efficacy increases individual's frequency of using technology it will decrease their computer related concerns (Khorrami-Arani, 2001). Studies on this subject have revealed that individuals whose computer self- efficacy belief are high have more willingness in participating activities relating computer and that it is easier for them to cope when they are challenged by a difficulty (Compeau & Higgins 1995; Karsten & Roth, 1998). In another study, it has been established that self- efficacy of students who get computer lesson during their education in high school and university regarding computer has improved positively (Miura, 1997, In: Askar and Umay, 2001). On the other hand, Murphy and his friends (1989) have stated that computer self- efficacy belief has a positive relationship with participating in activities regarding computer, hoping success, being consistent and patient when confronted with a negative situation regarding computer and computer performance. The study carried by Askar and Umay (2001) with prospective mathematics teacher has shown that students' self- efficacy beliefs against computer are low. Students' self-efficacy belief against computer has also given high relation with their computer experience and using frequency.

In literature, it has been expressed that self- efficacy towards a specific domain would affect those individuals' attitudes and behaviours towards that domain (Ipek & Acuner, 2011). As Yurdugul and Askar (2008) states, one of the main factors on success of students in a certain domain or forming a learning program design is "attitude" variable towards learning products. Attitudes form human behaviours with different ways, determines daily activities and forms behaviours like humans' accepting or leaving (Rikard & Banville, 2006).Various definitions made on literature on attitude concept and these definitions have expressed different sides of attitude concept. Smith (1968) describes attitude as "an inclination which attributed to an individual and which regularly constitutes his/her thinking, feeling and behaviours regarding a psychological event (Qtd. in Kagitcibasi, 1999). According to Safrit and Wood (1995); a situation is a special feeling felt against a situation, person or activity. Tezbasaran (1997) has expressed the attitude as inclination to make a reaction, either positive or negative, to certain object, situation, institution, concept or other people.

From this point, it could be said that, self- efficacy belief in individuals regarding computer will not be sufficient alone, however, attitude towards computer and therefore technology might have effect on computer self- efficacy belief. In terms of future of societies, all societies, particularly most developed ones, are in effort to give their individuals a quality education by using technology in education which is one of the most important domain in which technology was used (MEB, 2004). Technology was seen as an indicator of high quality in education by many educator, teacher, researcher, therefore the importance of technology integration in schools will increase. Therefore, in order to grow individuals who access to the knowledge and use this knowledge teachers have effectively to use technologic equipment (computer, internet, etc.) and have these skills (Erdemir & Bakirci, 2009). When considered all these results, the necessity of knowing students' attitudes and ideas towards technologic equipment (Yavuz & Coskun, 2008). That teachers who consist of human power source of educational system gain relevant sufficiency is important on the name of keeping up with time, developing technology, consisting of a future that has a high welfare level and growing students with this aim (Odabasi & Kabakci, 2007). That teacher use technology in learning environment will cause students' success to increase. The attitude and self-confidence of prospective teachers to use technology when they started their profession play an important role in whether students use technology in learning environment and therefore in student success (Christanse, 2002; McGrail, 2005). In various domains, studies were carried out with the aim of determining the attitudes of candidate teachers towards technology (Yavuz & Coskun, 2008; Yilmaz, Ulucan & Pehlivan, 2010; Erdemir, Bakirci & Eyduran, 2009; Teo, 2008; Ipek & Acuner, 2011). In the study carried by Yavuz and Coskun (2008) with primary school teachers, it has been established that students use technologic equipment in teaching to increase students' attitude positively and has been determined that students have positive ideas about using technology. In the study was carried out by Erdemir and his friends (2009) with students of primary school mathematics, science, social sciences, pre-school, class and Turkish teaching students, while prospective teachers do not feel themselves sufficient in using internet, computer with the aim of teaching, they stated that they were sufficient to use searching motors, can prepare simple materials, can't prepare complex and multi-purposeful teaching devices. Also, in the self- efficacy of using technology with the aim of teaching, it has been concluded that woman prospective teachers are in better level than man prospective teachers. Also, it has been expressed to the prospective teachers that with individual research and project home works which requires use of individual research and project home works this difference can be erased. In the studies which are carried by Teo (2008) with prospective teachers, it has been found that there was a positive relationship between attitude towards computer and attitude towards education technology. Yılmaz and his friends (2010), in their study they determined the attitude of prospective physical education teachers toward technology has determined that using technological materials in teaching affected students attitude scores in a positive way. In the study carried out by Ipek and Acuner (2011), it has been observed that the prospective primary school teachers' computer self- efficacy beliefs can be forecasted in a statistically meaningful level from their attitudes toward education technologies. On the other hand, it has been concluded that computer self-

efficacy beliefs of male prospective teachers are higher than that of females and that computer self- efficacy beliefs of prospective teachers who have a computer are higher than that of those who have not got.

When studies regarding attitudes investigated, it has been seen that studies were usually carried out with mathematics, science, social sciences and that prospective primary school teachers and studies on physical education is limited. In fact, that teachers' who will exercise the lesson attitudes towards technology, ideas, ability to use equipment is extremely important for getting maximum benefits at highest level from physical education lessons that play an important role in terms of realizing the aim of education within education system. Also Yaman (2007) has stated that physical education teachers have to develop their knowledge and skills in order to use computers as teaching tools and support and guide students to use these technologies for learning. Together with this, when considered that self- efficacy belief and attitude towards computer is important in terms of individuals' professional success (Ipek & Acuner, 2011); it has been thought that investigating the relationship between computer self- efficacy belief and education technology could be helpful. From this perspective, it has been aimed to investigate the attitude of prospective physical education teachers' toward using technologic equipment and to investigate computer self- efficacy according to other valuables (gender, class, having a computer and level of using computer) and to determine that attitude towards education technology, computer self- efficacy predicate power.

METHOD

In research, relational research model has been used. In research, relationship between attitude of prospective physical education teacher toward using technology in education and computer self- efficacy belief and whether or not relation has shown difference according to gender, class, having computer and level of using computer have been investigated.

Study Group

Research group was constituted by 337 prospective physical education teacher (M_{age}=21.57±1.72) who were chosen by random sample and who take their education at four universities' department of physical education and sport. Descriptive statistics belong to research group was given at Table 1.

Table 1. Descriptive statistics regarding the study group

Variables		N	%
Gender	Female	169	50,1
	Male	168	49,9
Grade	1. Grade	97	28,8
	2. Grade	67	19,9
	3. Grade	63	18,7
	4. Grade	110	32,6
Having computer	Yes	281	83,4
	No	56	16,6
Using computer level	High	91	27,0
	Middle	212	62,9
	Lower	34	10,1

Data Collection Tools

As tool for collecting, individual information form, "Technology Attitude Scale" and "Computer Self-Efficacy Belief Scale" have been used.

Individual Information Form: In this form, there are articles regarding students' features who participated in the research such as their class where they are taught, the situation of having computer and their level of using computer.

Technology Attitude Scale: The scale improved by Soner Yavuz (2005) has been constituted by 5 factors. Factors in scale has been named as "not using technological tools in education", "using technological tools in education", "the effects of technology in educational life", "teaching how to use technological tools" and "evaluating technological tools". In sample, there are 19 articles of which 6 are negative and 13 are positive. For instance, Cronbach Alpha reliability coefficient as .87. Articles in scale's total correlations estimated for item discrimination and item difficulty has changed between .24 - .68. Scale is 5 point Likert type scale in the way following (1) I definitely disagree, (2) I disagree, (3) I am neutral, (4) I agree, (5) I definitely agree. According to this, a value from 5 to 1 respectively is given to options of positive items while a value from 1 to 5 is given to negative options respectively, thus all options ere coded.

Computer Self-Efficacy Belief Scale: The scale developed by Askar and Umay (2001) is consisted by 18 items. For instance, Cronbach Alpha reliability coefficient was estimated as .71. Scale is 5 point Likert type scale which is graded as (1) is never, (5) is always for positive items and for negative items (1) is always, (5) is never. When items' discrimination was estimated, items discrimination of most of items is understood to be high.

Analysis of Data

Before analysing of research data, the distribution was seen. It has been determined research data suits to normal distribution by Kolmogorov-Smirnov of Lilliefors test, Histogram graphic and normal distribution curve and Skewness and Kurtosis. In research, primarily overall arithmetic value of items took place in each sub-scale was estimated and a score for that factor was determined. Analysis was carried via this factor points. In the analysis of data descriptive statistics (number, percentage, arithmetic medium and standard deviation); with the aim of determining difference between dependent and independent variables; and t Test and one-way variance analysis (One-Way-Anova) for independent groups; with the aim of determining relation Pearson Product Moment Correlation Co-efficient technique was used. In the one way variance analysis (Anova), Tukey post-hoc test was carried with the aim of finding in which groups are inter unit differences. Together with this, Multi Linear Regression Analysis was carried out with the aim of determining attitude toward education technologies' prediction power of computer self-sufficiency belief. In this analysis, each of attitude toward technology scale sub-factor scores has taken as dependent variable and computer self-sufficiency belief scale is taken as dependent variable. In the interpretation of data, 0.01 and 0.05 significant level was used. Research data was analysed with SPSS 17 program.

FINDINGS

Arithmetic medium and standard deviations regarding attitude of prospective physical education teacher toward education technologies and computer self- efficacy beliefs are given in Table 2.

Table 2. Attitude toward education technology and computer self-efficacy belief scores

Dimension	**N**	$\overline{X}$	**SD**
Technology attitude	337	72.48	12.168
Computer self-efficacy beliefs	337	61.29	9.996

When Table 2 is investigated, arithmetic medium of prospective physical education teachers was estimated $M_{\text{self-efficacy}}$=61.29 and medium score regarding attitudes toward education technologies was estimated as M_{attitude}=72.48.

Attitude and Computer Self-Efficacy Belief Toward According to Gender Variable

Primarily homogeneity test was carried out to determine whether computer self-efficacy beliefs and attitudes of prospective physical education teachers towards education technologies are differentiated according to gender variable and it has been seen that variances are homogeny. In this direction, t-test belong to arithmetic medium was carried out in independent groups (Table 3).

Table 3. Attitude toward education technologies and computer self-efficacy belief according to gender variable

Dimension	**Gender**	**n**	$\overline{X}$	**SD**	**Df**	**t**	**p**
Not using technological tools in education	Female	169	19.31	4.595	335	-0.766	.444
	Male	168	19.61	3.982			
Using technological tools in education	Female	169	15.37	3.332	335	1.010	.313
	Male	168	14.98	3.756			
The effects of technology in educational life	Female	169	14.92	2.709	335	-1.254	.211
	Male	168	15.56	6.012			
Teaching how to use technological tools	Female	169	14.71	3.778	335	-1.339	.182
	Male	168	15.22	3.278			
Evaluating technological tools	Female	169	7.62	1.876	335	.194	.846
	Male	168	7.58	1.714			
Technology attitude total	Female	169	71.94	11.422	335	-0.816	.415
	Male	168	73.02	12.888			
Computer self-efficacy beliefs	Female	169	60.85	10.138	335	-0.808	.420
	Male	168	61.73	9.861			

p>0.05

When Table 3 is investigated; in the total score of prospective physical education teachers toward education technologies (M_{male}=73.02; M_{female}=71,94) and in computer self-efficacy belief (M_{male}=61.73; M_{female}=60.85) a meaningful difference has not been seen according to gender (p>.05).

Computer Self-Efficacy Belief and Attitude towards Education Technology According to Grade Variable

Primarily homogeneity test was carried out to determine whether computer self-efficacy beliefs and attitudes of prospective physical education teachers towards education technologies are differentiated according to grade variable and it has been seen that variances are homogeny. In this direction, one-way variance analysis was made (ANOVA). (Table 4)

Tablo 4. Computer Self-Efficacy Belief and Attitude towards Education Technology According to Grade Variable

Dimension	Grade	n	$\overline{X}$	SD	Df	F	p	Tukey HSD
Not using technological tools in education	1	97	19.07	3.854	3	1.911	.127	
	2	67	19.26	4.863				
	3	63	20.63	4.151				
	4	110	19.34	4.333				
Using technological tools in education	1	97	14.93	3.529	3	2.956	.033	
	2	67	14.61	2.953				
	3	63	14.74	4.482				
	4	110	15.98	3.188				
The effects of technology in educational life	1	97	14.85	2.268	3	5.554	.001*	1 < 2 2 > 3 2 > 4
	2	67	17.26	8.640				
	3	63	14.47	3.078				
	4	110	14.80	2.948				
Teaching how to use technological tools	1	97	14.29	3.553	3	2.185	.090	
	2	67	14.89	3.477				
	3	63	15.68	3.775				
	4	110	15.19	3.374				
Evaluating technological tools	1	97	7.46	1.677	3	1.389	.246	
	2	67	7.35	1.524				
	3	63	7.61	1.772				
	4	110	7.86	2.034				
Technology attitude total	1	97	70.62	9.886	3	1.065	.364	
	2	67	73.40	14.852				
	3	63	73.15	11.119				
	4	110	73.18	12.733				
Computer self-efficacy beliefs	1	97	59.32	9.864	3	7.310	.000*	1<2 2>3
	2	67	65.23	12.094				
	3	63	58.34	9.712				
	4	110	62.30	7.813				

*p<0.05

When table 4 is investigated, attitude scale towards education technologies, in the sub-dimension "the effects of technology in educational life", it has been noted that there were important differences. According to this; medium score of first grade prospective physical education teachers ($\overline{X}$ =14.85) is lower than that of second grade prospective teachers ($\overline{X}$ =17.26). However, medium scores of candidates of second grade ($\overline{X}$ =17.26) are higher than that of third ($\overline{X}$ =14.47) and fourth grade ($\overline{X}$ =14.80) prospective teachers are higher than medium scores.

Again, it has been determined that computer self-efficacy belief of prospective teachers has shown meaningful differences. According to this, it has been seen that medium scores of first grade prospective teachers ($\overline{X}$ =59.32), is lower than that of second grade ($\overline{X}$ =65.23), and medium scores of second grade prospective teachers ($\overline{X}$ =65.23) is larger than that of third grade ($\overline{X}$ =58.34).

Computer Self-Sufficiency Belief and Attitudes toward Education Technologies According to Level of Using Computer

Primarily homogeneity test was carried out to determine whether computer self-efficacy beliefs and attitudes of prospective physical education teachers towards education technologies are differentiated according to level of using computer variable and it has been seen that variances are homogeny. In this direction, one way variance analysis (ANOVA) has been carried (Table 5).

Tablo 5. Computer self-efficacy belief and attitudes toward education technologies according to level of using computer

Dimension	**Düzey**	**n**	$\overline{X}$	**SD**	**Df**	**F**	**p**	**Tukey HSD**
Not using technological tools in education	High	91	19.56	4.206	2	2.240	.108	
	Middle	212	19.69	3.931				
	Lower	34	18.02	6.210				
Using technological tools in education	High	91	14.59	3.744	2	2.329	.099	
	Middle	212	15.49	3.366				
	Lower	34	14.76	3.985				
The effects of technology in educational life	High	91	14.40	2.902	2	4.304	.014	
	Middle	212	15.80	5.264				
	Lower	34	14.00	3.954				
Teaching how to use technological tools	High	91	15.41	3.718	2	4.250	.015	
	Middle	212	15.02	3.263				
	Lower	34	13.38	4.334				
Evaluating technological tools	High	91	7.60	1.645	2	1.107	.332	
	Middle	212	7.66	1.726				
	Lower	34	7.17	2.479				
Technology attitude total	High	91	71.58	11.253	2	4.415	.013	
	Middle	212	73.69	11.771				
	Lower	34	67.35	15.411				
Computer self-efficacy beliefs	High	91	65.27	10.621	2	15.621	.000*	Y>O Y>D
	Middle	212	60.58	9.161				
	Lower	34	55.05	9.270				

*p<0.05

When table 4 is investigated, attitude scale towards education technologies, in the sub-dimension "the effects of technology in educational life", it has been noted that there were important differences.

It has been established that self-efficacy of prospective teachers has shown meaningful differences according to level of using computer. According to this, it has been seen that high scores of prospective teachers who can use computer ($\overline{X}$ =65.27) is larger than that of prospective teachers who can use computer in middle ($\overline{X}$ =60.58) and lower levels ($\overline{X}$ =55.05).

Computer Self-Efficacy Belief and Attitude toward Education Technologies According to Having Computer

Primarily homogeneity test was carried out to determine whether computer self-efficacy beliefs and attitudes of prospective physical education teachers towards education technologies are differentiated according to having computer variable and it has been seen that variances are homogeny. T-test was carried out belonged to arithmetical mediums in independent groups in this direction.

Table 6. Computer self-efficacy belief and attitude toward education technologies according to having computer

Dimension	Bilgisayara Sahip	n	$\overline{X}$	SD	Df	t	p
Not using technological tools in education	Yes	281	19.72	4.150	335	2.211	.028
	No	56	18.33	4.855			
Using technological tools in education	Yes	281	15.39	3.420	335	2.533	.012
	No	56	14.08	4.001			
The effects of technology in educational life	Yes	281	15.32	4.859	335	.652	.515
	No	56	14.87	3.526			
Teaching how to use technological tools	Yes	281	15.27	3.266	335	3.667	.000*
	No	56	13.41	4.401			
Evaluating technological tools	Yes	281	7.83	1.661	335	5.502	.000*
	No	56	6.44	1.999			
Technology attitude total	Yes	281	73.54	11.652	335	3.652	.000*
	No	56	67.16	13.368			
Computer self-efficacy beliefs	Yes	281	62.25	9.660	335	4.046	.000*
	No	56	56.46	10.337			

p>0.05

When table 6 is investigated, it has been established that there was a meaningful differences in attitude scale total scores according to education technologies and sub-dimensions of "teaching how to use technological tools" and "evaluating technological tools". According to this, it has been seen that medium scores of prospective teacher who has a computer ($M_{teaching}$=15.27, $M_{evaluation}$=7.83, M_{total}=73.54) is larger than that of those who hasn't got a computer ($M_{teaching}$=13.41, $M_{evaluation}$=6.44, M_{total}=67.16). Meaningful differences have not been seen in other lower dimensions of attitude scales toward education technologies (p>.05).

It has been established that there are meaningful differences according to computer self-efficacy of prospective teachers according to variables of having computer According to this, medium scores of prospective teacher who have computer ($\overline{X}$ =62.25) is higher than that of those who have not a computer ($\overline{X}$ =56.46).

Relationship between Attitude toward Education Technologies and Computer Self-Efficacy Belief

The relationship between computer self-efficacy beliefs and attitudes of prospective physical education teachers toward education technologies has been tried to be determined and analysis results were given in Table 7.

Table 7. Relationship between Attitude toward Education Technologies and Computer Self-Efficacy Belief

Variables	A	B	C	D	E	F
Not using technological tools in education (A)	1					
Using technological tools in education (B)	.134*	1				
The effects of technology in educational life (C)	.179**	.388**	1			
Teaching how to use technological tools (D)	.296**	.578**	.248**	1		
Evaluating technological tools (E)	.208**	.561**	.300**	.648**	1	
Computer self-efficacy beliefs (F)	.223**	.347**	.088	.281**	.191**	1
Mean	19.49	15.17	15.24	14.96	7.60	61.29
Standart Deviations	4.298	3.550	4.662	3.542	1.795	9.996

*p<0.05 **p<0.01

When Table 7 is examined, it has been seen that “not using technological tools in education" (r=.223; p<.01), "teaching how to use technological tools" (r=.281; p<.01) and "evaluating technological tools" (r=.191, p<.01) sub-dimensions of attitude scale toward education technologies have a relationship with computer self-efficacy

belief in lower level and positive way. However, it has been stated that "using technological tools in education" (r=.347; p<.01) sub-dimension has a positive relationship with computer self-efficacy belief in middle level.

It has been tried to determine predicting power of computer self-efficacy believes and attitudes toward education technologies and results of analysis is given in Table 8. In analysis, each of sub-factor points of attitude scales toward education technologies was taken as independent variable; computer self-efficacy belief was taken as dependent variable.

Table 8. The result of analysis regarding predicting computer self-efficacy belief

Variables	**B**	**Standard Error**	**ß**	**t**	**p**	**Dual r**	**Partial r**
Constant	42.388	3.236		13.099	.000		
Not using technological tools in education	0.383	0.127	0.165	3.006	.003**	.223	.163
Using technological tools in education	0.445	0.195	0.158	2.278	.023	.247	.124
The effects of technology in educational life	-0.075	0.122	-0.035	-0.616	.539	.088	-.034
Teaching how to use technological tools	0.479	0.209	0.170	2.288	.023	.281	.125
Evaluating technological tools	-0.175	0.399	-0.031	-0.438	.662	.191	-.024
R= 0.338 **F**= 8.543		**R^2**= 0.114 **p**= .000					

**p<0.01

When findings in Table 8 is investigated, prediction equation of sub-dimensions of attitude scale toward education technologies is important (R=0.338; p<.01). Variables consisting sub-dimension of attitude scale explains %11 of total variance. The relative order of importance of predictive variables according to standardized regression coefficient (ß) is in the following way: teaching how to use technological tools, not using technological tools in education, using technological tools in education, the effects of technology in educational life and evaluating technological tools

When the results regarding meaningful of regression coefficient is investigated, it has been seen that the sub-dimension of “not using technological tools in education” is an important and meaningful predictive on computer self-sufficiency believes. It has been seen that the sub-dimensions of “Teaching how to use technological tools”, “using technological tools in education”, “the effects of technology in educational life” and “evaluating technological tools” are not meaningful and important predictive.

CONCLUSION

According to findings obtained in research, the attitudes prospective physical education teachers toward education technology realized in high level (Table 2). This finding has shown parallelism with some studied in which attitudes toward education technology was determined (Yavuz & Coskun, 2008; Arslan, 2008; Basarici & Ural, 2009; Yılmaz et al., 2010). On the other hand, another finding obtained from research, computer self-efficacy beliefs have realized in prospective physical education teachers in high level again (Table 2). While this result shows parallelism with some study results (Arslan, 2008; Orhan, 2005); does not coincide with some studies' results (Askar & Umay, 2001; Yilmaz, Gercek, Koseoglu & Soran, 2006) When considered that self-efficacy belief directly created a positive effect on intention to use computer and accept technology (Hu, Clark & Ma, 2003), it could be said that qualities of prospective physical education teachers to use computer and knowledge technologies on their lessons in future and various education qualities could be higher.

It has not been seen a meaningful difference between male and female prospective teachers when their attitudes toward education technologies was considered (Table 3). This finding has shown parallelism with many studies (Ipek & Acuner, 2011; Basarici & Ural, 2009; Celik & Bindak, 2005; Yilmaz et. al, 2007). In a similar way, it has not been seen a meaningful difference between males and females when computer self-efficacy beliefs of prospective teachers are investigated (Table 3). While this finding shows similarity with many studies (Yilmaz and et. al, 2006; Ozcelik & Kurt, 2007), it does not coincide with results of many others (Cetin, 2008; Busch, 1995; Tekinarslan, 2008; Erdemir, Bakirci & Eyduran, 2009; Orhan & Akkoyunlu, 2003). Cetin (2008), in his study he carried out with prospective primary school teachers, has stated a meaningful difference in favour of male prospective teacher in computer self-efficacy beliefs scores. In a similar way, it has been observed in study

carried out by Tekinarslan (2008) with prospective teachers who receive education in different department in education faculty that self-efficacy of males are higher than that of females in basic technology skills and advance computer technology. As different from other studies, in the studies carried out by Erdemir and et al. with prospective teachers who receive education in departments of primary school mathematics, science, social sciences, pre-school, school and Turkish teaching it has been established that computer self-efficacy beliefs of female prospective teachers are higher than that of male. But when it is considered that the studies which do not coincide with research finding are high in number, it is needed that too many studies have to be carried out in order to determine whether computer self-efficacy beliefs are differentiated according to gender.

It has not been seen a meaningful difference in attitudes of prospective physical education teachers toward education technologies except for sub-dimension of "the effects of technology in educational life" when it is considered according to class variable (Table 4). In sub-dimension of “the effects of technology in educational life”, it has been seen that medium scores of first grade prospective teacher is lower than that of second grade. Medium scores of second grade prospective teacher have been estimated as higher than that of both third and fourth grade prospective teachers. Obay and Ozgen (2008) has established that taking lesson of teaching technologies and material improving has created a positive effect in attitudes of prospective teachers toward education technologies positively in their study in which they assessed the attitudes of prospective teachers toward education technology. When it is thought that computer lesson is given at second grade and teaching technologies lesson is given at third grade, the finding we obtained from our study is an unexpected study. It could be thought that this result was caused by positive experiences of prospective physical education teachers regarding education technologies in previous years.

When computer self-efficacy beliefs of prospective physical education teachers are investigated in terms of variable of class, it has been seen that medium score of first grade prospective teachers are lower than that of second grade prospective teachers. However, it has been seen that medium score of second grade prospective teachers are higher than that of third grade teachers (Table 4). In the study carried out by Cetin, it has been seen that self-efficacy beliefs of candidates of class teaching regarding computer has changed according to the class in which they receive education in a meaningful way. Conversely, Yilmaz and his friends (2006) have not established a meaningful difference between computer self-efficacy beliefs of biology teaching students according to class in which they receive their education. Askar and Umay (2001) have expressed that inexperience and inadequate using of computer has caused that students' self-efficacy against computer is low. Since it is informed that computer self-efficacy is closely related to using computer (Hu and et. al., 2003; Decker, 1998), it can be thought that second grade prospective teachers take computer lesson which is compulsory at second grade and that computer take place in every stage of our lives as a result of rapid spread of computer technologies.

It has not been seen meaningful differences in terms of level of using computer in sub-dimensions and total scores of attitude scale of prospective physical education teachers toward education technologies (Table 5). When computer self-efficacy beliefs of prospective teachers are investigated in terms of level of using computer, it has been seen that medium scores of prospective teachers who can use computer in high level is larger than that of prospective teacher who can use the computer at middle and lower level (Table 5).

It has been established that there are meaningful differences according to situation of having a computer in sub-dimensions of “teaching how to use technological tools” and “evaluating technological tools” with attitude scale total score toward education technologies of prospective physical education teachers. According to this; it has been seen that prospective teachers having computer are larger than that of those who have not got a computer (Table 6). When the computer self-efficacy beliefs is investigated according to situation of having a computer, the medium scores of prospective teachers who have a computer is higher than that of those who have not got a computer. This finding has shown parallelism with the result of many studies (Askar & Umay, 2001; Celik & Bindak, 2005; Ipek & Acuner, 2011; Tekinarslan, 2008). Since computer self-efficacy is closely related with using computer (Hu et al., 2001; Decker, 1998) and ,as Askar and Umay (2001) stated, inexperience and using computer in inadequate level, that individuals who have computer have a high self-efficacy is an expected situation.

When relationship between sub-dimensions of attitude scales toward education technologies and self-efficacy belief was investigated (Table 7), it has been seen that the sub-dimensions of “not using technological tools in education", "teaching how to use technological tools" and "evaluating technological tools" have a lower level positive relation. However, it has been stated that the sub-dimension of "using technological tools in education" have a middle level positive relation with computer self-sufficiency belief. In a similar way, in the study carried

out by Arslan (2008), it has been found a positive and middle level relationship between self-efficacy and attitude toward realizing computer supported education.

In research, it has been determined that sub-dimensions of attitude scale towards education technologies have an effect magnitude in a middle level on computer self-efficacy belief (Table 8). Also, the effect of level of attitude toward education technologies on computer self-efficacy belief is explained with a rate of 11%. In the light of all these results, it has been determined that computer self-efficacy beliefs have an effect magnitude on attitude toward education technologies in low level. This result has shown similarity with the study carried out by Ipek and Acuner (2011) with candidates of class teaching, it has been seen that the attitude of prospective teacher toward education technologies could explain only 3% of variance in computer self-efficacy beliefs. In their study with prospective primary school teacher and social science teachers, Usta and Korkmaz (2010) has shown that a positive increase was seen in attitudes toward using technology in education. Again in a similar way, it has been concluded that there is a middle level and positive relation between computer self-efficacy beliefs and attitudes of prospective teachers toward computer supported education. From this point of view, if there is an increasing in attitude or self-efficacy belief it could be said that the other would decrease in case of decreasing. It also could be said that steps to be taken to increase the self-efficacy belief or attitude would increase the other; the factors that would decrease a variable would decrease the other. Therefore, it is needed to consider this relationship while regulating education environments.

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THE STUDY OF LEARNERS' PREFERENCE FOR VISUAL COMPLEXITY ON SMALL SCREENS OF MOBILE COMPUTERS USING NEURAL NETWORKS

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ABSTRACT
The vision plays an important role in educational technologies because it can produce and communicate quite important functions in teaching and learning. In this paper, learners' preference for the visual complexity on small screens of mobile computers is studied by neural networks. The visual complexity in this study is divided into five levels, including "very high" complexity, "slightly high" complexity, "medium" complexity, "slightly low" complexity and "very low" complexity. This study focuses on the age effects for vision problems in educational technologies. The age of the tested subjects distributes from 10 to 64, and is uniformly divided into 11 groups with each group composed of 30 tested subjects. For simplicity, the effects of gender, words, colors, and other visual factors are ignored. This study found that only learners of the younger and older age groups have special preference on the picture of very high complexity. Most learners prefer pictures of medium and slightly high complexity. These results are consistent with many existing studies. With the use of neural networks, only about half of the investigation data are required to predict the overall investigation results. Discussions and interpretations on the results are also given in this study. This study will be helpful in vision problems of educational technologies.
Keywords: learner, visual complexity, screen, mobile computers, neural networks

INTRODUCTION

The use and capabilities of small mobile communication devices, which include many all-in-one features, have become embedded in one's everyday life and are growing rapidly, such as pocket PCs, tablet PCs, smart mobile phones, and smart wireless sensors (Karan, Bayraktar, Gümüskaya and Karlik, 2012). Mobile devices are portable, ubiquitous and easily accessible, and are then widely used by many people. This situation implies that there is great potential to enhance learning through mobile devices (Keskin & Metcalf, 2011). The learning is one of human instincts. New learning technologies initiate new learning styles. Nowadays, mobile computers lead learners to new mobile learning environments. This then motivates us to choose the vision of mobile computers as the main topic of this study. The degree of a device's mobility determines the way it is best used in learning. A smartphone is no doubt much more mobile than a laptop, and this high degree of mobility makes it indispensible in modern learning (Franklin, 2011; Mcconatha, 2008). Traditionally, artists presented their work using non-interactive visual media. With the ongoing development of information and interactive technologies, people can create art using digital multimedia (Chang & Lee, 2010; Isman & Celikli, 2009). From a constructivist perspective, small mobile computers can be utilized to provide meaningful art information and then enhance learning experiences.

The neural network is a control theory rising in recent years (Haykin, 2009). It has attracted wide attention of researchers due to its special black-box characteristics. For example, a neural network makes inference according only to human operating experiences and control rules (Kumar, 2005). Hence, the neural network has become the new focus of various professional research areas in recent years (Ham and Kostanic, 2001). This is because various research fields can utilize neural networks to solve strongly nonlinear and complicated problems (Zhang and Zhang, 2006). Neural networks can simulate the information processing of biological neural systems, and simulate the nerve tissues and functions of the human brain. Thus a black-box system with simulated operations of perception, thought, imagination, and logic of the human brain can be constructed. The neural network can learn through given examples (i.e., known input and output data) to construct a nonlinear system model (input-output relation) for estimation and prediction. It can also be viewed as a special type of statistical techniques (Bailey & Thompson, 1990; Specht, 1991; Haykin, 2009). This study focuses on vision problems of educational technologies. The vision system is probably the most complicated system among all sensory systems (Solso, 2000). In visual cognition, the acceptance of vision communication is easier than that of textual communication. This is the reason why we choose pictures on mobile computers' screens as the research topic. We study learners' preference for visual complexity on small screens of mobile computers. In addition, this study utilizes a neural network model for analysis, and intends to predict the overall results by using fewer questionnaire samples. The goal is to know learners' preference for visual complexity on small screens of mobile computers. The results will be helpful for educational technologies.

Although scholars have studied human brains for years, there are still many secrets in the vision cognition processes of brains (Solso, 2000). Throughout the years, the two major theories for the psychology of vision, i.e., Realism Theories and Relevant Cue Hypotheses, have not reached any consensus yet (Lin, 1994). The Realism Theories suggest that the learning effects of learners increase with visual information, and learners prefer more complex visions. Pictures with rich information can arouse the interest of learners (Vartanian & Goel, 2004; Kawabata & Zeki, 2004; Hsu & Wang, 2010). In addition, picture background information can help learners to build an overall architecture and then enhances the recognition of visions. Thus, more complex vision information is favored (Dale, 1946; Antes & Metzger, 1980). However, the Relevant Cue Hypotheses suggest opposite viewpoints. They report that one's ability to process information is limited, although complex pictures are interesting. Complex pictures will increase the load on the brain. Thus interferes are occurred during the communication of pictures (Alesandrini, 1984; Dwyer, 1978; Hurt & Kirk, 1988). People are more sensitive to simple pictures than to complex pictures (Pezdek & Maki, 1988), as illustrated in Figure 1. The recognition advantage of pictures over verbal descriptions is not due to the extra details that pictures contain. Complex pictures with extra details have no advantage in recognition (Nelson, Metzler & Reed, 1974), as illustrated in Figure 1.

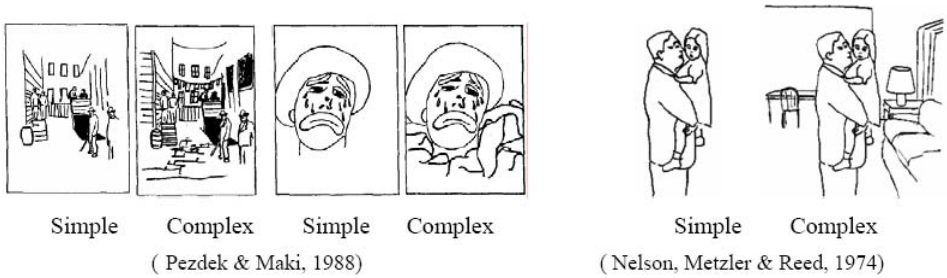

Figure 1. Examples of pictures in both simple and complex forms.

In this paper, investigations by questionnaires are first given. The testing pictures in this study are mostly drawings with black and white outlines. The visual complexity means the density of conveyed visual information in the picture. Higher picture density makes the image more complex, and vice versa. Visual complexity contains the amount of interior details in a picture and background information (Wang, 2002). Many studies have discussed the relationships of pictures to cognition and attention, emphasized the importance of picture information (Saunders, 1994; Micklos, 1982), (Rieber, 1994), and used the inverted U-shaped function to explain the relationship between pictures and learners (Wang & Hsu, 2009; Dwyer, 1978), as shown in Figure 2.

METHOD

Research Method & Procedure

Initially, this study conducted a questionnaire survey, and collected data from subjects of various age groups. Next, data were analyzed by statistical operations and modeled by neural networks. Finally, the discussion and interpretation about learners' preference for complexity is given. This study utilized the neural network to model learners' preference for visual complexity on small screens of mobile computers. Wang (2002) found that the gender factor would not influence the preference for visual complexity. Therefore, this study only considered the age factor. The subjects of this study were 10-64 years old, and were divided into 11 age groups in units of 5 years. They were chosen by using the stratified random sampling method, including 10-14 years old, 15-19 years old, 20-24 years old, 25-29 years old, 30-34 years old, 35-39 years old, 40-44 years old, 45-49 years old, 50-54 years old, 55-59 years old, and 60-64 years old. Each age group consisted of thirty subjects, and thus there were totally 330 subjects surveyed by questionnaires. Pictures with five different levels of complexity were utilized to test the subjects. Each subject was asked to answer a questionnaire and chose his favorite picture among the five testing pictures. The goal is to obtain the percentages (%) of preferences of various age groups for mobile computer pictures with different levels of complexity. These investigation results are further modeled by neural networks. In the learning phase of neural networks, investigated data of the 6 odd age groups (Groups #1, #3, #5, #7, #9, and #11) were selected from the 11 age groups to serve as the training samples. After the neural network is trained, results of all the 11 age groups were predicted by the neural-network model. Neural networks may have many types of architectures. The neural-network architecture utilized in this study is the RBF-NN (radial basis function neural network) model, which is composed of weighted Gaussian function bases (Christodoulous & Georgiopoulos, 2001). This type of neural-network architecture can model strongly nonlinear problems through only simple algebraic operations. Since the learners' preference for a picture is inherently strongly nonlinear behavior, the RBF-NN model becomes a good candidate for modeling such a problem.

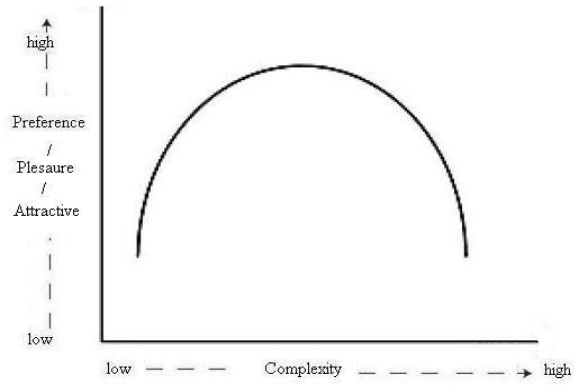

Figure 2. Te inverted U-shaped function for visual complexity.

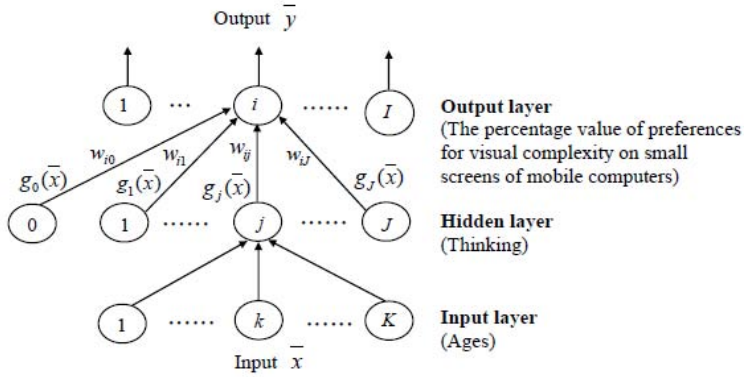

Figure 3. Architectures for the RBF-NN Model.

Figure 3 shows architectures for the RBF-NN model. In Figure 3, the *K* nodes (chosen as *K*=1 in this study) of the input layer represent age, which is normalized into the range of 0 to 1. The hidden layer has *J* nodes, which serve as the thinking process of a neural network. The *J* is chosen as *J*=10 in this study. The output layer has *I* nodes (chosen as *I*=5 in this study) representing the output functions, which are percentages (%) of preferences of various age groups for testing pictures with five different levels of complexity. According to Christodoulous & Georgiopoulos (2001), the output of the RBF-NN can be expressed as

$$y_i = w_{i0} + \sum_{j=1}^{J} w_{ij} g_j(\bar{x}), \; i = 1, 2, \ldots, I, \tag{1}$$

where

$$g_j(\bar{x}) = e^{-\frac{1}{2}(\bar{x}-\bar{v}_j)^T \bar{\bar{\Sigma}}_j^{-1} (\bar{x}-\bar{v}_j)}, \; j = 1, 2, \ldots\ldots, J, \tag{2}$$

represents the nonlinear transform relation between input-layer and hidden-layer variables. In Eq. (2), $\bar{v}_j$ denotes the mean vector for Gaussian functions in the hidden layer, and $\bar{\bar{\Sigma}}_j$ denotes the auto-covariance matrix. The training procedures of the RBF-NN are described in the following (Christodoulous & Georgiopoulos, 2001).

* Step 1: Select initial values for the weights (w_{ij}) from hidden to output layers. These weights are chosen to be small random values. Select initial values for the centers of the Gaussians in the hidden layers. These centers are randomly chosen from the training data. Select initial values for the diagonal elements of the covariances of the Gaussian functions. These variances are all chosen to be equal to some constant.
* Step 2: Present the p^{th} input pattern at the input layer of the RBF-NN.
* Step 3: Utilize Eq.(1) and Eq.(2) to calculate values for nodes in hidden and output layers of the RBF-NN.
* Step 4: Compare the actual output $y_i(p)$ at the output layer and the described output $d_i(p)$ for i = 1, 2, …, *I*. If $y_i(p) = d_i(p)$ for 1 i *I*, go to step 5. If $y_i(p) \neq d_i(p)$ for some *i*, proceed to change the weight or parameter values as follows

$$\Delta w_{ij} = \eta[d_i(p) - y_i(p)]g_j[\bar{x}(p)], \tag{3}$$

$$\Delta \bar{v}_j = \eta g_j[\bar{x}(p)]\sum_{i=1}^{I}[d_i(p) - y_i(p)] \cdot w_{ij}(\bar{x}(p) - \bar{v}_j) \cdot \tag{4}$$

* Step5: If $p=P_T$ and the cumulative error is smaller than a pre-specified threshold, we consider the training completed. If $p=P_T$ and the cumulative error is larger than a pre-specified threshold, then we return to Step 2 starting with the first input pattern of index p=1. If $p \neq P_T$, we return to Step 2, by increasing the pattern index p by one.

After the neural network is trained by some learning samples of $\bar{x} \to \bar{y}$ according to the above procedures, all the weights w_{ij} (i = 1, 2, …, I; j = 0, 1, …, J) will be determined. Therefore, the prediction of $\bar{x} \to \bar{y}$ will be given by Eq.(1). That is, the trained RBF-NN can model the mapping of $\bar{x} \to \bar{y}$. In particular, the trained neural network can predict data of $\bar{x} \to \bar{y}$ that do not belong to the training data sets.

Research Samples

The samples in this study are drawings with black and white outlines, of single scenario without text, as shown in Table 1. There are five testing pictures with different levels of complexity in Table 1, as described in the following.

(1) Picture A: Very high complexity image, with detailed descriptions of figures, objects, scenarios, and backgrounds.
(2) Picture B: Slightly high complexity image, with detailed descriptions of figures, objects and scenarios, but background is slightly simplified.
(3) Picture C: Medium complexity image, with detailed descriptions of figures, objects, and scenarios, but only the most important background information is maintained.
(4) Picture D: Slightly low complexity image, with only descriptions of character details.
(5) Picture E: Very low complexity image, only outlines of characters are retained.

The above five testing pictures are entered into a mobile computer with a small screen (Figure 4). The experimental screen size is 102mm × 62mm (Figure 5). Figure 6 shows the experiment for a subject.

Table 1. The five testing pictures with different levels of complexity.

			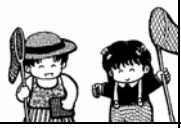	
Picture **A**	Picture **B**	Picture **C**	Picture **D**	Picture **E**
Very high complexity	Slightly high complexity	Medium complexity	Slightly low complexity	Very low complexity

Figure 4. The sample picture is entered into a mobile computer with a small screen.

Figure 5. The experimental screen size.

Figure 6. The experiment for a subject.

Limitations

There are some limitations in this study, as shown in the following.

(1) The sample pictures of this study are homemade and are simple. Practically, pictures on a mobile computer are complex and have many styles. For simplicity, this study focuses on pictures of only one style.
(2) For simplicity, pictures of this study are monochrome. Practically, pictures on a mobile computer are colored.
(3) For simplicity, pictures of this study are static. Practically, pictures on a mobile computer are moving.
(4) For simplicity, pictures of this study contain only icons. Practically, pictures on a mobile computer contain both icons and text.
(5) For simplicity, surveys are made on only 330 subjects form the Southern Taiwan. To improve the accuracy, much more subjects should be tested in the future.

EXPERIMENTAL RESULTS

Following the above investigation procedures, experimental data are recorded and statistically analyzed. Table 2 shows the percentages (%) of preferences of various age groups for mobile computer pictures with different levels of complexity. For clear illustration, the data in Table 2 are further plotted in Figure 7.

Table 2. Percentages (%) of preferences of various age groups for mobile computer pictures with different levels of complexity.

Group	Group #1	Group #2	Group #3	Group #4	Group #5	Group #6	Group #7	Group #8	Group #9	Group #10	Group #11
Ages	10-14 years old	15-19 years old	20-24 years old	25-29 years old	30-34 years old	35-39 years old	40-44 years old	45-49 years old	50-54 years old	55-59 years old	60-64 years old
Preference for Picture A (%)	19.79	18.18	17.03	14.60	17.69	16.44	13.34	12.88	14.01	17.03	21.67
Preference for Picture B (%)	22.24	24.10	25.10	25.25	24.05	23.20	24.83	23.36	23.56	23.34	20.31
Preference for Picture C (%)	24.80	26.38	27.95	26.88	24.92	25.33	25.36	26.82	24.33	25.13	25.22
Preference for Picture D (%)	21.64	19.07	16.59	17.27	16.84	18.24	19.30	19.09	20.19	18.88	20.00
Preference for Picture E (%)	11.98	12.16	13.63	15.79	16.23	16.42	17.38	17.51	18.02	16.10	12.79

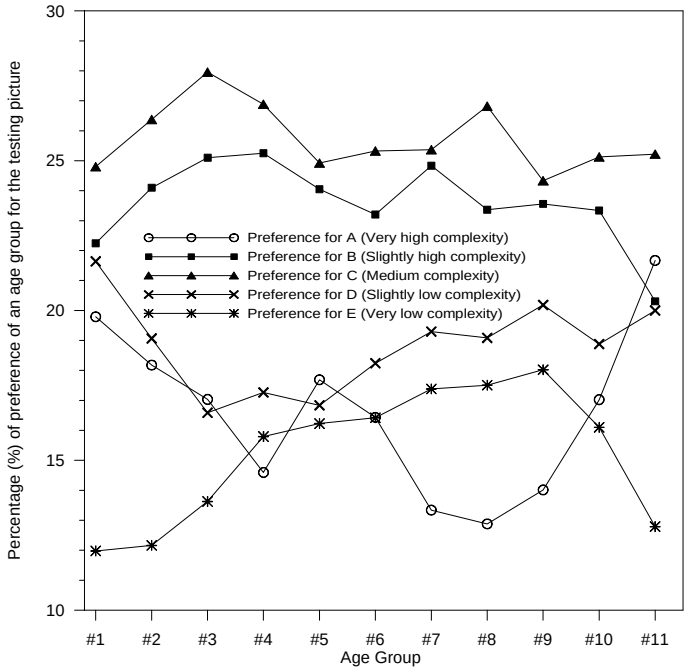

Figure 7. Tendency chart for percentages (%) of preferences of various age groups for mobile computer pictures with different levels of complexity.

Next, the RBF-NN is utilized to model and then predict the results of Table 2 or Figure 7. During the learning phase of RBF-NN, data of Groups #1, #3, #5, #7, #9, and #11 from Table 2 are chosen as training samples, as shown in Table 3. The detailed learning procedures have been mentioned above. After the RBF-NN is trained, it can predict the overall investigation data.

Table 3. Training data sets of the RBF-NN --- odd groups of Table 2.

Group	Group #1	Group #3	Group #5	Group #7	Group #9	Group #11
Ages	10-14 years old	20-24 years old	30-34 years old	40-44 years old	50-54 years old	60-64 years old
Preference for Picture A (%)	19.79	17.03	17.69	13.34	14.01	21.67
Preference for Picture B (%)	22.24	25.10	24.05	24.83	23.56	20.31
Preference for Picture C (%)	24.80	27.95	24.92	25.36	24.33	25.22
Preference for Picture D (%)	21.64	16.59	16.84	19.30	20.19	20.00
Preference for Picture E (%)	11.98	13.63	16.23	17.38	18.02	12.79

Table 4 shows the comparison between RBF-NN predictions and questionnaire survey results. The absolute error in Table 4 means the absolute value for difference between the RBF-NN prediction and questionnaire survey. It is defined as "Absolute error (%) = | RBF-NN prediction (%) - questionnaire survey (%) |". From Table 4, it reports that the maximum error value is 3.64%, the minimum is 0.06%, and the average error value is 1.627%. These results are very accurate and reasonable. Comparisons between RBF-NN predictions and questionnaire survey results for individual testing pictures are plotted in Figure 8 to Figure 12.

Table 4. Comparison between RBF-NN predictions and questionnaire survey results.

Group		Group #1	Group #2	Group #3	Group #4	Group #5	Group #6	Group #7	Group #8	Group #9	Group #10	Group #11
Ages		10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Preference for Picture A (Very high complexity)	Questionnaire survey (%)	19.79	18.18	17.03	14.60	17.69	16.44	13.34	12.88	14.01	17.03	21.67
	RBF-NN prediction (%)	16.89	17.57	14.78	15.22	16.08	16.18	14.88	12.16	14.08	14.94	22.40
	Absolute error (%)	2.90	0.61	2.25	0.63	1.61	0.25	1.54	0.72	0.06*	2.09	0.73

Preference for Picture B (Slightly high complexity)	Questionnaire survey (%)	22.24	24.10	25.10	25.25	24.05	23.20	24.83	23.36	23.56	23.34	20.31
	RBF-NN prediction (%)	24.89	25.57	23.70	23.62	22.01	25.36	27.34	21.82	22.38	20.19	21.81
	Absolute error (%)	1.16	1.47	1.40	1.63	2.04	2.16	2.51	1.54	1.18	3.15	1.50
Preference for Picture C (Medium complexity)	Questionnaire survey (%)	24.80	26.38	27.95	26.88	24.92	25.33	25.36	26.82	24.33	25.13	25.22
	RBF-NN prediction (%)	25.96	24.87	28.89	28.54	21.80	21.94	27.91	27.99	27.96	22.85	27.31
	Absolute error (%)	1.16	1.50	0.93	1.66	3.13	3.38	2.55	1.17	3.64*	2.27	2.10
Preference for Picture D (Slightly low complexity)	Questionnaire survey (%)	21.64	19.07	16.59	17.27	16.84	18.24	19.30	19.09	20.19	18.88	20.00
	RBF-NN prediction (%)	18.61	18.29	18.45	17.58	17.47	20.73	16.91	21.68	23.00	17.20	19.75
	Absolute error (%)	3.03	0.78	1.86	0.31	0.64	2.49	2.39	2.59	2.81	1.68	0.25
Preference for Picture E (Very low complexity)	Questionnaire survey (%)	11.98	12.16	13.63	15.79	16.23	16.42	17.38	17.51	18.02	16.10	12.79
	RBF-NN prediction (%)	13.70	13.10	13.10	18.06	16.64	16.92	19.34	18.24	15.40	16.62	14.66
	Absolute error (%)	1.72	0.94	0.53	2.27	0.41	0.49	1.96	0.73	2.62	0.51	1.87
※ Absolute error (%) = | RBF-NN prediction (%) - Questionnaire survey (%) |												

DISCUSSION

Image is generated by a computer to blend with the environment to enhance the visual experience. Visual complexity is a multiple concept that combines picture attributes with picture variables. Thus, it does not merely refer to the density of picture composition, but is also influenced by many different factors, such as picture size, line, style, form, and color. This study discussed the amount of interior details inside a picture and its background information. The learners' preference affected by age factor is discussed. Table 5 shows the results from Table 4 sorted by total subjects' preference for testing pictures. From Table 5, it indicates that learners most prefer the picture with medium complexity (Picture C, survey: 25.74%), followed by the picture of slightly high complexity (Picture B, survey: 23.58%). The possible reasons are as bellows. First, the two testing pictures (C & B) contain moderate amount of vision elements and appropriate amount of information communication. They conform to an acceptable degree of visual capacity without increasing visual and cerebral loads. Second, the two testing pictures (C & B) are not too crowded so that the picture subject is clear at a glance. That is, they have the most comfortable density degree for visual elements. Third, the two testing pictures (C & B) have proper guiding functions and strong communication and transmission abilities.

The data in Table 5 also indicate that learners most dislike the picture of very low complexity (Picture E, survey: 15.27%), followed by the picture of very high complexity (Picture A, survey: 16.61%). This implies that the picture with too much or too little information is disadvantageous to visual communication in learning. The possible reasons why learners dislike the picture of very low complexity (Picture E) are as bellows. First, the picture of very low complexity is plain with tedious and empty senses so that it is not interesting to the learners. Second, learners feel that the picture of very low complexity is incomplete with no visual strength or feeling of quantity. Third, the picture subject is unclear, and provides insufficient stimulation for the learning. The possible reasons why learners dislike the picture of very high complexity (Picture A) are as bellows. First, the picture of very high complexity contains too many details unrelated to the subject and thus the normal learning is influenced. Second, the subject content cannot be highlighted in a short time due to too much information. This is disadvantageous to visual communication and learning. Third, learners can process only a part of the information when they are presented with a very complex picture. Thus the remaining information will be neglected and meaningless.

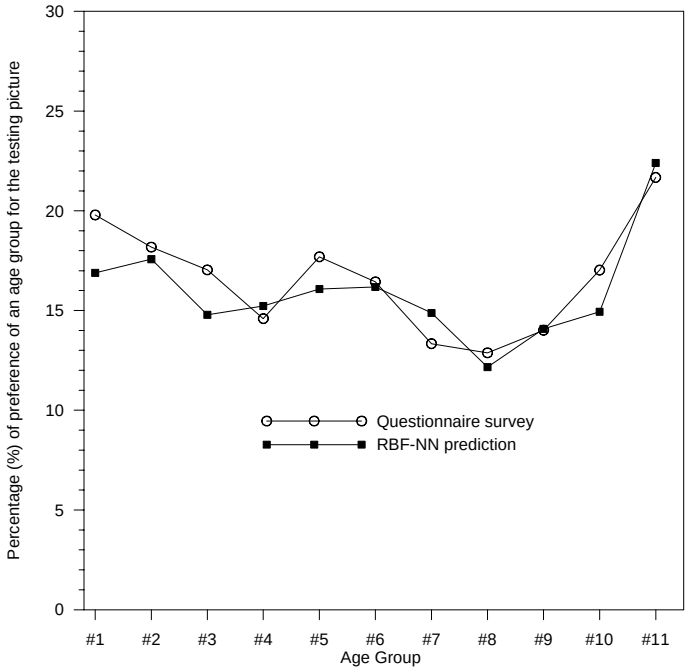

Figure 8. Comparison between RBF-NN predictions and questionnaire survey results --- Picture A (Very high complexity).

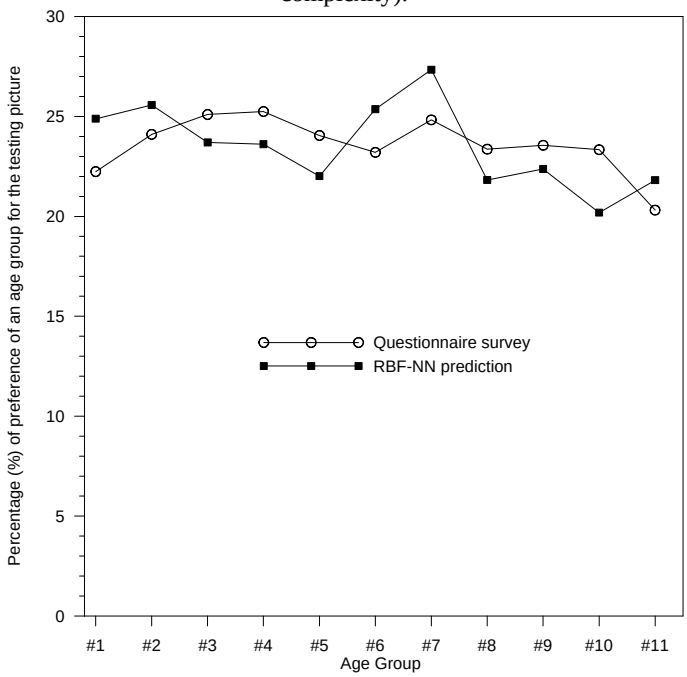

Figure 9. Comparison between RBF-NN predictions and questionnaire survey results --- Picture B (Slightly high complexity).

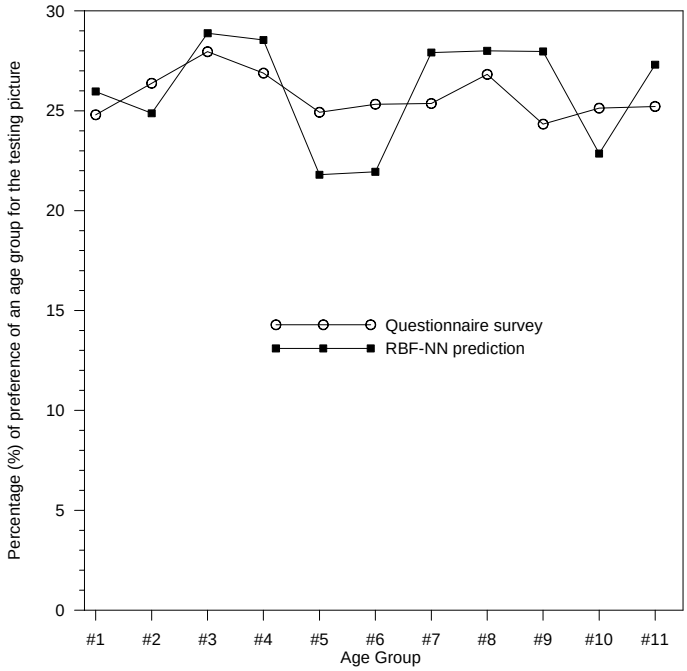

Figure 10. Comparison between RBF-NN predictions and questionnaire survey results --- Picture C (Medium complexity).

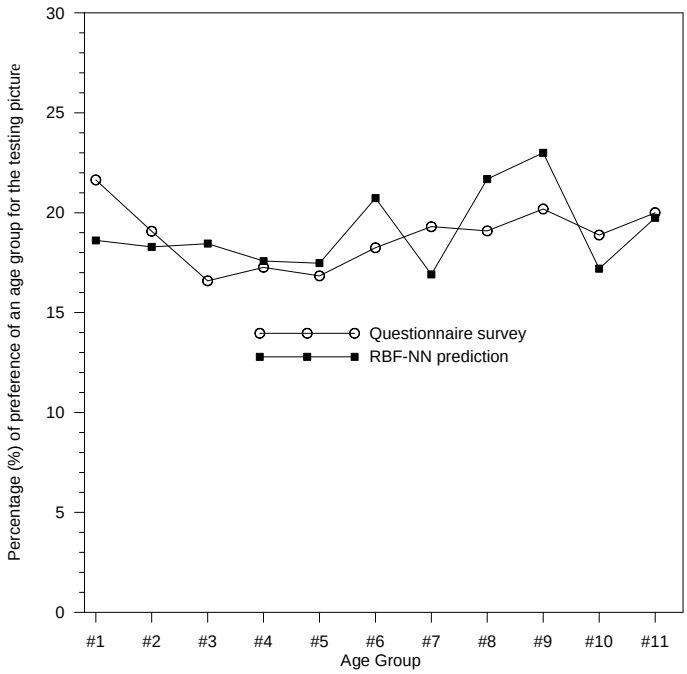

Figure 11. Comparison between RBF-NN predictions and questionnaire survey results --- Picture D (Slightly low complexity).

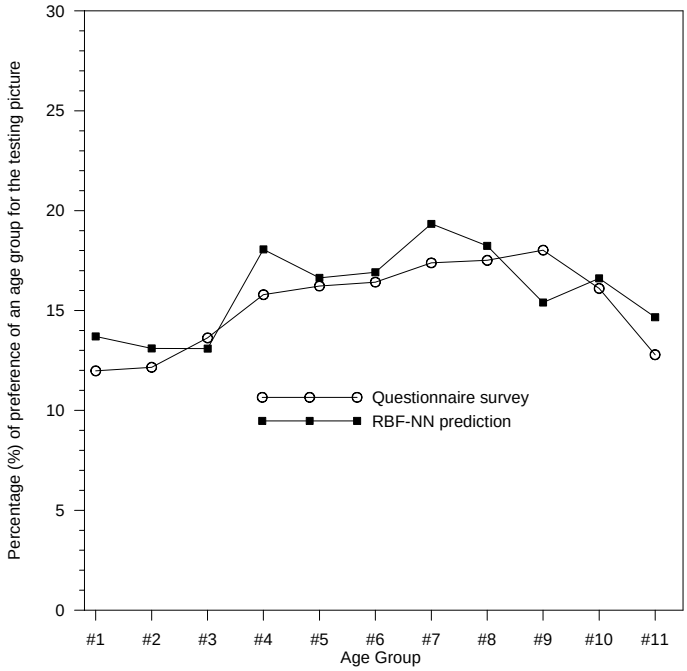

Figure 12. Comparison between RBF-NN predictions and questionnaire survey results --- Picture E (Very low complexity).

Table 5. Results from Table 4 sorted by total subjects' preference for testing pictures.

Testing Picture					
Sorted by Subjects' Preference	1	2	3	4	5
Visual complexity	Medium complexity	Slightly high complexity	Slightly low complexity	Very high complexity	Very low complexity
Picture number	Picture C	Picture B	Picture D	Picture A	Picture E
Questionnaire survey (%)	25.74	23.58	18.83	16.61	15.27
RBF-NN prediction (%)	26.00	23.52	19.06	15.93	15.98
Absolute error (%)	2.14	1.80	1.71	1.22	1.28

The complexity of a picture has significant influences on cognitive learning and these influences are tightly related to age (Micklos, 1982). Although most subjects disliked the picture of very high complexity, there were special groups of learners preferring this picture. According to Figure 8, the learners in younger and older age groups most liked the picture of very high complexity, and the preference curve is slightly U-shaped. The learners of the group "60-64 years old" (group #11) and the group "10-14 years old" (group #1) specially prefer the picture of very high complexity. The possible reasons for this phenomenon are as follows. First, the picture of very high complexity has visual integrity, and is then vivid, lively, entertaining, and vital. Second, learners sometimes selected a picture according to their psychological perceptions for different psychological conditions. Thus the learners of older and younger age groups may psychologically select their preference without basing on visual factors. Third, the learners in younger and older age groups did not like comfortlessness, loneliness or emptiness. This will influence the choice of preference for pictures. This finding is consistent with the Realism Theories, which assert that the learning effect of pictures increases with visual complexity. Only a few researchers, e.g., McDougall & Reppa (2008) think that viewers prefer simple pictures. Figure 12 shows that neither the older nor the younger learners like the picture of very low complexity. The curves of Figure 12 are slightly inverted U-shaped. The older and younger learners may have some similarities in psychology (Siegler & Alibali, 2005; Peng, 2008). In general, they are mentally empty, afraid, dependent, and short of a sense of security. Detailed pictures provide viewers more entertainment (Tsai, Chang, Chuang & Wang, 2008), and hence

they preferred the picture of very high complexity.
Figure 13 shows the tendency chart for Table 5, which is plotted with respect to levels of complexity for testing pictures. Note that the curve in Figure 13 is approximately inverted U-shaped. This is consistent with Figure 2, which is the viewpoint of numerous scholars studying visual complexity (Berlyne, 1974; Chang & Wei, 2002; Hsu & Wang, 2010; Tucha et al., 2009; Hurt & Kirk, 1988; Angert, 1980). Taking a general view of Figure 13, the final finding of this study is similar to the viewpoint of Relevant Cue Hypotheses, but different from the viewpoint of Realism Theories. From the curve of Figure 13, the maximum value occurs at the medium level of complexity (Picture C, survey: 25.74 %). In addition, the learners preferring pictures of medium complexity and slightly high complexity are about half of total subjects. Wang (2002) found that the subjects thought that the optimum computer screen picture only needed to emphasize the important part of the picture, and thus excessive detail description was unnecessary. For learning, pictures of medium complexity generally have better learning effects, and higher relative learning efficiency (Antes & Metzger, 1980).

After comprehensive discussion, it was found that the influencing factors in the preference of learners for visual complexity could be divided into objective and subjective factors. The objective factors for complexity depend on the structure of a picture. They include the picture line thickness, style, manifestation, shape, size, information content, and elements' distribution. While the subjective factors for complexity depend on individual differences of learners. They include learners' psychology, life background, personal preference, visual system difference, learning background, and age. In particular, the age has the most significant influence (Travers & Alvarado, 1970). The objective factors shall be observed using the subjective factors. Thus different learners will have different cognition results. Existing studies reported that the objective factors and the subject factors for complexity are correlated (Attneave, 1957; Chipman & Mendelson, 1979) and interactive (Strother & Kubovy, 2003). The above factors are listed in Table 6.

Table 6. Factors affecting learners' preference for visual complexity.

Structure of a picture (objective factors)	Individual differences of learners (subjective factors)
* line thickness of a picture * style of a picture * manifestation of a picture * shape of a picture * size of a picture * information content of a picture * elements' distribution of a picture	* psychology of learners * life background of learners * personal preference of learners * learning background of learners * age of learners * visual system of learners

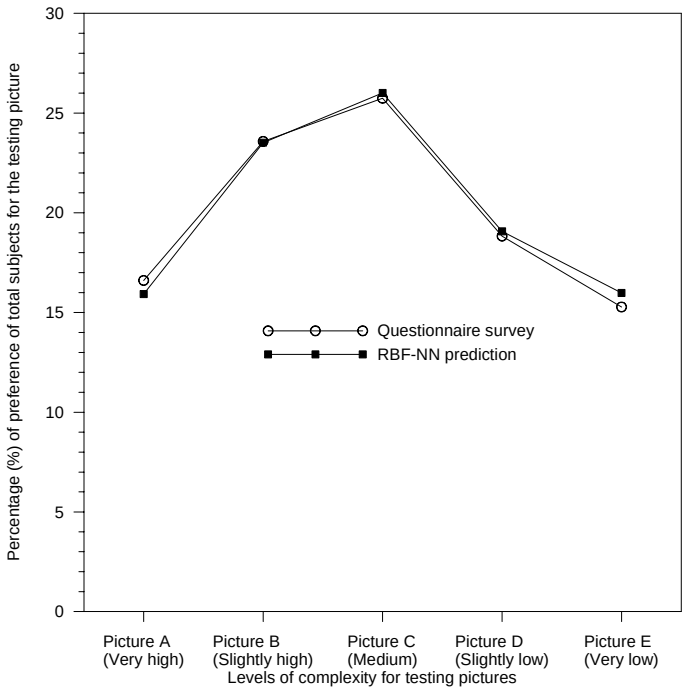

Figure 13. Tendency chart for Table 5, which is plotted with respect to levels of complexity for testing pictures.

CONCLUSIONS

The neural network has been widely used in engineering science, and its nonlinear modeling and predicting abilities have been proven. In this study, the RBF-NN has been successfully applied to visual communication of educational technologies. The average absolute error of prediction is only 1.627%, which is very accurate. With the use of RBF-NN model, only about half of investigation data are required to predict the overall investigation results. This will greatly reduce the investigation efforts. The important problems in this study are age, human vision acuity, and visual information processing capacity, which will affect learners' preference. Thus the learners will have logical decisions and different preference. This study found that learners' preference for pictures has differences and obviously varies with age. This is because learners have their favorite perception modes with differences in psychological cognition, and thus preference occurs in different age groups. The visual complexity of this study is the visual evaluation of integrity composed of many internal elements. Discussions regarding the visual complexity of mobile computers have been given in this study. Learners in different age groups will have different visual acuities and visual information processing capacities. Under the influences of both objective and subjective factors for complexity, learners will select their preferences for picture compositions by personal perception. This study found that only the learners of the younger and older age groups have special preference for pictures of very high complexity. Most learners prefer pictures of medium complexity, followed by pictures of slightly high complexity. This finding is consistent with the results of Dwyer (1978) and Berlyne (1974). In addition, our results are consistent with the viewpoints of Relevant Cue Hypotheses, which present the picture preference distribution as an inverted U-shaped curve. The vision is very important in educational technologies. It produces quite important functions and has already become indispensable arts of teaching materials. When educators choose and determine the type of vision for teaching materials, they should not base choices on their own aesthetic conceptions. To enhance learning effects, educators should choose the suitable vision according to learners' preference. This study will be helpful in vision problems of educational technologies.

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USAGE OF THIN-CLIENT / SERVER ARCHITECTURE IN COMPUTER AIDED EDUCATION

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ABSTRACT
With the advances of technology, thin-client / server architecture has become popular in multi-user / single-network environments. Thin-client is a user terminal in which the user can login to a domain and run programs by connecting to a remote server. Recent developments in network and hardware technologies (cloud computing, virtualization, etc.) have made the thin-client / server architecture more efficient with respect to total cost of ownership, administration, maintenance, security and power consumption. Therefore, the usage of thin-client / server architecture in computer-aided education has scaled up exponentially since 2010. In this study, we present our architecture in a Public College with 270 user terminals and 9 servers. We describe the planning, design, testing and implementation phases of the new architecture and analyze the outcomes of this implementation in regard to students and staff.
Keywords: Computer Aided Education;Thin-Client / Server Architecture

INTRODUCTION

Thin Client / Server Architecture, which has been one of the hot topics in the information systems literature for the last decade, nowadays, becomes a powerful, secure and cost-efficient solution for Health, Finance, Education and other industrial sectors (Energy Calculator for PC Equipment). For instance, several public/private companies/institutions have tendency for cloud computing, virtualization, etc. to keep up with the speed of hardware/software technology development, and this improves the preference of thin client / server architecture. In addition to this, thin client / server architecture has different characteristics according to classical personal computer usage, which are described below in detail.

Thin clients improve information system efficiency at several institutions. In thin client / server architecture, software and data are stored in the remote servers on the network. However, it is possible to communicate and exchange data with other clients on the network. As there is no local disk or portable media drive on the thin client, user data is stored on the remote file servers on the network. Software upgrade is done remotely on the network. Thin clients have more lifetimes according to personal computers as they have less vulnerable hardware parts. Moreover, it is easier to use thin clients as they have standard software and user interface all over the related institution. In addition to this, ease of thin client installation makes recovery in case of system crash faster and lessens the need for technical assistance.

The information and data security can be improved with the usage of thin clients. As they do not have local disks or portable media drives, they are less vulnerable to anti-viruses and spy wares. Users can only store data on remote file servers and cannot copy or move critical data to a portable media. The usage of thin clients in a domain on the network makes system administration easier and safer with respect to the remote user control and system policy checking in the domain that lessens the system internal threats.

Thin client / server architecture is a cost-efficient information system infrastructure. Thin clients are cheaper, have less hardware parts and more lifetimes. At the same time, system management and maintenance is easier as software upgrade and data storage/backup are done on remote servers. Finally, thin clients have less power consumption than personal computers. According to above-mentioned characteristics, a detailed comparison of thin clients and personal computers with respect to several criteria is summarized in Table 1.

Table 1: Comparison of PC and Thin Client with respect to several criteria.

Criteria	P C	THIN CLIENT
Operating System	Manual installation on local disk	Installed on flash memory (DOM). No need for manual installation.
Anti-Virus Protection	Needs anti-virus protection software	No need for anti-virus protection for portable media
Software Upgrade	Needs for manual software upgrade periodically.	No need for manual software upgrade. Only remote software upgrade.
System	Risk for system crash according to user	Remote system recovery in case of system

Recovery	faults.	crash.
Local Drive Crash	Risk for local drive crash (bad sector, etc.)	No local drive and no data loss.
Hardware Upgrade	Needs for hardware upgrade periodically.	No need for hardware upgrade.
Data Backup / Recovery	Needs for data backup periodically in case of recovery after system crash.	Usage of remote file server. No local backup.
Power Consumption	300 - 350 watt. (avg)	8 - 20 watt. (avg)
Technical Assistance	Needs allocated technical staff for frequent hardware/software problems with respect to more portable hardware parts and software on local drive.	Less hardware/software problems and less allocated technical staff with respect to lower risk for system crash.
Emulation	Needs emulation software for connection to servers such as AS/400.	Pre-installed emulation software for connection to several server types.
Cost of Purchase	600 – 1000 $ (avg)	250 – 400 $ (avg)
Noise and Physical Appearance	Works more noisy according to several hardware parts. Needs more space.	Works quieter and needs less space.

An example total cost of ownership analysis is presented in Table 2 with respect to purchase costs, software license costs, network support costs, desktop support costs, upgrade costs, security costs, power consumption, heat generation and office real estate.

Table 2: Comparison of PC and Thin Client in terms of Total Cost of Ownership.

Criteria	PC	Thin Client	Saving ($)
Purchase Cost	650	350	300
Hardware Upgrade (CPU, Memory, Disk etc.)	320	-	320
Software Upgrade (OS, User Programs, etc.)	250	-	250
Virus Protection	30	-	30
Upgrade Labour Cost	250	-	250
Technical Staff Cost. (Per 100 users)	3 staff = 180.000 (annual) 1800 (per user)	1 staff = 60.000 (annual) 600 (per user)	1200
Data Backup and Storage Maintenance	200	-	200
Power Consumption (watt/h)	350	20	450
Total savings per client after 5 years: 3000 $			

In the light of above analysis, we conclude that:

* Using thin client instead of PC saves 3000$ after 5 years (50$ monthly). In other words, thin client redeems itself after 7 months.

* In a middle-sized unit, using 100 thin client instead of 100 PC saves 300000$ in total. Besides, the fact that hardware is an imported product and has foreign currency, the cost analysis shows the contribution of usage of thin client to country's economy.

Thin client / server architecture has a prominent advantage in terms of power consumption (Energy Calculator for PC Equipment). Forrester Research Inc. in 2008 shows that thin clients reduce power usage by 24% and carbon dioxide emission by 23% and increases the life span by five to ten years. By replacing desktops by thin clients, nearly two-thirds of the power consumption can be reduced (Davis, 2008).

Thin client / server architecture is used by educational institutions as they allow students to analyze real data in their research without modifying or removing data either deliberately or unconsciously (Hatakeyama, Kataoka, Nakajima, Watabe, Okuhara, Sagara, 2011, p.494-497). Also, this architecture disallows unauthorized access to critical data from outside the institution. Moreover, computer-aided education has overlapping characteristics with thin client / server architecture in terms of multiple usage of digital resources and cost-effectiveness (Reynolds, 2006, p.73-78).

There are a lot of benefits of cloud computing in education, (e.g. providing educational resource storage and databases, e-mails, educational applications and tools for students and teachers and clients located all over the world involving in an educational program) and advantages in cost for improving the quality of system in terms of Total Cost of Ownership (Anwar Hossain Masud, Xiaodi Huang, 2012). This encourages the use of thin clients in several implementation areas and has renewed people's interest in the thin client concept (Deboosere, 2012, p.60-67).

IMPLEMENTATION

To make use of thin client / server architecture in our public college having approximately 1000 students and 500 staff, we install 270 thin clients in total (222 for students and 48 for staff) at the moment. We also install 7 terminal servers and 2 file servers. The network diagram of this architecture is represented in Figure 1.

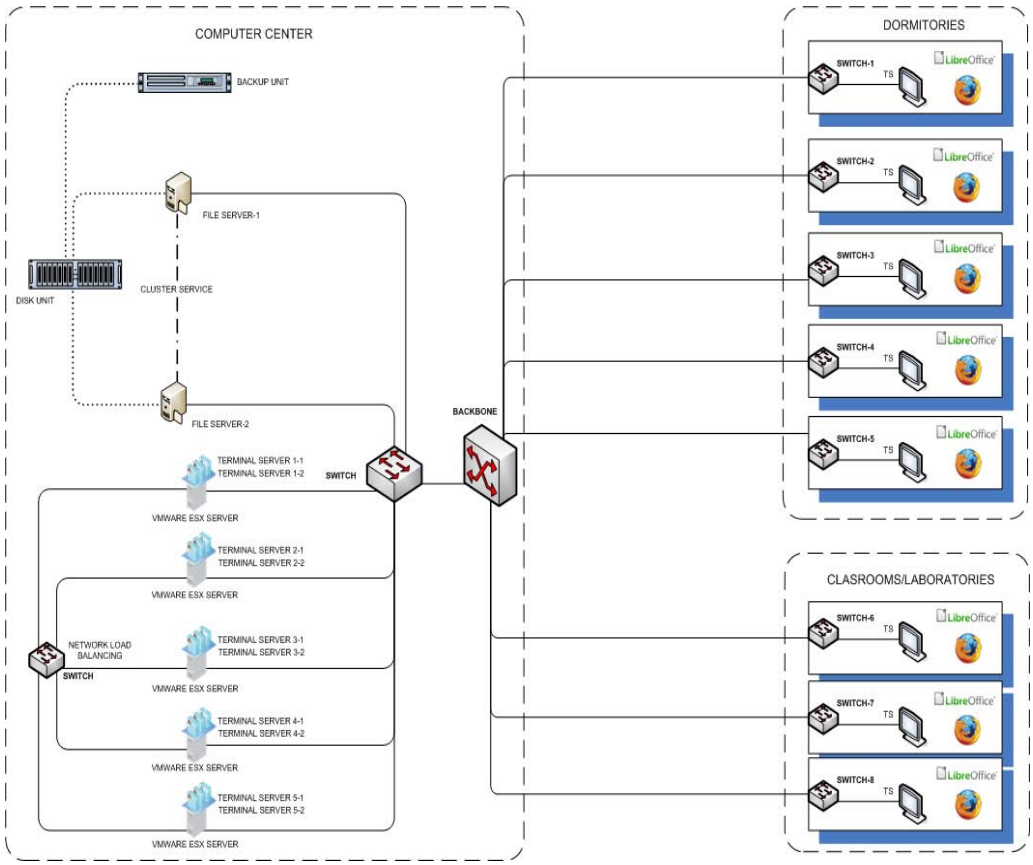

Figure 1: Thin client / server architecture in our college

We use thin clients having model as ASTC TA-1381 and terminal/file servers having model as IBM X3650-M3. We utilize VMware ESXi 4.5 software on terminal servers for the purpose of virtualization. We install Windows 2008 R2 Enterprise operating system on the servers. Also, we install Libre Office, Foxit Reader, 7zip, IrfanView, Mozilla Firefox, Thunderbird, Notepad++, VLC player, Eclipse and Dev C++ software programs on the terminal servers for users through thin clients.

We reserve one-gigabyte data storage on the file server for each student and the owner student can only access his/her corresponding data storage. In addition to this, we define roaming profiles for each student so that each

student can define and use personal settings (shortcuts, program settings, etc.) on different thin clients without any loss of information.

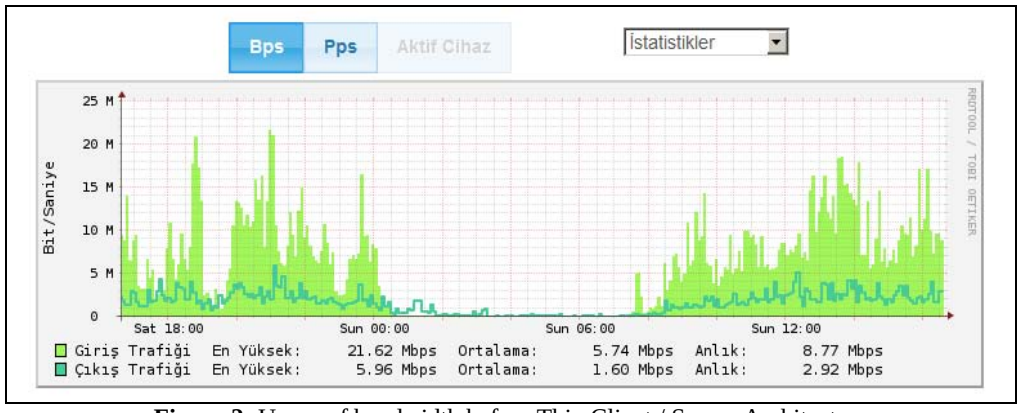

Figure 2: Usage of bandwidth before Thin Client / Server Architecture

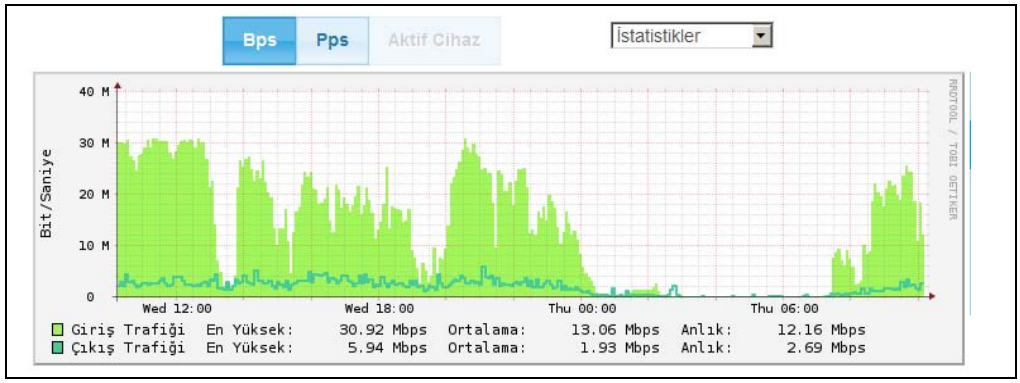

Figure 3: Usage of bandwidth on Thin Client / Server Architecture

We define two different server profiles on each terminal server with the usage of VMvare ESXi virtualization software. The first one is defined for students and the other one is defined for staff use. There are different settings and software programs on two virtual terminal server types. We define different hardware (SPU, RAM, etc.) usage settings on two servers at different times during the day. For instance, we reserve most of the hardware capacity for staff during working hours as the students are taking classes. And, we reserve most of the hardware capacity for students after working hours as students mostly use thin clients on those times.

After the implementation, 10 hours labour force per daily is needed for maintenance problems. A survey about the new architecture is applied on the users and 91% of them express their satisfaction about the usage of thin clients. In addition to this, we analyze that the usage of bandwidth has increased after the implementation of the new architecture. At the moment, we have 30 Mbit/s Internet connection bandwidth in our college. The usage of bandwidth before this implementation is plotted in Figure 2, whereas, Figure 3 represents the usage of bandwidth on the new architecture.

Consequently, we make cost-effectiveness analysis of the new architecture by using several tools implemented in the literature and web. The overall analysis is described in Table 3. Although the results vary because of the different parameters of tools, we conclude that we get a significant amount of saving by using this new architecture in our college.

Table 3: Cost saving analysis of our architecture according to several tools

Tool	Total saving	Period	Parameter
www.xiteb.net	107154 £	Annual	270 PC
www.netvoyager.co.uk	9,614,000 $	Five year period	1000 Users
www.2x.com	312660 $	Annual	270 PC

www.eu-energystar.org	79595 €	For six year	270 Thin Client instead of 270 PC

CONCLUSION

The usage of thin client / server architecture for the purpose of computer-aided education scales up with respect to developments in the information systems technology. In this study, we present our architecture in a public college in which we install 270 thin clients for students and staff. The increase of bandwidth usage represents the effectiveness of this new architecture on the education in our college.

Students and staff can access to their data from several units (dormitory, lab, library, etc.) by using the same settings and interface (which is more user-friendly) as a result of roaming profile definitions. The need for new software in education can be met easily by installing them on a small number of terminal servers. In addition to this, we adjust the usage of resources by students and staff by using virtualization technologies so that, all users can use thin clients more effectively.

We also apply a survey on the users about the performance of new system and most of the users show their satisfaction through the survey. We also need less maintenance labour for hardware/software problems on the client side.

We analyze the cost of new architecture according to several tools exist on the web. One of the important results is the less power consumption of thin clients, which is approximately 10% of personal computers. This has a big contribution not only to the total cost of ownership but also to reduce environmental impact. This can be seen as a social responsibility. After getting a primary saving and social responsibility contributions by implementing new computer architecture in education, we conclude that, the usage of thin client / server architecture will become widespread on educational institutions.

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USE OF ICT TECHNOLOGIES AND FACTORS AFFECTING PRE-SERVICE ELT TEACHERS' PERCEIVED ICT SELF-EFFICACY

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ABSTRACT
This study aims to identify both level and frequency of ICT technology use and factors affecting perceived self-efficacy levels of pre-service English Language Teaching (ELT) teachers' (n=241) ICT self-efficacy. The data were collected through a survey (Çuhadar & Yücel, 2010) during the 2011-2012 academic year that includes items on the use and frequency of ICT technologies along with three open-ended questions. The responses were analyzed in frequency and percentages using descriptive statistics within the framework of Technology Acceptance Model (TAM) based on Social Cognitive Theory and the content analysis technique. It could be concluded that majority of the pre-service ELT teachers find themselves self-efficacious in the use of ICT. Results further suggest that the perceived use of computers, experience and confidence play significant role while lack of knowledge and skills, technical problems and lack of confidence negatively influence ICT self-efficacy.

INTRODUCTION

The need, nowadays sometimes *the pressure*, to prioritize teaching with technology considering teachers' level of preparedness has become more demanding due to the rapid advancements in the educational use of technology. This need has been extensively emphasized in a variety of contexts (Albion, 1999; Chen, 2008). Nonetheless, numerous teachers' use of technology still has not extended over emails and search engines (Chen, 2008; Ertmer & Ottenbreit-Leftwich, 2010; Jimoyiannis & Komis, 2007; Markauskaite, 2007; Tezci, 2009; Tondeur, van Braak, Sang, Voogt, Fisser & Ottenbreit-Leftwich, 2012) albeit the excessive number and variety of Web 2.0 tools.

First, and most importantly, Bandura's (1999:2) definition of self-efficacy (SE) as "beliefs in one's capabilities to organize and execute the courses of action required managing prospective situations." sketches the effects of one's actions for the time being and later. Thus, within the context of social cognitive theory, as Bandura later (2006:4) stated SE is an asset to "self-development, successful adaptation and change" that influences either directly or indirectly goals, motivation and determination to cope with difficulties. In the educational settings, along with the recent changes in the roles of actors in education, students have become stronger in the way they control their learning process by self-directed learning including through the Internet. Essentially, teachers' level of SE directly influences the pedagogical outcomes. Friedman and Kass (2002) updated the teacher self-efficacy definition by combining classroom and organizational efficacy in that:

> "teacher's perception of his or her ability to (a) perform required professional tasks and to regulate relations involved in the process of teaching and educating students and (b) perform organizational tasks, become part of the organization and its political and social processes." (p. 684).

Research on SE has explicitly addressed its impact on technology use such as Albion (1999) considered teachers' SE beliefs as one of the leading factors affecting the success of technology integration. Perceived beliefs of teachers regarding technology are significant; they are likely to determine the use of technology and related decisions and teacher behavior in the classroom (Sang, Valcke, van Braak & Tondeur, 2010).

In the Turkish context, a plethora of research (Akkoyunlu & Kurbanoğlu, 2003; Çelik & Yeşilyurt, 2013; Demiralay & Karadeniz 2010; Deryakulu, Buyukozturk, Karadeniz & Olkun, 2008; Korkut & Akkoyunlu, 2008; Tezci, 2009; Topkaya, 2010; Usluel, 2007) in relation to ICT attitudes and self-efficacy are available; mostly, the studies reveal similar findings such in Çelik and Yeşilyurt (2013) featuring attitudes to technology, perceived computer SE and computer anxiety as predicators of effective computer-assisted education. In a more general sense, Deryakulu, Buyukozturk, Karadeniz and Olkun (2008) outlined the positive and negative factors during the ICT implementation process. Furthermore, Tezci (2009) analyzed the effect of teachers on ICT use in education and concluded that ICT use among teachers in Turkey is low and limited to the Internet, email, word processing and some educational CDs. Teachers with previous experience and higher levels of knowledge and

attitude are likely to exert the ICT tools. Similarly, Demiralay and Karadeniz (2010) analyzed the effect of ICT on elementary pre-service teachers' perceived literacy SE and pre-service teachers' computer experience, skills and frequency of computer and internet use, access opportunities to computer and internet were found to be leading influencing factors. With pre-service primary education teachers, Usluel (2007) identified the level and duration of ICT usage as primary factors having an impact on the information literacy SE. Besides, Akkoyunlu and Kurbanoğlu (2003) explored the relation between pre-service teachers' perceived information literacy SE and perceived computer SE and found a positive correlation with varying degrees of change over the years. Korkut and Akkoyunlu (2008) investigating the foreign language pre-service teachers' information and computer literacy perceived SE, announced a high level of abovementioned SE types and a positive inter-relation. Correspondingly, Topkaya (2010) revealed a positive correlation between computer and general SE focusing on the pre-service English language teachers.

Theoretical background to this study is based on Social Cognitive Theory as outlined by Bandura (2001:10) in relation to perceived self-efficacy placing it as the major key agent in the adaptation and change, positive or negative inclination of thought and "self-regulation of motivation through goal challenges and outcome expectations". By this means, SE not only influences types of activities to be engaged in but also selection of behaviors that leads to a direction in personal development. A complementary model to refer is Technology Acceptance Model (TAM) developed by Davis (1986) that guides in explaining and predicating behaviors of ICT users as an extended version of the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980, as cited in Park, 2009: 151). TAM with its dimensions of perceived usefulness, perceived ease of use, attitude towards, behavioral intention to use, external variable and actual use, has been referred and confirmed by numerous research (Dillon & Morris, 1996; Park, 2009; Silva & Dias, 2007; Yuen & Ma, 2008). In line with the model, this study intends to deduce a blend of perceived usefulness of ICT technologies, attitudes to technology use for education, affecting variables and further intentions of use by eliciting responses from the participants through analysis of their statements.

What is commonly stated in the aforementioned studies puts the teachers in the center for the successful integration of technology. Therefore, teachers needed to be instructed and trained during their pre-service training and regarding this fact this study highly values the pre-service teachers' insights about ICT. All in all, this study considers the factors affecting pre-service teachers ICT SE to frame their preparedness for ICT integration to their own teaching context.

THE STUDY

Self-efficacy levels of teachers play a significant role on the effectiveness of teaching pedagogy; as for the SE for the educational use of information and communication technologies (ICT), technology integration to education can be traced at the very least from the teacher perspective. Given its place in language teaching, this study aims to identify self-efficacy levels of pre-service English Language Teaching (ELT) students for educational use of ICT. According to Jimoyiannis and Komis (2007), among the secondary teachers of different subject, English teachers did not effectively integrated ICT and resisted to a great extent to accept ICT as a pedagogical tool. Bearing in mind these findings, the focus is the self-perception of participants' ICT use self-efficacy, besides the positively and negatively perceived factors affecting ICT integration to education. Within this framework, this study seeks answers to the following questions:

1. What are the ELT students' ICT technology frequency and use levels?
2. How do ELT students perceive themselves about their ICT SE?
3. What are the positive factors affecting perceived ICT SE levels of ELT students?
4. What are the negative factors affecting perceived ICT SE levels of ELT students?

The findings of this study need to be interpreted regarding its limitations; the research is limited to the number of students in a program of Faculty of Education, properties of the location (geographical as well as educational) and single location (one state university) and timing of the application. One final restriction is the blistering and non-stop technological developments in that the list of ICT technologies could have included some social network websites and tools used for educational purposes.

In the present study survey method was used (Karasar, 1991:77) as the pre-service ELT teachers' self-perceptions' of ICT use efficacy and the positive and negative perceived factors affecting ICT integration to education were examined.

PARTICIPANTS

Pre-service ELT students (n=241) formed the study group which consisted of 195 female and 46 male

participants during the 2011-2012 academic year**.** Age range of the students is between 19 and 26. The number of students according to their year of study is as follows: 74 first year, 91 second year, 51 third year and 25 fourth year students. The study group is composed of the students available at the time of survey implementation in the classroom; thus, the whole group was treated as the study group. The survey was administered in Turkish for better comprehension of the items and expression to the responses despite the presumably high English proficiency level of students. The ICT background of the participants, though could vary in a wide range, includes the ICT course offered starting from fourth grade of primary education. Nonetheless, as of 2007-2008 school year, Board of Education (Talim Terbiye Kurulu Başkanlığı – TTKB) in Turkey extended the duration of ICT course to the first eight years of compulsory education (TTKB, 2006). Moreover, students during secondary education most probably have used computers at least for personal uses. When the current undergraduate pre-service ELT program is examined, it is seen that during the training of pre-service ELT teachers at Educational Faculties in Turkey*, Computer I and II(1st grade), Instructional Technologies and Materials Design (ITMD)*) (2nd grade), *Language Teaching Materials Adaptation and Development* (4thgrade) courses are offered as compulsory courses and *Computer-Assisted Language Learning (CALL)* course is offered during the last year of study as an optional course as stated by the Council of Higher Education (Yüksek Öğretim Kurulu Başkanlığı – YÖK, 2007). When the previous undergraduate education faculty programme is examined, it is seen that Instructional Technologies and Materials Development (ITMD) course was offered to pre-service ELT teachers instead of Instructional Technologies and Materials Design (ITMD) in their second year at their training (YÖK, 1998).

DATA COLLECTION INSTRUMENT AND ANALYSIS

Within this context, the study followed mixed approach using both quantitative and qualitative research design by administering a survey originally developed by Çuhadar and Yücel (2010) that is composed of three parts. Part I with six questions aims to identify basic information about the participants (i.e. age, gender, internet access and frequency of use), Part II includes a list of computer and hardware products (15 items) along with software and communication services (13 items) to uncover the participants' level and frequency of ICT technologies use. In Part III, three open-ended questions directed to gather detailed reflection are as follows:

1. As a prospective foreign language teacher, do you think you have ICT self-efficacy?
2. What factors have positively influenced your ICT self-efficacy beliefs during your undergraduate studies?
3. What factors have negatively influenced your ICT self-efficacy beliefs during your undergraduate studies?

Responses for each grade were collected, typed, listed and categorized following the content analysis technique (Yıldırım & Şimşek, 2008) as was carried out by Çuhadar and Yücel (2010). For a reliable categorization process, the two researchers were both worked on grouping the statements and naming the categories. On the other hand, the use level and frequency of ICT technologies were analyzed through descriptive statistics; in other words, calculating percentage and frequency values. Furthermore, the participants have been listed and coded in numbers; for instance, referring to the student numbered 22 as S22 in short as Çuhadar and Yücel (2010) did.

FINDINGS

Responses to the survey and open-ended questions are organized and displayed in tables to underpin participants' ICT technology frequency and level of use as well as to uncover the underlying the reasons. To begin with, Table 1 demonstrates participants' ICT technology frequency and level of use concentrating on computer and hardware products in frequency and percentages.

Table 1. ELT students' frequency and level of computer and hardware products use

Computer and Hardware Products	Frequency of use						Level of use					
	Often		Sometimes		Never		Can use		Can use with the help of others		Cannot use	
	f	%	f	%	f	%	f	%	f	%	f	%
PC	94	42	111	50	19	8	206	99	1	1	1	0
PDA (pocket PC)	21	10	43	20	149	70	140	69	27	13	35	18
Notebook	200	86	28	12	4	2	209	100	0	0	0	0
Mobile phone	225	97	5	2	3	1	206	100	0	0	0	0
CD/DVD writer	97	43	110	48	21	9	183	88	23	11	3	1

Flash drive	219	92	18	8	1	0	203	98	4	2	0	0
Printer	58	26	119	52	50	22	157	76	37	18	14	6
Scanner	25	11	98	44	99	45	100	48	74	35	37	17
Webcam	79	34	127	56	23	10	191	93	10	5	4	2
DVD player	119	52	91	40	20	8	192	92	15	7	2	1
Digital camera	138	59	79	34	16	7	201	95	8	4	2	1
MP3 player	167	71	44	19	23	10	206	99	2	1	0	0
Voice recorder	34	15	118	53	71	32	183	87	20	10	7	3
Video camera	82	37	115	51	27	12	188	90	20	9	2	1
E-dictionary	87	38	77	34	63	28	193	92	80	5	92	3

It is clearly understood that mobile phones (97%) are the foremost device to be used while flash drive (92%) and notebook (86%) use is quite at the high frequencies. Additionally, the level of use for mobile phones and notebook is 100% and 98% for the flash drive. The least frequently and commonly used technologies are PDA (10%), scanner (11%) and voice recorder (15%) among which scanner (48%) has the lowest level of use. It is interesting to note that the frequency of notebook (86%) use doubles that of PCs (42%); on the other hand, as a language learning tool, e-dictionary is used frequently only by the 38 percent of the participants.

Table 2 lists software and services of communication used by the participants outlining their frequency and level of use. This table aims to display ICT technologies that are also commonly practiced for educational purposes.

Table 2. ELT students' frequency and level of software and services of communication use

Software and Services of Communication	Frequency of use						Level of use					
	Often		Sometimes		Never		Can use		Can use with the help of others		Cannot use	
	f	%	f	%	f	%	f	%	f	%	f	%
Educational programs	106	48	102	46	13	6	177	86	23	11	5	3
Word processing programs (Eg. Word)	191	82	42	18	2	0	198	97	8	3	0	0
Spreadsheets (Eg. Excel)	33	14	138	61	57	25	137	66	59	28	12	6
Presentation program (Eg. PowerPoint)	184	78	48	20	3	2	196	95	9	4	1	1
Music programs (Eg. Winamp)	203	88	24	10	5	2	203	98	3	1	1	1
Video player program (Eg. Windows Media Player)	213	91	21	9	1	0	205	100	0	0	0	0
Web browser (Eg. Internet Explorer)	214	92	14	6	6	2	201	96	6	3	2	1
E-mail program (Eg. Outlook)	74	33	76	34	73	33	148	72	34	16	25	12
Chat program (Eg. MSN)	168	72	58	25	8	3	204	98	3	2	0	0
E-mail groups (Eg. Yahoo Groups)	72	32	68	30	85	38	158	79	29	14	14	7
Web-based forum	48	21	99	44	77	35	136	68	39	19	25	13
Blog (Weblog)	41	18	106	47	79	35	140	70	44	22	15	8
SMS	217	92	18	8	2	0	201	99	3	1	0	0

The most commonly used ICT technologies displayed in Table 2 are web browsers (92%), SMS (92%), video player programs (91%) and music programs (88%). Spreadsheets (14%), blogs (18%) and forums (21%), respectively, are listed as the least frequently used ones; at the same time, the level of use for these technologies are high with blogs (70%) as the least self-used one. Nevertheless, frequent use of emails has been expressed only by the 33% of the participants.

The following tables will report the responses to the three open ended questions. Pre-service ELT student responses to the first question "As a prospective foreign language teacher, do you think you have self-efficacy

for using ICT for educational purposes?" were analyzed in two categories: Competence and Incompetence. For competency, seven; conversely, for incompetency five main reasons emerged as illustrated in Table 3.

Table 3. ELT students' ICT SE and their reasons

	Reasons	1st (n=74)		2nd (n=91)		3rd (n=51)		4th (n=25)	
		f	%	f	%	f	%	f	%
Competence	I can use ICT for educational purposes (research, assignments, presentations).	14	40	10	13.70	14	56	4	21.05
	ELT requires me to use ICT.	5	14.29	11	15.07	1	4	-	-
	I know how to use ICT successfully.	6	17.14	19	26.03	4	16	3	15.79
	I am eager to use ICT and keep myself updated.	3	8.57	10	13.70	4	16	5	26.32
	I can use ICT for personal use (videos, communication).	7	20	11	15.07	2	8	-	-
	I enrolled in the ICT course last year.	-	-	12	16.44	-	-	-	-
	CALL course has improved my ICT skills.	-	-	-	-	-	-	7	36.84
	Total	35	100	73	100	25	100	19	100
Incompetence	Teachers do not provide enough guidance (eg. website addresses).	2	10	3	12.5	1	10	-	-
	I do not have enough information and skills.	10	50	14	58.33	3	30	4	100
	I do not use it for educational purposes.	6	30	-	-	2	20	-	-
	I have limited Internet access.	2	10	3	12.5	3	30	-	-
	I cannot keep myself updated.	-	-	4	16.67	1	10	-	-
	Total	20	100	24	100	10	100	4	100

Students seem to have an awareness of using ICT in language teaching and learning. In general, students of all grades expressed their competence in ICT use while fewer voiced some concerns and insufficiencies as their incompetence. Given the frequency of reasons per grade, it is observed that first graders believe they "can use" ICT for both educational and personal uses while they know to conduct the ICT operations successfully. Second graders reported knowing how to use ICT successfully; additionally emphasized the significant role of the compulsory ICT course they had enrolled the previous year. On the other hand, third graders ranked "educational use of ICT" top among the reasons followed by knowing how to use it. What is thought-provoking in the fourth graders' statements is the effect of CALL course and the distinctive increase in their eagerness to use ICT as opposed to other grades.

More specifically, some second year students (S102, S146) linked their self-confidence in their use of ICT to their interest in the newest and up-to-date tools. As for the educational use, integrating visual aids was emphasized in addition to using ICT to practice pronunciation and to aid as an e-dictionary. Nonetheless, third grade students (S171, S 188 and S192) attributed access to and use of online databases and material development as the educational uses of ICT in practice. Lastly, to fourth graders CALL course has created a feeling that they would be confident in their future profession in integrating ICT to their classes. Here, neither ICT course offered in the first year nor the personal use of ICT was mentioned. Instead, students about to graduate started showing more eagerness to ICT use. Moreover, several (S222, S234) conveyed how they could manage to succeed using ICT by trial and error attempts.

Answers to the second question "What factors have positively influenced your self-efficacy beliefs about the educational use of ICT during your undergraduate studies?" were listed and ranked that included 17 reasons identified as positive contributors (see Table 4).

Table 4. Positive factors influencing ELT students' ICT SE

Positive factors	1st (n=74)		2nd (n=91)		3rd (n=51)		4th (n=25)	
	f	%	f	%	f	%	f	%
I can manage to use ICT on my own.	4	8.89	1	0.93	-	-	-	-
I get positive feedback and support from my teachers.	3	6.67	-	-	2	2.90	-	-
I can use ICT for my courses.	13	28.89	34	31.78	22	31.88	11	31.43
I am/get experienced in the use of ICT.	6	13.33	21	19.63	9	13.04	1	2.86
I can access information instantly & save time.	5	11.11	4	3.74	5	7.25	1	2.86
Computer Literacy course	5	11.11	4	3.74	2	2.90	5	14.29

ITMD course	-	0.00	12	11.21	-	-	1	2.86
My self-confidence increases.	5	11.11	12	11.21	6	8.70	3	8.57
My language skills (listening) improve.	1	2.22	2	1.87	1	1.45	-	-
Availability of ICT facilities/tools	1	2.22	1	0.93	1	1.45	1	2.86
Awareness for the importance of ICT use in teaching	2	4.44	1	0.93	2	2.90	4	11.43
My interest and enjoyment increase.	-	-	7	6.54	4	5.80	2	5.71
ICT change the learning environment (visuality, rich sources, meaningful learning)	-	-	8	7.48	10	14.49	-	-
I get more motivated.	-	-	-	-	3	4.35	1	2.86
ICT enables individualized learning.	-	-	-	-	1	1.45	-	-
ICT enables communication among students.	-	-	-	-	1	1.45	-	-
CALL course	-	-	-	-	-	-	5	14.29
Total	45	100	107	100	69	100	35	100

The most commonly stated leading reason is determined as "I can use ICT for my courses." for all grades. The ranking for the initial three reasons "I can use ICT for my courses.", "I am/get experienced in the use of ICT." and "My self-confidence increases." is the same for the first and second year students. Accordingly, a first grader wrote down "I am aware of my skills in technology use." Several students mentioned that "knowing that I will be a teacher, I am aware of the need to use technology for my profession." First year students see "Computer Literacy" course as a contributor while second year students consider ITMD (Instructional Technology and Material Development) course a positive factor. As an example, S3, a first year student listed "happiness of completing the assignments on her own, encouraging herself to perform by reminding herself that she can do and she did it, and positive feedback from the teachers" as positive contributors. Besides, CALL (Computer Assisted Language Learning) course was perceived to have positive influence for the course participant fourth year students. To name a few more of the positive factors, students believe that their language skills, specifically, listening skills will improve with the help of ICT tools; in the meantime, they will be more confident, motivated and interested.

Students (S22, S45) identified an overall positive impact on their learning process. One of the first year students (S3) expressed his/her confidence that shows the courage needed to make the utmost use of ICT by stating "I can do it, I did it." In line with their undergraduate courses, first graders (S14) indicate the benefit of ICT in the form of online dictionaries that help get prepared for the "Composition" course.

Though the leading reasons are similar to those of first graders, second year students differentiated themselves by pointing out the impact of ITMD course. Moreover, properties such as time-saving and instantly accessible have been merged into practical use of ICT. Increase is not only observed in self-confidence but also in interest and enjoyment. What has been meant by "experience" was clarified as the Computer Literacy course, private ICT courses, and being computer literate since childhood. Positive factors of "effective presentation skills through ICT" and "positive ICT-related peer feedback" stated by a second year student (S85). Third year students explained how they could use ICT for my courses including way of doing research and preparing for courses. Another popular issue was the teachers' guidance and feedback indicated by first and third graders and not to be mentioned by the rest. Only third and fourth year students seem to have realized the importance of speed of developments in the internet and felt somehow left behind.

Last of all, there were not as many responses to the third question as in the previous ones. The question posed was: "What factors have negatively influenced your self-efficacy beliefs about the educational use of ICT during your undergraduate studies? Majority of students left this question blank and only 12 general statements could be listed (see Table 5).

Table 5. Negative factors influencing pre-service ELT students' ICT SE

Negative factors	1st (n=74)		2nd (n=91)		3rd (n=51)		4th (n=25)	
	f	%	f	%	f	%	f	%
Insufficient guidance	3	12.5	-	-	-	-	-	-
Lack of technological tools	5	20.83	3	6.67	3	8.57	3	21.43
Time consuming	3	12.5	2	4.44	2	5.71	-	-

Technical problems	3	12.5	10	22.22	7	20	2	14.29
Lack of knowledge & skills	9	37.5	9	20.00	12	34.29	5	35.71
Reluctance	1	4.17	-	-	-	-	-	-
Information access problems	-	-	8	17.78	1	2.86	-	-
Excessive use of ICT in courses	-	-	1	2.22	1	2.86	-	-
Lack of interest	-	-	1	2.22	4	11.43	-	-
Insufficient access to ICT in class	-	-	-	-	2	5.71	-	-
Insufficient access to Internet	-	-	-	-	-	-	1	7.14
Lack of confidence	-	-	11	24.44	3	8.57	3	21.43
Total	24	100	45	100	35	100	14	100

Negative factors could be grouped as insufficiencies and challenges. Precisely, insufficiencies are of guidance, technological tools, knowledge and skills, interest, confidence, access to ICT and Internet. Likewise, challenges are of technical or accessibility origin. Most commonly stated negative point is "lack of knowledge and skills" with a lessening degree among grades; nevertheless, it peaked during the third year. Furthermore, majority of the respondents reported "having difficulty in using Microsoft Excel program" which is described as "Fear of Excel" by a third year student. It is necessary to remind here that spreadsheets were reported to have been used least (14%) with a level of use of 66 percent. One of the first year students (S12) voiced the complaint about teachers' constant criticism. Another student (third grade, S202) stated the Internet problems as coming across unrelated and untrusted resources. This factor is followed by the technical problems some of which were stated as hardware (lack of) and software problems, breakdowns during presentations and issues regarding Internet connection. An interesting statement is "There are no problems at present." signaling the probability of any such incident.

Table 3 displays that first year students have not stated any lack of confidence and interest or access. Main trouble for them seems to be their inexperience and availability of technological tools. Besides, second grade students peaked in lack of confidence and technical problems. Several of them (S82, S107, and S149) explicitly correlated lack of confidence to anxiety and fear of making mistakes that would cause either technical problems or data loss. Another identified technical problem is the websites that do not work properly. It is the third grade students who felt the lack of knowledge and skills most. Apart from this, since the classes are crowded, there is not sufficient access of ICT that is closely linked to access to information. Last but not the least, fourth grade students seem to be the least negative group and they are the only group pointing out the access problems to Internet.

DISCUSSION

Outnumbering reasons for competence and positive factors could suggest that majority of pre-service ELT students have high levels of ICT self-efficacy. It could be explained with reference to the related literature. First of all, the study by Demiralay and Karadeniz (2010) resulted in the positive effect of computer use experience, level of computer use skills, frequency of use and access (both computers and Internet) on the student teachers' perceived information literacy SE. Accordingly, the participants in this study indicated the place of experience, knowledge of skills and access while singling out educational need to use ICT skills. The study by Deryakulu et al., (2008) might help to visualize how perceptions might mis/match to the practice.

Findings in this study support the aforementioned literature. In general terms, both positive and negative factors are likely to be observed for pre-service teachers. For instance, "dynamic nature of ICT" from the ICT teachers' perceptive (Deryakulu et al., 2008) and affirmative influence of ICT on the nature of teaching and learning (Jimoyiannis & Komis, 2007) seem to match one of the positive remarks in this study about ICT integration spicing up the environment with visuals and variety of sources as well as "student interest" reported in both studies.

For the first three positive factors influencing the ICT SE, the leading is "I can use ICT for my courses" displaying the awareness of pre-servicers about the practical use of ICT in language classes. "Perceived usefulness and ease of use" (Davis, 1989) are strong determinants to envisage one's intention of computer use (Ma, Andersson & Streith, 2005: 388). Furthermore, Martinovic and Zhang (2012: 467) pointed out the importance of "perceived importance of ICT" as a motivational factor. Unlike the findings of the study Jimoyiannis and Komis (2007) in which teachers feel more reasons and real experiences to be convinced about the educational use of ICT tools, participants in this study ranked the capacity to use ICT for educational purposes at the top. This could be explained as in five years, ICT might have become more pivotal and essential

even for pre-service teachers. Another difference between pre and in-service teachers that could be inferred from the aforementioned studies is in addition to awareness, in-service teachers are skeptical about the benefits of ICT.

Secondly, "I am/get experienced in the use of ICT." Though personal use of ICT does not always lead to its transfer to professional setting as contrary to the hypothesis of So, Choi, Lim and Xiong (2012) that inferred no direct effect of personal computer use on the prospective use, computer use experience could be a strong determinant of its application. Previous experience has been seen to increase the levels of computer use (Tezci, 2009); teachers with computer use experience are considered to have positive attitude and higher levels of knowledge those in line with enhanced ICT SE. For instance, to Goktas and Demirel, (2012) using ICT tools for either personal or professional purposes contributes to ICT skills as in the form of keeping blogs during which you need to use stay online and practice using ICT. Thirdly, "My self-confidence increases." has also been reported in numerous research (Goktas & Demirel, 2012; Martinovic & Zhang, 2012; Papastergiou, 2010). A supporting evidence for the increase in self-confidence regarding ICT is demonstrated by Martinovic and Zhang (2012); in their study, self-confidence as well as ICT skills of pre-service teachers improved having used ICT in the teacher education program. According to Goktas and Demirel (2012) blogs as a commonly used ICT tool helps increase the self-confidence levels of prospective teachers.

Teacher-training technology components have been found to be a strong factor in affecting and even changing ICT SE levels of pre-service teachers (Abbitt & Klett, 2007; Tondeur et al., 2012) and it is reflected here as the provision of ITMD and CALL courses labeled as positive factors. The former course covers areas of ICT based materials development and the latter offers fourth year students hands-on teaching activities blended into theory and most recent updates in the field.

On the other hand, for the negative factors the most commonly experienced "Lack of knowledge and skills". Ertmer and Ottenbreit-Leftwich (2010: 259) expressed the significance of teacher knowledge that directly influences the decision-making processes. Additional knowledge and skills required in today's context includes "pedagogical technology integration content knowledge". Teachers are expected to know about the technology, new methods enhancing student learning in the ICT settings and how to select appropriate resources to reach the learning goals. Therefore, as this study suggests "knowledge and skills" of teachers that are transferred or transformed to student learning are key indicators of success in technology integration. In line with these, for pre-service teacher education, "hands-on experiences with technology, observations of best practices of technology use, related readings and discussions as well as reflection, opportunities to practice technology use to facilitate learning (ibid, p. 266)". Using blogs experimented by Goktas and Demirel (2012) applies here. Prospective teachers' perceptions of the effects of blogs on ICT competencies display that students believe "blogging helped improve my knowledge and skills regarding how to use ICTs in my future profession (ibid, p. 913)"

This factor is followed by "Technical problems". Some minor similar problems such as software or hardware related pitfalls have been reported by Martinovic and Zhang (2012) and teachers solved problems by bringing their personal laptops to the classroom as a backup plan. Several further complaints were collected from the students regarding the opportunities in the laboratory and Internet connection (Papastergiou, 2010).

Third negative factor listed "Lack of confidence" have been extensively encountered in relation to SE (Albion, 1999; Ertmer & Ottenbreit-Leftwich, 2010; Goktas & Demirel, 2012; Markauskaite, 2007). To start with, Ertmer and Ottenbreit-Leftwich (2010) further adds that, in addition to the knowledge and skills required, self-efficacy referred to as feeling self-confidence is necessary particularly for the inexperienced and prospective teachers. Hence, opportunities to practice technology use in the form of presentations or field experiences and accessing a variety of models and examples (ibid, p. 266) are some suggestions to enhance SE during the pre-service teacher education. In a similar fashion, Markauskaite (2007) reported that while trainee teachers were "quite confident" with their basic ICT skills, they were not as confident as with their advanced technical skills. A significant increase of self-confidence in this study of 2007 was regarding the use of email to communicate. Another suggestion is the use of blogging during pre-service teacher education to improve self-confidence regarding ICT (Goktas & Demirel, 2012). As an additional point, pre-service and in-service teachers (Chen, 2008) have been complaining about the time consuming character of ICT tools that is also reflected in the participant responses in this study.

As a final and comprehensive point, the findings of this study reveals correspondence to the Prospective Computer Use (PCU) domain and scale of Sang et al. (2010) applied to pre-service teachers in China. PCU, the adapted version of Computer Use Scale by van Braak (2004, as cited in Sang et al., 2010: 105) covers using

computers for future teaching practice such as making presentations using Powerpoint, doing online research, getting help from computers to shape individualized learning and communicating to teachers and classmates through emails.

CONCLUSIONS

Technology has been transformed to *teachnology* as an integral part of teaching programs requiring some essentials for the set up and implementation. As Prensky (2001:1) proposed the dichotomy of digital natives and immigrants; today's learners "think and process information differently" as natives to the digital world; therefore their interests, expectations, beliefs and practices should be evaluated within the digital context. In this direction, natives seem to be ICT self-efficacious and positive factors outnumber and outweigh the negative ones influencing their ICT use.

To sum up, believing the difference technology creates on the information processing, "the Net Generation" student teachers are expected to create that difference when it is their turn (So et al., 2012: 1234). Pre-service teachers' preparation for technology use should cover areas of systematic change efforts such as aligning theory and practice, access to resources, cooperation with/between institutions, leadership, teachers as role models, feedback, collaboration, reflection and finally authentic experiences (Tondeur et al., 2012). Additionally, these programs need to consider teacher beliefs, SE and attitude to ICT that directly influence their in-class behaviors and practices (Chen, 2008).

The answer to the question "Are the teachers with low levels of SE likely to experience more stress and early burnout?" signals the role and importance of SE for teachers of all levels and subject areas. The significance of this study lies in the fact that if the changes either at the curriculum or subject level take place following a bottom-up approach regarding what teachers are able, willing and motivated to do, there is an increased chance of success.

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USE OF INSTRUCTIONAL TECHNOLOGIES IN SCIENCE CLASSROOMS: TEACHERS' PERSPECTIVES

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ABSTRACT
The purpose of this study was to investigate how science teachers use instructional technologies in science classrooms. Participants were 63 teachers who have just completed an alternative teaching certificate program in one of the largest universities in Turkey. They were asked to make a lesson plan based on any topic by assuming that they had an ideal school environment. Based on analysis of all lesson plans, participants were asked to explain their reasons for using those technologies. Findings revealed that PowerPoint was the most widely used instructional technology in their lesson plans. Textbooks and blackboards were other instructional technologies used by participants. Animations were the least used instructional technology by all participants. None of the participants used internet, interactive smart boards, spreadsheets, computer simulations, and educational software in their lesson plans even though they were told to assume that they had an ideal environment in terms of time, resources, and students.
Keywords: Instructional technologies, Science teachers, Information and communication technologies (ICT), High schools

INTRODUCTION

Use of instructional technologies in education has been widely discussed with advancement of new technologies (Koç & Bakır, 2010; Lavonen, Juuti, Aksela, & Meisalo, 2006; Linn, 2003; Lumpe, & Chanbers, 2001; Mumtaz, 2010; Serin, 2011; Spector, Merrill, Merrienboer, & Driscoll, 2008; Umay, 2004). Governments all over the world have made investment in order to integrate information and communication technologies in schools. For example, in the United States, more than 95% of schools and 72% of classrooms were connected to the internet by 2000 (Quality Education Data, 2000, as cited in Hogarty, Lang, & Kromrey, 2003) and the total spending cost $5.2 billion in 2001 (Reed et al., 2001, as cited in Hogarty, Lang, & Kromrey, 2003). Turkey also started projects related to integration information and communication technology in educational system as early as 1984 (Göktaş, 2006). The recent project was the FATIH Project initiated by the Ministry of National Education ([MNE], 2012) with the purpose of improving use of information and communication technologies in schools during the teaching and learning process. In this project, each classroom in schools will have computers with high speed internet connections, interactive smart boards, printers, and projections in order to reach information and communication technology based instruction by 2013 (MNE, 2012).

On the other hand, many scholars have discussed concerns about teacher beliefs, proficiency, and preparation about use of technology in their instruction (Al-Fuadil, & Mellar, 2008; Hogarty, Lang, & Kromrey, 2003; İşman, 2002; Mumtaz, 2000; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010; Tezci, 2009). The main purpose of this study was to investigate how science teachers use instructional technologies in science classrooms. Therefore, the paper may have contribution to the literature by providing some information for especially teacher educators about what instructional technologies science teachers tended to use and why or why not they use those technologies in their classrooms.

METHODOLOGY

Qualitative research methodology was adopted in the current study in order to response the following research questions: The first research question is what kind of instructional technologies that teachers are more likely to use in science classrooms. The second research question is why they prefer those instructional technologies.

Participants

Participants were 63 teachers (46 female, 17 male) who have just completed an alternative teaching certificate in one of the largest universities in Turkey. All participants completed educational technology and material design, teaching science methods courses as well as other educational courses classroom management, educational psychology, field experience and teaching practice by the time of the data collected. All participants have Bachelor of Science (B.Sc.) degree in physics, chemistry, and biology. Thirty eight percent (24) of the participants graduated from physics, 27% of them (17) from chemistry and 35% of the participants (22) from biology departments. More than 76% of the participants were serving as teachers in public or private schools by the time of the study conducted.

Data Collection

Data from lesson plans and an open-ended questionnaire were collected at the end of spring 2012. Participants were asked to make a lesson plan based on any topic they selected by assuming that they had an ideal school environment. They were not directed to use any kind of instructional technologies but they were told that they would imagine that they had an ideal school environment in terms of student, administration and resources. All lesson plans were analyzed in terms of instructional technologies they used. In an open-ended questionnaire, participants were asked to explain why or why not they use those technologies.

Data Analysis

Data were analyzed by using an inductive approach at two main steps. At the first step, all lesson plans were numbered and analyzed in terms of instructional technologies used. Instructional technologies used in the plans were categorized as PowerPoint presentations, textbooks, blackboards, laboratory work, videos, worksheets, supplementary books, and animations. Frequency analysis was conducted for each category. At the second step, participants' responses to an open-ended question why or why not they selected those instructional technologies were listed and analyzed. Then, students' responses were compared by department. All findings will be discussed in the next section by providing key quotations given by participants.

RESULTS

Table 1 shows that instructional technologies indicated by participants in the lesson plans based on their majors physics, chemistry and biology. The overall findings of the study reveal that PowerPoint was the most widely used instructional technology in the lesson plans. Sixty three percent of the participants (40) used PowerPoint presentation in their lesson plans. The second widely used instructional technology was textbooks indicated by 46% of the participants in their lesson plans. The third widely used instructional technology was blackboards stated by 41% of the participants. Laboratory work including demonstration and experiments is stated by 37% of the participants. Thirty percent of the participants planned to use videos while only 10% of the participants tended to use animations in their class. Twenty four percent of the participants tended to use worksheets in order to help students prepare for standard-based tests while 21% of the participants planned to use supplementary books for the same purpose.

As compared instructional technologies used in the lesson plans in terms of majors, PowerPoint presentation was instructional technology still widely used by chemistry and biology teachers (82% each) while only 33% of physics teachers in the study tended to use PowerPoint presentation in their class. The instructional technology most widely used by physics teachers (63%) was blackboards. The instructional technology second widely used by physics teachers (58%) in the study was textbooks. Laboratory work, worksheets, and supplementary books were other widely used by physics teachers (38%) in the study. Videos (17%) and animations (13%) were less widely used instructional technologies by physics teachers in the study.

Table 1: Instructional technologies used by participants based on their majors

	Physics		Chemistry		Biology		Total	
	f	%	f	%	f	%	f	%
PowerPoint slides	8	33	14	82	18	82	40	63
Textbooks	14	58	6	35	9	41	29	46
Blackboards	15	63	3	18	8	36	26	41
Laboratory work	9	38	9	53	5	23	23	37
Videos	4	17	4	24	11	50	19	30
Worksheets	9	38	3	18	3	14	15	24
Supplementary books	9	38	1	6	3	14	13	21
Animations	3	13	0	0	3	14	6	10

Both chemistry teachers (82%) and biology teachers (82%) in the study tended to most widely use PowerPoint presentation as instructional technology. However, the second widely used instructional technology by chemistry teachers (53%) was laboratory work while the second most widely used instructional technology by biology teachers (50%) was videos. The third widely used instructional technologies by chemistry (35%) and biology (41%) teachers in the study were textbooks. Blackboards were used by biology teachers (36%) while used by chemistry teachers (18%). Twenty four percent of chemistry teachers in the study used videos while 23% of the biology teachers used laboratory work. Fourteen percent of the biology teachers tended to equally use worksheets, supplementary books, and animations. However, 18% of the chemistry teachers tended to use worksheets while 6% of them used supplementary books. None of the chemistry teachers in the study indicated that they would use animation in their class. It is noteworthy since animations have a significant role in teaching and learning chemistry. Many scholars agree that students have difficulty in understanding chemistry concepts

because they do not see directly phenomena at the submicroscopic level and do not have the ability to move between macroscopic, submicroscopic and symbolic representations in chemistry (Gabel, 1999; Johnstone, 1999; Talanquer, 2011). Animations may help students to understand chemistry concepts by showing the phenomena at different representation levels (Chang, Quintana, & Krajcik, 2010). Another significant finding of the study was that internet, interactive smart boards, spreadsheets, computer simulations, and educational software were not found in participants' lesson plans.

The second research question was why teachers prefer to use those instructional technologies in their lesson plans. The instructional technology most widely used by participants (63%) was PowerPoint presentations. Participants indicated their reasons why they chose PowerPoint presentations in their class as providing visuals (15), saving time (13), getting students' attention (10), knowledge retention (10), active participation (4), easily used and prepared (3). For example, participant #34 emphasized saving time by saying that "I preferred to use PowerPoint presentations during lecturing. I provide students with copies of slides. My purpose of doing this was to do more practice by saving more time." Similarly, participant #41 said that "I planned to use PowerPoint slides because I believe that they are attractive and easy to understand for students. I also believe that PowerPoint slides have more visuals so I can give more knowledge stick in their mind." On the other hand, two participants indicated that PowerPoint presentations should not be necessarily used if the topic is easy or time is limited. For example, participant #19 stated that "PowerPoint slides might be prepared for this lesson, but since the topic is very easy and time is limited, it is not necessary."

Only two participants indicated their reasons for using textbooks as being economic and helping students understand the content. Two participants stated that they used blackboards for solving problems. One participant expressed that she might want to use interactive smart boards and tablet PCs but she thought that she was not able to use them due to lack of training for using those technologies.

Laboratory work was widely used by participants for several reasons. Some of the reasons stated by participants were providing visual learning (4), developing positive attitude towards science and scientists (2), making abstract concepts to more concrete (1), making scientific inquiry (1), having students' active participation (1), and gaining scientific process skills (1). For instance, participant #17 stated that "by using simple materials (wood, water, oil, cup), students have opportunity to observe liquid pressure." Three participants indicated that they did not use laboratory. Their reasons for not using laboratory work were limited class time, inappropriate with some topic, and preventing instruction. One participant stated that "this topic [shooting and force] is not appropriate for laboratory" (P#10).

Videos were used by participants (30%) in their lesson plans for several reasons: providing visual and auditory learning (8), getting attention (5), making connection with daily life and giving examples from everyday life (2), knowledge retention (2), having fun (1). One participant stated that "I chose video demonstration because I think that students can learn better by both visual and auditory ways" (P#42). One participant stated that she did not prefer to use videos since they might make students lose their attention. Participant #44 stated that "I think that students would lose their attention and time would not be enough if I used videos. Instead, watching videos can be given as homework outside of the classroom"

DISCUSSION AND CONCLUSION

The findings of the study offer important insights related to the literature about use of instructional technologies in science classrooms. The main findings of the study and a discussion of each finding with related literature are presented.

a. One of the major findings of the study was that a majority of the participants used PowerPoint presentations in their lesson plans. Chemistry and biology teachers most widely used PowerPoint slides in their instruction while physics teachers most widely used blackboards. The reason for this discrepancy probably may come from their beliefs that PowerPoint is more appropriate depending on the content taught.
b. In the current study, physics teachers were more likely to use textbooks, worksheets, and supplementary books rather than PowerPoint presentations, videos, and animations.
c. In the current study, chemistry teachers were more likely to use PowerPoint presentations, laboratory work, and textbooks rather than videos, blackboards, worksheets, and supplementary books. It is noteworthy that none of the participants having chemistry major used animations in their lesson plans although animations can be helpful for students to connect the relationship between macro, sub-micro and symbolic representation levels.
d. Biology teachers in the study were more likely to use PowerPoint presentations, videos, textbooks rather than blackboards, laboratory work, worksheets, supplementary books, and animations.

e. Animations were the least used instructional technology by all participants.
f. None of the participants used internet, interactive smart boards, spreadsheets, computer simulations, and educational software in their lesson plans even though they were told to assume that they had an ideal environment in terms of time, resources, and students. Therefore, resources and institutions as barriers for using information and communication technologies stated by Hew & Brush (2007) should not be concern for teachers. The reason for this finding may be due to the fact that they may be unfamiliar with those technologies or they may not know how to use those technologies in their lesson. As Hew & Brush (2007) stated, teachers' knowledge, skills, beliefs and attitudes can be barriers for making instructional decisions.
g. There may be some limitations of the current study. Findings of the study cannot be generalized to all science teachers in schools. The findings are limited with this group of participants. However, the findings may be applied to similar context. Moreover, participants in this study were asked to assume that they would have an ideal classroom environment in fact they did not have such an environment in real life. If they had had an ideal (high tech) classroom environment, they would have more responses in favor of using more high tech instructional technology tools and materials. Not having an ideal environment in real life, participants may have tended to use more traditional instructional tools in their lesson plans.
h. There is a need to increase teachers' knowledge and skills about how to use those instructional technologies and help them develop positive attitudes toward information and communication technologies. Teacher education programs play a key role in preparing well-informed teachers with positive attitudes toward using ICT. Further research can be conducted in order to develop content-based workshops where teachers learn enough knowledge and skills about ICT in science classrooms and have positive attitudes toward using them and investigate effects of these programs on teachers' knowledge, skills, and attitudes toward ICT.

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USING FACEBOOK AS A LMS?

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ABSTRACT
The main purpose of this research was to compare the communication media according to effective teaching. For this purpose, in the research, the mixed method, including quantitative and qualitative data collecting techniques, was applied. For the quantitative part of the research, the static group comparison design was implemented as one of the quasi- experimental designs. The population of the research consisted of all pre-service teachers attending Adnan Menderes University Faculty of Education during the fall term of 2011- 2012 academic year. The study group composed of junior class students attending the Primary Education Program. One of the classes was divided into two. While Information Technology classes were conducted via Facebook in one group, the other group studied Information Technology via Adobe Connect. As a result of the research, there is no statistically significant difference between the academic success posttest scores of pre-service teacher groups, which were obtained from the whole sub-dimensions of Effective Teaching Scale. According to the pre-service teachers' views, Facebook needs to have a 3rd Party Software in the teaching and learning process. In addition, the study groups should consist of fewer students.
Keywords: Prospective primary education teacher, e-learning, scenario - based learning, facebook.

1. INTRODUCTION

With the increasing use of information technologies in the industrial field and daily life, computer literacy and related skills education has become extremely important. For the last 25 years, computer technologies have also been an effective concept in the field of learning-teaching (Cuban, 2001). Mouza (2002) stated that the use of computer technologies in the classroom creates an attractive communication setting due to the inexpensive, easily accessible and remarkable media features and therefore, it has become more common in the last 10 years. As Jonassen (1995) emphasizes, the use of technology supported materials in the learning-teaching process has the quality of being an extensive tool that increases student success.

Technological developments change not only teaching approaches and methods but also the typical features of learners with the same pace. According to the New Millenium Learners Project published by OECD in 2006, the learners of the new generation are defined by concepts such as millennials, digital natives, net generation and cyberkids (Pedro, 2006).

In this respect, it is not possible fır today's teachers to keep technological devices such as the internet, computers or CD-ROM etc. away from the classroom setting (Angers and Machtmes, 2005). In addition to the devices mentioned, social network sites, which can reach large crowds today, are also striking. When the history of social network sites are examined, according to Boyd and Ellison (2008), the beginning of social network sites, which are also known as social network software in the relevant literature, was the sixdegrees.com web site, where profiles could be formed and friends were added. Facebook, which is now one of the most common social network sites, was initiated in 2004 as a site that was only accessed by the students of Harvard University by using their school e-mail addresses. Later, it was used as a site open to all universities and then, in 2005, everyone was able access the site.

When expressed in numbers, a remarkable picture is seen. According to the statistics of the website Socialbakers, in the first month of 2013 there were 963,812,360 Facebook users in total. The USA is on the first rank in the list with 163,071,460 users while Turkey is the sixth with 32,438,200 users. The ratio of current users to population in our country is 41.69%. Other striking ratios are as follow: 64% of the users are male, and the user group between the ages of 18 and 24 constitutes the biggest group with a ratio of 34% (socialbakers.com). It is foreseen that ensuring the integration of social network sites with such a user potential in a short time will have positive contributions to the education process both qualitatively and quantitatively.

2. PURPOSE OF THE STUDY

The main purpose of this study was to determine the effect of scenario based curriculum offered via two different communication settings on the pre-service teachers' basic information technologies course to compare

the communication settings in terms of effective teaching. In line with this purpose, we attempted to answer the following questions:

1. Is there a significant difference between total scores of pre-service students, who use different communication settings, regarding sub scales of the effective teaching scale?
a) Do total scores of pre-service students, who use different communication settings, regarding sub scales of the effective teaching scale differ significantly in terms of group and gender variables?
b) Do total scores of pre-service students, who use different communication settings, regarding sub scales of the effective teaching scale differ significantly in terms of group and use of internet frequency variables?
2. How do pre-service teachers assess the learner characteristics, the learning-teaching process and the communication setting that they use based on the individual interviews and focus group interviews?

3. LIMITATIONS OF THE RESEARCH

1. The present research is limited with students who are enrolled to the must course of titled as "Basic Information Technologies" in Adnan Menderes University, Faculty of Education.
2. This research is also limited with the fall semester in 2011-2012.

4. METHOD

This is a Mixed Method study, where both qualitative and quantitative research methods are used. "The static group comparison model", which is one of the Quasi-Experimental research models, was used.

3.1. Respondents

The study group was composed of first grade students who were studying at the Faculty of Education Primary School Teaching Program of a public university in Turkey in the fall semester of 2011 – 2012 academic years. Within the experimental process, the Basic Information Technologies compulsory course was taught over Facebook with one group and over Adobe Connect virtual class application with another. Twenty-six of the pre-service teachers that made up the study group were female and 16 were males. Twenty-four of the pre-service teachers had their own computers and 19 of them attended the computer course prior to undergraduate program. When individuals' internet use frequency is examined, it is seen that pre-service teachers that made up the 88% of the sample were using the internet regularly. Regarding the access to online courses, it is seen that 83% of the participants were using internet cafes.

3.2. Data collection

3.2.1. Effective teaching scale

In the study, in order to analyze the opinions of pre-service teachers, who use different communication settings, regarding the quality of teaching, "Evaluating the quality of e-learning at the degree level in the student experience of blended learning", which was developed by Ginns and Ellis (2009), was used by making the adaptation study with the required permissions. The scale is composed of a total of twenty-eight items and six sub scales. The subscales are as follow, respectively: good teaching, Clear Goals and Standards, appropriate assessment, appropriate workload, e-learning and generic skills.

3.2.2. Exploratory factor analysis

In examining the structural validity of the scale, exploratory factor analysis and confirmatory factor analysis were made. Whether the data obtained from the pilot application were appropriate to the exploratory factor analysis was examined with KMO (Kaiser-Meyer-Olkin) coefficient and Barlett Sphericty test. The KMO value of the data obtained was 0.80 so it is appropriate for the analysis. The Barlett test of data obtained from the adapted scale (χ^2=1256.97, df= 378, p= 0.00) was found to be significant.

3.2.3. Findings regarding structural validity

In order to determine the significant factor number, instead of a line graph, eigenvalue coefficient was taken as a base. According to Gorsuch (1983. cited. Tabachnick and Fidell, 1996); line graph gives reliable results when sample size is large. As a result of the analysis, it was seen that the scale had a 7-factor structure. When item distributions and the results of confirmatory factor analysis were examined, it was seen that the 7-factor structure did not form a suitable structure. At this point, the scale was limited to 6 min factors appropriate to its original.

In order to separate scale items from one another to unrelated factors, various rotation techniques were tried and easily interpretable conclusion was reached through Equamax rotation technique. Following the Equamax rotation, common variance of items was between 0.42 and 0.86; item load values were between 0.42 and 0.81. The amount of variance that was explained by six factors was 63 percent. Fifteen percent of this was on the first factor while 13 percent was on the second, 11 percent was on the third, 9 percent was on the fourth, 8 percent

was on the fifth and 7 percent was on the sixth factor. Nine of the items were on the first factor while 6 were on the second 4 were on the third, 3 were on the fourth, 4 were on the fifth and 2 were on the sixth factor. Factor values of the scale are shown in Table 1.

Table 1: Factor Values of the Factors of effective teaching scale following the equamax rotation

Item	Factor 1 Good teaching	Factor 2 Generic skills	Factor 3 E-learning	Factor 4 Clear goals and standards	Factor 5 Appropriate assessment	Factor 6 Appropriate workload	Ratio of Explaining Total Variance
2	.60						8.29
4	.52						4.96
6	.76						4.31
13	.62						2.18
15	.72						1.67
17	.64						1.44
20	.51						1.11
21	.56						1.05
23	.65						.71
5		.47					4.85
7		.70					4.13
8		.76					3.53
14		.74					1.90
18		.43					1.37
19		.69					1.20
25			.63				.58
26			.81				.49
27			.69				.41
28			.80				.24
9				.52			3.34
11				.42			2.82
12				.70			2.43
10				.77			3.10
16					.53		1.53
22					.60		.77
24					.50		.65
1						.61	34.33
3						.79	6.60

3.2.4. Findings regarding reliability

For the reliability study of the Effective Teaching Scale, Cronbach alpha coefficient was calculated. When internal consistency analysis of the whole scale as well as six sub scales was examined separately, the Cronbach alpha coefficients were found as .91 for the whole scale and .91 for the good teaching subscale, .85 for generic skills, .78 for e-learning, .68 for clear goals and standards, .51 for assessment and .50 for appropriate workload subscale. These findings are shown in Table 2.

Table 2: Findings regarding effective teaching scale reliability study

	r
1. Sub Scale (Good teaching)	.91
2. Sub Scale (Generic Skills)	.85
3. Sub Scale (E-learning)	.78
4. Sub Scale (Clear goals and standards)	.68
5. Sub Scale (Assessment)	.51
6. Sub Scale (Appropriate workload)	.50
Total	

3.2.5. Confirmatory factor analysis

Confirmatory Factor Analysis was performed in order to determine whether factor structure of the original scale would be confirmed in target sample or not. Analysis was performed over the same data set for the six-factor structure. The fit indexes obtained were listed in Table 3.

Table 3: Findings regarding confirmatory factor analysis

	Fit
χ^2	432.90 (p=.000)
χ^2/df	1.29
RMSEA	.06
Standardize RMR	.08
GFI	.72
AGFI	.67
NFI	.86
NNFI	.94
CFI	.95
IFI	.95
RFI	.85

According to Tabachnick and Fidell (1996), when χ^2/df ratio is smaller than 3, it shows that .08 is an acceptable fit value for RMSEA and .05 is perfect fit while the acceptable fit value is considered .90 and above for GFI, AGFI, CFI, NFI, NNFI, RFI, IFI and AGFI indexes. For the SRMR value, .05 and smaller values show perfect fit. Current fit indexes are examined as a whole and it can be said that the six-factor structure of the effective teaching scale is confirmed as a model.

3.2.2. Individual interview and focus group interview

A semi-structured interview form including nine questions was used for individual interviews. In determining the students to be interviewed, criterion sampling technique, which is one of the purposeful sampling methods, was used. Six students were interviewed; two people from each group arranged as low, middle and high groups based on students' mid-term scores. Also gender and volunteerism are the other criteria considered at the process of determining the students to be interviewed. Data were recorded with a voice recorder throughout the interviews. Electronic data of the interviews which approximately lasted for 17 minutes were transferred into a 43 –page word document with 2.5 cm margin, single spaced and 12 font size in Times New Roman characters and codes as C_S1, C_S2, F_S1, F_S2 were used to indicate the participants.

In order to maintain the reliability and validity of the research, questions posed by Miles and Huberman (1994) were selected as the baseline. In line with this, in order to ensure internal validity it is seen that 1) considering the setting where data were obtained, research findings are significant, 2) findings are consistent and significant, concepts make up a meaningful whole 3) findings were confirmed by using different data collection methods and different analysis strategies, 4) findings were examined by the participants and were found to be realistic, 5) estimations and generalizations made based on the findings are consistent with the findings. In order to maintain external validity, it is thought that 1) every effort was made to thoroughly demonstrate the research method, 2) necessary explanations were made in order to test findings with other studies, 3) research findings can easily be tested in similar settings.

There are seven questions regarding external reliability and nine about internal reliability. In order to ensure external reliability, 1) research findings were supported with direct quotations from the interviews, 2) research duration was clearly defined, 3) different views and alternative explanations were included in the findings, 4) raw data with regards to the study were saved in a way that they could be examined by others. In order to ensure internal reliability, 1) Research questions were clearly expressed 2) research findings are in conformity with the data 3) Data were tried to be collected elaborately and suitable for the purpose as required by the research questions, 4) Data that are not valid were removed in data analysis. Also, in order to increase internal reliability, a randomly selected interview form was coded by the researcher and the advisor professor and consistency between the analyses was examined. With the "(agreement/agreement + disagreement) x 100" formula, the agreement coefficient between two coders was found as .77.

Focus group interviews were performed by forming student groups of six from each group. The criterion sampling technique, which is one of the purposeful sampling methods, was used while determining the students to be interviewed. Six participants were interviewed; two people from each group arranged as low, middle and high groups based on students' mid-term scores. Interviews were recorded with a video camera. Electronic data of the interviews, which lasted approximately 40 minutes, were transferred into a 20 –page word document with 2.5 cm margin, single spaced and 12 font size in Times New Roman characters, and codes as C_S1, C_S2, F_S1, F_S2 were used to indicate the participants.

3.2.3. Course design and implementation

Implementation lasted for one semester (15 weeks) in the fall term of 2011-2012. While conducting e-courses, Facebook was used in one of the groups and "Adobe Connect" virtual classroom application was used for the other.

5. FINDINGS

4.1. Findings regarding the total scores of pre-service teachers using different communication settings on the sub scales of effective teaching scale

The Effective Teaching Scale factor scores of pre-service teachers, who use two different communication settings and group variables, were tested with multi-variable variance analysis (*MANOVA*). The equality of covariance matrixes, which is the main assumption of *MANOVA* (Leech, Barrett and Morgan, 2008), was maintained with the Box M test and the variance equality of each independent variable according to grouped in independent variables was maintained with the Levene F test (p>.05). Descriptive statistics obtained as a result of analysis are summarized in Table 4.

Table 4: Descriptive statistics related with sub scale total scores according to group variable

Group		Good teaching		Generic Skills		E-learning		Clear goals and standards		Appropriate assessment		Appropriate workload	
	n	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S
Connect	21	33.67	4.88	21.09	4.47	14.67	3.17	11.43	1.94	13.28	2.87	4.90	2.12
Facebook	21	35.48	4.31	22.05	3.48	14.48	3.57	12.05	1.66	14.00	2.93	4.90	1.70

The results of MANOVA, conducted on the factor scores of effective teaching scale of pre-service teachers, show that the effect of group variable [λ=.91, F(6,35)=.55, p>.05, η^2=.08] on the scale in general is not significant. Data regarding on which subscales differentiation occurs can be seen in Table 5. When data in Table 4.2.1 and 4.2.2 are examined together, it is seen that there is no significant difference with regards to the sub factors of effective teaching scale.

Table 5: The effect of group variable on sub scale total scores

Source	Dependent Variable	df	F	η^2	p
Group	Good teaching	1	1. 226	.039	.210
	Generic Skills	1	.593	.015	.446
	E-Learning	1	.033	.001	.856
	Clear goals and standards	1	1.237	.030	.273
	Appropriate assessment	1	.637	.016	.429
	Appropriate workload	1	.000	.000	1.000

4.2. Findings regarding the analysis of total scores of pre-service teachers using different communication settings on the sub scales of effective teaching scale according to groups and gender

Effective teaching scale factor scores of pre-service teachers using two different communication settings, group and gender variables and group-gender interaction were tested with multi variable variance analysis (MANOVA). Descriptive statistics with regards to the aforesaid variables are summarized in Table 6.

Table 6: Descriptive statistics with regards to sub scale total scores according to group and gender variables

Group		Good teaching		Generic Skills		E-learning		Clear goals and standards		Appropriate assessment		Appropriate workload	
	n	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S
Connect													
Female	13	33.00	5.55	20.38	4.57	14.46	3.62	10.85	1.86	13.77	2.98	4.92	1.75
Male	8	34.75	3.62	22.25	4.33	15.00	2.45	12.38	1.77	12.50	2.67	4.88	2.75
Facebook													

Female	13	34.46	4.65	21.08	3.73	12.93	3.33	12.00	1.35	13.85	3.13	4.92	1.60
Male	8	37.13	3.31	23.63	2.50	17.00	2.39	12.31	2.17	14.25	2.76	4.88	1.96

The equality of covariance matrices, which is the main assumption of MANOVA (Leech, Barrett and Morgan, 2008), was maintained with Box M test and the variance equality of each independent variable according to groups in independent variables were maintained with Levene F test ($p>.05$). MANOVA results on pre-service teachers' effective teaching scale factor scores show that the effect of group [$\lambda=.93$, $F(6,33)=.40$, $p>.05$, $\eta^2=.07$], gender [$\lambda=.82$, $F(6,33)=1.22$, $p>.05$, $\eta^2=.18$] and group x gender [$\lambda=.75$, $F(6,33)=1.85$, $p>.05$, $\eta^2=.25$] interaction on the scale in general is not significant. Data regarding which sub scales have the differentiation according to group, gender and group x gender interaction are shown in Table 7, and mean and standard deviation data of the aforesaid variables are shown in Table 6. When data in Table 6 and 7 are examined in terms of gender, it is seen that there is a significant difference in favor of male students among mean values regarding "e-learning" sub scale.

Table 7: The Effect of group and gender variables on subscale total scores

Source	Dependent Variable	df	F	η^2	p
Group	Good teaching	1	1.736	.044	.195
	Generic Skills	1	.678	.018	.416
	E-Learning	1	.054	.001	.818
	Clear goals and standards	1	.649	.017	.425
	Appropriate assessment	1	.959	.025	.334
	Appropriate workload	1	.000	.000	1.000
Gender	Good teaching	1	2.298	.057	.138
	Generic Skills	1	3.089	.075	.087
	E-Learning	1	5.386	.124	.026*
	Clear goals and standards	1	2.173	.054	.149
	Appropriate assessment	1	.215	.006	.645
	Appropriate workload	1	.006	.000	.939
Group x Gender	Good teaching	1	.098	.003	.755
	Generic Skills	1	.074	.002	.787
	E-Learning	1	.3.166	.077	.083
	Clear goals and standards	1	1.566	.040	.218
	Appropriate assessment	1	.804	.021	.375
	Appropriate workload	1	.000	.000	1.000

4.3. Findings regarding the analysis of total scores of pre-service teachers using different communication settings on the sub scales of effective teaching scale according to the variables of group and the frequency of internet use.

Effective teaching scale factor scores of pre-service teachers using two different communication settings, group and frequency of internet use variables and group- frequency of internet use interaction were tested with multi variable variance analysis (MANOVA). Descriptive statistics with regards to the aforesaid variables are summarized in Table 8.

Table 8: Descriptive statistics regarding sub scale total scores according to group and frequency of internet use

Group		Good teaching		Generic Skills		E-learning		Clear goals and standards		Appropriate assessment		Appropriate workload	
	n	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S
Connect													
Every day/ Almost	7	35.00	3.16	21.57	3.69	15.28	3.04	11.86	2.12	12.71	3.68	5.43	2.70
At least once a week	11	34.18	5.15	22.27	3.90	14.82	3.34	11.45	2.07	13.54	2.73	4.73	1.85
At least once a month	3	28.66	5.51	15.66	5.51	12.66	3.05	10.33	.58	13.66	1.53	4.33	2.08
Facebook													
Every day/ Almost	9	36.11	4.19	23.00	3.87	15.89	3.10	12.33	1.41	15.44	2.01	5.55	1.66
At least once a week	10	36.20	3.42	22.20	2.48	14.60	2.36	12.10	1.91	13.80	2.48	4.70	1.57
At least once a month	2	29.00	5.65	17.00	2.83	7.50	3.53	10.50	.71	8.50	2.12	3.00	1.41

The equality of covariance matrices, which is the main assumption of MANOVA (Leech, Barrett and Morgan, 2008), and the variance equality of each independent variable according to groups in independent variables were maintained (p>.05). MANOVA results on pre-service teachers' effective teaching scale factor scores show that the effect of group [λ=.85, F(6,33)=.95, p>.05, η^2=.16], frequency of internet use [λ=.54, F(6,33)=1.90, p>.05, η^2=.27], group x frequency of internet use interaction [λ=.65, F(6,33)=1.24, p>.05, η^2=.19] are not significant on the scale in general. However, frequency of internet use variable factor scores are not significant yet quite interesting with the p=.052 value.

As a result of the analysis of sub scales, when data in Table 8 and 9 are examined together in terms of the frequency of internet use, it is seen that there are significant differences in group x frequency of internet use interaction and "good teaching", "generic skills" and "e-learning" subscales.

The results of Scheffe multiple comparisons test, which is done in order to find out among which groups the differences among units are present, are summarized in Table 10. According to multiple comparisons test, for the good teaching dependent variable, it was found that the difference among the means between everyday/almost every day and at least once a month is 6.825 and the difference among the means between at least once a week and at least once a month is 6.343 and in favor of frequency of internet use every day/almost every day and at least once a week. For generic skills dependent variable, it was found that the mean difference between everyday/almost every day and at least once a month is 6.175 in favor of frequency of internet use every day/almost every day and the mean difference between at least once a week and at least once a month is 6.038 in favor of frequency of internet use at least once a week. For e-learning dependent variable, it was found that the mean difference between everyday/almost every day and at least once a month is 5.025 in favor of frequency of internet use every day and the mean difference between at least once a week and at least once a month is 4.114 in favor of frequency of internet use at least once a week.

Table 9: The Effect of Group and Frequency of Internet Use Variables on Sub Scale Total Scores

Source	Dependent Variable	df	F	η^2	p
Group	Good teaching	1	.508	.014	.481
	Generic Skills	1	.426	.012	.518
	E-Learning	1	1.978	.052	.168
	Clear goals and standards	1	.391	.011	.536
	Appropriate	1	.530	.015	.471

	assessment				
	Appropriate workload	1	.323	.009	.574
Frequency of Internet Use	Good teaching	1	4.909	.214	.013*
	Generic Skills	1	5.609	.238	.008*
	E-Learning	1	6.258	.258	.005*
	Clear goals and standards	1	1.568	.080	.222
	Appropriate assessment	1	2.411	.118	.104
	Appropriate workload	1	1.835	.092	.174
Group x Frequency of Internet Use	Good teaching	1	.098	.005	.907
	Generic Skills	1	.214	.012	.808
	E-Learning	1	1.733	.088	.191
	Clear goals and standards	1	.036	.002	.965
	Appropriate assessment	1	4.152	.187	.024*
	Appropriate workload	1	.278	.015	.759

Table 10: Scheffe multiple comparisons test results

Independent Variable	Use of Internet		Difference between means	Standard Error	p
Good teaching	Every day/Almost Everyday	At least once a week	,4821	1,42601	,945
		At least once a month	6,8250(*)	2,20169	,014
	At least once a week	Every day/Almost everyday	-,4821	1,42601	,945
		At least once a month	6,3429(*)	2,13837	,020
	At least once a month	Every day/Almost everyday	-6,8250(*)	2,20169	,014
		At least once a week	-6,3429(*)	2,13837	,020
Generic Skills	Every day/Almost Everyday	At least once a week	,1369	1,20939	,994
		At least once a month	6,1750(*)	1,86724	,008
	At least once a week	Every day/Almost everyday	-,1369	1,20939	,994
		At least once a month	6,0381(*)	1,81355	,008
	At least once a month	Every day/Almost everyday	-6,1750(*)	1,86724	,008
		At least once a week	-6,0381(*)	1,81355	,008
E-learning	Every day/Almost Everyday	At least once a week	,9107	,99786	,662
		At least once a month	5,0250(*)	1,54064	,009
	At least once a week	Every day/Almost everyday	-,9107	,99786	,662
		At least once a month	4,1143(*)	1,49634	,032
	At least once a month	Every day/Almost everyday	-5,0250(*)	1,54064	,009
		At least once a week	-4,1143(*)	1,49634	,032

6. DISCUSSION AND CONCLUSION

In this section, findings regarding the effect of scenario based curriculum administered in different communication settings on the access of basic information technologies course are discussed.

6.1. Comparing two different communication setting in terms of "effective teaching"

Analyses were made over the total scores of twenty eight items in total and six sub scales as good teaching, clear goals and standards, appropriate assessment, appropriate workload e-learning and generic skills.

As a result of one-way MANOVA analysis, which was made in order to test whether there was a statistically significant difference among effective teaching scale subscale total scores of pre-service teachers using different communication settings, it was seen that there was no significant difference between post-test scores of Connect

and Facebook groups. In other words, it can be said that using whether Facebook or Connect as the communication setting has no effect on sub scale scores. Despite the gains obtained at the end of the learning-teaching process, the views that a traditional classroom setting is better and both communication settings are similar support the result of the analysis.

Effective teaching scale sub scale total scores of pre-service teachers, who used two different communication settings, group and gender variables and group x gender interaction, were tested with two-way MANOVA. According to the results of the analysis, the effects of group, gender and group x gender interaction on the scale in general are not significant. When data regarding on which scales differentiations according to group, gender and group x gender interaction exist are examined, it is seen that there is a significant difference in favor of male students between the means with regards to "e-learning" scale. When averages of two groups are examined, it is seen that they are close in the Connect group with 14.46 and 15.00. On the other hand, in the Facebook group, the average scores of female students are 12.93 while the average scores of male students are 17.00, which generated the reason of difference. The fact that the pre-service teacher who formed and managed the Facebook group stated that male pre-service teachers in the class made the request at the stage of forming the group supports the quantitative data. Also, it is another point supporting this finding that 64% of Facebook users in our country are men (socialbakers.com). Further, according to Cetin, Caliskan and Menzi (2012) male pre-service teachers, who deals with technology in daily life more than females, consider themselves more competent in technology and similarly, in literature it is emphasized that female teachers are more hesitant and have less confidence in terms of their skills of using technology.

Effective teaching scale sub scale total scores of pre-service teachers, who used two different communication settings, group and type of high school variables and group x type of high school interaction, were tested with two-way MANOVA. According to the results of the analysis, the effects of group, type of high school and group x type of high school interaction on the scale in general are not significant. When data regarding on which scales differentiations according to group, type of high school and group x type of high school interaction exist are examined, it is seen that there is a significant difference in favor of pre-service teachers graduated from general/academic high school between the means with regards to "good teaching" and "generic skills" factor scores. There is an approximately 3-point difference in both sub scale and both groups in favor of general/academic high school. The reason why there is such a difference might be that pre-service teachers graduated from Anatolian High School have higher expectations from learning-teaching process and their expectations are not met.

Effective teaching scale sub scale total scores of pre-service teachers, who used two different communication settings, group and frequency of internet use variables and group x frequency of internet use interaction were tested with two-way MANOVA. According to the results of the analysis, the effects of group, the frequency of internet use and group x the frequency of internet use interaction on the scale in general are not significant.

As a result of analyzing sub scales, data were examined together in terms of the frequency of internet use and it was seen that there are significant differences with low level of effect in group x the frequency of internet use and "good teaching", "generic skills" and "e-learning" sub scales.

According to the Scheffe multiple comparisons test, which is administered in order to find out among which groups differences between units exist, significant differences were found in each one of the good teaching, generic skills and e-learning sub scales between everyday/almost every day and at least once a month and also between at least once a week and at least once a month. It is seen that the aforesaid difference is in favor of every day/almost everyday frequency of use and at least once a week frequency of use. When average scores were examined, it was concluded that there are significant differences for both groups. However, no significant difference was observed between every day/almost every day and at least once a week frequency of internet use

According to Kutluca and Ekici (2010); pre-service teachers' self-efficacy perceptions about computer assisted education differ depending on their frequency of computer use and year of computer use. A significant difference was found between pre-service teachers' self-efficacy perceptions regarding computer assisted education and their frequency of computer use in favor of the ones who use computers more often. According to Cetin, Caliskan and Menzi (2012), the fact that pre-service teachers' frequency of internet use has increased creates a positive effect in terms of both technological competencies and attitudes towards technology. The technology competencies of pre-service teachers who deal with technology more in their daily lives increase while their attitudes towards technology change in a positive way.

When mean values were examined in order to interpret the significant difference seen in the appropriate assessment sub scale of group x 'frequency of internet use interaction', it was seen that in the Connect group, the values are 12.71, 13.54 and 13.66 in terms of all three frequency of uses, which indicate a small difference. On the other hand, in the Facebook group, the average scores, 15.44 for every day/almost every day, 13.80 for at least once a week, decrease to 8.50 at the at least once a month frequency of use. This difference can be explained with the fact that in the individual and focus group interviews, Connect was assessed as a more suitable application for academic purposes. Also, as a result of the analysis of their interviews with 20 university students and lecturers in the UK, who use social tools in their learning activities such as social network sites, blogs wiki, podcast, Schroder, Minocha and Schneidert (2010) stated that the weak aspect of social software is the assessment of cooperative learning activities. In the study by Ozcinar and Ozturk (2008), the students interviewed stated that they believe online discussions should be assessed. However, there was no agreement in terms of whether the criterion in assessment should be participation or the quality of the content because students think that deciding on what the criteria should be while assessing online discussions is a very challenging task.

6.2. Views regarding learner characteristics, learning-teaching process and communication settings

6.2.1 Views about learner characteristics

Academic readiness, learner effort and access to information technologies are noteworthy among views towards learner characteristics that are collected under two themes as academic and generic skills. At this point, having a certain amount of knowledge about computers and their applications positively affects learning-teaching processes. This is stated in a different way by Ozcinar and Ozturk (2008). In the interviews, students explained why different approaches did not arise in discussions as "they have nothing new to say". When literature is reviewed, it is seen that one of the main obstacles to students entering into discussions is lack of knowledge. With a broader perspective, Erturgut (2008) claims that the fact that students and teachers do not have enough level of knowledge in terms of computers and internet is a risk factor in internet based education. Hung, Chou, Chen and Own (2010) emphasized the importance of individuals' computer and internet use self-efficacy following the use of networks within the online learning-teaching processes. In a similar approach, Wu, Tennyson and Hsia (2010), as a result of their experimental study with a purpose of identifying student satisfaction in the mixed e-learning process, concluded that the two important factors affecting student success were performance expectation and learning atmosphere. They stressed computer self-efficacy as one of the factors indirectly affecting learning success by contributing in the two factors mentioned.

It is reflected in pre-service teachers' views that there are still some problems experienced, although quite important progress has been made in our country in terms of computer and internet access. According to Erturgut (2008), the insufficiency of technological infrastructure is the most important limitation of internet based distance education, because technical problems in computers and the internet would negatively affect both student and teacher motivation and the continuity of education.

With the generic skills theme, pre-service teachers consider the presence of a researcher as an obstacle in online communication. This finding is in parallel with the study results of Wise, Skues and Williams (2011). According to Ozcinar and Ozturk (2008), students could not agree on teacher participation. However, expert participation supported by the constructivist approach (experienced teachers' participation in discussions when considered within the context of teacher training) would give pre-service teachers the opportunity to assess the problems and classroom setting from the perspective of a teacher who knows this environment better and thus it can be used to find effective solutions in online discussions.

Masoumi and Lindström (2011) qualify student-student or teacher-student interactions in e-learning processes as the main activity of learning. However, in the implementation process, it is understood from student views that pre-service teachers prefer one-to-one dialogues in academic focused communication rather than groups. This may be a result of the fact that the group was composed of first grade undergraduate students. Also, according to Jones and Healing (2010), while the students of formal education use communication technologies in order to organize face to face meetings, students of distance education use it in order to form relationships with others and create a group, which can be a factor in not providing the expected interaction in our study. The positive result of ensuring communication is stated by Ractham, Kaewkitipong and Firpo (2012). In their social-constructivist learning setting which they designed to support learning inside and outside the classroom through Facebook, each student was found to post about two messages weekly. They stated that this provided the live communication between student – student and student – teacher. Thanks to this communication mentioned, students presented positive opinions about their learning experiences with Facebook. In providing the interaction, according to Hung, Chou, Chen and Own (2010), learners' online communication self-efficacy is another important aspect in e-learning. With a similar perspective, Ozcinar and Ozturk (2008) stated the factors that prevent students from joining online discussions as whether students have online experiences and problems

in expressing their opinions well. The fact that students did not know how to discuss in online settings caused them to get bored with online discussions and criticize others' online statements in terms of both style and content properties (length – shortness, clarity of the language used…etc.). It was also shown that students with a high level of online communication experience felt more comfortable in their learning experiences in an online setting and were able to gain more satisfaction.

6.2.2. Views about learning – teaching process

In this section the views of participants, who were arranged into groups according to the themes of effectiveness of instruction, e-learning and scenarios, about the learning – teaching process, were discussed. The results of experimental studies regarding Facebook's contribution to student achievement as an online learning environment (Keles and Demirel, 2011, Kayri and Cakir, 2010, Kabilan, Ahmad and Abidin, 2010) show that it makes a positive contribution to cooperative learning and improving online communication skills (Schroder, Minocha and Schneidert, 2010) as well as having a great potential as an informal learning environment (Ractham, Kaewkitipong and Firpo, 2012).

Pre-service teachers stated that with the effectiveness of instruction theme, they first learnt to complete the tasks given on their own. Further, a negative point expressed by many participants was related to the size of both groups. It was seen in many pre-service teachers' opinions that the large number of learners in both groups prevented the learning process. It was seen that problems such as not getting feedback for their posts, repetition of the same words all the time and being faced with questions irrelevant to the task were experienced. Kuo, Shadiev, Hwang and Chen (2012) stated that giving feedback immediately at e-learning settings have a positive effect on students' academic success. According to Ozcinar and Ozturk (2008), when the number of participants increase in a nonsynchronous communication setting, the number of messages that students have to read in order to follow up the discussion increase as well. They stated that in synchronized communication the abundance of participants in the group increases message transfer rate; thus there may be problems in following up the issue discussed and it might be better to discuss in small groups. In line with the finding of the present study as well as the above mentioned opinions, micro learning communities suggested to be formed with Facebook, which was proposed by Bosch (2009) draws attention.

Under the theme e-learning, almost all pre-service teachers emphasized the flexibility of access from home. Opinions regarding the fact that courses can be attended without the need to go to school as well as the opportunity for long weekend holidays reveal this situation clearly. Based on pre-service teachers' opinions, the biggest problem in e-learning process is the focusing on things other than the task. Student opinions showed that the warner effect of teacher at the traditional classroom decreases in e-learning processes. Hung, Chou, Chen and Own (2010) stated that traditional learning settings are much different than web-based learning settings. While there is a linear order in traditional learning settings, web-based settings offer freedom and flexibility in working with the materials. It gives learners the control of their own learning. Moreover, the fact that participants in both groups showed Facebook regarding the negativity mentioned is significant. According to Jones and Healing (2010); this is because of the nature of social network sites. The off-duty interaction, which was stated as a hazard by Schroder, Minocha and Schneidert (2010) affects learning and teaching activities in a negative way.

The most important factor emphasized under the scenarios heading is the positive outcome of learning through assignments. Participants agree on the point that learning is more permanent. Despite this, the fact that there is an expectation for a traditional classroom setting and direct instruction was explained by Ozcinar and Ozturk (2008) as follows: "Pre-service teachers currently studying at the universities have always been educated based on programs designed with a traditional educational approach. This has supported pre-service teachers' established educational habits to look for the correct information by listening from the teacher and trying to tell the correct answer. Thus, the effort to perform constructivist activities with a traditional learning perspective made students reluctant to give their own opinions and test their assumptions in these settings. However, this should not be thought of as a limitation; instead it should be perceived as a stage in realizing the radical transformation of constructivist approach in education."

Another positive view that should be presented with the scenarios theme is that scenarios prepared on different issues were reflected in students' opinions in an interesting way.

6.2.3. Views about communication setting

According to the participant views on communications setting, which is thought to be among the most important data of the study, Connect provides teacher-student interaction in the classroom setting better than Facebook.

It can be said that the views of a pre-service teacher in the Connect group who compared both settings was formed due to the habit of Facebook use and the sound, image and desktop share properties of Connect. The need for third party software for the use of Facebook in learning-teaching activities overlaps with the studies of Lim (2010) and Wang (2012). Despite the superiorities of Connect over Facebook, according to Senkal and Dincer (2012), software that provides synchronic virtual classroom applications such as Wiziq and Adobe Connect generally helps teachers show students the documents on a computer through video images. However, the board used in traditional classrooms cannot show course material etc. Although through these kinds of software the image of the classroom or the course material is shown with video stream, due to internet speed the image quality may be at quite low levels. Therefore, while student interface interaction can be provided in digital materials such as presentations or etc. that can be sent over computer, the desired interaction cannot be maintained in transferring the traditional classrooms into the e-learning system.

According to the views of pre-service teachers, the only academic advantage that Facebook provides is that it can be accessed regardless of time. In addition to this view, it is an important progress in terms of ensuring independence from location that social network sites can be accessed through mobile phones. Also, Ractham, Kaewkitipong and Firpo (2012) think that social network sites like Facebook, which are well-known, easy to use and quite popular, can be convenient for both teachers and students as a learning setting due to these properties, and students' personal use can easily be adapted towards academic purposes.

Although it has no direct effect on the expectation of academic achievement, according to Yu, Tian, Vogel and Kwok (2010) social network sites help students to be socially accepted and adopt univeristy culture. The important effect of those two factors on learning outputs is in parallel with the views of a pre-service teacher who is in the Facebook group.

One of the key concepts of e-learning activities is communication and the other is motivation. Research shows that motivation affects learning both in traditional teaching and in the process of e-learning (Martens, Bastiaens and Kirschner, 2007; Lim, 2004). For this purpose, teachers should spend time in getting to know their students better (Chen and Jang, 2010)

One of the motivation theories that can be used at this point is the ARCS model of Keller. Keller and Suzuki (2004) propose participative analysis in order to be able to develop suitable motivation tactics. Thus, desired outcomes can be reached as a result of motivational activities that would be performed. In case analysis cannot be made, they suggest that more motivational tactics should be implemented. The adaptation of Keller's ARCS model in –learning processes is effective on learner motivation, achievement and self-learning skills (Miltiadou and Savanye, 2003; Chang and Lehman, 2002). Kim and Keller (2008) stated that they had obtained quite successful results with the motivation tactic that they realized with personal messages.

Another variable in e-learning settings, which is as important as communication and learner motivation is the "management of e-learning process". Unlike the traditional classroom management concept, this is quite important in maintaining the "effective instruction" at learning-teaching processes where there is less or no classroom instruction or an exact concept of traditional classroom. In this study, it was seen that learners formed an alternative Facebook group without the knowledge of lecturers. This shows that variables which are outside the control of lecturers play an effective role in the learning-teaching process. Therefore, it is necessary for lecturers to closely monitor each learner's learning process in terms of the management of e-learning process.

In conclusion, social network sites have the potential to be important teaching devices in offering economic and effective solutions in order to meet the ever increasing education need in the globalized world.

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