THE TURKISH ONLINE JOURNAL OF EDUCATIONAL TECHNOLOGY

JULY 2008
Volume 7 - Issue 3

Prof. Dr. Aytekin İşman
Editor-in-Chief

Prof. Dr. Jerry Willis
Editor

Fahme Dabaj
Associate Editor

ISSN: 1303 - 6521

TOJET – Volume 7 – Issue 3 – July 2008
Table of Contents

Copyright © The Turkish Online Journal of Educational Technology 2002

Message from the Editor-in-Chief

The Turkish Online Journal of Educational Technology (TOJET) welcomes you. TOJET also thanks more than 20000 researchers, practitioners, administrators, educators, teachers, parents, and students from all around the world for visiting the volume7 and issue 2 between April 01 and June 30 2008. TOJET has diffused successfully innovation on educational technology around the world.

TOJET is a quarterly journal (January, April, July and October). This online periodical is devoted to the issues and applications of educational technology to enhance learning and teaching. Reviewed by leaders in the field, this publication is designed to provide a multi-disciplinary forum to present and discuss all aspects of educational technology in all learning environments.

TOJET provides an educational technology forum and focal point for readers to share and exchange their experiences and knowledge each other to create better research experiences on educational technology. The main purpose of this sharing and exchange should result in the growth of ideas and practical solutions that can contribute toward the improvement of education and learning through educational technology.

TOJET, Hacettepe University, Eastern Mediterranean University, and Sakarya University will organize the 9th International Educational Technology Conference (IETC 2009) in May 2009 in Ankara - Turkey.

TOJET records its appreciation of the voluntary work by the following persons, who have acted as reviewers for one or more submissions to TOJET for v7i3. The reviewers of this issue are drawn quite widely from educational technology field. Reviewers' interests and experiences match with the reviewed articles.

I am always honored to be the editor-in-chief of TOJET. Many persons gave their valuable contributions for this issue. I would like to thank the guest editor and the editorial board of this issue. The guest Editor of this issue is Prof. Dr. Petek Aşkar. TOJET thanks the guest Editor and the Editorial Board of this issue.

Prof. Dr. Aytekin İŞMAN
Sakarya University

Copyright © The Turkish Online Journal of Educational Technology 2002

Message from the Guest Editor

Dear Readers,

TOJET seeks to contribute to the educational understanding of information and communication technologies. As the guest editor of this issue, I'm glad to see the variety of articles focusing on the implementation of emerging tools, perception of the teachers and the students exposed in such environments.

Furthermore, the journal becomes more international which means that it is getting more recognized worlwide. We have contributors form Turkey, USA, Iran, Israel and Ghana.

Lauching a scholarly journal needs the involvement of all- the reviewers, the members of the editorial board, the editors and the publisher. I would like to thank them in every process to make this issue actualized.

Some of the articles published in this issue were submitted for the April issue and the review process were ended under the previous editor who I want to thank- Prof. Dr. Halil İbrahim Yalın.

The aim of TOJET fulfills and continue to fulfill by the readers and authors- the academic community- who have a great role in the development of innovations in teaching and learning.

July 1, 2008

Guest Editor

Prof. Dr. Petek Aşkar

Copyright © The Turkish Online Journal of Educational Technology 2002

President
Prof. Dr. Mehmet DURMAN (Sakarya University)

Editors
Prof. Dr. Aytekin İŞMAN (Sakarya University)
Prof. Dr. Jerry WILLIS (Louisiana State University)

Associate Editor
Senior Instructor Fahme DABAJ (Eastern Mediterranean University)

Editorial Board
Prof. Dr. Aytekin İŞMAN (Sakarya University)
Prof. Dr. Brent G. WILSON (University of Colorado at Denver)
Prof. Dr. Enver Tahir RIZA (Ege University)
Prof. Dr. Petek AŞKAR (Hacettepe University)
Prof. Dr. Ülkü KÖYMEN (Çukurova University)
Prof. Dr. Ali Ekrem ÖZKUL (Anadolu University)
Prof. Dr. Jerry WILLIS (Lousiana State University)
Prof. Dr. Asaf VAROL (Fırat University)
Prof. Dr. Murat BARKAN (Eastern Mediterranean University)
Prof. Dr. Ali ŞİMŞEK (Anadolu University)
Prof. Dr. Uğur DEMİRAY (Anadolu University)
Prof. Dr. Marina Stock MCISAAC (Arizona State University)
Prof. Dr. Charlotte N. (Lani) GUNAWARDENA (University of New Mexico)
Prof. Dr. Francine Shuchat SHAW (New York University)
Prof. Dr. Don M. FLOURNOY (Ohio University)
Prof. Dr. Akif ERGIN (Başkent University)
Prof. Dr. Arvind SINGHAL (Ohio University)
Prof. Dr. Mehmet GÜROL (Fırat University)
Prof. Dr. Buket AKKOYUNLU (Hacettepe University)
Prof. Dr. Colleen SEXTON (Ohio Üniversitesi)
Prof. Dr. Ferhan ODABAŞI (Anadolu University)
Prof. Dr. Hafize KESER (Ankara University)
Prof. Dr. Stefan AUFENANGER (University of Mainz)
Prof. Dr. Antoinette J. MUNTJEWERFF (University of Amsterdam)
Prof. Dr. Ali Rıza AKADENİZ (Karadeniz Teknik University)
Prof. Dr. Ali Paşa AYAS (Karadeniz Teknik University)
Prof. Dr. Adnan BAKİ (Karadeniz Teknik University)
Prof. Dr. Salih ÇEPNİ (Karadeniz Teknik University)
Prof. Dr. Servet BAYRAM (Marmara University)
Prof. Dr. Hasan AMCA (Eastern Mediterranean University)
Prof. Dr. Ing. Giovanni ADORNI (University of Genova)
Prof. Dr. Gianni Viardo VERCELLI (University of Genova)
Prof. Dr. Heli RUOKAMO (University of Lapland, Finland)
Prof. Dr. Halil İbrahim YALIN (Gazi University)
Prof. Dr. Rauf YILDIZ (Yıldız Teknik University)
Associate Prof. Dr. Eralp ALTUN (Dokuz Eylul University)
Associate Prof. Dr. Larysa M. MYTSYK (Gogol State University)
Associate Prof. Dr. Rozhan Hj. Mohammed IDRUS (Universiti Sains Malaysia)
Associate Prof. Dr. Mustafa Şahin DÜNDAR (Sakarya University)
Associate Prof. Dr. Yavuz AKPINAR (Boğaziçi University)
Associate Prof. Dr. C. Hakan AYDIN (Anadolu University)
Associate Prof. Dr. Ahmet Zeki SAKA (Sakarya University)
Associate Prof. Dr. Arif ALTUN (Nigde University)
Associate Prof. Dr. Mehmet ÇAĞLAR (Near East University)
Associate Prof. Dr. Hüseyin UZUNBOYLU (Near East University)
Associate Prof. Dr. Hasan Hüseyin ÖNDER (Eastern Mediterranean University, TRNC)
Assistant Prof. Dr. Teressa FRANKLIN (Ohio University)
Assistant Prof. Dr. Mustafa Murat INCEOGLU (Ege University)
Assistant Prof. Dr. Pamela EWELL (Central College of IOWA)

Assistant Prof. Dr. Aaron L. DAVENPORT (Grand View College)
Assistant Prof. Dr. Paula FITZGIBBON (University of Victoria)
Assistant Prof. Dr. Betül ÖZKAN (State University of West Georgia)
Assistant Prof. Dr. Hamit CANER (Eastern Mediterranean University)
Assistant Prof. Dr. Dale HAVILL (Dhofar University)
Assistant Prof. Dr. Hüseyin YARATAN (Eastern Mediterranean University)
Assistant Prof. Dr. Erkan TEKİNARSLAN (Bolu Abant İzzet Baysal University)
Assistant Prof. Dr. Murat ATAİZİ (Anadolu University)
Assistant Prof. Dr. Hasan ÇALIŞKAN (Anadolu University)
Assistant Prof. Dr. Muhammet DEMİRBİLEK (Süleyman Demirel University)
Assistant Prof. Dr. Selma KOÇ Vonderwell (Cleveland State University, Cleveland)
Dr. İsmail İPEK (Bilkent University)
Dr. Manoj Kumar SAXENA (Advance Institute of Management - India)
Fahme DABAJ (Eastern Mediterranean University)
John FITZGIBBON (Ministry of Education, Jordan)

EVALUATION OF THE SKILLS OF K-12 STUDENTS REGARDING THE NATIONAL EDUCATIONAL TECHNOLOGY STANDARDS FOR STUDENTS (NETS*S) IN TURKEY

Adile Aşkım KURT
Anadolu University, Education Faculty, Computer &Instructional Technologies Department
aakurt@anadolu.edu.tr

Ahmet Naci ÇOKLAR
Anadolu University, Graduate School of Educational Sciences
ncoklar@anadolu.edu.tr

Kerem KILIÇER
Anadolu University, Graduate School of Educational Sciences
kkilicer@anadolu.edu.tr

Yusuf YILDIRIM
Ziya Gökalp Primary School
yusufyildirim@anadolu.edu.tr

ABSTRACT
The goal of teaching technology used in every field of daily life as well as in every stage of education, is to have individuals acquire the necessary skills in technology use. In this era, these skills are among the essentials for individuals to discover the world with the help of technology. This study was carried out on students who completed their K-12 education and just started university. The purpose of the study was to evaluate their skills regarding the educational technology standards and to examine the factors that influence these skills. Consequently, it was found that the students examined had an average level of educational technology standards. Moreover, it was also revealed that their easy access to the internet via their own computers as well as the education level of their mother helped them develop their skills.

Key Words: Educational Technology Standards, K-12 Students, NETS

1. INTRODUCTION

Technology, as a bridge between science and application, has helped social life in many respects since the existence of early humans (Demirel, Seferoğlu & Yağcı, 2003). Technological advances have gained speed in the historical process. These advances are certainly parallel to the increase in information. While technological advances are rather slower in agricultural societies, industrial societies witness more advances in technology such that it is even difficult to keep with these advances in today's information society. The rapid and widespread development of technology has deeply influenced not only the activities in educational institutions but the other social institutions as well. When the related literature is examined, it is seen that the concept of educational technology refers to the use of technology in any field of education (Gülbahar, 2005).

1.1. The Concept of Educational Technology

The concept of educational technology emphasizes the use of technology in any field of education. In this respect, the use of technology in education starts with the first educational activities in schools. For instance, educational technology was used in hunting societies because authentic models were used even when it was necessary to use an arrow and a spring in order to teach hunting. Today, the use of information and communication technologies in educational environments is considered as the planning, application, evaluation and the development of learning-teaching processes so as to support learning (Alkan, 2005; Hızal, 1993).

Educational technologies enable students to structure information from the primary source. Besides keeping students' interest alive throughout the learning process, educational technologies also lead to permanent learning. Moreover, educational technologies provide teachers with the opportunity to develop activities appropriate to mass education (Alkan, 2005; İşman, 2005; Karaağaçlı, 2004). The use of these new and rapidly-developing technologies in education such as computers has helped with the skills and proficiencies of all the individuals like students, administrators and especially the teachers in educational institutions. Therefore, in order to increase the use of educational technologies in the education process, many countries have started to apply different programs. As a consequence of these programs, the teachers and the students increased their use of educational technologies (Stuve & Cassady, 2005). However, not all teachers can fully benefit from educational technologies, and that has made it necessary to provide unity in terms of the use of educational

Copyright © The Turkish Online Journal of Educational Technology 2002

technologies in the education process. In line with this need for unity, educational technology standards were determined, and these standards helped to reveal what skills and information teachers, students and administrators should have. For this purpose, several attempts have been made on national basis throughout Europe and especially in USA to develop these educational technology standards.

1.2. Educational Technology Standards

In 1979, International Society for Technology in Education (ISTE), a non-profit organization, was established for the purpose of functional and standardized use of educational technologies in USA. In order to increase the effective use of educational technologies in teaching training and in K-12 schools, the institution provides leadership and the sources necessary for the development of school leadership as well as for learning and teaching. Among the most significant attempts of the institution is the National Educational Technology Standards (NETS) project started in 1993 to determine the standards that should be obeyed in educational institutions in USA. The basic goal of this project is to improve the learning outcomes of students in USA by developing national standards regarding the educational use of technology in K-12. In the scope of this project, common standards for educational technologies in USA and the related indicators were determined (NETS, 2007). These standards are intended to form a criterion for teachers, administrators and students (UNESCO, 2002).

In Europe, there are national standards rather than international educational technology standards. However, NETS refers to the use of educational technologies in education by teachers, administrators and students, while the standards determined in Europe are rather technical and aim at helping individuals to have a perspective.

Though considered as national standards, NETS is also adopted by other countries all around the world and constitutes the basis of educational technology standards to be prepared. Using these standards, countries such as Australia, China, Costa Rica, Denmark, Ireland, Latin America, England and Japan developed national and regional educational technology standards or adapted the current standards to their own situations (ISTE, 2007; UNESCO, 2002). Considering the NETS project as a process, it is seen that the standards and the related indicators that students, teachers and administrators should have determined for the planning and use of education technologies in 1998 for students, in 2000 for teachers and in 2001 for administrators (NETS, 2007). These were NETS-T (Teachers), NETS-A (Administrators) and NETS-S (Students).

- NETS-T includes the standardized qualities and proficiencies that teachers should have for the use of educational technologies.
- NETS-A covers the standardized proficiencies that administrators, who have an important role in the education process, should have for the use of educational technologies.
- NETS-S defines what students should do for the use of educational technologies. While NETS-A and NETS-T constitute a common group of standards for administrators and teachers respectively, NETS-S, as a group of standards for students, is different. The reason for this difference is that NETS-S includes various standards from those of pre-school period called P-12 to those of high school 12th grade. Students in this group fall into 4 different categories with respect to their development levels. According to this, the standards were determined. It was also taken into consideration that pre-school students and high school students are not at the same level in terms of educational technology use. These four categories comprise the standards for the pre-school and 1st grade students (Grades PreK – 2), the standards for the 3rd and 5th grade students (Grades 3 – 5), the standards for the 6th and 8th grade students (Grades 6 – 8), and finally, the standards for the 9th and 12th grade students (Grades 9-12) (Çoklar & Kuzu, 2006). Moreover, considering all the categories of NETS-S, it is seen that the proficiencies that students are supposed to consist 6 dimensions (NETS, 2007). These dimensions are shown in Table 1.

Tablo 1. NETS*S Standards

I	Basic operations and concepts
II	Social, ethical, and human issues
III	Technology productivity tools
IV	Technology communication tools
V	Technology research tools
VI	Technology problem-solving and decision-making tools

Copyright © The Turkish Online Journal of Educational Technology 2002

In spite of the fact that there are no standards on use of educational technology for students in Turkey yet, students use technology in education system intensely. In this context, evaluating the technology use of students according to NETS*S standards which are well accepted throughout the world and emphasizes on both technical and social domains is main focus of this study.

2. METHOD

This study aims at revealing the overall state of students in terms of educational technology standards. The survey method was applied in this study to collect the research data. In line with the sub-goals, both singular and correlational survey models were employed. For the analysis of the data, SPSS 15.0 was run, and the significance level was taken as .05.

2.1 Purpose

This study was carried out on students who just started their university education in Anadolu University in Turkey. The study investigates the general conditions of these students focusing on their skills related to educational technology standards. For this purpose, the present study tries to find answers to the following questions.

1. What are the general conditions of students with respect to educational technology standards?
2. Is there a significant difference between the students' level of educational technology standards and;
   a. their gender?
   b. whether the students have a computer where they accommodate or not?
   c. whether the students have internet connection where they accommodate or not?
   d. the education level of their mother?
   e. the education level of their father?

2.2. Limitations

This study is limited to;

- the first grade students of Education Faculty, Anadolu University, 2006-2007 academic year
- NETS*S standards (the educational technology standards for students).

2.3. Participants

The study was conducted at Anadolu University, which admits students from different cities all through Turkey according to their scores of the university entrance exam and according to their K-12 school types. The study was carried out on 293 first grade students attending 9 teacher training programs of the Education Faculty of Anadolu University in the academic year of 2006-2007 as the Department of Computer and Educational Technologies, the Department of Primary-School Education, the Department of Special Education, and the Department of Foreign Languages. Seven students were excluded from the study as they did not respond to the data collection tool as required. Because NETS*S standards are for K-12 and because the students had just graduated from K-12, the study covered only the first grade students. The demographic background of the participants can be seen in Table 2.

Table 2. Demographic Background of the Participants

		Frequency	Percentage (%)
Gender	Male	101	35.3
	Female	185	64.7
	Total	286	
Computer	Yes	128	44.8
	No	158	55.2
	Total	286	
Internet Connection	Yes	98	34.3
	No	186	65.0
	Total*	284	
Mother's Education Level	Not a diploma and Primary School Education	182	63.6
	High School	73	25.5
	2-year/4-year University Level Education and Master's Degree/Doctorate	29	10.1
	Total*	284	
Father's Education Level	Not a diploma and Primary School Education	131	45.8
	High School	96	33.6

Copyright © The Turkish Online Journal of Educational Technology 2002

2-year/4-year University Level Education and Master's Degree/Doctorate	57	19.9
Total*	284	

(*) Non-responded data not included

2.4. Data Collection Tool

The data collection tool of the study was developed by the researchers considering the NETS*S standards and the current education programs in Turkey. The data collection tool developed was made up of two parts. The first part of the tool included statements about personal information, and the second part comprised statements about educational technology standards. The statements about educational technology standards were prepared as 5-item likert type like "Never", "Rarely", "Sometimes", "Often", "Very Often."

In the process of developing the data collection tool prepared on the basis of NETS*S standards, the researchers first prepared items as a rough draft and gathered them all in an item pool. A total of 33 items gathered in the item pool were sent to 5 experts, 4 of whom were expert in the field of Educational Technologies and 1 of whom was expert in the field of Education Programs and Teaching. Following the expert-feedback process, 5 items were excluded from the data collection tool, and some of the items were changed. Thus, the final version of the data collection tool included 28 items. Following its application, the reliability coefficient (Cronbach Alpha) of the data collection tool was calculated as α=0.93.

3. FINDINGS AND INTERPRETATIONS

This part of the study presents and interprets the findings about students' levels of educational technology standards as well as about the sub-dimensions of these standards. Furthermore, there are also findings presented and interpreted in this past regarding whether students' levels of educational technology standards differ according to their gender, according to whether they have a computer and internet connection where they accommodate, and according to education level of their parents.

3.1. The Conditions of Students in Terms of Educational Technology Standards

In order to reveal the overall conditions of the students in terms of educational technology standards, the results obtained from the five-item likert-type questionnaire were examined for their evaluation criteria. The evaluation criteria were calculated with the formula of (n-1/n)*number of items, n=5 for the five-item likert-type. The analyses were carried out considering the number of the items separately for each sub-dimension. The evaluation criteria for each dimension can be seen in Table 3.

Table 3. Evaluation Criteria

Evaluation Criteria	Overall $\overline{X}$	NETS*S I-II $\overline{X}$	NETS*S III-IV-V-VI $\overline{X}$
Never	28.0 – 50.4	6.0 – 10.8	4.0 – 7.2
Rarely	50.5 – 72.9	10.9 – 15.7	7.3 – 10.5
Sometimes	73.0 – 95.4	15.8 – 20.6	10.6 – 13.8
Often	95.5 – 117.9	20.7 – 25.5	13.9 – 17.1
Very Often	118.0 – 140.0	25.6 – 30.0	17.2 – 20.0

Based on the total scores obtained from the 28-item data collection tool for educational technology standards, the overall mean score of the 286 students was found 95.72 (Table 4). The data collection tool produces a score of at least 28 and at most 140. Examining the difference between the scores, as shown in Table 3, it is seen that according to the mean of the scores of the educational technology standards, the students generally met the educational technology standards and had an overall skill above the average level.

Table 4. Overall Distribution of the Participants Regarding NETS*S

	$\overline{X}$	Sd	Min	Max
Overall Distribution	95.72	15.88	49.00	135.00
NETS*S – I	20.61	4.45	6.00	30.00
NETS*S – II	22.50	3.80	10.00	30.00
NETS*S – III	11.21	3.03	4.00	20.00
NETS*S – IV	14.63	3.11	6.00	20.00
NETS*S – V	14.49	3.02	4.00	20.00
NETS*S – VI	12.25	3.37	4.00	20.00

Copyright © The Turkish Online Journal of Educational Technology 2002

Table 4 presents the overall situation in terms of the sub-dimensions of the NETS*S standards. According to the table, it is seen that the students had an average level with respect to the sub-dimensions of "Basic operations and concepts", "Technology productivity tools" and "Technology problem-solving and decision-making tools" and had a good level with respect to the other sub-dimensions of "Social, ethical, and human issues", "Technology communication tools" and "Technology research tools."

Taking these results into consideration, it is seen that according to the sub-dimension of "Basic operation and concepts," the students were in a better condition in terms of such skills as the general use of technological devices and the use of technological devices appropriate to their specific purposes like the preparation of projects/papers than they were in terms of overcoming the problems encountered while using the technological devices. On the other hand, the current situation revealed, does not reflect the expectations of the researchers regarding this sub-dimension because education in Turkey mostly depends on technological information and skills. This situation means that education in Turkey does not fully achieve its goal.

For the sub-dimension of "Social, ethical, and human issues," the students were found to be good at their skills in respecting social, ethical and cultural values for the use of technological devices and in paying attention to ethical issues while getting information with the help of technological devices. Regarding this sub-dimension, it was found that the students paid enough attention to social and ethical issues and that they did not pay as much attention to the health issues (sitting position, eye health, etc).

For the sub-dimension of "Technology productivity tools," the students had average-level skills in terms of the use of technological devices for increasing creativity and for supporting learning. Within this sub-dimension, it was seen that the students had lower-level skills in publishing the papers they prepared (web, internet, CD, etc.) than they did in other issues.

When the sub-dimension of "Technology communication tools" is considered, it is seen that the students used e-mail services and chat-software programs well enough to communicate and share information with their friends, teachers and other people. On the other hand, in this sub-dimension, the students had the lowest skill-level in using technological devices for group-works.

Regarding the sub-dimension of "Technology research tools," the students were found to prefer to use search engines for accessing to information on the internet than to benefit from such services as e-magazine, e-book, e-library and Wap. For the presentation of the projects prepared, it was revealed that the students had lower skill-level in their use of technology.

As for the sub-dimension of "Technology problem-solving and decision-making tools," it was found out that the students used technological devices mostly for analyzing the information they obtained and for having a different perspective. However, the students had lower skill-level in using technological devices for overcoming the problems they experienced in their daily lives.

3.2. Findings Related to the Relationship between Students' Levels of Educational Technology Standards and Their Gender

The findings related to whether there was a significant difference between the students' gender and their scores regarding the educational technology standards are presented in Table 5.

Table 5. t-Test Results Related to the Students' Gender and Their Educational Technology Standards

Gender	N	$\overline{X}$	Sd	df	t	p
Male	101	97.05	17.11	284	1.051	.294
Female	185	94.99	15.16			

As can be seen in Table 5, the students' levels of educational technology standards do not differ with respect to their gender [$t_{(284)}$=1.051, p>.05]. The male students' levels of educational technology standards ($\overline{X}$=97.05) do not statistically differ from the female students' levels of educational technology standards ($\overline{X}$=94.99). Based on this finding, it could be stated that the educational technology standard levels are the same for either gender.

3.3. Findings Related to the Relationship between Students' Levels of Educational Technology Standards and Their Having a Computer and Internet Connection Where They Accommodate

Supposing that the educational technology standard level of students is influenced by their having a computer and internet connection in their accommodation places, the data obtained were analyzed in terms of these two variables. The findings are as follows:

Findings Related to the Relationship between Students' Levels of Educational Technology Standards and Their Having a Computer Where They Accommodate

Table 6 presents the findings regarding whether there was a significant difference between the students' scores of educational technology standards and their having a computer where they accommodate. The findings are presented in Table 6 below.

Table 6. t-Test Results Related to the Students' Educational Technology Standards and Their Having a Computer Where They Accommodate

Computer	N	$\overline{X}$	Sd	df	t	p
Yes	128	100.13	15.32	284	4.357	.000
No	158	92.15	15.46			

When Table 6 is examined, it is seen that there is a significant difference between students' levels of educational technology standards and their having a computer where they accommodate [$t_{(284)}$=4.357, p<.05]. The educational technology standard levels of students who had a computer in their accommodation places ($\overline{X}$ =100.13) significantly differ from the educational technology standard levels of those who did not have a computer in their accommodation places ($\overline{X}$ =92.15). This finding reveals that having a computer in students' accommodation places is of great significance in terms of their levels of educational technology standards. Thus, it could be said that being able to use a computer at any time rather than using it only at school plays an important role in the development of the skills for educational technology standards.

Findings Related to the Relationship between Students' Levels of Educational Technology Standards and Their Having Internet Connection Where They Accommodate

Table 7 shows the findings regarding the relationship between the students' scores of educational technology standards and their having internet connection where they accommodate.

Table 7. t-Test Results Related to the Students' Educational Technology Standards and Their Having Internet Connection Where They Accommodate

Internet Connection	N	$\overline{X}$	Sd	df	t	p
Yes	98	99.98	14.97	282	3.348	.001
No	186	93.47	15.89			

Table 7 demonstrates that there is a significant difference between students' levels of educational technology standards and their having internet connection in their accommodation places [$t_{(282)}$=3.348, p<.05]. There is a significant difference between the educational technology standard levels of students who had internet connection in their accommodation places ($\overline{X}$ =99.98) and the educational technology standard levels of those who did not have internet connection in their accommodation places ($\overline{X}$ =93.47). This finding reveals that it is important to have internet connection in the accommodation place for the educational technology standard level. It could be concluded that the internet should be considered as a tool for an access to information is of great significance in terms of the development of the skills in educational technology use.

3.4. Findings Related to the Relationship between Students' Levels of Educational Technology Standards and the Education Levels of Their Parents

The data were analyzed for the mother and the father separately in order to see whether there was a significant difference between the students' scores of the educational technology standards and the education levels of their parents.

Findings Related to the Relationship between Students' Levels of Educational Technology Standards and the Mother's Education Level

The relationship between the mother's education level and the students' levels of educational technology standards is presented in Table 8 and Table 9.

Copyright © The Turkish Online Journal of Educational Technology 2002

Table 8. The Results of Descriptive Statistics Regarding the Students' Educational Technology Standards and the Mother's Education Level

Mother's Education Level	N	$\overline{X}$	Sd	Standard Error
- Not a Diploma and Primary School Education	182	93.71	16.10	1.19
B- High School	73	98.65	14.55	1.70
- 2-year/4-year University Level Education and Master's Degree/Doctorate	29	101.00	16.36	3.03
Total	284	95.72	15.93	0.94

Table 9. The Results of Analysis of Variance Regarding the Students' Educational Technology Standards and the Mother's Education Level

The Source of Variation	Sum of Squares	df	$\overline{X}$	F	p	Significant Difference
Between Groups	2170.54	2	1085.27	4.375	.013	A-B, A-C
Within Groups	69699.58	281	248.04			
Total	71870.12	283				

When the Table 8 and the Table 9 are examined, it is seen that there was a statistically significant difference between students' educational technology standards and the mother's education level [$F_{(2-281)}$=4.375, p<.05]. In other words, students' levels of educational technology standards significantly change depending on the mother's education level.

According to the results of the LSD test carried out to see which group caused the difference, it is seen that the educational technology standard skills of students whose mothers' education levels were either "2-year/4-year University Level Education and Master's Degree/Doctorate" ($\overline{X}$ =101.00) or "High School" ($\overline{X}$ =98.65) were better than those whose mothers' education levels were "Not a Diploma and Primary School Education" ($\overline{X}$ =93.71). Considering the traditional Turkish family structure, this finding could be attributed to the significant role of a mother in the education of her children. Thus, it can be noted that as the education level of the mother increases, so do children's skills in technology use.

Findings Related to the Relationship between Students' Levels of Educational Technology Standards and the Father's Education Level

The relationship between the father's education level and the students' levels of educational technology standards was examined, and the findings are presented in Table 10 and Table 11.

Table 10. The Results of Descriptive Statistics Regarding the Students' Educational Technology Standards and the Father's Education Level

Father's Education Level	N	$\overline{X}$	Sd	Standard Error
A-Not a Diploma and Primary School Education	131	93.61	15.70	1.37
B-High School	96	97.17	15.69	1.60
C-2-year/4-year University Level Education and Master's Degree/Doctorate	57	98.33	16.33	2.16
Total	284	95.76	15.90	0.94

Table 11. The Results of Analysis of Variance Regarding the Students' Educational Technology Standards and the Father's Education Level

The Source of the Variance	Sum of Squares	df	Mean Square	F	p	Significant Difference
Between Groups	1175.39	2	587.69	2.345	.098	-
Within Groups	70431.80	281	250.64			
Total	71607.19	283				

When the Table 10 and the Table 11 are examined, it is seen that there was not a statistically significant relationship between the students' educational technology standards and the father's education level [$F_{(2-}$

$_{281)}$=2.345, p>.05]. In line with this finding, the students' levels of educational technology standards do not change based on the father's education level. Thus, considering this finding, it could be stated that the father's education level does not influence children's skills in educational technology use in contrast with the previous finding that the mother's education level had an effect on children's skills in educational technology use. In other words, this result shows that the father is not as effective as the mother in children's education according to the structure of a traditional Turkish family.

4. CONCLUSION AND SUGGESTIONS

This study examines the overall conditions of students' skills in educational technology standards. As a consequence of the research, the students who just started university in Turkey were found to meet the NETS*S standards and their skills were observed to be above average. In general, students recognize the basic operations and concepts related to education technologies, know about the benefits and limitations of technological devices, use technological devices successfully, take ethical issues into consideration while using technological devices, use technological devices to support their own learning and to develop themselves, prefer search engines to other sources while searching for information, make good use of technological devices to share information with other people, use technological devices to find any information they need for their research studies and analyze the information they get with the help of technological devices. On the other hand, it is seen that students are not proficient enough in technical issues, they do not pay enough attention to health issues, they are not much successful in carrying out cooperative-based learning activities in online environments, and that they do not often benefit from technological devices in overcoming the problems they experience in daily life. This situation demonstrates that the course of Computer and Technology Literacy that K-12 students have taken does not fully achieve its goals although the course predominantly covers basic skills. In addition, it was observed that students have problems in their skills regarding online education, which is a future concept of education.

When students' skills regarding educational technology standards are taken into consideration, it is seen that no difference occurs with respect to gender; in other words, both male and female students have the same level of skills. On the other hand, it was found that being able to use a computer at any time develops students' skills regarding educational technology standards. Furthermore, the internet was found to be another factor that helps develop these skills. One striking conclusion is that the education level of parents is important for the development of students' skills regarding education technology standards. As the education level of the mother increases, children's perspective into education technologies and their skills in using these technologies increase as well. However, the education level of the father does not do so. The influence of the education level of the mother on children's skills reflects the significant role of the mother in the development and education of children as it is in a traditional Turkish family.

In order to help improve the skills of K-12 students regarding educational technology standards, first of all, certain subjects related to overcoming the problems that students may experience using technological devices should be included in the curriculum of education programs. Moreover, students should be provided with the opportunity to do practical applications regarding how to use education technologies in daily life and how to solve the problems they face. Students should be taught how they will make use of technology in their education process so as to search for the projects and papers they are assigned, to analyze the information they get and to interpret and report the results. Considering the fact that students had the lowest skill-level in using technological devices for the purpose of group work, online education should be introduced to students not at university level but rather at primary school level. Besides, there should be activities that will help students gain experience in working in groups and in searching and learning during online education. In this way, students will be more likely to become more successful and more conscious about online educational applications during their university education and their later life. Lastly, it should be kept in mind that not only using technology but also being close to it will improve the technology-related skills. Thus, students should be provided with the opportunity to live with computers and the internet. For this purpose, it is necessary that computers be used not only in computer courses but also in other courses or at least technology be inserted in lessons.

REFERENCES

Alkan, C. (2005). *Eğitim teknolojisi* (Yenilenmiş 7. Baskı). Ankara: Anı Yayıncılık,

Çoklar, N. & Kuzu. A. (2006). *Öğretmenlerin teknolojiyi eğitimde kullanmalarına yönelik standart oluşturma çabaları: NETS.* 6th International Educational Technology Conference, 19-21 Nisan 2006, Gazimağusa, KKTC.

Demirel, Ö., Seferoğlu S. & Yağcı E. (2003). *Öğretim teknolojileri ve materyal geliştirme* (4.baskı). Ankara: Pegem A Yayıncılık

Copyright © The Turkish Online Journal of Educational Technology 2002

Gülbahar, Y. (2005). Web-destekli öğretim ortamında bireysel tercihler. *The Turkish Online Journal of Educational Technology,* (4)2, Retrieved May 25, 2007, from http://www.tojet.net/articles/429.htm

Hızal, A. (1993). *Eğitim teknolojisi ders notları* (Basılmamış Ders Notları). Eskişehir: Anadolu Üniversitesi, Eğitim Fakültesi.

ISTE. (2007). *International Society for Technology in Education*. National educational technology standards for administrators, Retrieved May 15, 2007, from http://www.iste.org

İşman, A. (2005). *Öğretim teknolojileri ve materyal geliştirme*. Ankara: Pegem A Yayıncılık

Karaağaçlı, M. (2004). *Eğitimde teknoloji ve materyal.* Ankara: Pelikan Yayıncılık

NETS. (2007). National educational technology standards, Retrieved March 15, 2007, from http://cnets.iste.org

Stuve M. & Cassady J. (2005). A factor analysis of the NETS performance profiles: Searching for constructs of self-concept and technology professionalism. *Journal of Technology and Teacher Education*, 13(2), 303-324.

UNESCO (2002). *Information and communication technologies in teacher education: A planning guide*. France: Division of Higher Education.

Copyright © The Turkish Online Journal of Educational Technology 2002

MOBILE LEARNING IN HIGHER EDUCATION: AN EMPIRICAL ASSESSMENT OF A NEW EDUCATIONAL TOOL

Douglas MCCONATHA, Matt PRAUL, West Chester University of Pennsylvania,
Michael J. LYNCH, Temple University

ABSTRACT
Mobile Learning, or M-learning as it is often called, is a relatively new tool in the pedagogical arsenal to assist students and teachers as they navigate the options available in the expanding distance learning world. This article assesses some of the possible methods, challenges and future potential of using this approach in a college classroom and describes an empirical evaluation of the effectiveness of M-learning in a college classroom. One hundred twelve students in an introductory survey course in sociology were given the opportunity to use an M-Learning product developed by HotLava Software for the purpose of assisting them in preparation for two scheduled exams. Both practice and review questions were made available on Smart Phones, Web enabled phones, PDAs and other Internet capable mobile devices via Learning Mobile Author. Forty-two of the 112 students in the class chose to access these data via their personal devices and their responses were collected and recorded. The results of their performance, as indicated by a final grade in the course, were compared to the outcomes for those students who chose not to use the M-Learning tool. Students using the software demonstrated a higher level of knowledge of the subject matter covered in the course when compared to students choosing not to use the tools ($p<.01$). Conclusions and a discussion of these outcomes are offered as well as some inferences and speculation regarding the future of M-Learning in the classroom and beyond.

An earlier version of this paper was presented to the Society for Applied Learning Technology's Washington Interactive Technologies Conference
Sheraton Crystal City Hotel
Arlington, Virginia
August 22-24, 2007

Douglas McConatha is the corresponding author (dmcconatha@wcupa.edu)

Mobile Learning (M-Learning) is a relatively new tool in the pedagogical arsenal to support students and teachers as they navigate the options available in the expanding world of distance learning. M-Learning is learning accomplished with the use of small, portable computing devices. These computing devices may include: smartphones, personal digital assistants (PDAs) and similar handheld devices. M-learners typically view content and/or lessons in small, manageable formats that can be utilized when laptop or fixed station computers are unavailable. It is currently being used in a variety of educational, governmental and industrial settings. This paper assesses some of the possible methods; challenges and future potential of using this approach in a college classroom and provides an empirical evaluation of the effectiveness of this and similar tools.

MOBILE LEARNING

The first published studies focusing on M-Learning began around 2000. In the April 2000 issue of *Computers and Education*, Sharples (2000) discussed the potential for new designs in personal mobile technologies that could enhance lifelong learning programs and continuing adult educational opportunities. Many, if not all, of the ideas raised in Sharples' early article are still evolving and are of interest to M-Learning today.

Donna Abernathy's article "Get Ready for M-Learning" (2001) provides one of the first looks at the technology and how it could affect future business approaches with regard to learning initiatives. This article may also be counted as an early alert about the potential to this already expanding learning option. Abernathy observes that M-Learning options don't necessarily seek to replace the PC as a be-all tool, but instead notes that it will help supplement corporate learning objectives with on-the-go tools. Businesses hope this will increase willingness among their employees and customers to interact with other learners and provide rapid feedback for corporate and sales force personnel. Although wifi technically existed at the time the Abernathy article was written, it was not fully developed or nearly as ubiquitous as it is currently. Abernathy accurately noted that the fledgling state of wifi technology could be a major stumbling block for future advances.

Between 2002 and 2006 numerous studies began to appear that reported similar findings indicating M-Learning technologies were expanding and becoming commonplace in a variety of learning environments.

Copyright © The Turkish Online Journal of Educational Technology 2002

Seppala and Alamaki (2003) investigated the training and instruction of Finnish teachers using mobile technology in the classroom. Their experience and concerns with the new technology focused on several factors. First**,** they noted that, given that 98% of Finland's university students owned cell phones in 2002, instruction via mobile learning opportunities seemed to be an important next step in the digital learning revolution. In their study of the use of Short Messaging Service text messaging (SMS) and digital pictures, content material was sent to a centralized memory bank. Each user could "withdraw" this material at any time for review and study. The teachers regarded the ability to take notes at any time and the capacity to work on materials during their daily travel time as a second advantageous feature. Feedback on educational content was offered almost instantaneously given the characteristics of the devices being used (cell phones, PDAs etc.), and the researchers felt that this factor allowed them to be more honest in their responses and opinions about the potential of mobile learning. Seppala and Alamaki concluded that M-Learning has a multitude of advantages, and that this technology has a place in the teaching models of the future.

Attewell (2003) tackled a question many educators and some employers have had about mobile learning, particularly in relation to younger users. Some studies have questioned whether SMS "texting" could actually be harmful to a student's grammatical development (e.g. vocabulary acquisition and spelling) because text messages tend to be compact, and often times riddled with acronyms or purposely incorrect spelling designed for speed-of-input. Attewell agreed that these issues are valid concerns, and suggests more research into studies on mobile learning. However she also notes how a classroom full of students with mobile devices came together to share content and messages, counteracting the assumption that cell phones have an isolationist effect.

Other fields have begun inquiry into the effectiveness of mobile learning. Whitsed (2004) reviewed the advent of M-Learning and mobile computing in the field of medicine. The modern classroom environment for today's medical student is technologically sophisticated. Nevertheless PDA's that can access a patients charts from anywhere in a hospital provide a welcome alternative to having to log on to a networked terminal or a laptop just to recall patient details. Mobile devices also allow medical interns and residents to take notes and record audio, which can be studied and reviewed at a later date. The freedom afforded by being able to access information "anytime, anywhere" becomes a tremendous advantage and convenience when you take into account how many patients must be seen during a typical physician's rounds. Whitsed states that 28% of US physicians already use mobile computing as part of their daily routine and that as this technology advances, this percentage will grow.

Investigators have also examined how pervasive mobile technology is today and how it is still expanding. According to Wagner and Wilson (2005), cell phones now outnumber landline phones in America, and other wireless devices are gaining footholds with the help of workplace and community WiFi networks. The authors make an important distinction between M-Learning and E-Learning. They argue that as different devices and new delivery tools provide educators with far more options to reach today's students, the education community must recognize that the model of "command and control," typical of conventional education structures, is being replaced with a chance to make learning truly collaborative.

Rushby (2005) explored M-Learning from a workplace perspective. He has compared the benefits of freedom of location with the traditional E-Learning models many companies have in place. His work suggests that M-Learning is superior to the older format particularly regarding employees' ability to track and discover new knowledge in whatever setting best benefits their learning style. What has held back this type of educational openness was the limited memory and technology of past wireless devices. Now useful additions to mobile devices, such as GPS and video/audio enhancement make the possibilities of the devices themselves much more robust. The digitally versatile and collaborative nature of these new technologies is best captured by Jenkins' notion of *media convergence,* where "[A] whole range of new technologies enable consumers to archive, annotate, appropriate, and recirculate media content and in the process, these technologies have altered the ways that consumers interact with core institutions of government, education, and commerce" (Jenkins, 2006). Rushby believes that M-Learning is most likely to be adopted first by the business sector and that more research into it will only enhance this opportunity. As other risks and rewards are examined, other organizations such as high schools and universities should be able to pick up the technology and find an effective pedagogical use for it.

Thornton and Houser (2005) have recently reported on their study of data and opinions regarding M-Learning and its use in a Japanese University. In Japan web enabled mobile phones, PDAs, and other portable media devices are extraordinarily prevalent and the populace is well versed in how to use them. In this study the investigators evaluated outcomes measures for classroom material using mobile phones, both via e-mail and using WAP technology (Wireless Application Protocol) for web enabled phones. It is important to note that in

Copyright © The Turkish Online Journal of Educational Technology 2002

Japan, rates for cell phone plans are far less expensive than in the United States, allowing more students to take part in M-Learning study and research. The results of their experiments were particularly revealing. The researchers observed improvements in test scores ranging from between 35% and 75%, using pre-post test measures over paper materials alone. The students' reactions to this new learning opportunity were positive, although more so for the PDA trials than for the cell phone. The researcher's noted that since the cell-phone is so well established in Japan, distributing educational material through them is a relatively effortless process. They stress that interactivity in content seemed a superior teaching method when compared to using static web pages alone for conveying material. As the United States catches up in more technologically advanced cell phone usage, M-Learning should become even more attractive to businesses and educational institutions wishing to advance their learning environments.

Wagner (2005) has also reviewed the current state of mobile technology in America. Wagner cites examples in which mobile computing has made significant differences in peoples lives, such as helping to find survivors after the 2004 Indian Ocean tsunami. She notes that while mobile devices are yet to be the most prevalent tool available to many office workers and students, this technological landscape is changing and is becoming ever more friendly to M-Learning through the expansion of wireless networks and falling hardware and access prices.

Lessons are to be learned from the implementation of E-Learning in the school environment as well, particularly with regard to the importance of varying content and interactivity. Wagner stresses that while M-Learning devices can be tremendously helpful, the information itself should be the focus of most of an educator's attention, and that improving the content is the best approach to assuring that M-Learning is effective for all parties. In approaching the obstacles facing quality mobile learning experiences, Wagner concedes that ownership of the required hardware is the most important roadblock still standing in the way of widespread use. She goes on to note however that many universities are taking steps to correct this shortcoming by making the devices more available. By producing more quality content, regardless of the number of current users, students will be drawn to the flexibility and access of having a mobile device that can assist in their learning process.

Corlett et al. (2005) report on a small class of students at the University of Birmingham who were given wireless PDA's for a semester to enable them to take part in an experiment on the possibilities and limitations of M-Learning in a college atmosphere. Students were familiarized with the capabilities and limitations of the hardware and then proceeded to use them for class work. The problems students reported to researchers were mostly technical in nature, for example having problems with limited memory of the handheld device or the battery life being too short. There were also some issues with the software used for the trial. At the end of the school year, discussion panels were held and a series of questionnaires were administered. The students' experiences were mixed. The PDA had significant promise in their opinion, but they felt these devices did not live up to expectations. The hardware limitations of the devices used and software issues were enough for the students to offer somewhat lower ratings to M-Learning approaches than in some other studies. Nevertheless, the authors see these data as supporting information that can help improve upon the hardware and technology as these devices become increasingly ubiquitous in educational settings.

M-Learning has shown increasing penetration at the professional level as well. As revealed by Pulchino (2006) in research published for the E-Learning Guild, collaboration of several different business organizations is underway. Pulchino sent questionnaires to a group of companies now using mobile computing to educate their workforce and to companies that were considering the option to upgrade from traditional computer assisted practices to mobile learning. He found that mobile devices were being used primarily for audio and text content and that wireless laptops were still the device of choice. However the iPod and cell phone were popular as well.

Articles evaluating mobile learning technologies are increasing. Gomez (2007) has discussed how lessons and lectures delivered to students via mobile devices are evolving. He examined podcasts, audio and video files, and how they can be easily incorporated into courses. In general, the outcomes were rated very highly. After an initial period of training and acclimation, comments on how staff and students experience these opportunities were measured. His students reported that they enjoyed the ability to pause and segment lectures and to listen to them on their own time. An additional feature rated as *highly valued* centered on the fact that much of this information was readily available when students were away from their desktops. Gomez also reported that roadblocks do still exist however. Echoing Wagner (2005), he says that foremost among these issues is that all students do not necessarily have access to the required hardware (Gomez, 2007).

At least one recent article has commented on a dimension to M-Learning that may seem contrary to its purpose. It has been noted that the content available in a designated M-Learning format may be accessed frequently on a

Copyright © The Turkish Online Journal of Educational Technology 2002

non-mobile device. Weekes (2007) suggests this is actually a strength of M-Learning. This is true because it validates mobile learning's place in the learning environment while demonstrating the importance of providing learners with choices about how and when they access learning materials. She goes on to indicate that, in theory at least, nothing liberates the learner more than mobile learning.

The importance of M-Learning in some parts of the global knowledge enterprise is obviously growing. And a quick search on LexisNexis (10-25-07) reveals more than one hundred related articles ranging from a news on recent M-Learning Conferences (such as the 1st Asia-Pacific Regional Mobile Learning Conference on August 7, 2007 in Kuala Lumpur…see: www.lttcom.com/mlearning) to stories on its popularity in Turkey, Korea, India, Nigeria, Thailand and many others. Very few articles have been published in the US, where awareness seems to be lagging. The authors suggest this is about to change as the US "catches up" with the developing world.

AN EMPIRICAL EVALUATION

In order to evaluate the effectiveness of M-Learning on student outcomes in the US higher education market, an empirical evaluation was undertaken. This study attempts to evaluate the effectiveness of using a relatively new mobile learning tool by HotLava Software to improve student performance. Essential to the expansion of these new mobile learning technologies and pedagogical approaches is the continuation of their empirical evaluations. It is hypothesized that employing mobile learning can impact performance (as measured by test scores) among college students. In this study, performance is measured by grade outcomes. Using HotLava WAP software called *Learning Mobile Author* (LMA), this study investigates the effects of access to review and study material made available on mobile devices-primarily web enabled cell phones.

LEARNING MOBILE AUTHOR

"Learning Mobile Author" is a mobile learning software program designed by Hot Lava Software Inc. It guides the user through the development and publishing of mobile-device-ready web content. The LMA software can be installed and run from most desktop machines with an Internet connection, and Hot Lava provide hosting services upon request. LMA also allows for the collection of details regarding individual user session activity and other connection information, effectively tracking time of use, session data, and any score or test information. The interface is simple, relatively intuitive, and allows for easy access to functions for revising and editing published web pages. LMA constructs pre-formatted XML code, and the content can be distributed in multiple file formats.

METHODS

The subjects for this experiment were students in a large Introduction to Sociology course at a midsized state university in the Northeast. The course was made up of primarily freshmen students taking the course to fulfill a general education requirement. The study was conducted over the course of the 2006 spring semester. There were a total of 112 students enrolled in the course (three students did not complete one of the scheduled tests prior to completing the final exam but were included in the data following a later make-up test).

Two mid semester tests were given during the term at approximately the end of the first and second third of the course respectively. The average score for each student on the first two tests were used as the dependent variable to assess the effect of the independent variable: access to practice exam questions and vocabulary words via cell phone. These materials were also part of the weekly lectures and class reading assignments. Students were given the following instructions with regard to practice materials that would be made available to them in a variety of ways during the course of the semester:

Throughout the semester you will be given access to vocabulary words and study questions of varying difficulty for review via your web-enabled cell phone. This material will be posted at various intervals prior to the two scheduled mid-semester exams. Access to these questions and terms can be accessed via the following URL[1] and listed sources:

- Via cell phone: http://www.WAP/xxx
- Class review sessions
- Class handouts

You may use cell phone site and one or both of the classroom sources. The information from all sources is identical.

The instructor then provided a detailed in-class explanation about how to access the MLA site. Additionally, specific review days when the classroom sources would be available were also designated. Students were then

Copyright © The Turkish Online Journal of Educational Technology 2002

allowed to choose a method by which they would retrieve the materials, and a password and ID were assigned using the cell phone technology. This introduces a potential source of bias. However, the investigators decided that a randomized approach would not allow for a determination of smart phone availability. This issue is discussed in more detail following the results section below.

Four times prior to each mid semester exam, important people, practice questions and vocabulary words with definitions were placed on the WAP site in the form of multiple choice or T/F test items. These materials were also discussed and distributed on the specified review days prior to the tests as well. Table 1 provides examples that are illustrative of the kinds of material that were made available:

Table 1:
Examples of Practice Test Questions Published for Student Review

1. Mobility in a caste system is based on achieved status. True □ False □
2. If intergenerational mobility is high, stratification is relatively rigid. True □ False □
3. All deviance is bad for society. True □ False □
4. Deviance is related to social class. True □ False □
5. _____ used the "term looking-glass self" to describe how a sense of self develops.

a. Mead □ b. Cooley □ c. Goffman □

6. Pavlov, Watson and Skinner are associated with:

a. Conflict □ b. Functionalism □ c. Behaviorism □

7. Who is this?

a. August Comte □
b. Emile Durkheim □
c. Henri Saint-Simone □

Answers: 1-T;2-F;3-F;4-T;5-b;6-c;7-a

Students who accessed the MLA site were designated as experimental subjects and part of the experimental group. Those who used other methods to retrieve the review and study the practice information were identified as the control group. Each student was tracked over the semester while data on their use of one (or none) of the review methods were collected. Students who accessed or collected the materials on one or more occasions for each test were included as part of the study. After administering the two tests, the results were compiled and sorted into two groups: Group 1: The experimental group using the cell phone technology, n=42 and; Group 2: Students who did not access the site but collected material from the other sources one or more times n=70.

The HotLava LMA software was employed to create the cell phone WAP web site. This software also automatically tracked who accessed the site, how often it was accessed, recorded their IDs and provided quiz scores feedback to the instructor and the student.

RESULTS

The purpose of this study was to evaluate the effectiveness of HotLava Software's Learning Mobile Author in improving learning outcomes in an introductory undergraduate sociology class. Table 2 outlines the findings from the analysis. A statistically significant difference was found between the control and the experiment groups. A mean difference of 3 points and a median difference of 4 points were found between the two groups. The standard deviation for the control group was almost twice as high (11.7 compared to 6.1) as the experimental group. Those students who used the MLA/WAP web-enabled cells phones to retrieve and review the practice material provided for the two mid semester tests in the course had an average for the two tests of 89% and those who used only the printed or discussion sources had an overall average of 84% ($t=-2.50$, $p < .01$). These findings indicate that students in this class using web-enabled cell phones to assist in their review of test materials out scored the students who used more traditional means (handouts and review lectures) to practice and review materials.

Copyright © The Turkish Online Journal of Educational Technology 2002

Table 2:
t Test for comparison of means between the experimental and control groups
N=112

	Experimental Group	Control Group
n	**42**	**70**
Mean	**89**	**84**
95% Mean Conf	**87 - 91**	**82 - 87**
SD	**6.1**	**11.7**
High	**101**[2]	**101**[2]
Low	**74**	**38**
Interquartile Range	**98 - 86**	**91 - 81**
Median	**89**	**85**

T-value of difference: -2.498; df-t: 110
Probability: 0.007757 (left tail pr: 0.99224)
$p < .01$

CONCLUSIONS AND DISCUSSION

This study supports the notion that the use of mobile learning can make a positive and significant difference in the outcome performance as measured by average test score for students using the LMA software to review and practice for the exams. It should be noted that this is not meant to be a definitive study however. There are some important limitations to the investigation. As mentioned earlier, students who are willing to go the extra distance and become involved in a class by taking on novel study techniques may be more likely to succeed in the first place. It is possible that these same students would still have studied the quiz material just as fervently had it been distributed in any manner. But it is hard to argue against the idea that delivering information to mobile devices is at least a helpful convenience and probably much more. These results parallel the findings observed in other studies of mobile learning (Thornton and Houser, 2005) which have found increases in knowledge in students who were emailed study material to their cell phones compared to classmates who received hard-copy handouts of the same notes.

Convenient availability of information and resources are strong bargaining chips in championing M-Learning. Instructors need to get the attention of their students to be effective educators, and with the advent of mobile devices there are even more opportunities to grab their imagination. As M-Learning obtains a foothold in American universities, class is theoretically always in session. The authors recommend that more college courses utilize a mobile-learning ready framework. If instructors begin experimenting with mobile learning, the field will experience a rapid growth in the quality and quantity of studies about the effectiveness of these tools and technique. The materials and knowledge required for an instructor to begin taking part in these new possibilities and pedagogies are becoming increasingly available to instructors. Many colleges around the world have begun this process.

THE FUTURE OF M-LEARNING

One important obstacle to overcome in the acceptance of M-Learning is that it is based upon students owning the necessary hardware. As noted, cell phone use among college students is pervasive, and trends have shown an ever-increasing saturation. The problem of outdated cell phones that cannot access the websites or materials directly will resolve itself. The realm *beyond* cell phones, however, is more difficult to analyze. While we know ownership of tools like the Blackberry or PDA's has risen, they have yet to permeate college campuses the way mobile phones have. This is echoed in the Corlett and Sharples study where students reported enjoying having the school-loaned PDA for the class even though they would be unlikely to purchase the equipment themselves. The growth of WiFi networks in major metropolitan areas and increasing numbers of college campuses means

Copyright © The Turkish Online Journal of Educational Technology 2002

much of the backbone for the system may already be in place by the time schools and educators adopt these tools. "The adoption of next generation WiFi and MAN/WAN cellular networks will continue to deliver on the promise of 'anywhere, anytime access'..." (Wagner & Wilson, 2005, p. 43). As new iPhone like devices become increasingly available and integrated with computers and desktop functions, the spread of M-Learning possibilities will certainly continue.

The cell phone has become an ever-present fixture in the lives of modern college students, who use their devices to talk, message, capture pictures, and more recently-*to learn.* Like remembering the keys to your home, students take their phones with them everywhere, and a large number of these devices are now web-enabled. These web-enabled phones, along with the increasingly popular PDAs and blackberry devices, can receive text, audio, and video information, as well as access web pages. It is doubtful that academia will let such a potentially transforming opportunity pass them by without taking advantage of this opportunity to deliver educational content.

It is true that many college students have regular access to personal computers, delivering notes and study materials and even exams through course management systems it has taken more than a decade for this technology to reach the level it has. The personal computer may be a technologically more advanced medium, but it isn't portable, and so it isn't something students are likely to carry around with them on a day-to-day basis. M-Learning does not seek to replace the utilization of computers to aid in learning, but rather to supplement it with interesting new methods that use a preferred medium increasingly available to students at affordable prices and already widely in use.

Imagine a classroom where the instructor asks a question about subjects that have yet to be assigned or discussed in class. Instead of having to wait for an assignment or a lecture, they can use the devices at their disposal to access information themselves in a matter of seconds-all without leaving their desk. And, as was the case in this current study, practice material for an exam can be made available so students can truly study, and review and prepare for tests using a wide array of delivery options that will allow them to do this virtually anywhere at any time.

REFERENCES

Abernathy, D. (2001) Get Ready for M-Learning. *Training & Development,* February, 20-21.
Attewell, J. (2003) Mobile Learning. *Literacy Today,* September, 14.
Corlett, D. & Sharples, M. & Bull, S. & Chan, T. (2005) Evaluation of a mobile learning organiser for university students. *Journal of Computer Assisted learning, 21,* 162-170.
Gomez, S. (2007) Scroll to 'E' for Education. *The Times Higher Education Supplement,* 1780, 13.
Jenkins, Henry. (2006). *Convergence Culture: Where Old and New Media Collide.* NYU Press.
Pullchino, J. (2006) Mobile Learning Research Report. *The E-Learning Guild. Retrieved April 28, 2007 from http://www.elearningguild.com/*
Rushby, N. (2005) Editorial. *British Journal of Educational Technology,* 36 (5), 709-710.
Seppala, P. & Alamaki, H. (2003) Mobile Learning in Teacher Training. *Journal of Computer Assisted Learning, 19,* 330-335.
Sharples, M. (2000) The Design of Personal Mobile Technologies for Lifelong Learning. *Computers and Education, 34,* 177-193.
Thornton, P. & Houser, C. (2005) Using mobile phones in English education in Japan. *Journal of Computer Assisted Learning, 21,* 217-228.
Wagner, E. (2005) Enabling Mobile Learning. *Educause Review, 40(3),* 40-53.
Wagner, E. & Wilson, P. (2005) Disconnected. *ASTD, December,* 40-43.
Weekes, S. (2007) Don't Believe the Hype?, *Training Journal,* June 19 *(page numbers unavailable)*
Whitsed, N. (Dec 2004) Learning and Teaching. *Health Information & Libraries Journal, 21,* 273-275.

1
For illustration only

2
Bonus points allowed for a score above 100

Copyright © The Turkish Online Journal of Educational Technology 2002

MODELING SPRING MASS SYSTEM WITH SYSTEM DYNAMICS APPROACH IN MIDDLE SCHOOL EDUCATION

Hasret NUHOĞLU
Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Fen Eğitimi ABD, Ankara
hasret.nuhoglu@gmail.com

ABSTRACT
System Dynamics is a well formulated methodology for analyzing the components of a system including cause-effect relationships and their underlying mathematics and logic, time delays, and feedback loops. It began in the business and manufacturing world, but is now affecting education and many other disciplines. Having inspired by successful policy changes in lots of fields, the system dynamics researchers targeted to apply the system dynamics approach in the educational fields too.

The aim of this study is to model spring mass system that is taught in middle school science and technology curriculum, using system dynamics approach and to learn the effect of the system dynamics approach with sample application group. This research consists of three sections: exploring system elements, modeling systems and testing models. In the first section of this research the theoretical information was given about how the models are developed and tested. In the other section two sample students' developmental data were examined and discussed.
Key words: System dynamics, STELLA program, Spring mass system

INTRODUCTION

One of the best ways to learn is to participate in a project. Educators can stand in front of students all day long and lecture on how to hit a tennis ball, change the oil in a car, or run a corporation. Once a student is in the position where it is necessary to complete one of these tasks, however, the student often cannot. The reason that a student cannot complete the task is because the student has created a mental model of the system, based on lecturing or reading that does not fit reality. A mental model is one's mental perception or representation of system interactions and the behavior those interactions can produce. Due to an incomplete or incorrect mental model, a student cannot apply the principles taught in lectures to tasks in life (Martin, 1997a).

System dynamics offers a source of direct and immediate feedback for students to test assumptions about their mental models of reality through the use of computer simulation. Computer simulation is the imitation of system behavior through numerical calculations performed by a computer on a system dynamics model. A system dynamics model is the representation of the structure of a system. Once a system dynamics model is constructed and the initial conditions are specified, a computer can simulate the behavior of the different model variables over time. A good model attempts to imitate some aspect of real life. Real life does not allow one to go back in time and change the way things are. Simulation, however, gives students the power to change system structure and analyze the behavior of the system under many different conditions (Forrester, 1995; Martin, 1997a; Sterman, 2000).

Using system dynamics approach the modelers produce simulation tools called as micro worlds. The students use these tools to make certain experiments. So these tools are actually replacements for the real world. That is why they are called as micro worlds. The experiments in the micro worlds can be repeated easily using varying parameters and alternative scenarios. This allows the student to see how the dynamics of the system works, by experiencing it in the virtual world. Usually there is no other way of observing the results of the experiments outside of the micro worlds. The experiments are done with the help of certain easy to use simulation software. Dynamo, Powersim, Vensim, Stella, ithink, Extend and Anylogic are some of the system dynamics software (Martin, 1996; Alessi, 2000). Stella is the mostly preferred tool for the K-8 students. (Brown, 1992; Forrester, 1996) STELLA is a computer simulation program which provides a framework and an easy- to-understand graphical interface for observing the quantitative interaction of variables within a system. The graphical interface can be used to describe and analyze very complex physical, chemical, biological, and social systems. (Martin, 1997a)

The aim of this study is to model spring mass system that is taught in middle school science and technology curriculum, using system dynamics approach and to learn the effect of the system dynamics approach with sample application group. This research consists of three sections: exploring system elements, modeling systems and testing models. In the first section of this research the theoretical information was given about how the models are developed and tested. In the other section two sample students' developmental data were examined and discussed.

Copyright © The Turkish Online Journal of Educational Technology 2002

SYSTEM DYNAMICS COMPUTER SIMULATION PROGRAM

STELLA (System Thinking Educational Learning Laboratory with Animation)

STELLA is a computer simulation program which provides a framework and an easy-to-understand graphical interface for observing the quantitative interaction of variables within a system. The graphical interface can be used to describe and analyze very complex physical, chemical, biological, and social systems. Model builders and users, however, are not overburdened with complexity because all STELLA models are made up of only four building blocks: stock, flows, converter, connector (Martin, 1997a).

STOCK: A stock is a generic symbol for anything that accumulates or drains. For example, water accumulates in your bathtub. At any point in time, the amount of water in the bathtub reflects the accumulation of what has flowed in from the faucet, minus what has flowed out down the drain. The amount of water in the bathtub is the stock of water (Martin, 1997a).

AKIŞ: A flow is the rate of change of a stock. In the bathtub example, the flows are the water coming into the bathtub through the faucet and the water leaving the bathtub through the drain (Martin, 1997a).

What is the difference between a stock and a flow? Stocks are accumulations. Stocks hold the current state of the system: what you would see if you were to take a snapshot of the system. If you take a picture of a bathtub, you can easily see the level of the water. Water accumulates in a bathtub. The accumulated volume of water is a stock. Stocks fully describe the condition of the system at any point in time. Stocks, furthermore, do not change instantaneously: they change gradually over a period of time. Flows do the changing. The faucet pours water into the bathtub and the drain sucks water out. Flows increase or decrease stocks not just once, but every unit of time. The entire time that the faucet is turned on and the drain unplugged, water will flow in and out. All systems that change through time can be represented by using only stocks and flows (Martin, 1997b).

Table of stock and flows examples

inflows	**stocks**	**outflows**
Birth	Population	Dead
Growing	Oak trees	Harvesting
Eating	Foods in stomach	digesting
Learning	information	Forgetting

Figure 1. Examples of stock and flows

CONVERTER: A converter is used to take input data and manipulate or convert that input into some output signal. In the bathtub example, if you were to turn the valve that controls the water flow in your bathtub, the converter would take as an input your action on the valve and convert that signal into an output reflecting the flow of water (Martin, 1997a).

CONNECTOR: A connector is an arrow that allows information to pass between converters and converters, stocks and converters, stocks and flows, and converters and flows. (Martin, 1997a).In figure 2 Stella programs' elements are shown.

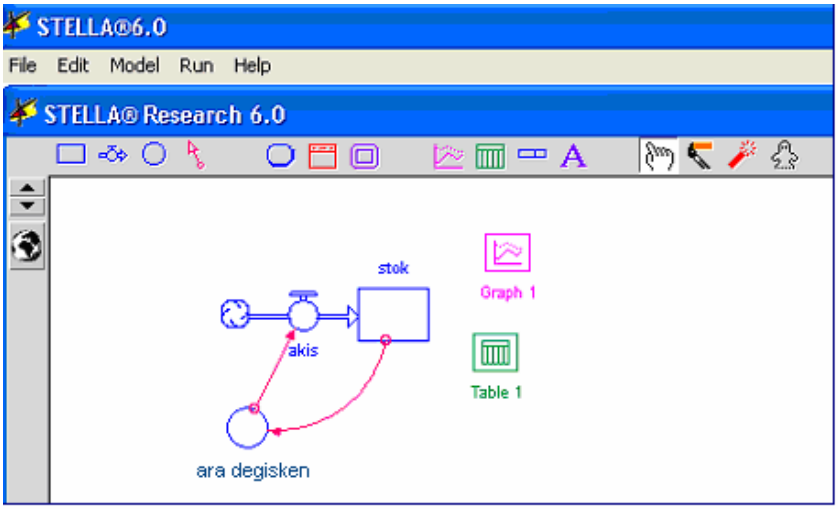


Figure 2. Stella Model Elements

Copyright © The Turkish Online Journal of Educational Technology 2002

Student's profile
Students learn force, force measurement with dynamometer, balanced and unbalanced force, and gravity force and velocity concepts in 6th grade in middle school. The subject of spring mass system takes place in 7th curriculum. The students are expected to learn the following knowledge on spring mass system according to the MEB curriculum:

Benefits for students
The students learn about spring mass system:

- They observe springs' elastically features.
- They determine that spring implement force in same size but opposite direction
- They notice that when the force that stretch or compress the spring is increase the force of application from spring is increase.
- They discover that the spring can be permanently deformed.
- They may design a dynamometer using springs' features.

Target students for application
Target students were 7th grades students. They should study in a computer laboratory. Student may use the computers for building models individual or cooperatively with friends. In the computer the STELLA software program must be installed. Students don't need to have prior deep computer skills. If they learn how to run Stella programs with a sample application before the lesson, they don't struggle with difficulties in the lesson while building models.

I. STEP: EXPLORING THE SYSTEMS' COMPONENTS
Three activities related to the spring mass system were made in the lesson. Firstly students observed springs' motion in laboratory environment, and then they explored cause and effect relationship between events and feedback loops while they were building models. The activities were taken from the 7th grade curriculum of MEB (2007).

Activity 1: Playing with springs
Several springs with different properties are distributed to students for this activity. Students apply push and pull force on the springs with different properties. They share observations and discuss the results of these observations with friends. They show the direction of the applied force.

Activity 2: Making a spring
Students make their own springs using different materials in this activity. They notice that the springs have elastic features. They can use wires that made of copper, iron and nickel-chrome. When a bigger force is put on them, they change shape. When the force is removed, they return to their original shape. Students must be careful to do not stretch the spring beyond what is called its elastic limit. It will not return to its original shape. It will be permanently deformed.

Activity 3: Designing a dynamometer
The aim of this activity is to provide opportunity to students to design a dynamometer using pocket tire or slim spring. Students attach a hanger of known weight. This stretches the spring. They measure and note the new length of the spring at the new position of the pointer. The extension is the extra length beyond its natural length. They record the extension of the spring by subtracting the natural length from this new length. In conclusion they learn that the extension of a spring is directly proportional to the force that is stretching it.

After these activities students review their learning.

- Springs are elastic object.
- When you stretch the spring beyond the elastic limit, it will not return to its original shape.
- Different springs have different features. If same force applies to different three springs, different changes occur.
- Every spring have special features and force constant.
- If you apply push and pull force to springs you observe some changes to spring motion.
- When spring push and pull you feel that spring apply a force to us.
- If we apply the more force to spring it apply the more force same size but opposite direction.
- If we hang some weight up on spring the extension point of the spring can change.

Copyright © The Turkish Online Journal of Educational Technology 2002

II. STEP: MODELING THE SYSTEM

Students built a model using Stella software program after experiment this activity. Firstly students tried to find which stocks or flows were. There are two stocks in spring mass system model. Stocks describe the system condition and give basic information about system. There are two factors to determine system motion: position and velocity. The change of position and velocity are flows because flows do the changing. The meaning of the bilateral arrow is that the flow has two directions both inward and outward.

Student built a new spring mass system model using their observation in the prior activities. This model can be like this:

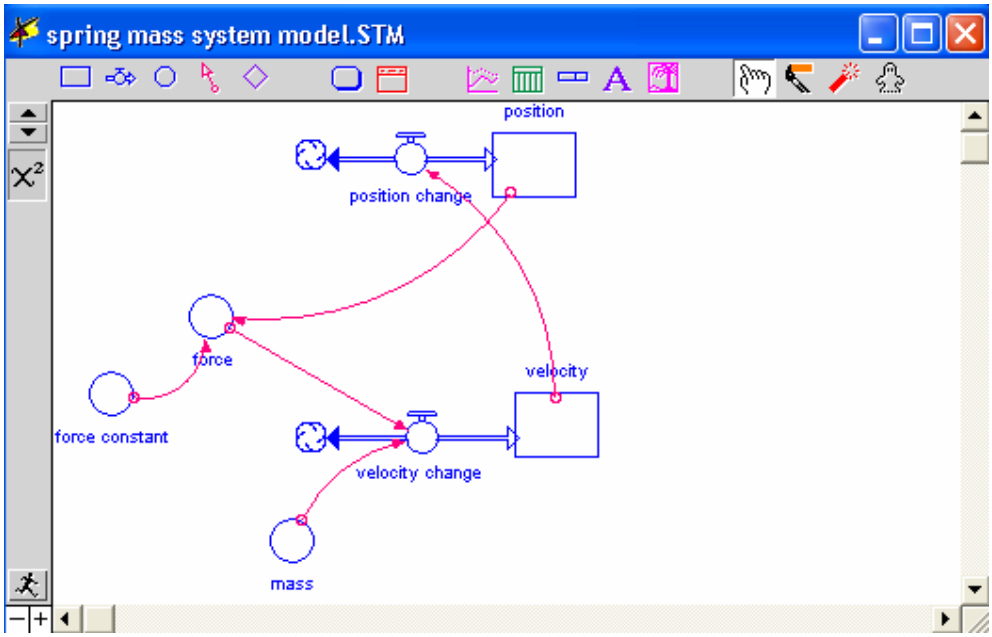


Figure 3. Modeling To Spring Mass System with Stella

Stock and flows in the system consist of feedback loops. “Feedback is a process whereby an initial cause ripples through a chain of causation ultimately to reaffect itself” (Roberts, 1983; quoted from Martin, 1997c). The structure of the feedback constitutes their dynamics. Feedback loop related to cause effect relationship in the spring mass system can be shown figure 4.

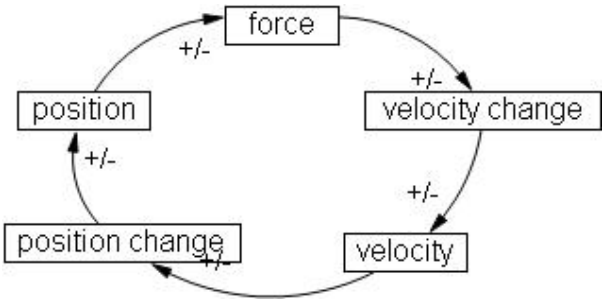


Figure 4. Feedback loop in spring mass system model

The feedback loop in the system begins with push and pulls force. Springs begin to have velocity via force effect. This effect caused to position change and position too. Then, spring exerts force in same size but opposite direction to us. This feedback loop continues in the same way.

Feedback loops join with non-lineer relationships. In other words feedback relationship about stocks gets feedback to stocks by non-lineer ways. And the simulation program is necessary in order to modeling complex dynamics systems. Spring mass system models built using Stella software and computer simulation.

Copyright © The Turkish Online Journal of Educational Technology 2002

III. STEP: TESTING THE MODELS

In STELLA, there are two ways to view a model: in mapping mode and in modeling mode. Right now we are in mapping mode, as seen by the little globe in the top left hand corner of the page. Let's go into modeling mode. Click on the globe in the top left corner of the page. The globe should change to the algebraic symbol Notice that there is a "?" inside both the stock and the flow. A "?" means that the building block has not yet been defined by a mathematical equation. The new window open, like figure 5, then you can write in numbers, or arithmetic operators, in forming your equations. The mathematical equations for every systems component are shown at the following.

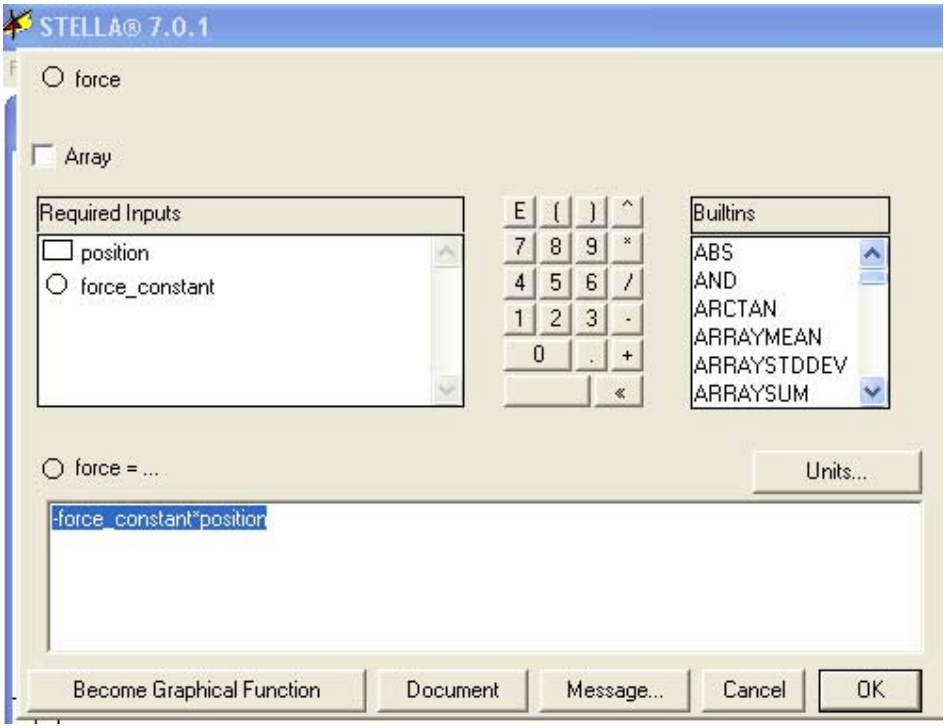


Figure 5. Showing mathematical equations

Position	0
Velocity	10
Velocity change	Force/mass
Position change	velocity
Force	- position*force constant
Force constant	0.1
Mass	2

Supposed that the velocity is 10 m/s in equilibrium position. Restoring force and mass of the spring effects the velocity change. Their mathematical equation related to force and mass. Velocity change is equal to force/mass (Newton's motion laws). Position change is equal to velocity. Velocity can be placed with stock or flow in the system. Mass and force constant are stable value in the system so their value can change for different situation. In this system force constant is 0.1. Changing this value doesn't effect mathematical equation in the system.

It is enough to click button for drawing a graphic of model. When you click on the graphic button double, allowable and selected window open, like figure 6 and 7.

Copyright © The Turkish Online Journal of Educational Technology 2002

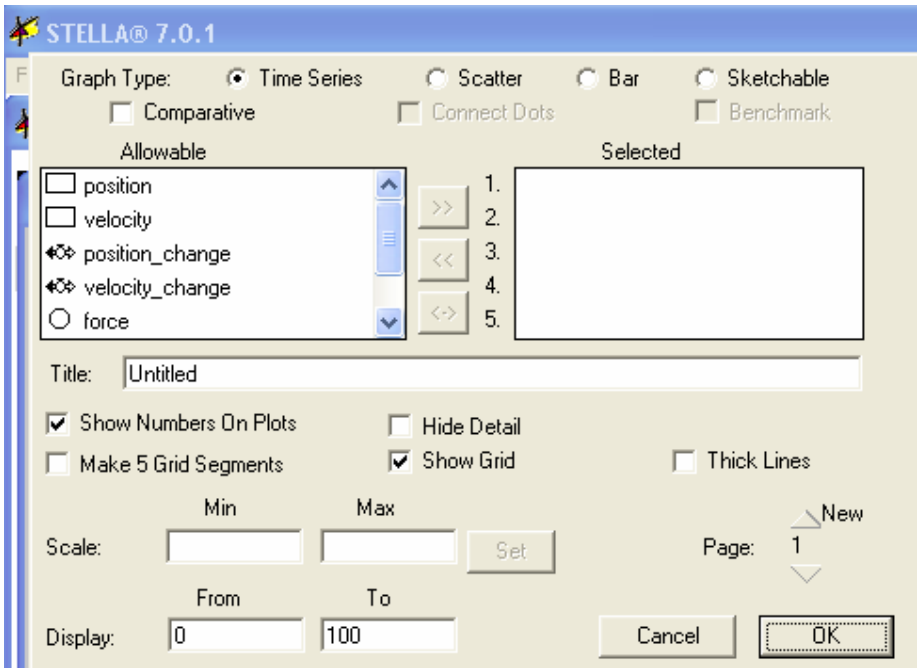


Figure 6. Allowable window

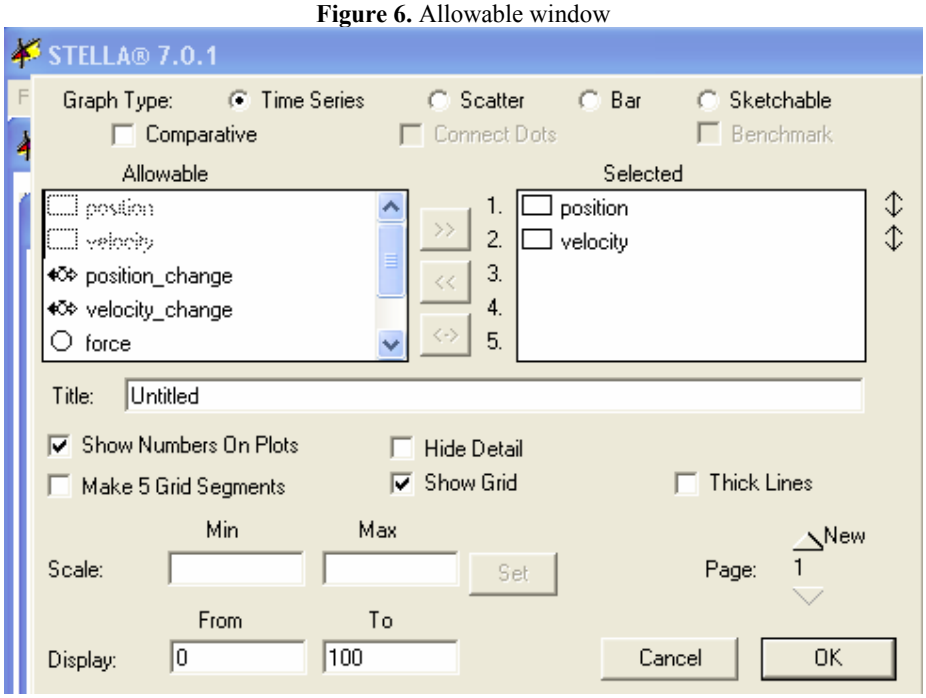


Figure 7. Selected window

The graphic draw after parameter is selected. The graphic of the spring mass system models has shown figure 8.

Copyright © The Turkish Online Journal of Educational Technology 2002

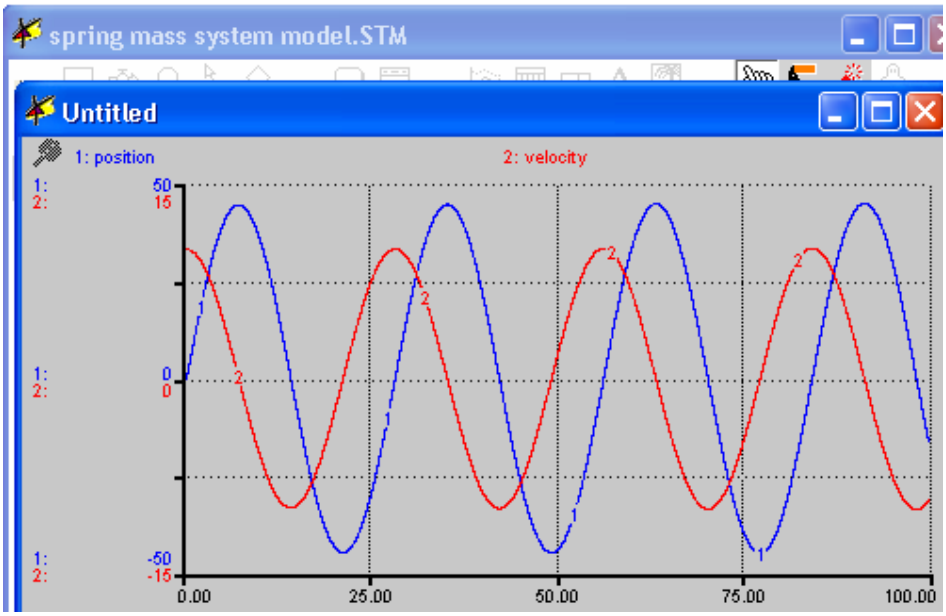


Figure 8. The graphic of spring mass system models

In this graphic only two parameter were selected: position and velocity. Position and velocity are shown different color in the graphic so the difference can be understood clearly. The graphic shows that the velocity curve has a phase lag of approximately 90 degrees with position curve. When position is maximum and minimum value the velocity is zero value. Like this when position value is zero velocity value is maximum.

METHODS

This research has a quantitative design which is not experimental. According to practice this research is a case study research model.

APPLICATION STAGES

This application was done with ten 7th grade middle school students in 6 lesson hours. Program was planned as to new MEB curriculum. New teaching methods based on constructivist learning and supported by system dynamics approach were applied. Firstly students made experiments about spring mass system in science laboratory with cooperative groups. Then, they modeled their observation in the experiments with Stella program in computer laboratory. They tried to find correct model changing it again and again. They tested their models and drew graphics that explain system behavior. They discussed and interpreted models with friends. Every student saved their model during the modeling by one by. Their saving data were evaluated by researcher and examined their improvement. In this research there are only two students' improvement data. In the end these data were analyzed and every data compared with each other.

PS: Students learned modeling with Stella in 3 hours introduction lesson that teached system dynamics components such as stock, flows, feedback and cause-effect relationship previously.

FINDINGS

Spring mass system models developed with ten 7th grade middle school students. In this section two students' (Gizem and Koray) improvement data were take place. Students' data were analyzed comparatively. Gizem developed her model in 4 step and Koray 3 step. The data table was prepared for each student. It was analyzed that stocks, flows and converters place are true or false, whether cause and effect relationships and connectors are correct or not, whether mathematical equations are correct or not for every systems' component and whether models' graphic drew correct or not. In the total it was calculated that students how many true or false point have got.

In the first step; both students decided stock and flows in the model correctly but Koray determined only one converter false. If we evaluate according to connector is true or not, we observed that Gizem determined that velocity- weight and force-position relationship were wrong although Koray determined all connectors wrong without force- force constant relation. Gizem found four mathematical equations correctly but three wrong. In addition that Gizem drew models' graphic although it wasn't true. Koray didn't draw any graphic in this part.

Copyright © The Turkish Online Journal of Educational Technology 2002

Students determined systems' basic components stocks and flows clearly although determining connector between components was difficult for them in first step.

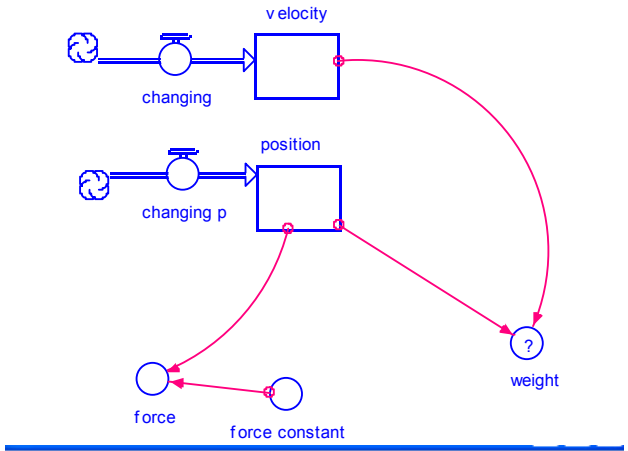
In the second step; Gizem arranged some mathematical equations in the model but it wasn't enough to correct graphics. Koray arranged only one connector wrong like position- velocity so he couldn't arrange mathematical equation and draw graphic correctly.

In the third step; Gizem drew wrong graphic because she didn't arrange mathematical equation correctly. Koray reached the correct model and graphic in the third step but Gizem in the forth step.
Gizem has tried to building and testing model since first step although Koray firstly focused on developing model then testing model. It is clear that both of the students have special methods while developing correct model.

IMPROVEMENT DATA FROM GİZEM AND KORAY

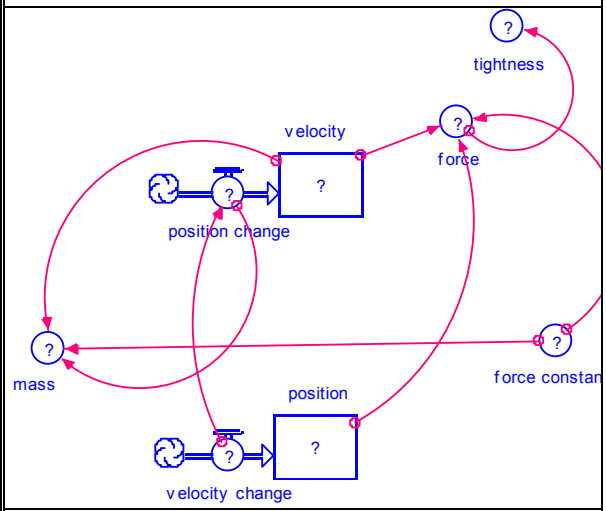
1. STEP

GİZEM



		True	False
Stock	Position	+	
	Velocity	+	
Flows	Position change	+	
	Velocity change	+	
Converters	Force	+	
	Force constant	+	
	Weight	+	
connectors	velocity-weight		+
	Force constant-force	+	
	force-position		+
Mathematical equations	Stocks-flows-converters	**4**	**3**
Graphic			+
Total		**12**	**6**

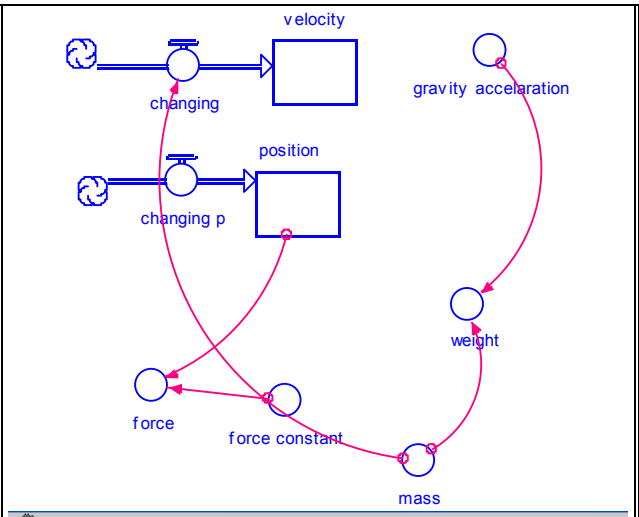
KORAY

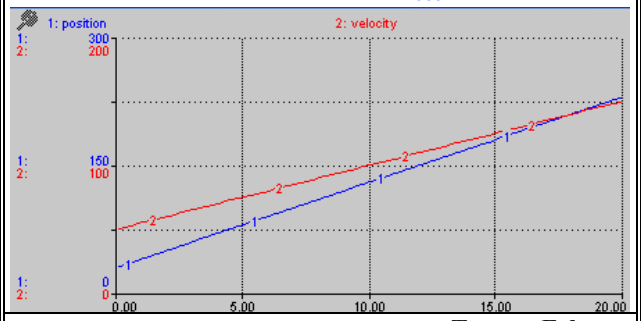


		True	False
Stock	Position	+	
	Velocity	+	
Flows	Position change	+	
	Velocity change	+	
Converters	Force	+	
	Force constant	+	
	tightness		+
	mass	+	
Connectors	velocity-force		+
	Force constant-force	+	
	force-position		+
	Force constant-mass		+
	Position change-mass		+
	velocity-mass		+
	Velocity change-position change		+
	force-tightness		+
Mathematical equations	Stocks-flows-converters	**0**	**0**
Graphic		**0**	**0**
Total		**8**	**8**

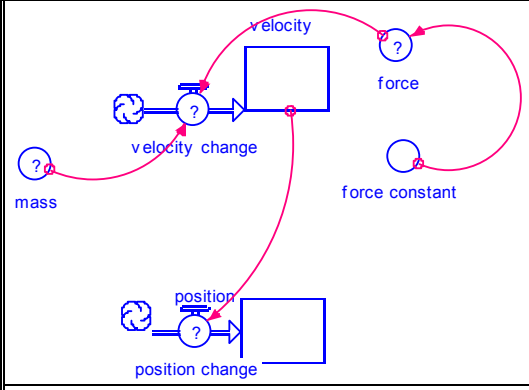
Copyright © The Turkish Online Journal of Educational Technology 2002

2. STEP



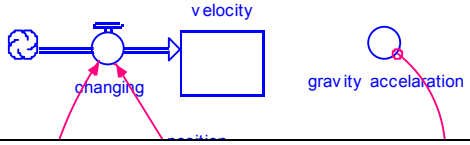


		True	False
Stocks	Position	+	
	Velocity	+	
Flows	Position change	+	
	Velocity change	+	
Converters	Force	+	
	Force constant	+	
	Weight	+	
	Gravity acceleration	+	
	mass	+	
Connectors	mass-weight	+	
	weight- gravity acceleration	+	
	Force constant-force	+	
	force-position	+	
	mass-velocity change	+	
Mathematical equations	Stocks-flows-converters	**6**	**3**
Graphic			+
Total		**20**	**4**

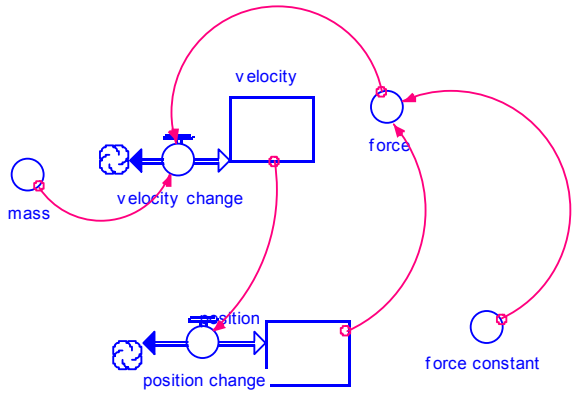


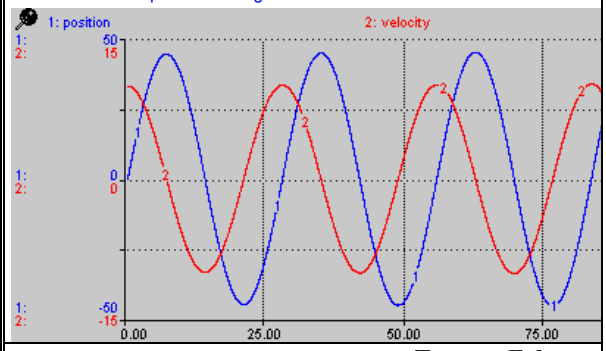
		True	False
Stocks	Position	+	
	Velocity	+	
Flows	Position change	+	
	Velocity change	+	
Converters	Force	+	
	Force constant	+	
	mass	+	
Connectors	velocity-position		+
	Force constant-force	+	
	force-velocity change	+	
	mass-velocity change	+	
Mathematical equations	Stocks-flows-converters	**0**	**0**
Graphic		**0**	**0**
Total		**10**	**1**

3. STEP



Copyright © The Turkish Online Journal of Educational Technology 2002

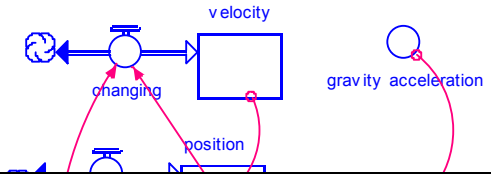




		True	False
Stocks	Position	+	
	Velocity	+	
Flows	Position change	+	
	Velocity change	+	
Converters	Force	+	
	Force constant	+	
	Weight	+	
	Gravity acceleration	+	
	mass	+	
Connectors	mass-weight	+	
	weight- Gravity acceleration	+	
	Force constant-force	+	
	force-position	+	
	mass-velocity change	+	
	force-velocity change	+	
Mathematical equations	Stocks-flows-converters	**6**	**3**
Graphic			+
Total		**21**	**4**

		True	False
Stocks	Position	+	
	Velocity	+	
Flows	Position change	+	
	Velocity change	+	
Converters	Force	+	
	Force constant	+	
	mass	+	
Connectors	Force constant-force	+	
	force-position	+	
	mass-velocity change	+	
Mathematical equations	Stocks-flows-converters	**7**	**0**
Graphic		+	
Total		**18**	**0**

4. STEP



		True	Fals e
Stocks	Position	+	
	Velocity	+	

Flows	Position change	+		
	Velocity change	+		
Converters	Force	+		
	Force constant	+		
	Weight	+		
	Gravity acceleration	+		
	mass	+		
Connectors	mass-weight	+		
	weight- Gravity acceleration	+		
	Force constant-force	+		
	force-position	+		
	mass-velocity change	+		
	force-velocity change	+		
	velocity-position change	+		
Mathematical equations	Stocks-flows-converters	**9**		
Graphic		+		
Total		**26**	**0**	

DISCUSSION

First educational applications showed that important improvements can be obtained in this field as well (Forrester, 1996). The students in the schools, where system dynamics approach is used, run voluntary projects in relation with their school courses even after the school time. The students became so enthusiastic with the subjects that they made their parents to take part in the projects too.

There is a remarkable increase in the interest and understanding level of the students to the courses. This increase caused an expectation in the practitioners that this approach will enter the general education system in the USA. But in the time that passed, the researches saw that the level of system dynamics applications have not reached the intended level (Forrester, 1996). Then teachers focused on developing more applications. Forrester and his students prepared to road maps (Road Maps, 2005) including system dynamics samples in different subjects for teachers helping with education project. Schecker, (1994) developed an application using system dynamics approach in physics education using motion of meteors that contain force, momentum, velocity and position concepts.

In this section some quotations from teachers and student using system dynamics in their class is presented:
Hopkins (1992), 11th grade English literature teacher, in the Desert View High School, Tucson, told to us about their course teached Hamlet:

"The *Hamlet* model was used with my students… "When we used a STELLA model which analyzed the motivation of Shakespeare's Hamlet to avenge the death of his father in HAMLET… The students were engrossed throughout the process… The amazing thing was that the discussion was completely student dominated. They were talking directly to each other about the plot events and about the human responses being stimulated. They talked to each other about how they would have reacted and how the normal person would react. … My function became that of listening to their viewpoints and entering their decisions into the computer. It was wonderful! It was as though the use of precise numbers to talk about psychological motives and human responses had given them power, had given them a system to communicate with. It had given them something they could handle, something that turned thin air into solid ground. They were directed and in control of learning, instead of my having to force them to keep their attention on the task."
Al Powers reports student reactions in his chemistry classes (Forrester, 1996):

"Working in groups was incredibly effective. Often it is easier to understand concepts when they are explained by a peer." "I feel that everyone is heard and, therefore, the people are more willing to contribute to the discussions and admit to being uncertain about a concept." "The graphs and simulations brought the concepts to life." "I found myself explaining concepts to people in other classes. This has never happened to me before. I

think they would have benefited just as much as I did if they had had the opportunity." "Being a visual learner, it really helped to see the reactions in easy schematics. The graphs produced were even more helpful. My father and I spent long hours discussing the graphs and talking about what was the initial change and what was the reaction to that change." "This was a great lab! Using the computer made it easier for me to understand what was going on in the reaction."

Ossimitz reported that the students have positive attitude as his experimental research in 1996 (Ossimitz, 2000):

"It was very funny activity although this teaching strategy was very new for me. Especially studying with my partners instead of that teacher explains about connection between objects in a long way was very amusing."
Helen Zhu, an MIT undergraduate working to develop system dynamics materials for K-12 education observed (Forrester, 1996):

"In my differential equations class we used calculus to figure out the behavior of populations. I realized just how much simpler system dynamics made that thought process. Whereas only college students can understand such phenomena using math, elementary schoolers can understand the same things by using system dynamics modeling. It's really amazing."

Teachers find that, in the process of using these tools, students' learning becomes more learner-centered and cooperative. System dynamics encourages students to figure things out, put puzzle pieces together, look for similar patterns, and work together to ask questions and find answers across disciplines. With system dynamics, however, they all fall together naturally, to the great benefit of children. In elementary and middle school, the work is genuinely interdisciplinary. At all levels, students do not do system dynamics all the time in every class—they still cover "the basics."(Lyneis, 2000).

Everyone who teaches System Dynamics modeling has reported how difficult it is, even though the benefits are great (Forrester, 1992, 1996; Lyneis, 2000, Alessi, 2005). There are errors all students make and difficulties they all encounter. Students tend to confuse stocks (levels) with flows (rates of change). They try to incorporate the formulas of previous science and math classes (which they often do not fully understand) instead of doing true system analysis. When models do not work correctly, they include fudge factors. Fudge factors are formulas, constants, or logical conditions designed to artificially fix the problem, not to realistically model the system. Students fail to test their models well, so the models tend to work only for common conditions, rather than the wide range of real-life conditions. Students confuse flows with cause-effect relationships. They create models that are unnecessarily complex and abstract, rather than having a close correspondence to reality. They try to copy and adapt models from instructors or textbooks, instead of thinking through the phenomenon and generating their own models from scratch. The main error made by teachers is thinking that students can create their first sophisticated models in a few weeks, when doing so (and overcoming all the above problems) may take several months. Patience, with yourself and with your students, is essential. Learning System Dynamics is slow in the beginning and it takes some time before there is visible payoff (Forrester, 1996; Alessi, 2005).

In this research the subject of spring mass system in middle school curriculum was modeled through STELLA program with 7th grade students. The aim of developing this model is to give new ideas about system dynamics applications to teachers. The real effect of modeling spring mass system will be understood when the model is applied in more crowded student groups.

RESULTS AND SUGGESTIONS

The advantage of system dynamics modeling about spring mass system to science and technology course can be summarized like in the following:

1. Using system dynamics approach the modelers produce simulation tools called as micro worlds. Simulation environment to students about spring mass system:
- Provide modeling to activity doing with cooperative groups.
- Provide developing the model after try it again and again.
- Provide learning that how spring mass dynamics occur in the different situation.

2. Student realizes that different springs have different features after they make spring mass experiments. They learn different dynamic pattern in spring mass mechanism during the modeling with system dynamics. Different dynamic pattern to students:
- Description how springs' behavior is in different situation.
- Research the reason why springs indicate different dynamic behavior.
- Give an opportunity to discover how different dynamic occur using cause-effect and stock-flow diagrams

Copyright © The Turkish Online Journal of Educational Technology 2002

3. System dynamics orient to students to learn cause and effect relationship between systems' component. It is observed that the student in this research had some difficulties in determining cause and effect relation. Especially they have troubles in replacement mathematical equations during the modeling. If the mathematical equations teach to students during the course the students can learn the meaning of concepts about subject easily.

4. System dynamics is a general approach for defining and solving problems (Forrester, 1961, 1976; Sterman, 2000). The students who learned this approach will be able to use this problem definition and solution tool for their whole life. This approach helps students to get the discipline and sensitivity of a scientist. In this way students can have abilities to actively observe their environment, discover new problems, model and investigate these problems in a scientific way.

5. At the end of this sample application students learn the concepts of the subject, cause and effect relationship and dynamic behavior of the systems via modeling more effectively. It is observed that students had some difficulties on putting the mathematical equations into the model. It is observed that this was due to the false identification of the connector variables. Because of this error they failed to obtain the correct graphics at the first try.

REFERENCE

Alessi, S. M. (2000). Designing educational support in system-dynamics-based interactive learning environments. *Simulation&Gaming*. 31(2), 178-196.

Alessi, S. (2005). The Application of System Dynamics Modeling in Elementary and Secondary School Curricula.
http://web.archive.org/web/20060304015136/http://www.c5.cl/ieinvestiga/actas/ribie2000/charlas/alessi.htm

Forrester, J. W. (1992). *Road Map 1: System Dynamics and Learner-Centered-Learning in Kindergarten through 12th Grade Education*. MIT System Dynamics in Education Project.

Forrester, J. W. (1995). *Road Map 1:* Counterintuitive Behaviour of Social Systems. MIT System Dynamics in Education Project.

Forrester, J. W. (1996). *Road Map 1: System Dynamics and K-12 Teachers*. MIT System Dynamics in Education Project.
http://web.archive.org/web/20060430061546/http://sysdyn.clexchange.org/sdep/papers/D-4665-4.pdf

Hopkins, P. L. (1992). Simulating *Hamlet* in the Classroom. *System Dynamics Review*,
8 (1), 91-98.

Karasar, N. (2002), Bilimsel Araştırma Yöntemi, Ankara: Anı yayıncılık, 11. baskı.

Lyneis D. A. (2000). *Bringing system dynamics to a school near you suggestions for introducing and sustaining system dynamics in K-12 education*. International System Dynamics Society Conference Bergen, Norway.

Martin, L. A. (1997a). Road Map 2: The First Step. MIT System Dynamics in Education Project. http://sysdyn.clexchange.org/sdep/Roadmaps/RM2/D-4694.pdf

Martin, L. A. (1997b). Road Map 2: Beginner Modelling Exercise. MIT System Dynamics in Education Project.
http://sysdyn.clexchange.org/sdep/Roadmaps/RM2/D-4347-7.pdf

Martin, L. A. (1997c). Road Map 2: An Introduction to Feedback. MIT System Dynamics in Education Project.
http://sysdyn.clexchange.org/sdep/Roadmaps/RM2/D-4691.pdf

MEB (2007).
http://ttkb.meb.gov.tr/ogretmen/modules.php?name=Downloads&d_op=viewdownload&cid=32

Ossimitz, G. (2000). *Teaching System Dynamics and Systems Thinking in Austria and Germany*. System Dynamics Conference in Bergen, Norway.

Road Maps (2005). http://sysdyn.clexchange.org/road-maps/rm-toc.html

Roberts, N. et al. (1983). Introduction to Computer Simulation . Reading, MA: Addison-Wesley, p. 16.

Schecker, H. P., (1994). System Dynamics in High School Physics. International System Dynamics Conference, Stirling, Scotland.

Sterman, J. D., (2000). *Business Dnamics: Systems Thinking and Modelling for a Complex World*. Boston, MA: Irwin McGraw- Hill.

Copyright © The Turkish Online Journal of Educational Technology 2002

POLICY IMPLICATIONS FOR USING ICTS FOR EMPOWERMENT OF RURAL WOMEN IN GHANA

Olivia Adwoa Tiwaah Frimpong KWAPONG
okwapong@ug.edu.gh

ABSTRACT
Using rural household survey data collected from 1000 female household heads selected from all the ten administrative regions in Ghana, this paper explored the policy implications for using ICTs for empowerment of rural women. A contingent valuation (CV) method was used to quantitatively estimate the influence of selected socio-economic factors on rural women's willingness to pay for alternative information delivery technologies. Even though the government sets the overall national ICT policy, the results from this study suggest some merit in allocating considerable authority to regional and local authorities in setting priorities and approaches to empowering rural women through the use of ICT. The study results also point to a need to cast rural empowerment policies and programs within the broader poverty reduction policies of the government and also within the attainment of the Millennium Development Goals (MDGs). The results again indicate the need to formulate policies and programs to prevent duplication of efforts and critical "Political Will".

I. INTRODUCTION

Empowerment of women is emphasized in the Millennium Development Goals (MDGs) and Ghana's own Poverty Reduction Strategy Program (GPRSP) as a measure to address the problem of poverty. The use of modern information and communication technology (ICT) is considered a critical element in the effort to empower rural women. Empowerment entails the ability and freedom to make choices in the social, political, and economic arenas. One of the challenges facing a developing country like Ghana is how effectively information could be made available to rural households to enhance choice-making. ICTs are very expensive, government has budget limitations. One wonders how the government of a developing nation like Ghana could harness the potential of modern technology to meet the information need of most people, especially the marginalized in society. Given the budget restrictions facing developing countries, the possibility of disaggregating implementation of ICT policies that will respond to the unique needs of rural women may have to be explored. This has several policy implications which are drawn from this paper.

II. SCOPE OF STUDY

This paper throws light on the essence of designing a disaggregated ICT policy to empower rural women. The study uses survey data from all the ten administrative regions in Ghana to determine the factors influencing rural women's' choice of information delivery technology. The information delivery technologies considered are private radio, community radio, and extension services.

The motivating hypothesis in this study is that the wide differences in the socio-economic status of rural women households' influences their choice of information delivery technology and also their willingness to pay for a selected technology. This basic hypothesis is addressed using data from a survey instrument administered to 1000 households from the ten administrative regions of the country. Beyond the issue of whether an aggregate rural empowerment ICT policy would be appropriate, the outcome of this exercise has important policy implications for program planning and implementation applications. For example, since Ghana receives considerable funding and technical support from development partners, the results from this study could be used to channel and target donor support to identifiable needs in rural areas so as to minimize waste and duplication of effort. For the government's own resource allocation, a disaggregated ICT policy could lead to significant policy efficiency gains.

III. THE ICT ENVIRONMENT IN GHANA AND THE RURAL SECTOR

Ghana has made a response to the ICT challenge. In 2003, the *Ghana Integrated ICT for Accelerated Development* (ICT4AD) *Policy*, which summarized the vision of Ghana in the information age was announced. While the policy outlines a broad array of objectives, it is clear that the core of the policy is to use ICT to achieve Ghana's vision of becoming a middle-income country by the year 2020. Ghana's ICT policy is supported by a slew of supporting laws, programs, and initiatives such as, the National Initiative Concerning the ICT and Education and Training (NISI), the African Information Society Initiative (AISI), and the Science and Technology Policy Research Institute.

Despite the wide recognition of the role of ICT in national development, a successful ICT program planning and implementation to accelerate empowerment of women in Ghana is beset by several institutional, technical,

Copyright © The Turkish Online Journal of Educational Technology 2002

political, economic and social challenges. As an institutional matter, ICT policy planning and implementation is spread among several ministries, institutes, research centers, and private agencies. This increases the potential for institutional dissonance and 'turf battles' that could lead to waste and duplication of effort. As a political and social matter, there are concerns that the uneven access to education would translate to a 'gender digital divide' in Ghana unless explicit and credible policies are put in place to address the situation.

Probably the most daunting task facing policy makers in Ghana is making ICT available to a large segment of the population, especially for educational purposes in the rural areas. Some point to the difficult choice between resource allocation to meet immediate needs such as food, shelter, and health versus investing these resources in computers and ICT infrastructure. This 'bread or computers' debate is misplaced because it fails to recognize the symbiotic relationship between ICT/information and rural households' empowerment to improve their welfare.

Also, ICT policies and programs are expensive to design and implement. Resources are needed for infrastructure and operational purposes. Given the pressure on the government's budget, it may be necessary to solicit contributions from rural households, a rather difficult proposition given household income levels in rural areas. Also, it is well established that technology adoption and use depend on the socio-economic characteristics of rural households. Yet the ongoing policy debate concerning ICT in empowering rural households seems tilted to the belief that all Ghana needs is to make ICT available and rural households will jump at the opportunity. A credible and sustainable ICT policy to empower women in rural Ghana should consider the socio-economic characteristics of households, including a determination of their willingness to pay for alternative ICT technologies. This paper attempts to provide such information for ICT policy and program planning and implementation.

Rural Poverty, Status of Rural Women, and ICT in Ghana

The basic document summarizing the state of poverty in Ghana, strategies to defeat poverty, targets, constraints, and projections is the Ghana Poverty Reduction Strategy paper (GPRS, 2003). The GPRS defines poverty as "unacceptable physiological and social deprivation." (pg. 3) and lists participation in decision making, health, education, environmental sustainability, lack of political power as some of the critical considerations in defining poverty.

The high incidence of poverty among women presents a major barrier to ICT adoption. The Ghana Living Standards Survey (GLSS 4, 2000) concluded that women form over 70% of food crop farmers, and 90% of those in internal agricultural distribution, marketing and processing. About 80% of Ghanaian women in the labor force are employed in small, semi-formal and informal undertakings.

There are other constraints that could limit the employment of ICT in empowering rural women. Women constitute the higher percentage (42%) of adult illiteracy population (People who are 15 years and above, and can read and write at least a sentence) in Ghana. Studies have shown that women experience greater poverty, have heavier time burdens, lower rates of utilization of productive resources and lower literacy rates (GLSS 4, 2000). School participation rate for basic and second cycle schools is 77 % for men and 38% for women. Dropout rates remain high at about 20% for boys and 30% for girls at Primary School and 15% for boys and 30% for girls at Junior Secondary School. Programs targeting empowerment of rural women through ICT applications must take into account the targeted population to use the technology.

There are also major barriers to introducing ICT to rural women due to the political context within which rural women function in Ghana. In a true sense, the idea of empowerment' is captured by the participation of rural women in all phases – design, implementation, and evaluation - of policies and programs that affect them. The participation of women in decision-making is the weakest link in the fight against poverty. The GLSS concluded that women are poorly represented at all levels of decision-making. This low level of participation by women excludes their perspectives from policies and legislation; it prevents their input into national budgets and resource allocation, and it deprives society of women's skills, knowledge and their perspectives (Ofei-Aboagye, 2000). Considering these, policies and programs to promote ICT in empowering women in rural areas have to be undertaken with due consideration of the broader socio-economic environment within which women function in Ghana.

Another consideration is the availability of complementary inputs such as computers, voice and video systems, and in some cases, physical access to rural locations. The current infrastructure for telecommunication broadcast to regions in Ghana is limited to serving the major regional centers and capitals. Resources for expanding the reach of the telecommunication infrastructure may be quite limited in light of the findings of a

Copyright © The Turkish Online Journal of Educational Technology 2002

recent survey of budget allocations to the ICT sector. According to the report, the majority of government ministries and public sector organizations have less than 10% of their total budget on ICT (including acquisition of hardware, software, training, maintenance of ICT systems, etc.). Close to 60% indicated that their ICT expenditure as a percentage of their total expenditure is below 10%. Close to 34% of the organizations reported devoting about a quarter of their total expenditure on ICTs. On the whole, most of the organizations in all the sectors spend less than half of their annual budget on ICT (Ghana, 2004). These call for an innovative policy approaches for using ICTs for empowerment of rural women.

IV. STUDY AREAS AND RESEARCH PROCEDURES

The population of the study was 1000 female household heads randomly selected from the ten administrative regions of Ghana. Hundred female household heads were selected from each of the ten administrative regions. The data used in this study was based on a contingent valuation survey instrument administered in several villages in Ghana. The survey was divided into two main parts. The first part sought information on basic characteristics of households (age, education, dependents, occupation, expenditures, and membership in community organizations.) The second part consisted of a bidding game for alternative information delivery technologies. Three main information delivery technologies were considered – community radio, private radio, and extension agents (printed material). The main distinguishing feature of these technologies was price.

The use of radio in rural communication is very common in Sub-Sahara Africa (SSA). The proposed framework considers radio technology a key information delivery instrument given its popularity. Ghana has one of the highest radio ownership rates in SSA (710 per 1,000 people in 2002) compared to an ownership rate of 198 per 1,000 people in the rest of SSA, and 139 per 1,000 people for all low income countries. Ghana's ownership rate represents about a 207 percent increase over a 7-year period 1995-2002 (World Bank, 2003). Following the approach used in several studies, information dissemination through the radio is considered in two contexts - private radio and community radio. There are good reasons to consider radio use in these two contexts. Governments and donors who usually fund the rural education programs may want to reduce the cost of information dissemination by increasing the number of radio listeners usually in a group format. In this context, the amount of contribution to be made by information recipients is correspondingly reduced, making households more willing to pay for the information. An added benefit of a community radio format is the opportunities for listeners to interact and react to information received taking into account the views and opinions of other receivers of information. This interaction enriches the learning process and may be preferred by households.

On the other hand, there may be some rural households that prefer their own private radio to receive information. It is plausible that younger and educated females may want to have the freedom to listen to other radio programs (for example, broadcasts in English), and therefore will be more willing to pay for their own radio instead of paying for a community radio. It is also very likely that educated rural dwellers have higher incomes since they may draw income from both farm and non-farm sources. In this context, they are in a position to pay for their own radio sets to receive information.

In terms of print media, the focus is on extension bulletins and adult education publications. The extension and adult education publications are assumed to be part of a person-to-person information delivery protocol. Information through the print media is assumed to be delivered by extension agents. There is no consideration of newspaper given the currently low level of circulation (about 14 per 1000 population in 2001) compared to about 40 per thousand population for low-income countries for the same period (World Bank, 2003).

The preceding suggests that the study considers information delivery by community radio to be the cheapest since several households contribute to the purchase and maintenance of the system. Extension agents are considered the next cheapest of the three technologies considered because the government pays these agents. The idea is to explore the extent to which a part of the cost of extension information delivery could be shifted to households and lessen the burden on government. The most expensive delivery technology as assumed in the study is the private radio since a household owns it individually and pays full amount for it.

Bidding took the form of a series of specific questions. For example, a respondent was asked whether she would be willing to pay ¢1,000 per year to use a community radio. If 'yes' the question was posed again with an increase in the amount to ¢2,000. The process continued until 'No' answered. The final amount to which the respondent answered 'yes' was recorded as the maximum willingness to pay to have the community radio installed in the village. For extension agents, the beginning bid was at ¢5,000, while for private radios, the beginning point was ¢10,000. Respondents were also asked to state an amount they will be willing to pay for each of the information delivery technologies.

Copyright © The Turkish Online Journal of Educational Technology 2002

Field data was collected with the assistance of staff of the Institute of Adult Education. These are people located in the Regional Centers of the Institute, which is established in all the ten Regions of Ghana and are constantly engaged in community programs with the local people. Their residence in the regions, accumulated community research and training experience helped to do rapid field data collection. Data was collected in a face-to-face interview where the interviewer had the opportunity to explain the purpose of the survey and the need to obtain truthful responses from the respondent. The interviewers were quite familiar with the villages and based on their experiences understood the need to interview in a manner that did not impair the integrity of the effort. For example, respondents were cautioned not to discuss their responses with other households. There was broad agreement among field staff that respondents took the process seriously and were willing to offer truthful information to assist in achieving the objectives of the survey.

V. MODEL AND STATISTICAL ESTIMATION

A multiple linear regression relationship was assumed between the dependent variable and the independent variables. The following factors were hypothesized to influence a household's willingness to pay for a selected technology:

Age: It was hypothesized that older households will be more willing to pay for community radio systems and extension visits. There were good reasons for this expectation. First, older households are likely to belong to community organizations and hence more comfortable with sharing the media. On the other hand, a young household is also likely to be less involved in community organizations, and would be willing to pay for their own private radio system.

Marital Status: The combined income effect and support of married couples is likely to encourage their willingness to pay for private radio information delivery technology. Oftentimes community organization activities are organized along gender lines and there are not much joint community activities between men and women. Thus, information delivery via community radio or extension services would be less attractive to married households. A plausible hypothesis is that married households will be more likely to pay for private radio, and are unlikely to pay for extension information or community radio.

Household Size: The household is defined to include all persons who are under the direct responsibility of the female respondent. At a given income level, large households are less likely to pay for private radios given the cost of these radios. Thus, large households will be more willing to pay for community radios and extension services, while small households are more likely to be willing to pay for private radios.

Education: Rural females have lower school attendance rates across all regions with the lowest rates recorded in the three northern regions (Northern, Upper West and Upper East). Generally, it is hypothesized that educated households will be willing to pay for any ICT media given the premium on information in decision making. While an illiterate household naturally would depend on the radio and extension visits for information, a literate household has the additional source of information delivered through extension bulletins, and other printed sources.

Income: It is difficult to predict the effect of income on the willingness to pay for ICT in rural households. Generally, a positive relationship between income and the willingness to pay for ICT was expected. Households with high incomes tend to spend a smaller proportion of income on food while poorer households spend a higher proportion of income on food. Thus, one would expect the effect of income on ICT to be positive in the relatively richer regions. Furthermore, one would expect households with high incomes to use private radios instead of community radios in receiving information. One could argue that even though poorer households spend a higher proportion of income on food, their interest in obtaining information to 'kick' out of poverty may encourage them to be willing to pay for ICT information. In essence, there are no statistically significant differences in households' willingness to pay across regions. In this sense, it is difficult to predict the exact sign (positive or negative) on the income variable, and the issue is left to empirical determination. An indirect approach was used to obtain measures of income from rural households. Households were asked to list the major sources of income, and then inquired about their expenditure patterns. This was done due to the difficulty in obtaining direct income figures from households and also to capture the effect of transfers. These expenditure amounts were used as proxies for income. Indeed studies of willingness to pay for amenities in rural households have found direct rural income measures to be unreliable and have resorted to proxies to estimate income (Boadu, 1993).

Membership in Community Organizations: It was hypothesized that households who belong to a community organization will be willing to pay for information delivered via community radio. Community radio is cheaper

Copyright © The Turkish Online Journal of Educational Technology 2002

than a private radio and more importantly, these households have cultivated the spirit of sharing through their membership in an organization. Table 1 show that rural households make more contribution to community initiatives than do urban households.

Table 1. Miscellaneous Expenditures by Urban and Rural Households

Purpose of expenditure	Mean household expenditure (cedis)			Estimated total miscellaneous expenditure (billion cedis)
	Urban	Rural	All	
Taxes (TV License, property tax etc.)	3,700	1,300	2,200	8.8
Contributions to self-help projects	9,500	10,200	9,900	40.4
Weddings, dowry, funeral, etc.	91,900	62,900	73,500	298.9
Gifts and presents (excluding remittances)	36,700	28,900	31,800	129.3
Other miscellaneous expenditures	21,500	12,500	15,800	64.3
Total	**163,300**	**115,800**	**133,200**	**541.7**

Source: GLSS 4 (Table 9. 27)

The estimated multiple linear regression equation of the relationship between a household's willingness to pay for a selected information delivery technology and the socio-economic characteristics of the households is as follows:

$$1. \quad (WTP)_{ijt} = a_0 + a_1 (AGE) + a_2 (EDUC) + a_3 (MARS) + a_4 (DEPEND) + a_5 (EXPEND) + a_6 (MEMBR) + U_{i,}$$

where $(WTP)_{ijt}$ is the willingness to pay by a household (i) in region (j) for information delivery technology (t), AGE is age of respondent measured in years, EDUC is the educational level of respondent. The educational level was broken down into two main levels of up to primary and above primary to reflect the low educational levels of women in rural households. MARS is the marital status of respondent, and was measured using a *dummy* variable equal to 1 if respondent is married, and zero otherwise. DEPEND is the number of dependents of respondent, EXPEND is the aggregate of all expenditures reported by the respondent measured in Ghana Cedis, and MEMBR is the membership of respondent in a community organization. Membership was measured as a *dummy* variable, equal to 1 if the respondent belonged to a community organization and zero, otherwise. The term U is a random error term assumed $N(0, \sigma^2)$.

VI. RESULTS

Table 2 below lists the means of selected independent variables for the ten regions in the study, and the mean bids for extension services, community radio, and private radio. Mean household size and expenditures are also provided. Consistent with expectation, mean bids for private radio is highest, followed by mean bids for extension information, followed by community radio.

Table 2. Means of Independent Variables Compared to Means from GLSS 4

	Household Bids in Ghana Cedis					
Region	*Community Radio*	*Private Radio*	*Extension Agent*	*No. of Dependents*	*Expenditure Survey*	*Expenditure GLSS 4*
Western	3535.5	10404	6182	2.79	5,052,525	4,677,000
Ashanti	3360	22300	8480	3.61	11,054,650	5,008,000
B. Ahafo	3730	24305	10030	1.77	4,180,710	3,544,000
Central	3886	22450	10180	3.74	5,153,510	2,977,000
Eastern	4868	22696	8909	3.33	8,549,222	3,736,000
Gt. Accra	3656	21162	10202	2.83	11,495,487	6,777,000
Northern	3400	21069	9520	4.43	3,335,400	2,837,000
Upper East	3141	21262	8595	3.04	4,059,460	1,793,000
Upper Eest	3830	26200	9980	5.67	2,070,160	2,462,000
Volta	5200	11190	7320	2.39	6,134,540	4,000,000

Source: Survey and GLSS 4, Table 9.2

Copyright © The Turkish Online Journal of Educational Technology 2002

Mean expenditure pattern for households also tracks the numbers from GLSS 4. However, in Greater Accra, Eastern, and Central regions, means from the survey are significantly different from the means based on GLSS 4. Since the GLSS 4 is based on 1999 information, it could be that expenditures have changed significantly over the last five years. The means are sufficiently credible to provide a reasonable basis for the survey data analysis. Equation 1 was estimated for all the regions using the Newey-West estimator. The Newey-West estimation procedure takes into account the problems in using cross-section data to give consistent and efficient estimates. The results of the estimation procedures are presented and discussed below.

Tables 3a, 3b, and 3c present the results of regression analysis using the combined data set from all the ten regions in Ghana, 100 observations for each of the ten regions. Four observations were rejected so the total number of observations is 996 instead of 1000. The overall explanatory power of the model is poor with an R^2 (Coefficient of determination) of 7.5% for the community radio regression, 6.9% for private radio and 8.4% for extension services. The low explanatory power of the models is not fatal, especially given the consistency and statistical significance of several of the critical socio-economic factors that were hypothesized to influence rural women's' willingness to pay for selected information delivery technologies.

Table 3a shows that older women, educated above the primary school level, with high expenditure levels, and are members of a community organization are more willing to pay for information delivered via a community radio. With the exception of the income factor that is statistically significant at the 10% level, all the other factors are significant at the 1% and 5% levels. The table also shows that younger women (below age 20) are not willing to pay for information delivered via a community radio. Results for information delivered via private radio (Table 3b) follow the pattern obtained for community radio but it could also be found that married women are willing to pay for information delivered via private radio. This may be due to the fact that married households have higher income (combined income) and could afford the more expensive media for information delivery. This observation is supported by the fact that the estimated coefficient for expenditures (.00011) in Table 3b is bigger than the estimated coefficient for expenditures (5.09E-06) in Table 2a. Also the expenditure factor in table 3b is highly significant (1% level) compared to the significance level (5%) for the same factor in Table 3a. Table 3c reports the results of estimation for information delivered via extension agents. The pattern observed under the two previous results is observed for information delivery via extension agents. Here again, the principal factors are high education, high expenditures, membership in community organizations, age and marital status. Again, the results show that younger women are not willing to pay for information delivered via extension agents. The only factor that was not found significant in explaining variation in the choice of information media is the number of dependents.

Table 3a Regression Results for Households Willingness to Pay for Community Radio

Variable	Coefficient	t-Statistic
Constant	3017.98	23.08
Age [Up to 20]	-704.62	-5.07
Age [Above 20]	180.84	2.69
Married	38.70	0.43
Dependents	-1.60	-0.10
Educ. [Primary]	-110.71	-0.84
Educ. [Above Primary]	187.74	2.05
Expenditure	5.09E-06	1.62
Membership	316.90	3.54
R-squared	0.075	N = 996

Table 2b Regression Results for Households Willingness to Pay for Private Radio

Variable	Coefficient	t-Statistic
Constant	12333.05	8.14
Age [Up to 20]	-5469.63	-2.54
Age [Above 20]	1041.34	0.81
Married	3433.88	2.47
Dependents	348.89	1.40
Educ. [Primary]	1204.46	0.73
Educ. [Above Primary]	5663.57	3.17
Expenditure	0.00011	2.82
Membership	4867.08	3.69
R-squared	0.069	N = 996

Copyright © The Turkish Online Journal of Educational Technology 2002

Table 2c Regression Results for Households Willingness to Pay for Extension Service

Variable	Coefficient	t-Statistic
Constant	6707.23	17.23
Age [Up to 20]	-1855.98	-4.57
Age [Above 20]	395.12	1.95
Married	463.64	1.71
Dependents	48.58	1.059
Educ. [Primary]	-27.67	-0.089
Educ. [Above Primary]	473.32	1.82
Expenditure	1.43E-05	2.22
Membership	1298.57	5.20
R-squared	0.084	N = 996

The results based on regional data followed the pattern observed under the pooled results as presented above. With the notable exception for the Volta and Upper West regions, the income variable was found to be statistically significant in explaining the variation in the willingness to pay for information delivered under the selected media for all the other regions. The education variable was found to be statistically significant for all regions except the Northern, Greater Accra, and Upper East regions, while the community membership variable was found to be statistically significant in all regions for at least one of the media except in the Ashanti, Brong Ahafo, and Eastern regions. The only regions where the age variable was not found to be significant in explaining the variation in willingness to pay for any media were Western, Ashanti, and the Upper East. Likewise, the number of dependents variable yielded inconclusive results. Unlike the outcome using the pooled data, the marital status of women did not play a significant role in explaining the willingness to pay for any of the regions.

VII. POLICY IMPLICATIONS

The overall results from this study point to household expenditures (used as proxy for income), household education, and membership in community organizations as the principal factors influencing rural women's willingness to pay for the various technologies used in information delivery to women in rural areas. The income variable was found to be statistically significant in explaining the variation in the willingness to pay for information delivered under the selected media for all the regions. The education variable was found to be statistically only in the Ashanti while the community membership variable was found to be statistically significant in the Upper East and Greater Accra regions. Age was found to be significant in explaining the variation in willingness to pay for any media in the Ashanti, and the Upper East regions. Likewise, the number of dependents variable yielded inconclusive results. Also, the marital status of women did not play a significant role in explaining the willingness to pay for any of the regions. Despite the lack of consistency in the regression results several important policy and planning options are suggested by the results from this study.

a. Need to disaggregate Policy planning and Implementation process

Even though the government sets the overall national ICT policy, the results from this study suggest some merit in allocating considerable authority to regional and local authorities in setting priorities and approaches to empowering rural women through the use of ICT. This is due to the different impacts the socio-economic factors had on different regions. It is in this context that the government has to put 'teeth' into the Local government Act (1988) PNDC Law 207 and the instructions under Article 35 Ghana's 1992 constitution which indicate that the state shall make democracy a reality by decentralizing the administration and financial machinery of government to regions and districts and by providing all possible opportunities to the people to participate in decision making at every level of national life and in government.

There have been some efforts by government to broaden the participation of strategic groups in the public policy and planning decision-making process. This was evident in the preparation of Ghana's poverty Reduction Program (GPRP). For example, the GPRP planning group consulted about 36 community groups during the preparation of the document. These groups included women, the youth, and community leaders (GPRP 2003, P.6). Also, the planning group held seminars with women leaders/coalitions of women's groups to obtain their input in preparing the strategy paper. The coalition of women's groups prepared a statement listing areas, which they felt, could be more engendered and which had not been treated as part of the first draft document (GPRP 2003, P. 7). While these initiatives are laudable, the study results point to need to deepen this consultation process with even greater emphasis on local control and input from women.

Copyright © The Turkish Online Journal of Educational Technology 2002

b. Need to Implement ICT policy within a Broader Poverty Reduction Program

i. Improving Rural Incomes

The study results also point to a need to cast rural empowerment policies and programs within the broader poverty reduction policies of the government and also within the attainment of the Millennium Development Goals (MDGs). Ghana's primary poverty reduction objective is defined under its *Vision 2020* goal to become a middle-income country by the year 2020. The results show how that the attainment of this vision would boost ICT use in delivering information to rural households since income was found to be consistently statistically significant in explaining rural women's willingness to pay for information. There are two important issues to address in the context of the relationship between incomes and ICT use to empower rural women.

First, the relationship between ICT use and income must be seen as bi-directional. While high incomes make it possible for rural women to pay for the information delivery technology of choice, the delivered information, in turn, is intended to empower women to be able to make those decisions that would improve their welfare and incomes. These observations lead to the conclusion that knowledge of the importance of incomes in ICT use in information delivery is not enough. There is also a need to emphasize the learning component that allows rural women to better utilize received information in decision making to further improve their incomes.

A second implication of the statistical significance of the income factor is the need to broaden policies to enhance the many possible sources of income available to rural women. Even though the popular view has been to focus on agriculture as the primary source of raising incomes of rural women, the survey results point to a need to broaden the scope of an incomes policy in rural areas. The field survey results show that the majority of women (45.8%) reported "trading" as the primary source of income while 23.9% reported "farming" as their primary source of income. About 7.7% reported "dressmaking" as their primary source of income while 4.1%, 2.7%, 2.6% reported "hairdressing," "teaching," and "office work" respectively as the primary source of income. A sizable percentage (11.2%) reported no income source.

The distribution of women's sources of income is beginning to put flesh on some of the results obtained in the study. For example, the distribution may help explain why several households were not willing to pay for information delivered by extension agents since the historical mission of these agents are the delivery of "agriculture-related" information. The results may also explain the popularity of private radio because radios may complement such activities as 'hairdressing', 'dressmaking,' 'office work,' and 'trading.' The key is for policy and program planners to better understand the dynamics in the rural sector and to recognize shifts in economic activity that may be counter to the historical pattern of economic activity.

ii. Education

Another factor that emerged as important in explaining households' willingness to pay for information is education. The significance of the education factor supports the need to plan and implement ICT policies for rural empowerment in a holistic context. Education is one of the major components of Ghana's poverty reduction program and the MDG. The survey results show that the government has a major hurdle to clear in its effort to empower rural women using ICT to deliver information. Formal educational attainment appears to be very low among the female rural household heads. The survey showed that about 45% of the household heads had no formal education. Only 1.1% had attained tertiary education. Thus, even though rural women who had some education had expressed a strong willingness to pay for information, policy and program planners have to undertake *specially designed* adult education programs to benefit rural women. The results also imply that information would have to be delivered to rural households in a language they understand and a medium that they would be comfortable with. The significance of the education variable also points to a need to emphasize 'local' content in designing rural information programs.

iii. Community Organizations

The statistical analysis also point to an important role that community organizations could play in the delivery of information to empower rural women. Women who belong to some form of community organization were more willing to pay for information delivered via the three ICT media examined in the study. The survey showed that slightly more than half (50.3%) of rural women belonged to a community organization and cooperatives. This strong sense of communalism has important policy and program planning implications. For example, the government may want to take advantage of the spirit of communalism and focus on programs that could be delivered to a group as a way to reduce costs and hence be able to extend programs to cover a larger population group. It also means that there is a need to design effective feedback mechanisms since in a group context, it may not be possible to easily address individual concerns. Information program content may emphasize discussion as a way to sustain group interest. It is important for the government to allow rural organizations to

Copyright © The Turkish Online Journal of Educational Technology 2002

define their own rules to check practices such as 'free riding' and 'shirking.' Attempts by government agents to interfere in group organization may be counterproductive.

c. Need to develop a disaggregated funding strategy

In addition to disaggregating the policy and planning process in using ICT to provide information to rural women, the results also point to a need to formulate policies and programs to prevent duplication of efforts. This study has helped to identify factors that influence rural women's willingness to pay for different information delivery technologies. The many factors have different effects in different regions. This opens the door for policy and program planners to allocate efforts among different agencies and development partners.

The survey showed that rural women were very interested in receiving information. About 49.7% responded in the affirmative when asked whether they received information on agriculture, trading, health, education, and government. A higher percentage of 72.5% indicated their desire to acquire information and skills which is a good indicator for the need for a *specially designed* rural adult program for the women. From the survey only about 7.6% responded that they pay for information delivery. On the other hand, about 77.6% indicated their willingness to pay for the learning media if the government was to offer such a specially designed program whiles 4.8% were not sure of their decision. In a similar vein 79.3% indicated their willingness to pay for such a facility if it is offered by a private organization. While a large majority of the respondents indicated that it is the responsibility of the individuals using the facility to pay for information, a few indicated that it should be the Government, or District Assemblies, or Non-governmental organizations [NGOs] who should pay for the information. Policy and program planners have to take into account both the needs in different regions, and also the alternative funding sources available to be able to target information delivery programs that reach the appropriate rural population.

d. Need for Holistic Planning

There were several factors that were not statistically significant in explaining the willingness to pay for information by rural women but are very important in planning an effective program to deliver information to rural households using ICT. Even though these factors were not statistically significant, they had the right signs consistent with the hypothesis. One such factor is age. A very high percentage, about 94% of the respondents fell within the active adult stage of 21 – 50 years. These are people who could be described to be in their peak stage of development and production. Their responses could well inform policy on the use of ICT for rural adult education and willingness to pay for such facility and services. Furthermore, the distribution points to a need to examine education program content and the relevance of the information delivered.

Another factor that is important to consider is the number of dependents in a household. It was hypothesized that women with many dependents would be less willing to pay for information given the cost in maintaining a large household. Note that dependents meant not only the biological daughters and sons of respondents but all their wards or other people that they were responsible for. While it is typical of a rural Ghanaian household to report as many as 17 dependents within a household, the survey found the majority of the respondents, 88.3% to have dependents ranging from 0 – 6. A further break-down showed that over 55% had the total number of their dependents ranging from 0 – 3. What this suggests is that a good number of households may not have the huge financial burden associated with maintaining a large number of dependents. Holistic planning dictates that the government takes a long term view of the empowerment process to include issues related to population planning that on the surface seems like a remote factor in planning information delivery to rural women using ICT.

Another seemingly remote factor is the marital status of rural women. The survey indicated that a majority, almost 70% of the household heads were married. This point to an important socio-cultural factor that must be taken into account in planning information delivery to rural women via ICT. Men occupy a dominant role in Ghanaian society, and this dominance is even more pronounced in rural communities. The roles and status of women/wives and the nature of male - female relationship that exist in these communities put considerable burden on women's time allocation. A more comprehensive rural education program must therefore take into account this dominant position of men. Thus their views, consent and support would be crucial for effective program planning and implementation.

e. Need for the critical "Political Will"

The Government of Ghana has expressed its commitment to provide information through the use of ICT to empower rural women through various policy pronouncements and position papers. Government's commitment however must be examined within the broader context of the allocation of budgetary resources to rural education programs and ICT development. As pointed out in Chapter Two of this study, over 70% of

Copyright © The Turkish Online Journal of Educational Technology 2002

government ministries spend less than 10% of their budgets on ICT related activities. With the global trend towards e–government, government may want to signal its commitment by increasing its own use of ICT. Furthermore several indicators point to the possibility of significantly expanding ICT use in information delivery to empower rural women. A few of these indicators are examined below.

■ Ghana already has an extensive telecommunications network that reaches every region in the country. Given the strong expression of willingness to pay for information delivered via community radio, private radio, and extension services, government may need to explore ways of strengthening the existing network to achieve the goal of empowering rural women through information delivery using information technology.
■ Ghana has considerable experience in rural education programs. This experience should reduce the learning curve to a significant degree. As reported by Abbey-Mensah, (2001), head of Rural Broadcasting in Ghana, Rural Broadcasting [RB] in Ghana began in October 1962. Programs were designed for both men and women to educate [to stress *Dignity in Labor*], inform and entertain the rural people in local languages. In the program segments that targeted farmers and fishermen consisted of agricultural news, interviews with successful farmers, talks by experts on new methods of farming, nutrition, child-care and market reports. Broadcasting staff followed-up with visits to determine the extent to which the listeners practiced their trade using the new knowledge and skills discussed in the radio program.

Another dimension of the RB programs explained by Abbey-Mensah [2001] is the Rural Radio Forums introduced in 1964 where a series of listening groups of farmers met at a point to listen to special radio programs on improved methods of farming and had discussions with agriculture extension officers. Recognizing the roles rural women play in housekeeping, farming, preservation and selling of agricultural products, special 30-minute daily program was broadcasted for the rural women. In addition to the FM radio stations which are currently operating in almost all the regions in Ghana, other private initiatives include the *Worsum* Clubs, radio forums organized by the School of Communication Studies of the University of Ghana which seem to make a lot of impact on the income-generating activities of the rural people. There is a need to build on these proven activities to achieve the goal of empowering rural women.

■ There are currently available on the market several technologies that avoid many of the technical constraints, especially electricity that prevent the introduction of popular technologies such as computers. For example, *Wind Up and Solar Powered Radio* is a self-powered radio which may be operated directly by spring generated power, or by using its solar panel. The Freeplay Global Shortwave Radio which weighs 5 lbs. 51 oz./ 2.5kg has no need for batteries or an external power source [electricity]. The Freeplay Radio plays all day in direct sunlight, and when low-light conditions prevail it automatically switches over to spring power. (if the radio has been previously wound.) For convenience, the Freeplay may also be powered using AC/DC 6 Volt wall adapters. The radio has been distributed to refugee camps in Burundi and in Tanzania's Great Lakes region.

An innovative facility that could help improve the community radio program is the *Suitcase Radio* product developed by the Wantok Enterprises, a Canadian company [www.wantokent.com]. Both its Radio [and TV] systems were designed for use in areas where infrastructure such as roads and power grids are either non existent or in very limited supply. Everything operates from 13.8 Volts (a fully charged car battery voltage). Solar panels, wind generators, or standard gasoline or diesel chargers can also charge the batteries. If AC power is available, the company supplies an AC to DC power supply that will convert 230 Volts to 13.8 Volts DC. The company has community radio stations in many African countries and in the Caribbean, Asia and to a lesser extent Eastern Europe. The largest quantity of their radio stations are in Niger (75 or 80 units) and Mali (45). Niger, one of the poorest countries in the world has 90% of their equipment running off Solar charged systems. The company also did their TV pilot project in Niger, which also runs off solar (Holmes, 2004; Wagner et al, 200Kwapong, 2005). This discussion of emerging technologies illustrates the importance of strategic planning as a process, with frequent updates based on new information.

f. Need for Inter-Agency Coordination
One of the most difficult hurdles in any massive government program is effective coordination to minimize 'turf battles' and waste. An ICT program to deliver information to rural women would involve technical experts, policy planners, and several public and private agencies. At a minimum, one could think of the involvement of the ministries of finance, education, agriculture, local government, and science and technology. At the agency level, one could think of the Ghana News Agency (GNA), the extension service, and the Institute of Adult Education. To these must be added the numerous NGO's and bilateral agencies that are pursuing their own development aid activities consistent with their national priorities. The challenge is for government to coordinate these many institutions to optimize resources devoted to using ICTs for rural adult education.

Copyright © The Turkish Online Journal of Educational Technology 2002

One option is to create a 'super agency' that draws personnel from the various agencies with the specific single objective to supervise ICT activities directed at rural communities. Such an agency could serve as a 'clearinghouse' and one-stop shop for all activities connected with rural information delivery.

VIII. CONCLUSION

The overriding conclusion that emerges from this study is the need to examine ICT use in empowering rural women within a 'holistic' policy context. No single socio-economic factor emerged as the dominant variable in planning policies and programs to introduce ICT use in information delivery to rural women. Likewise, no single information delivery technology emerged as ***the*** technology to use in delivering information to rural women.

REFERENCES

Abbey-Mensah (2001), "Expert consultation on rural women and distance learning: Regional Strategies" http://www.fao.org/sd/2003/PE12033a_en.htm http://www.fao.org/sd/ruralradio/en/index.html [DA: 11/12/04]

Boadu, F.O. (1993), "Contingent Valuation for Household Water in Rural Ghana", Journal of Economics, vol. 43, no.3

Ghana (2003), "Republic of Ghana – National ICT Policy and Plan Development Committee" http://www.ict.gov.gh/html/about.html [DA: 11/20/04]

Ghana (1996), "Ghana Vision 2020 – The First Step: 1996 – 2000" http://www.ghana.edu.gh/prospects/vision.html [DA: 10/15/04]

Ghana (1995), Constitution of the Republic of Ghana. http://www.idlo.int/texts/leg5515.pdf [DA: 09/16/04]

GLSS 4 (2000), Ghana Living Standards Survey – Report of the Fourth Round, Ghana Statistical Service

GPRS/P (2003), Ghana Poverty Reduction Strategy/Programme 2003 -2005 - An Agenda for Growth and Prosperity, http://poverty.worldbank.org/files/Ghana_PRSP.pdf [DA: 09/16/04]

Holmes, R. (2004), "Advancing Rural Women's Empowerment:

Information and Communication Technologies (ICTs) in the service of Good Governance, Democratic Practice and Development for Rural Women in Africa", A Women'sNet Resource Paper http://womensnet.org.za/dimitra_conference/papers.shtml

[DA: 11/11/04]

Kwapong, O. (2005). Exploring Innovative Approaches for Using ICT for Rural Women's Adult Education in Ghana, Ghana Journal of Development Studies Vol. 2 No. 2

Ofei-Aboagye, E. (2000) 'Promoting the Participation of Women in Local Governance and Development: The Case of Ghana' ECDPM Discussion Paper 18, Maastricht: ECDPM.

Wagner, D. & Kozma, R. (2003), "New Technologies for Literacy and Adult Education: A Global Perspective" A Paper in Support of the UN Literacy Decade, The Education for All Initiative, World Summit on the Information Society and Leave No Child Behind.

World Bank (2003). Development Data Group

Copyright © The Turkish Online Journal of Educational Technology 2002

PROMOTING TEACHERS' POSITIVE ATTITUDE TOWARDS WEB USE: A STUDY IN WEB SITE DEVELOPMENT

Yavuz AKPINAR, Yusuf BAYRAMOĞLU
Boğaziçi Üniversitesi, Eğitim Fakültesi
Bebek, İstanbul
akpinar@boun.edu.tr

ABSTRACT
The purpose of the study was to examine effects of a compact training for developing web sites on teachers' web attitude, as composed of: web self efficacy, perceived web enjoyment, perceived web usefulness and behavioral intention to use the web. To measure the related constructs, the Web Attitude Scale was adapted into Turkish and tested with a sample of 156 teachers. Then, a web site development training based upon behavioral modeling method of instruction was conducted with sixteen teachers. The training created a positive and significant difference on the participants' web attitude, web self efficacy and perceived web usefulness scores. Although the post training scores of perceived web enjoyment and behavioral intention to use the web were higher than the pre training scores, the differences were not significant. The results are encouraging and suggest that teachers should involve more in design and development of web based materials to help students to learn.
Keywords: web attitude, self efficacy, web usefulness, teacher development, web enjoyment, behavioral intention

INTRODUCTION

Technology based teaching and learning materials became more common in educational settings. To provide an information source for teachers, administrators, students and parents, different portals and web sites have been developed worldwide. In Turkey, For example, Education News Portal (Eğitim Haber Portalı) collects and serves updated news about education from all over local and the World Media with the help of a news agency. In another portal (Öğretmenler portalı), teachers are able to find information about the new curriculum, programs, activities, and sample annual plans for classes for different majors. A third portal (Bilgiye Erişim Portalı) provides facilities for administration. It includes modules for teachers, administrators and students. Teachers will be able to share information and resources with each other. In the administration part, students' grades are now announced via the Internet. A more recent site (Skoool) provides online content for science and mathematics. While having technological resources is important, another critical issue is whether the teachers, students, and administrators are ready to use the available technology. In a study carried out in thirty-four Curriculum Laboratory Schools with 1705 teachers (Tüy, 2003), it was reported that the number of teachers using educational technology devices like CD-Rom, DVD and data-show was very small although schools had the required equipment. None of the teachers reported that they used the Internet in their lessons: Teachers emphasized that they needed specialists who could support them and provide required information to use educational technology. Later, Demirarslan and Usluel (2005) presented similar results: Majority of the participant teachers confirmed that they often preferred traditional methods instead of integrating information and communication technology in the education process. The rate of the teachers who had never participated in an online project with their students was 80%. In another study (Deniz, 2005), teachers and school administrators' use of computer for professional purposes was stated as low. Further, Kabadayı (2006) reported that teachers mostly tended to use traditional teaching devices rather than contemporary devices: Although they did not perceive the use of technological devices as a waste of time and believed in its positive effect on learning, they were not motivated enough to overcome the difficulties of manipulating technological devices. There seems to be different variables affecting technology adoptions and use which needs to be considered in getting individuals to benefit from new technologies.

Attitude towards computers and the internet

Recently, attitude towards computers and the Internet has been the subject of many studies, within different theoretical frameworks and methods. Also, there have been a substantial number of studies in Turkey about teachers' attitudes towards technology use (e.g. Akkoyunlu, 1996; Altun, 2003; Asan, 2002; Bayhan, Olgun & Yelland, 2002; Deniz, 2005; Gomleksiz, 2004); however most of those studies examined the interaction between attitude toward technology and teacher/prospective teacher characteristics. For example, Altun (2003) studied the interaction between prospective teachers' attitude towards computers and their cognitive styles, the study concluded that cognitive styles could not be considered as an effective contributor to participants' attitudes toward computers. Another study in Turkey (Deniz, 2005) showed that male teacher have more favorable attitudes than female teachers, and less experienced teachers have more favorable computer attitudes than the ones with more teaching experience. Also, there is a meaningful relation between teachers' knowledge about technology and their attitude towards it; the prospective teachers with more information about technologies have

Copyright © The Turkish Online Journal of Educational Technology 2002

more positive attitude towards the use of technologies in their profession (Akkoyunlu, 1996). Further, the studies by Asan (2002) and Gomleksiz (2004) found that teachers have positive attitudes towards the use of technology, though they cannot use technologies at the desired level (Gomleksiz, 2004).

The most influential study in technology acceptance was conducted by Davis (1989). It attempted to predict and to explain the information system use and developed the Technology Acceptance Model (TAM) in which two theoretical constructs, and perceived usefulness (PU) and perceived ease of use (PEOU), were examined as fundamental determinants of system use. The study showed that usefulness was significantly more strongly linked to usage than ease of use was. Users were ready to deal with difficulty in use if they believed in the benefits of the system. Regression analyses supported that the ease of use might be an antecedent to usefulness rather than a direct determinant of the system use. Later, the TAM was extended and used by adding new variables. For example, Yanga and Yoob (2004) reported that cognitive dimension of attitude and PU had a direct relation with information system use; attitude explained more than twice as many variances of information system use as did PU. Moreover, several researches extended the TAM model by including the concept of cognitive absorption, a state of deep involvement with the system. Saade and Bahli (2005) revealed that cognitive absorption is an important antecedent to PU but less important to PEOU. As advocated by prior research (Davis, 1989; Flavian, Guinaliu & Gurrea, 2005; Venkatesh et al., 2003; Wixom & Todd, 2005), the analysis verified that there was a positive effect of PEOU on PU. Roca, Chiu and Martinez (2006) included cognitive absorption as a determinant of the PU, and found that the influence of perceived quality of information, service and system on confirmation, and satisfaction was strong. When the Internet is considered, information quality emerged as an important factor which especially influenced usefulness. In addition, predictor variables of the PU and PEOU were also examined (Lederer, Maupin, Sena & Zhuang, 2000; Lin & Lu; 2000; Thong, Hong &Tam, 2002; Wixom & Todd, 2005). Information quality was found as to be the predictor for usefulness and for ease of use; the highest predictive power was the ease of understanding. The fact that there was a stronger effect of usefulness than ease of use on web site use was consistent with previous research. Thus, these studies demonstrate that the effects of external variables appeared to depend on the nature of the information system used and external variable itself. The findings consistent across technologies also verified that PU was a more powerful predictor of usage than PEOU.

Self-efficacy and enjoyment in information system use

Self efficacy was another widely studied component in information system use research. David, Song, Hayes and Fredin (2007) examined the relationships among goal difficulty, goal success and self efficacy in success in Internet use, and reported that the immediate effect of self-efficacy came from the success of one cycle leading to a decrease in perceived goal difficulty on the next cycle. The underlying reason was that each cycle the user finished with success increased the self-efficacy of the user, thus it improved performance in subsequent cycles and mediated further success. Furthermore, Wilfong's (2006) empirical analyses indicated that computer self-efficacy beliefs, not computer experience or use, had the largest significant relationship with both computer anxiety and anger. In a similar study, Mcilroy, Sadler and Boojawon (2007) stated that students who reported either high computer phobia or low computer self-efficacy were less likely to maximize their use of university computer facilities. Hence, it is vital for individuals to have a sense of self-efficacy in new systems to be used.

Further, the impact of enjoyment on usage intentions was examined by Davis, Bagozzi and Warshaw (1992). The degree of enjoyment experienced in using computers emerged as the second variable after usefulness. Enjoyment played a more important role on affecting intentions when the PU of computer programs was high. More recently, Teo, Lim and Lai (1999) investigated the effect of intrinsic (perceived enjoyment) and extrinsic (PU) motivation for the use of Internet: The direct effects of PU and perceived enjoyment were at least three times greater than the direct effects of PEOU on daily Internet usage. Moon and Kim (2001) added playfulness as a new factor that represented intrinsic motivation of the user and confirmed that PEOU and PU were determinant variables of attitude. Motivation variables of enjoyment, self-efficacy and learning goal orientation were added to the TAM model in order to predict the use of web-based information systems by Yi and Hwang (2003). All these studies showed that enjoyment, learning goal orientation, and application-specific self-efficacy positively influenced the decision to use Web-based technology and subsequent actual use.

Self efficacy in technology use model

The results of many studies confirmed that PEOU emerged as an antecedent to PU rather than a parallel determinant of system use (Davis, 1989; Lederer, Maupin, Sena & Zhuang, 2000; Lin & Lu, 2000; Moon & Kim, 2001; Saade & Bahli, 2005; Roca, Chiu & Martinez, 2006; Burton-Jones & Hubona, 2006). Moreover, the positive relation between self efficacy and the use of computers or internet was confirmed in many studies, and self efficacy was accepted as a determinant of information system use (Bandura, 1997; Compeau & Higgens, 1995a; Hua, Clark & Ma, 2003; Mcilroy, Sadler & Boojawon, 2007; Wilfong, 2006; Yi & Hwang, 2003).

Copyright © The Turkish Online Journal of Educational Technology 2002

Accordingly, Liaw added self efficacy to his model and defined self efficacy in terms of web as "the confidence to use or learn about the Internet/WWW" (Liaw, 2002a, p. 139). Liaw's Technology Use Model (TUM), included the TAM, the social cognitive theory, individual attitudes, motivation and self-efficacy, and examined the effect of behavioral self efficacy on perceived usefulness, perceived enjoyment and behavioral intention with TUM. He then developed the Web Attitude Scale (WAS) in order to test this model. It consisted of sixteen items, four items for each construct, web self-efficacy, enjoyment, usefulness and intention to use the web. When the model was tested with a large sample, Web self-efficacy, web enjoyment and web usefulness turned out to have significantly positive effects on behavioral intention to use the Web. Web usefulness was found to be the most, and web enjoyment the least, important determinant of behavioral intention to use the web. In a second study, Liaw (2002b) showed that there was a significantly positive correlation between students' computer attitudes and Web attitudes. It implied that computer and Web attitudes could provide concurrent validity to each other. Besides; the best three predictors for the Computer Attitudes Survey were experience with word processors, experience in using computers, and experience in using the Internet/WWW. Students' experience in word processors and experience in using the Internet/WWW were predictors for both computer attitudes and Web attitudes. These results supported that the Computer and Web Attitudes Survey had high criterion validity. The results also indicated that when students had more years in computer-related experience; they had more positive perceptions of computer and Web technologies.

Influence of training and intervention on self efficacy

Different processes may lead to attitude change in different circumstances. Some of these processes require industrious and effortful information processing activity whereas others proceed with relatively little mental effort. Contemporary research indicates that distraction can enhance persuasion if the arguments are weak because the distraction can disrupt the normal counter arguing that would take place and expertise can be bad for persuasion when it leads to enhanced thinking about weak arguments (Petty & Wegener, 1998; p. 379). Conditions that foster people's motivation and ability to engage in issue-relevant cognitive activity at the time of message exposure are associated with increased persuasion (Elms, 1966). Further, comparison of attitude change scores in a short time period and terminal source credibility ratings by message condition indicated that both the literal and figurative versions produced attitude change (McCroskey & Combs, 1969). As a result, changing self-perception and self-efficacy of an individual about a particular behavior or phenomena will greatly help the individual to change attitude towards that behavior or phenomena (Bohner & Wanke, 2002; Bowers, & Michael, 1966; Rosenberg, 1967; Sherif & Hovland, 1961). Hence, attitude change is about changing one's way of evaluating the relevant attitude object or phenomena. Once instructional activities are successful at changing one's way of evaluating the relevant attitude object or phenomena, attitude change may become possible. However, this research is aware that, acceptance of web technologies through interacting with those technologies should be reinforced by continuous activities and assistance.

Influence of training and intervention on self efficacy was studied in details (Chou, 2001; Hua, Clark & Ma, 2003; Karavidas, Lim & Katsikas, 2005; Torkzadeh, Pflughoeft & Hall, 1999; Torkzadeh, Chang & Demirhan, 2006; Wang & Newlin, 2002). Torkzadeh and Dyke (2002) focused on the relationship between training and computer user attitude and Internet self-efficacy. They provided supportive evidence that training significantly improved Internet self-efficacy. Torkzadeh, Chang and Demirhan (2006) reported that the computer training significantly influenced computer and Internet self-efficacy development. Besides, user attitude and computer anxiety significantly influenced computer and Internet self-efficacy development. The respondents with 'favorable' attitudes towards computers improved their self-efficacy significantly after the training more than the respondents with 'unfavorable' attitudes. In addition, the respondents with 'low' computer anxiety improved their self-efficacy significantly more than the respondents with 'high' computer anxiety. The interaction effect between attitude and anxiety was significant for computer self-efficacy scores but not for Internet self-efficacy scores.

The effects of training method and computer anxiety on computer self-efficacy and learning performance were also previously examined (Chou & Wang, 2000; Chou, 2001). Two types of training were used in the studies. One method was instruction based training: teachers followed a deductive way and lecture. Another method was the behavior modeling: involved a visual observation of the behaviors of a model performing a task. The studies confirmed that behavior-modeling was superior to the instruction-based approaches on learning performance and self-efficacy: Learning occurred by imitating and extending the model's behavior in practice. Further, many studies revealed that training influenced computer self-efficacy positively (e.g. Torkzadeh, Pflughoeft & Hall, 1999). Karavidas, Lim and Katsikas (2005) examined relationship among training, self efficacy, anxiety and computer use by retired older adult users. They found that as older users learnt more about computers, self-efficacy became higher and this lowered computer anxiety: The implicit benefits of using computers such as, being more independent, maintaining a social network of friends and families, and staying informed about

Copyright © The Turkish Online Journal of Educational Technology 2002

health concerns affected older adults' life satisfaction. Additionally, Hua, Clark and Ma (2003) used the TAM and included computer self-efficacy and subjective norm: Computer self-efficacy showed a direct positive effect on user acceptance and it was an important determinant of PEOU. With user experience, the influence of computer self-efficacy on individuals' acceptance decreased. PEOU had limited direct effect on user acceptance. Perceived job relevance was related with PU: If a user considered the technology as relevant to his/her job, it was accepted as useful. Although the effect of subjective norm on acceptance before the training intervention was significant, after the training, its importance was diminished as individuals became experienced in using the technology. In light of these findings, it may be concluded that during the initial acceptance of new technology, colleagues' opinions are worth considering and this should be supported by clear training to increase self efficacy and to develop positive attitude toward technology.

Research questions

The literature highlighted that usefulness, enjoyment, self efficacy and behavioral intention and in general attitude influenced the use of information systems. Altering those variables for a target group of users, e.g. teachers, may help them use and benefit from information system facilities. If self efficacy, enjoyment, usefulness and behavioral intentions of participants are taken into account when developing training plans for teachers, they may be more likely to have a positive attitude. This may, in turn, increase their use of it, particularly for educational purposes. In this study, the influence of a short modular training on teachers' attitude towards the Internet, particularly, web usefulness, web enjoyment, self efficacy in Internet use, and behavioral intention to use the Internet are examined. The following questions are studied:

1. Is there any significant difference in teachers' attitudes toward the Internet/WWW before and after a short training program in terms of self-efficacy, enjoyment, usefulness, and behavioral intention?
2. To what extend does behavior modeling type of training influence teachers' attitude toward the Internet/WWW?

METHODOLOGY

To examine the effect of training on teachers' attitude towards the web; A behavior modeling type of training was developed. It aimed to teach how to create a web site by using Mysite, a free service of the MyNet portal. In order to measure teachers' attitude before and after the training, the Turkish adaptation of the Web Attitude Scale was used. Each sub scale (web self-efficacy, enjoyment, usefulness and intention to use the web) were examined separately in terms of the effect of the training. To measure web self-efficacy, web enjoyment, perceptions of web usefulness, behavioral intention to use the web and attitude towards the web, the WAS (Liaw, 2002a) was first adapted into Turkish in a pilot study with 156 teachers, and then used for collecting data before and after the training. To the training, sixteen teachers (9 female and 7 male) from two Istanbul high schools participated. According to questionnaire collecting information about the participants' background, most of the participants were teachers of English; aged between 27 and 56, and none of them had experience or knowledge at web site development. Two training sessions were organized. In the first training session ten and in the second session six teachers participated.

Instruments

The data required for this study was gathered by the Turkish version of the WAS, developed originally in English (Liaw, 2002a). It consists of 16 items with seven-point Likert scale from strongly disagree to strongly agree. Questions are related to perceptions about web self-efficacy, enjoyment, usefulness and intention to use the web. There were four items for each construct. In a pilot study, the WAS (Liaw, 2002a) was adapted into Turkish (Bayramoglu, 2007). First, the WAS was translated into Turkish. Then Turkish version of the scale was translated back into English by two English Language teachers. By comparing the original and translated English version, the Turkish version of the scale was revised and prepared. The teachers of varying disciplines in easily accessible schools were asked to administer the questionnaires in their schools. The questionnaires were distributed to the teachers and collected within three months. Out of 185, twenty-nine questionnaires with missing responses were eliminated from the statistical analyses. A total of 156 (102 female and 54 male) teachers from preschool level to secondary schools in Istanbul provided fully replied questionnaires. The age of teachers evenly distributed from 20 to 60. Further, a factor analysis was performed in order to check the predefined components (web self-efficacy, enjoyment, usefulness and intention to use the web) of the questionnaire and items in each component. Varimax rotation with Kaiser Normalization was conducted. The number of factor was set as four for the analysis. Eigenvalues was found to be 72.76 for four components. Results supported that items were divided and grouped properly except one item, (The multimedia environment of WWW is helpful to understand online information) from the web usefulness component needed to be changed with another item (I believe that learning how to use the Internet/WWW is worthwhile) in behavioral intention to use the web. The items used in the WAS were evaluated in terms of reliability. A reliability test was

Copyright © The Turkish Online Journal of Educational Technology 2002

performed for each sub components according to the results of factor analyses and for the scale as a whole. All subscales had Cronbach's alpha values at least 0.80, and item-total correlation was 0.90, providing evidence for the internal consistency reliability of the scale.

The training materials and method

The aim of the training developed was to teach how to create a web site by using free services provided on the Internet without having to utilize any commercial software. Web sites and portals providing users with the opportunity to create their own pages were investigated. Adding and editing text, link, and picture were the minimum required facilities that were needed. MyNet, a portal site that provides free services such as news, games, chat, email, weather information, web page creation, forums and search was selected as the training instrument, because it provided all the required features. MySite is one of MyNet services enables Turkish users to create their own web sites over the Internet. A document with detailed explanations and screen-shots for each step of the training was prepared to distribute to the teachers.

The training in the study was based on behavior modeling training (BMT) method as found more effective in previous studies (e.g. Chou & Wang, 2000; Chou, 2001). The BMT has become a widely used and highly regarded psychologically based training intervention (Baldwin, 1992; Taylor, Russeft & Chan, 2005). BMT was grounded on Bandura's social learning theory (1977), and according to Decker and Nathan (1985), it differs from other training methods with specific emphasis on (a) stating to trainees a set of well-defined behaviors to be learned, (b) giving instructions that what specific learning points or critical behavior trainees have to watch: Models demonstrating the effective use of those behaviors, (c) the trainees are encouraged to practice the suitable behavior in a role play or through any other method of simulation, (d) providing feedback and reinforcement, and (e) taking steps to maximize the transfer of those behaviors to the job. BMT was found to be effective in terms of cognitive and behavioral learning and productivity improvements, and on computer training (Compeau & Higgins, 1995b). A meta-analysis on BMT (Taylor et al, 2005) reported that 117 studies evaluated the effects of behavior modeling training on some training outcomes, across characteristics of training design. Effects of BMT were largest for learning outcomes; Although BMT effects on declarative knowledge decayed over time, training effects on skills and job behavior remained stable or even increased. Also, this approach seems to be well-suited to computer training, because BMT is in many ways a middle ground between instruction and exploration training because it encourages the formal cognitive learning provided by instruction as well as hands-on practice of exploration (Simon & Werner, 1996).

In BMT, there are tasks to be undertaken by students, and each task consists of a series of behaviors: the instructor correctly performs the task and at the same time explains in details how it is done and what are the critical issues of features of carrying out the tasks. Also alternative ways of doing is to be mentioned but it is not shown while one alternative way is being studied. During the training of this study, each step was demonstrated by the instructor and the participants were encouraged to carry out each step individually. Also, the immediate effect of confidence came from the success of one step leading to a decrease in perceived goal difficulty in the next step (David et al., 2007). Before taking the next step, accomplishment of each step by the participant was ensured. If needed, the instructor helped the participant individually. The topics covered in the training in a step by step fashion included (1) Opening the portal page (mynet.com), (2) Opening Mysite services home page (mysite.mynet.com), (3) Creating an account in MyNet to use its services, (4) Adding and editing page elements: Text element (Font, Size, Color, Alignment); Picture, (5) Debugging the site.

Procedure

The administrators in an Anatolian High School in Istanbul were informed about the study and the training. Permission to use the school computer lab was obtained. The computer lab was visited and tested before the training in terms of its adequacy. There were twenty-one computers connected to the Internet in the lab, and one of which was reserved for the instructor. A projector was also ready to use. The training was announced on the bulletin board of the school, and according to volunteered applicants' responses, a training day was set and announced to them. Two training sessions were conducted, which covered the same information, ten teachers participated in the first session and there were six teachers in the second session. Two trainings were lectured by the same trainer. Before and after the training, the WAS was applied and collected.

The training started with creating an account so that teachers would be able to use the free services of MyNet. This procedure required filling in a long form and then clicking the link which was sent via e-mail after submitting the form for verification. The teachers needed to have an e-mail account for verification of their identity so the ones without an e-mail account or forgot their passwords were encouraged to use the e-mail account provided by MyNet. This task was the one with which the teachers needed the most help. During the training, the main problem was the slowness of the Internet connection: The response time when the forms were

Copyright © The Turkish Online Journal of Educational Technology 2002

submitted was relatively long. The training took almost three hours and it consisted of small tasks that needed to be accomplished. The trainer helped the teachers individually whenever they encountered problems and a new task was performed only if the previous task was accomplished by all participants.

Data analysis and findings

The data was analyzed to see whether there was a significant difference before and after the training for the WAS as a whole and as each sub scale. A score was calculated as the average of the scores of the related items for each sub scale. The average of all items formed a score for the total scale. In the analysis, t-tests and Wilcoxon tests were used. Due to the fact that the sample was small, before applying the t-test, the distribution of the scores was examined in terms of normality using the Skewness and Kurtosis values. For the scales which had a normal distribution, t-test was performed, and otherwise Wilcoxon test was conducted.

A paired samples t test revealed that there is a significant difference between teachers' web self-efficacy level before and after the compact training (t=-2.41; p<.01; Cohen's d effect size=0.37). The teachers' web self-efficacy mean score after the training ($\bar{x}$=4.86; *sd*=1.64) was greater than the mean score before the training ($\bar{x}$=4.28; *sd*=1.45). Also, the same type of t test demonstrated a significant difference (t=-3.81; p<.01; Cohen's d effect size=0.53) between the teachers' web usefulness scores before and after the compact training. The teachers' web usefulness mean score after the training ($\bar{x}$=5.80; *sd*=1.11) was greater than the mean score before the training ($\bar{x}$=5.14; *sd*=1.33).

The Wilcoxon Signed Ranks test showed that there is not any significant difference between teachers' scores of web enjoyment to use the web before and after the compact training (Z=-0.42; p>.05; Cohen's d effect size=0.08). Although, the teachers' web enjoyment mean scores after the training was slightly greater ($\bar{x}$=6.42; *sd*=0.95) than the mean scores before the training ($\bar{x}$=6.34; *sd*=0.92). Also, another Wilcoxon Signed Ranks test revealed that there is not any significant difference between the teachers' level of behavioral intention to use the Web before and after the compact training (*Z*=-1.61; p>.05; Cohen's d effect size=0.15). The teachers' scores of behavioral intention to use the Web after the training was slightly greater ($\bar{x}$=6.53; *sd*=0.88) than the scores before the training ($\bar{x}$=6.38; *sd*=0.83).

Further, a paired samples t test revealed that there is a significant difference between teachers' web attitude level before and after the compact training (t=-3.98; p<.01; Cohen's d effect size=0.35). The teachers' web attitude mean score after the training ($\bar{x}$=5.90; sd=1.03) was greater than the mean score before the training ($\bar{x}$=5.54; sd=0.96). It is possible to say that training enhanced the web attitude of the teachers. The mean scores and the standard deviation of the post-treatment scale and subscale were not very much different from the pre-treatment scales, however, the statistical tests conducted seemed to maximize such small differences and yielded a significant difference.

DISCUSSION and CONCLUSION

This study started with the adaptation of the WAS. When the WAS was used before and after a behavior modeling type of a training, an evidence was provided for the internal consistency reliability (r=0.90) of the Turkish adaptation of WAS. The analysis showed that the training was effective on enhancing the user's positive attitude towards the web and perceptions of web self efficacy and web usefulness, but did not make much of a difference in terms of perceived enjoyment and behavioral intention to use the web. Previous research results show similarities and differences when compared to the findings of this study. In terms of positive change in attitude after a training intervention, the results of the present study were similar to the study by Torkzadeh, Pflughoeft and Hall (1999) which showed that respondents with positive attitudes towards computers indicated improvements in their attitudes after the training. Also, the present study verified much earlier claims (e.g. Chein, 1948; Triandis, 1971) that the training provided did indeed influence attitudes positively. Considering the computer and internet self efficacy, there were other studies showing positive influence of training. For example, in Chou and Wang's study (2000) two training methods used caused a significant difference on computer self efficacy. In addition, Karavidas, Lim and Katsikas (2005) concluded that as people learnt more about computers, self-efficacy increased and this caused a decrease in computer anxiety; showing that the training enhances self efficacy. This is, too, consistent with the findings of the present study.

Contrary to the present study, Torkzadeh and Dyke (2002) did not find training as an influential factor to change user attitudes towards computers: They stated that user attitudes towards computers seemed to have improved over time. Although the course content was related with the Internet, they focused on the change in computer attitude, rather then the Internet. This could be another reason why they did not find any difference.

Copyright © The Turkish Online Journal of Educational Technology 2002

PU was another construct in which training provided a positive increase (Davis, 1989). Though there were many studies verifying the relationship between system use, attitude and constructs of TAM, especially PU (Davis, 1989; Lederer, Maupin, Sena & Zhuang, 2000; Lin & Lu, 2000; Moon & Kim, 2001; Saade & Bahli, 2005; Roca, Chiu & Martinez, 2006; Burton-Jones & Hubona, 2006), the present study was the one which focused on the effect of training on PU. The positive effect of training on PU was verified in this study. It may be argued that enhancing PU through appropriate training would provide an increase on information system use. However, the results of this study should be interpreted with caution as the differences in scores of the pre and post measurement *were not great.*

This study was conducted in order to examine the effect of a compact training on teachers' attitude towards the internet. There were two important outcomes of the study: (1) the training provided did indeed improve the teachers' attitude toward the web, which is important to consider while designing new training for teachers, especially when targeting attitude. (2) The instrument adapted and used in the study, Turkish version of the WAS. Its reliability was tested in an adaptation study and was used for measuring teachers' web attitude.

Training materials were developed in order to teach how to create web sites using free services of a portal site. The training created a positive and significant difference on web self efficacy and perceived web usefulness scores. Nevertheless, the post training scores of perceived web enjoyment and behavioral intention to use web were higher than the pre training scores, the differences were found not to be significant. Further studies should focus more on creating change in these two constructs. There were two important properties of the training which possibly provided the improvement. One of them was the instruction method used during the training. The behavior modeling method, which involved a visual observation of the behaviors of a model performing a task was used and learning occurred by imitating and extending the model's behavior in practice (Chou and Wang, 2000). The second was the use of a meaningful large task but dividing the content of the training into small tasks. Before moving to the next task, accomplishment of the previous task by the participant was required. If needed, the instructor helped the participant individually. The success of one task led to a decrease in perceived difficulty of the next task and enhanced self-efficacy (David et al., 2007). While developing new training for teachers, focusing on the properties of the training stated above may provide a similar success on changing attitude positively.

The content of the training may be another positive factor: Creating a web page was previously considered a high level task due to programming skills needed. However, in our training, the free service provided by the portal did not require the participants to have any information about programming skills. As a result, each participant was able to create a web page after the training, and this helped them form a sense of self efficacy.

While developing training materials for in service teacher training, the principles behind this study could be used. These principles are briefly; (1) giving teachers the opportunity to individually perform each task, and (2) providing individual assistance whenever needed. This method could also be tested and used in adult education programs in order to help the participants acquire some basic computer and Internet skills.

The training offered as part of this research was voluntary. Those who responded to an announcement at a school were recruited as participants. However, it was not easy to persuade teachers, who taught thirty hours a week and also had other responsibilities, to participate in the training after the school day. Therefore many teachers did not want to attend the training, so the number of teachers participated was limited to sixteen. Because a limited number of participants prevented using more robust statistics, and making generalizations, it is, therefore, necessary to carry out further treatments with larger samples in order to conduct other statistical tests and to confirm findings of this study. As a solution some motivational incentives could be used to encourage participation. Preparing training as a part of a compulsory course for in-service training would also provide an increase in the number of participants.

Although the participants did not have any experience in creating web sites, they had the basic skills needed to operate computers, such as using the keyboard and the mouse. Participants with limited knowledge and experience with computers and the Internet might be chosen for further study in order to test the effect of the compact training on teachers who are not all familiar with information technology. In this study the participants were not grouped according to their attitude levels before the training. Working with a group of participants whose computer and Internet attitude levels are low may lead to more significant attitude changes after the training, which can be investigated.

The Turkish version of WAS, could be used in order to measure the attitude towards the internet in further research. In the present study, the instrument was used specifically in order to measure the change that occurred

Copyright © The Turkish Online Journal of Educational Technology 2002

after training. It could be used in different research settings by adding new variables, such as the type of information system used, the type of content designed and developed, the duration of the training, age, previous experience of the participants, and the effects of these variables on attitude could be examined. Also, the argumentation the individual goes through, the time and amount of message exposure, credibility of the instruction source, and message conditions necessary for web attitude change are primary variables for further studies. Finally, it is also possible to research the influence of training with different participants from different occupations, and to compare the attitude of different participant groups.

Acknowledgement: The authors thank both the teachers who participated in the WAS adaptation study and the ones in the two training sessions.

REFERENCES

Akkoyunlu, B. (1996) Öğrencilerin bilgisayara karşı tutumları. *Eğitim ve Bilim*. 20(1), 15-29.

Altun, A. (2003) Ögretmen adaylarının bilişsel stilleri ile bilgisayara yönelik tutumları arasındaki ilişkinin incelenmesi**.** *Turkish Online Journal of Educational Technology* 2(1), Article 9. Retrieved at May 29, 2008, from www.tojet.net

Asan, A. (2002). Fen ve sosyal alanlarda öğrenim gören öğretmen adaylarının bilgisayara yönelik tutumları. *EJER*. Sayı, 7. Retrieved at May 29, 2008, from www.aniyayincilik.com.tr

Baldwin, T. T. (1992). Effects of alternative modeling strategies on outcomes of interpersonal skills training. *Journal of Applied Psychology,* 77(2), 147-154.

Bandura, A. (1977). *Social Learning Theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1997). *Self-efficacy: The Exercise of Control*. New York: W.H. Freeman.

Bayhan, P., Olgun P. & Yelland, J. N. (2002). A study of pre-school teachers' thoughts about computer-assisted instruction, *Contemporary Issues in Early Childhood,* 3(2), 298-303.

Bayramoglu, Y. (2007). A training to promote teachers' positive attitude towards web use: Self efficacy, web enjoyment, web usefulness and behavioral intention to use the web. *Unpublished master thesis*. Bogaziçi University. Istanbul.

Bohner, G. and Wanke, M. (2002) *Attitudes and Attitude Change*. New York, Psychology Press.

Bowers, J. W. and Michael M. O. (1966). Attitudinal effects of selected types of concluding metaphors in persuasive speeches. *Speech Monographs,* 33(1), 47-55,

Burton-Jones, A. & Hubona, G. S. (2006). The mediation of external variables in the technology acceptance model. *Information & Management,* 43(6), 706–717.

Chein, I. (1948). Behavior theory and the behavior of attitudes: Some critical comments. In M. Fishbein, (Ed.). (1967). *Readings in attitude theory and measurement* (pp. 51-58). New York: Wiley.

Chou, H. W. & Wang, T. (2000). The influence of learning style and training method on self-efficacy and learning performance in WWW homepage design training. *International Journal of Information Management*, 20(6), 455-472.

Chou, H. W. (2001). Effects of training method and computer anxiety on learning performance and self-efficacy. *Computers in Human Behavior,* 17(1), 51-69.

Compeau, D. R. & Higgins, C. A. (1995a). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 19(2), 189–211.

Compeau, D. R. & Higgins, C. A. (1995b). Application of social cognitive theory to training for computer skills. *Information Systems Research,* 6(2), 118-143.

David, P., Song, M., Hayes, A. & Fredin, E. S. (2007). A cyclic model of information seeking in hyperlinked environments: The role of goals, self-efficacy, and intrinsic motivation. *Human-Computer Studies*, 65(2), 170–182.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 318–340.

Davis, F. D., Bagozzi, R. P. & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology,* 22(14), 1111–1132.

Decker, P. J. & Nathan, B. R. (1985). *Behavior Modeling Training: Principles and applications.* New York: Praeger.

Demirarslan, Y. & Usluel, Y. K. (2005). Bilgi ve iletişim teknolojilerinin öğrenme öğretme sürecine entegrasyonunda öğretmenlerin durumu. *Turkish Online Journal of Educational Technology,* 4(3), Article 15. Retrieved at May 29, 2008, from www.tojet.net

Deniz, L. (2005) İlköğretim okullarında görev yapan sınıf ve alan öğretmenlerinin bilgisayar tutumları**.** *Turkish Online Journal of Educational Technology*, 4(4), Article 22. Retrieved at May 29, 2008, from www.tojet.net

Elms, A. C. (1966). Influence of fantasy ability on attitude change through role-playing. *Journal of Personality and Social Psychology*, 4, 36-43.

Copyright © The Turkish Online Journal of Educational Technology 2002

Flavian C., Guinaliu M. & Guerrea, R. (2005). The role played by perceived usability, satisfaction and consumer trust on website loyalty. *Information & Management*, 43(1), 1-14.
Gomleksiz, M. N. (2004). Use of education technology in English classes. *Turkish Online Journal of Educational Technology*. 3(2). Retrieved at May 29, 2008, from www.tojet.net
Hua, P. J., Clark, T. H. K. & Ma, W. W. (2003). Examining technology acceptance by school teachers: A longitudinal study. *Information & Management,* 41(2), 227–241.
Kabadayı, A. (2006). Analyzing pre-school student teachers' and their cooperating teachers' attitudes towards the use of educational technology. *Turkish Online Journal of Educational Technology,* 5(4), Article 1. Retrieved at May 29, 2008, from www.tojet.net
Karavidas, M., Lim, N. K. & Katsikas, S. L. (2005). The effects of computers on older adult users. *Computers in Human Behavior*, 21(5), 697–711.
Lederer, A. L., Maupin, D. J., Sena, M. P. & Zhuang, Y. (2000). The technology acceptance model and the World Wide Web. *Decision Support Systems,* 29(3), 269–282.
Liaw, S. S. (2002a). Understanding user perceptions of World-wide web environments. *Journal of Computer Assisted Learning*, 18(2), 137-148.
Liaw, S. S. (2002b). An Internet survey for perceptions of computers and the World Wide Web: Relationship, prediction, and difference. *Computers in Human Behavior*, 18(19), 17–35.
Lin, J. C. & Lu, H. (2000). Towards an understanding of the behavioral intention to use a web site. *International Journal of Information Management*, 20(3), 197-208.
McCroskey, J. C. & Combs, W. H. (1969). The effects of the use of analogy on attitude change and source credibility. *The Journal of Communication, 19*, 333-339.
Mcilroy, D., Sadler, C. & Boojawon, N. (2007). Computer phobia and computer self-efficacy: Their association with undergraduates' use of university computer facilities. *Computers in Human Behavior*, 23(3), 1285–1299.
Moon, J. W. & Kim, Y. G. (2001). Extending the TAM for a World-Wide-Web context. *Information & Management*, 38(4), 217-230.
Petty, R. E. & Wegener, D. T. (1998). Attitude change: Multiple roles for persuasion variables. In D. Gilbert, S. Fiske & G. Lindzey (Eds.), *The Handbook of Social Psychology* (4th ed.), New York: McGraw-Hill.
Roca, J. C., Chiub, C. M. & Martinez, F. J. (2006). Understanding e-learning continuance intention: An extension of the TAM. *Human-Computer Studies*, 64(8), 683–696.
Rosenberg, M. (1967). Psychological selectivity in self-esteem formation. In C. W. Sherif & M. Sherif (Eds.) *Attitude, Ego Involvement and Change*. New York: Wiley.
Saade, R. & Bahli, B. (2005). The impact of cognitive absorption on perceived usefulness and perceived ease of use in on-line learning: An extension of the TAM. *Information & Management*, 42(2), 317–327.
Sherif, M. & Hovland, C. I. (1961). *Social Judgment: Assimilation and contrast effects in communication and attitude change*. New Haven, Yale University Press.
Simon, S. J. & Werner, J. M. (1996). Computer training through behavior modeling, self-paced, and instructional approaches: A Field Experiment**.** *Journal of Applied Psychology,* 81(6), 648-659.
Taylor, P. J., Russeft, D. F. & Chan, D. W. L. (2005). A meta-analytic review of behavior modeling training. *Journal of Applied Psychology*. 90(4) 692-709.
Teo, T. S. H., Lim V. K. G. & Lai, R. Y. C. (1999). Intrinsic and extrinsic motivation in Internet usage. *Omega, Internet Journal of Management Science*, 27(1), 25-37.
Thong, J. Y. L., Hong, W. & Tam, K. Y. (2002). Understanding user acceptance of digital libraries. *Human-computer Studies,* 57, 215-242.
Torkzadeh, G. & Dyke, T. P. V. (2002). Effects of training on Internet self-efficacy and computer user attitudes. *Computers in Human Behavior*, 18(5), 479–494.
Torkzadeh, G., Chang, J. C. J. & Demirhan, D. (2006). A contingency model of computer and Internet self-efficacy. *Information & Managemen*t, 43(4), 541–550.
Torkzadeh, R., Pflughoeft, K. & Hall, L. (1999). Computer self-efficacy, training effectiveness and user attitudes. *Behavior & Information Technology*, 18(4), 299–309.
Triandis, H. C. (1971). *Attitude and Attitude change*. New York: Wiley.
Tüy, M. A. (2003) .Orta Öğretim okullarında öğretmenlik yapan öğretmenlerin öğretim teknolojilerini sistematik kullanımına ilişkin davranışlarının incelenmesi. *Eğitim Bilimleri ve Uygulama*, 2(5), 187-208.
Venkatesh, V., Morris, M. G., Davis, G. B. & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.
Wang, A. Y. & Newlin, M. H. (2002). Predictors of web-student performance: The role of self-efficacy and reasons for taking an on-line class. *Computers in Human Behavior*, 18(2), 151–163.
Wilfong, J. D. (2006). Computer anxiety and anger: The impact of computer use, computer experience, and self-efficacy beliefs. *Computers in Human Behavior*, 22(6), 1001–1011.

Copyright © The Turkish Online Journal of Educational Technology 2002

Wixom, B. H. & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research*, 16(1), 85-102.

Yanga, H. D. & Yoob, Y. (2004). It's all about attitude: Revisiting the technology acceptance model. *Decision Support Systems*, 38(1), 19– 31.

Yi, M. Y. & Hwang, Y. (2003). Predicting the use of web-based information systems: Self-efficacy, enjoyment, learning goal orientation, and the technology acceptance model. *Human-Computer Studies*, 59(4), 431–449

Copyright © The Turkish Online Journal of Educational Technology 2002

THE ORGANIZATION OF THE FACULTY DEVELOPMENT PROGRAMS FOR RESEARCH ASSISTANTS: THE CASE OF EDUCATION FACULTIES IN TURKEY*

Işıl KABAKÇI, H. Ferhan ODABAŞI
Anadolu University, Faculty of Education
Department of Computer Education and Instructional Technologies
fodabasi@anadolu.edu.tr - isilk@anadolu.edu.tr

ABSTRACT
The faculty development of research assistants who are at the first step of their academic careers are significant for the employment of faculty members of future and realizing the responsibilities of higher education institutions as to contribute to science and technology. However, there is little research on the features of faculty development programs for research assistants in literature. The aim of this research is to determine the organization of the faculty development programs for research assistants. This study was improved by using descriptive research method. The population of the research consisted of 1095 research assistants who work in 54 Education Faculties of 44 state universities of Turkey between 2003 and 2004. The research data were collected by means of the survey. At the end of the study, it has been determined that the Research Assistants in Education Faculties in Turkey are highly in need of faculty development in view of; professional development, institutional development, instructional development and personal development respectively. It has also been determined with the study that the organization of the faculty development programs that research assistant suggest should be organized by the experts in education period as a workshop, and as activities continuing 2-3 hours in a week in a faculty development center.

Keyword: Faculty Development, faculty development area, faculty development program, research assistant.

INTRODUCTION

Faculty members are the human sources that will help higher education institutions to have the pioneering role in development and change, to meet the educational needs of the society and to contribute to the science and technology. They require faculty development for the purpose of carrying out these roles and responsibilities, adapting new technologies, coping with changing work conditions and increasing their ability towards research and teaching skills.

It is quite significant for the future of higher education institutions that research assistants as the faculty members in higher education institutions should be trained as to be the future academic staff. Research assistants are at the beginning of their academic carriers and in the class of future faculty (Odabaşı, 2005). For these reasons, one of the areas where faculty development has started to gain importance is the faculty development of research assistants who are at the beginning of their academic carriers as the teaching assistants in higher education institutions (Odabaşı, 2003).

According to the statistics of the Higher Education Committee (HEC), the number of total research assistants in Turkey is 27.205 (HEC, 2003). Research assistants have the highest proportion among all other instructors such as faculty members, instructors and lecturers (54.823) with a rate of 49%. Hence, the faculty development of research assistants – both as instructors and researchers from the very beginning of the process - is of primary importance for the higher education system to carry out its goals.

It is seen in literature that much of the research on faculty development cover all of the faculty members. Research on the faculty development of research assistants in literature is generally related to the needs analysis. On the other hand, it is also seen that little research has been carried out on the features that faculty development programs for research assistants should have.

Definition and Importance of Faculty Development

When the definitions in literature are taken into consideration, faculty development can be defined as "all of such activities as seminars, conferences and individual counseling carried out in a certain discipline in instructional, personal and institutional areas and fields by an higher education institution for the instructor to do

* This study is a part of PhD Thesis, and the study as a whole is financially supported by the Scientific Research Fund of Anadolu University. Project No: 040547

Copyright © The Turkish Online Journal of Educational Technology 2002

his duties" (Brawer, 1990; Odabaşı, 2003; Steinert, 2000; Moeini, 2003). Considered in this respect, the aim in the activities for faculty development held by higher education institutions is to increase the development and effectiveness of the faculty members in the areas of education and research with the help of faculty members and thus to increase the quality of such responsibilities of higher education institutions as contributing to science and technology through scientific studies and educational activities.

In early 1970s, studies on faculty development included teaching skills and field specialization in basically developing the educational effectiveness of faculty members. With later approaches, faculty development focused on raising the faculty members' awareness of and on improving their comprehension of newer information about the complexity of the teaching-learning process. In 1980s, the faculty development centers, in other words excellence centers for teaching, which would help to increase faculty members' experience in class applications were established. This point of view also continued in 1990s. In late 1990s, the problems encountered in higher education started to become different and show diversity. In recent years, there is tendency towards both an individual and institutional approach indicating that faculty members should develop and renew themselves for their faculty development (Lawler, 2003).

Different classifications of faculty development are found in literature. According to these classifications, faculty development generally falls into four groups as instructional, professional, personal and institutional development areas. *Instructional development area* covers activities related to the development of such educational identities of faculty members as the systematical design, development, application and evaluation of the educational programs or of lessons, courses and teaching materials. *Professional development area* is made up of activities related to the development of their researcher-identities such as getting information about research techniques and statistical research methods, use of research funds and research grants and preparation and publication of scientific studies. Another development area, *personal development* includes activities related to increasing the productivity of faculty members and supporting and encouraging their academic development related to their individual development in and out of their academic environment As for the *institutional development* area, it consists of activities that help to inform instructors about the institutional operation, to adopt themselves to the institutional culture and to see themselves as a part of the institution they work for (Babcock, 1989; McKenzie, 1991; Jarvis, 1992; Lee, 1996; Borko, Ellibot & Uchiyama, 2002; Grant & Keim, 2002; Moeini, 2003).

Faculty members have different carrier stages and needs with respect to their professional development area, because they show diversity in terms of variables that create individual differences such as experience, years of working and age on the way from being a research assistant to becoming a professor, (DiLorenzo & Heppener, 1994). For this reason, the needs of research assistants for faculty development differ from those of faculty and other faculty members.

Faculty Development Programs for Research Assistants

Faculty development programs for research assistants are the ones that basically depend on adult education, because the participants are adults. For this reason, the principles of adult education should be taken into consideration for the establishment and application of productive and effective faculty development programs appropriate to the goals for research assistants (McKenzie, 1991; Borko, Ellibot & Uchiyama, 2002; Grant & Keim, 2002; Richardson, 2003).

A study was carried out by Jarvis (1992a) for the purpose of determining the features of faculty development programs for newly employed faculty members and research assistants. According to the research findings of 117 faculty members working at 9 different universities in USA, the faculty members participating in the study stated that it would be the best model to organize a faculty development program including group activities such as workshops and seminars. Furthermore, it was also revealed that faculty members were of the opinion that the faculty development program to carry out in small groups mentored by senior faculty members would be the most effective program. In another study carried out by Mu (1997) on 209 faculty members in Education Faculty at the University of Tennessee in USA, it was determined that the most-preferred faculty development activity to meet the faculty development needs was the one that included workshops organized in small groups or one-on-one.

In the study carried out by Odabaşı (2003), with 427 faculty at Anadolu University, revealed that among the factors which would affect the participation of the faculty members in the faculty development program, the specialization of the educators that would take part in the activity was the most effective factor, yet the award system was not effective. Moreover, it was found out in the study that the faculty preferred the activities which were as workshops for the presentation of faculty development activities and as their first preferences related to

Copyright © The Turkish Online Journal of Educational Technology 2002

the timing of the faculty development activities, the faculty members wanted these activities to be carried out within the education period. As for the other findings of the study, the faculty indicated that subject expert faculty from their university was their first choice. The educators that would carry out the faculty development activities should be the faculty members from their own universities specialized in the field of the activity to be done.

In another study carried out to evaluate the "Interactive Instructional Media" module, - through the views of its participants - a faculty development program prepared by the Educational Communication and Technology Research Unit at Anadolu University, it was concluded that delivering the faculty development programs on the internet is one of the most-preferred types of presentation and that the faculty members were in need of faculty development programs for the use information technologies (Kabakçı & Odabaşı, 2004).

The Educational Communication and Technology Research Unit was established at Anadolu University in 2003 to support the faculty development. This unit executes an institutional orientation program as well as academic development programs. The goal of the institutional orientation program called "Program Orientation to Anadolu" is to inform the newly employed faculty members about the management of the university, its organizational structure and about the legal rights and responsibilities. Another faculty development program executed by the unit is the Academic Development Program. In the scope of this program, in-service courses that help faculty members increase their information and improve their skills related to the areas of teaching and research are organized in certain periods. Although the faculty development programs executed by this unit are addressed to all the faculty members, most of the participants in the academic years of 2003-2004 and 2004-2005 were strikingly research assistants (Odabasi & Kabakci, 2004).

The necessary features of faculty development programs for research assistants are as follows (Jarvis, 1992a):

1. The managers of each department in higher education institutions should hold interviews with research assistants for the purpose of evaluation and planning of the faculty developments of research assistants in certain periods. In this way, the needs of research assistants should primarily be identified.
2. The awarding criteria should be determined by the managers of higher education institutions in order to support the faculty development of research assistants.
3. A variety of programs should be organized for each professional development area as the instructional, professional, personal and institutional areas for research assistants.
4. The programs to meet the faculty development needs of research assistants should be current and be supported by as many tools of educational technology as possible.
5. The faculty development programs for research assistants should be executed by such faculty development centers as Educational Technology Centers or Research-Development Centers which will be established in higher education institutions.
6. The necessary technological tools that will enable research assistants to benefit from faculty development programs should be available for use.

A study carried out interviews with faculty members over a hundred in USA and reviews of the general fields of personnel and faculty development was determined to several characteristics for an effective planning of faculty development programs. According to these characteristics, it should be considered administrative support, good management, good communication, orientation toward the future, collegiality for an effective faculty development programs. In addition, tactics for developing professional development area of faculty development include mentoring, group projects, research centers, travel money to interact with the large community of scholars, a reasonable amount of research time in short blocks, research support programs and good facilities, equipment and maintenance (Jarvis, 1992b). The views of research assistants about the organization of the program and the principles of adult education and the effective planning principles of faculty development programs should be taken into consideration together with the faculty development areas.

In order to assure the productivity and efficiency expected from the program for the faculty development of the research assistants, it is very important to identify the needs of the participants as well as to consider the views about the necessary features and the structure of the programs to be offered. For this reason, the purpose of this study is to identify the necessary features of a faculty development programs for research assistants.

METHOD

It was used the descriptive research method in the study. Among the 53 state universities in Turkey, 44 of them had education faculties according to 2003-2004 statistics of the Higher Education Committee (HEC). However, since there were more than one Education Faculty in some universities, there were 54 Education Faculties in

Copyright © The Turkish Online Journal of Educational Technology 2002

total. The research population of this study consisted of 1095 research assistants in 54 Education Faculties of the 44 universities.

"The Survey for Identifying the Point of Views of Research Assistants on Faculty Development" was used as the data collection tool in the study. For the validity of the questionnaire, the views of 9 field specialists (4 professors, 2 associated professors, 1 assistant professor and 2 instructors) were taken. Following the validity of the questionnaire, the pilot application of the questionnaire was executed on 14 research assistants who were not included in the research population - 5 were research assistants at Anadolu University, 5 at Osmangazi University and 4 were research assistants at Erciyes University. After the validity study and the pilot application, the final form of the data collection tool was ready. Among the questionnaires sent to 1081 research assistants, 573 of the questionnaires from the research population of totally 1095 research assistants – the 14 research assistants who had participated in the pilot study were not sent a questionnaire - were returned. Therefore, the return-rate achieved in this study was 53%. For the analysis of the data obtained in the study, "numbers and percentages" were used.

FINDINGS AND INTERPRETATION

Preferences of the Research Assistants about Faculty Development Areas

In table 1, the distribution of the preferences of the research assistants on faculty development areas is shown as their first, second, third and fourth preferences.

According to Table 1, it was found out that 40,7% of the research assistants at education faculties need the instructional development area as their second preference, 34,9% as their third preference, 13,8% as their first preference and 7,0% as their fourth preference; 46,9% need faculty development as their first preference, 31.6% as their second preference, 16.6% as their third preference and 3.0% as their fourth preference; 29,8% need personal development as their third preference, 26.9% as their first preference, 23.2% as their fourth preference and 16.4% as their second preference; and 62,8% need institutional development as their fourth preference, 14.7% as their third preference, 11.7% as their first preference and 7.5% as their second preference.

Table 1. Preferences of the Research Assistants on Faculty Development Areas

Faculty Development Areas	First Preference		Second Preference		Third Preference		Fourth Preference		Total
	N	%	N	%	N	%	N	%	
Instructional Area	79	13.8	233	**40.7**	200	34.9	40	7.0	552
Professional Area	269	**46.9**	181	31.6	95	16.6	17	3.0	562
Personal Area	154	26.9	94	16.4	171	**29.8**	133	23.2	552
Institutional Area	67	11.7	43	7.5	84	14.7	360	**62.8**	554

According to the findings obtained from the preferences of research assistants about the faculty development areas, it was found out that they preferred faculty development activities in the first place, instructional development activities in the second place, personal development in the third and institutional development activities in the fourth place.

The Delivery Forms of Faculty Development Programs

Table 2 shows the distribution of the preferences of the research assistants related to the presentation forms of faculty development programs as their first, second, third and fourth

Table 2. Delivery Forms of Faculty Development Programs

Delivery Forms	First Preference		Second Preference		Third Preference		Fourth Preference		Total
	N	%	N	%	N	%	N	%	
Conference	87	15.8	78	14.2	237	**43.0**	137	24.9	539
Seminar	81	14.7	265	**48.1**	149	27.0	42	7.6	537
Workshops	332	**60.3**	88	16.0	87	15.8	35	6.4	542
Via the internet	47	8.5	107	19.4	63	11.4	321	**58.3**	538

Copyright © The Turkish Online Journal of Educational Technology 2002

According to table 2, 43.0% of the research assistants at education faculties preferred the faculty development programs to be presented in the form of a conference as their third preference, 24.9% as their fourth preference, 15.8% as their first preference, 14.2% as their second preference; 48,1% in the form of a seminar as their second preference, 27.0% as their third preference, 14.7% as their first preference, 7.6% as their fourth preference; 60,3% in the form of a workshop as their first preference, 16.0% as their second preference, 15.8% as their third preference, 6.4% as their fourth preference; and 58,3% preferred the programs to be presented via the internet as their fourth preference, 19.4% as their second preference, 11.4% as their third preference, 8.5% as their first preference. In the light of this finding, the order of the preferences of the research assistants about the delivery forms of the faculty development programs was found to be as follows: presentation in the form of workshops as their first preference, in the form of seminars as their second preference, in the form of conferences as their third preference and presentation via the internet as their fourth preference.

This finding is similar to the findings of Jarvis (1992a) and of Mu (1997) that organizing faculty development programs for faculty members in the form of such group activities as workshops and seminars will be the most appropriate presentation form. Furthermore, this finding is in line with the finding of Odabaşı (2003) that "for the presentation of academic staff development activities, faculty prefer the activities in the form of a workshop as their first preference, those in the form a seminar as their second preference and those in the form of a conference as their third preference". In other words, the preferences of the research assistants about the presentation forms of faculty development programs are similar to those of faculty.

The Features of Educators Working in Faculty Development Programs

Table 3 shows the distribution of the preferences of the research assistants about the features of educators working in faculty development programs as their first, second, third and fourth.

Table 3. Preferences about the Features of Educators Working in Faculty Development Programs

Features of Educators	First Preference		Second Preference		Third Preference		Fourth Preference		Total
	N	%	N	%	N	%	N	%	
By Faculty at Education Faculty	82	14.9	97	17.6	136	24.7	185	**33.6**	500
By specialists in an education center to be established for this purpose at the university	245	**44.5**	150	27.2	102	18.5	18	3.3	515
In a private education center out of the university and by its specialists	115	20.9	110	20.0	92	16.7	184	33.4	501
By experienced faculty members of the several departments of the university	107	19.4	131	23.8	159	**28.9**	102	18.5	499

According to Table 3, it was found out that 33,6% of the research assistants prefer faculty development programs to be executed "by the faculty members at Education Faculty" as their fourth preference, 24.7% as their third preference, 17.6% as their second preference and 14.9% as their first preference; 44.5% "by specialists at an education center to be established for this purpose at the university" as their first preference, 27.2% as their second preference, 18.5% as their third preference and 3.3% as their fourth preference; 33.4% "in a private education center out of the university and by its specialists" as their fourth preference, 20.9% as their first preference, 20.0% as their second preference and 18.5% as their third preference; and 28.9% "by experienced faculty members of departments at some departments of the university" as their third preference, 23.8% as their second preference, 19.4% as their first preference and 18.5% as their fourth preference.

Depending on these findings, the order of the preferences of the research assistants about the features of educators that will execute faculty development programs is as follows: "by specialists at an education center to be established for this purpose at the university" is their first and second preferences, "by experienced faculty of departments at some departments of the university" is their third preference, and their fourth one is "by the faculty at Education Faculty" and "in a private education center out of the university and by its specialists."

This finding of the study is consistent with the finding of Odabaşı (2003) that "faculty prefer the faculty who are specialized in the area of the activities that will be organized and who are from their own universities as their first preference related to the academic backgrounds of educators that will carry out faculty development activities." In other words, while faculty prefer specialized faculty primarily from their own universities to execute faculty development programs, research assistants prefer the programs to be executed by specialists in an education center to be established for this purpose.

Copyright © The Turkish Online Journal of Educational Technology 2002

Factors Affecting Participation of Research Assistants to Faculty Development Programs

Factors affecting participation of research assistants in faculty development programs are shown in Table 4.

Table 4. Factors That Affect Participation of Research Assistants in Faculty Development Programs

Participation Factors in Faculty Development Programs	Not Effective		Little Effective		Partly Effective		Quite effective		Very effective		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Information exchange with colleagues	12	2.1	28	4.9	85	14.8	283	**49.4**	162	28.3	570	100.0
Developing of teaching skills	7	1.2	30	5.2	92	16.1	255	44.5	186	32.5	570	100.0
Developing research skills	4	.7	14	2.4	64	11.2	212	37.0	276	**48.2**	570	100.0
Monetary awarding of participation in the program	125	21.8	103	18.0	142	24.8	102	17.8	99	**17.3**	570	100.0
Awarding of participation in the program with a chance to participate in a field-related activity abroad	20	3.5	30	5.2	76	13.3	157	27.4	288	**50.3**	571	100.0
Specialization levels of the educators that will manage the activities	2	.3	13	2.3	37	6.5	165	28.8	354	**61.8**	571	100.0
Giving An achievement certificate at the end of the program	53	9.2	81	14.1	155	27.1	152	26.5	130	22.7	571	100.0

When the values in Table 4 are examined, 61,8% of the research assistants find such factors "very effective" as "the specialization levels of the educators who will manage the activities", 50,3% as "awarding of participation in a program with a chance to participate in an activity abroad related to the field", and 48,2% as "development of research skills"; and 49.4% find the factor "quite effective" which is "information exchange with colleagues". Depending on this finding, it was found out that the factor most effective on the participation of the research assistants in faculty development programs was the one "participation levels of educators who will manage the activities", and the least effective factor was the one "monetary awarding of participation in the program".

This research finding is similar to the finding of Odabaşı (2003) that "among the factors that will affect the development of academic staff, faculty find the factor very effective that an educator to take part in an activity should be an expert, yet they regard monetary awarding ineffective."

The Preferred Time Period of Faculty Development Programs for Research Assistant

Table 5 shows the data related to the time period that education faculty research assistants will devote to faculty development programs.

Table 5. The Time Period of Faculty Development Programs for Research Assistant

The Time Period To Be Devoted	N	%
2-3 hours during the term	25	4.4
2-3 hours a month	143	25.0
2-3 hours a week	356	62.1
Other	45	7.9
Total	569	100.0

Copyright © The Turkish Online Journal of Educational Technology 2002

When the values in Table 5 are examined, 62,1% of the research assistants are observed to devote their "2-3 hours a week", 25.0% "2-3 hours a month" and 4.40% "2-3 hours during a term" to the faculty development program that will be organized. According to this finding, more than half of the research assistants are found out to devote 2-3 hours in a week to a faculty development program.

Table 6 shows the numbers and percentages related to the time periods that the research assistants prefer for the execution of the faculty development program as their first preference, second, and third preference.

Table 6. Preferences of Research Assistants about the Period for the Execution of Faculty Development Programs

The Time Preferred	First Preference		Second Preference		Third Preference		Total
	N	%	N	%	N	%	N
In the education period	313	**56.8**	76	13.8	142	25.8	531
On summer holiday	141	25.6	78	14.2	290	**52.6**	509
On semester holiday	94	17.1	344	**62.4**	65	11.8	503

When the values in Table 6 are examined, it is found out that 56,8% of the research assistants prefer the faculty development program to be executed "in the education period" as their first preference, 25.8% as their second preference and 13.8% as their third preference; 52,6% "on summer holiday" as their third preference, 25.6% as their first preference and 14.2% as their second preference; 62,4% "on semester holiday" as their second preference, 17.1% as their first preference and 11.8% as their second preference. According to this finding, the order of the preferences of the research assistants related to the period in which the faculty development program will be executed is as follows: "in the education period" is the first preference, "on semester holiday" is the second and "on summer holiday" is the third preference.

This research finding is similar to the finding of Odabaşı (2003) that "the preferences of faculty about the timing of academic staff development activities are respectively in the education period, on semester holiday and in summer".

CONCLUSION AND DISCUSSION

According to the findings obtained from the study, it is concluded that the faculty development area which research assistants need most includes the faculty development activities. Among the presentation forms of faculty development programs, the research assistants at most preferred the faculty development programs executed in the form of workshops. According to another finding, the research assistants stated that faculty development programs should be executed by specialists in an education center to be established for this purpose at the university. One more conclusion is that the factor most effective on the participation of research assistants in faculty development programs is the fact that faculty development programs for research assistants should be supported by education faculty members and specialists in the field. The factor least effective on the participation in the faculty development program is the monetary awarding of participation in the program. According to another finding obtained in the study, it is concluded that research assistants prefer a faculty development program more which will be organized in the education period as to be 2-3 hours in a week.

In faculty development programs for research assistants, faculty development activities should be considered in the first place such as following the developments in the related scientific field, being aware of the projects and having information about scientific research methods to publish a scientific study. If the faculty development program is structurally presented in the form workshops such as small group activities, it will be more effective on meeting the faculty development needs of research assistants. Moreover, it will be better to support it with faculty development activities in the form of seminars, conferences or via the internet. Faculty development programs for research assistants should be executed by specialists that will serve this purpose. In addition, for the execution of faculty development programs for this purpose in centers, the support of specialists in the related field, education designers, specialists on education technology and that of faculty members specialized in the related field at education faculties should be taken. The faculty development programs for research assistants should be executed in the education period as to be 2-3 hours in a week. The participation of research assistants

Copyright © The Turkish Online Journal of Educational Technology 2002

in faculty development programs is very important for the expected productivity of the program. The participation of research assistants in faculty development programs should be on voluntary basis, and awarding criteria such as research grants and points for academic achievements should be determined in order to have research assistants participate in the programs and to support their success.

The results obtained in this study can be supported by research on the identification of the problems that research assistants meet in their first-year working, qualitative and quantitative research on the views of managers (such as the dean and the head of the department) and experimental research on the effectiveness of faculty development programs in terms of product and process.

REFERENCES

Babcock, L. C. (1989). What do we really mean by faculty development?. *ADFL Bulletin,* 20(3), 31-34.

Borko, H., Elliton, R. & Uchiyama, K. (2002). Proffesional development: A key to Kentucky's Educational Reform effort. *Teaching and Teaching Education*, 18, 969-987.

Brawer, B. F. (1990). Faculty Development: The Literature. *Community College Review,* 18(1), 50-57.

DiLorenzo, T M. & Heppener, P. P. (1994). The role of an academic department in promoting faculty development: recognizing diversity and leading to excellence. *Journal of Counseling & Development,* 72, 485-491.

Grant, M. R. & C. K. Marybelle. (2002). Faculty development in publicly supported. *Community College Journal of Research and Practice,* 26, 793-807.

Jarvis, D. K. (1992a). *Junior Faculty Development: A Handbook.* Second edition. New York: The Modern Language Association of America.

Jarvis, D. K. (1992b). Improving junior faculty scholarship, *New Directions for Teaching and Learning: Developing New and Junior Faculty.* Ed.: Mary D. Sorcinelli and Ann E. Austin. 50, 63-72.

Kabakçı, I. & Odabaşı, H. F. (2004). Evaluation of an online faculty development course from the point of view of participants, E-Learn 2004 World Conference on E-Learning in Corporate, Government, Healthcare & Higher Education, *The Proceeding Book of E-Learn 2004 Conference***,** Washington, DC/ABD, 326-331.

Lawler, P. A. (2003). Teachers as adult learners: a new perspective, new perspectives on designing and implementing professional development of teachers of adults. Ed.: Kathleen P. King, Patricia A. Lawler, *New Directions for Adult and Continuing Education***,** No:98, San Francisco: Jossey-Bass.

Lee, J. (1996). Faculty development: Opportunity and satisfaction. *Update,* 2(2), 1-4.

McKenzie, J. (1991). Designing staff development for the information age, *The Educational Technology Journal,* 1(4), 1-9.

Moeini, H. (2003). A Need analysis study for faculty development programs in METU and structural equation modeling of faculty needs. Unpublished Doctoral Thesis. Middle Technical East University, Ankara, Turkey.

Mu, L. (1997). A Study of Computing Education Needs Among College of Education Faculty. *Dissertation Abstracts International,* 58(9), 3479-A.

Odabaşı, H. F. (2003). Faculty point of view on faculty development. *Hacettepe Univesity Journal of Education*, 24, 86-89.

Odabaşı, H. F. (2005). The status and need for faculty development in Turkey. *International Journal for Academic Development, 10(2),139–142.*

Richardson, V. (2003). The dilemmas of professional development. *Phi Delta Kappan,* 84(5), 401-406, 2003.

Steinert, Y. (2000). Faculty development in the new millennium: key challenges and future directions. *Medical Teacher,* 22(1), 44-5.

Higher Education Committee-HEC (2003). The Turkish Higher Education System (Part 3 -Current Status). Retrieved January, 20, 2004, from,URL: http://yok.gov.tr/english/index_en.htm

Copyright © The Turkish Online Journal of Educational Technology 2002

THE RELATIONSHIP BETWEEN TEACHER IMMEDIACY BEHAVIORS AND LEARNERS' PERCEPTIONS OF SOCIAL PRESENCE AND SATISFACTION IN OPEN AND DISTANCE EDUCATION: THE CASE OF ANADOLU UNIVERSITY OPEN EDUCATION FACULTY

Asst. Prof. Dr. Müjgan BOZKAYA[1]
Asst. İrem ERDEM AYDIN[2]

ABSTRACT
There are a significant number of studies in the literature stressing the important role of teacher immediacy behaviors on learners' perceptions of social presence and satisfaction in open and distance learning environments. Yet, those studies were conducted in different open and distance education institutions than the current example of which unique characteristics and applications are commonly recognized in the field. Unlike others, the current study examined the effects of both verbal and nonverbal instructor immediacy behaviors on learners' perceptions of social presence and satisfaction in face-to-face academic tutoring services provided in open and distance learning environments. Results indicated a moderate and positive relationship between the control variable and outcome variables

1. INTRODUCTION

Open and Distance Education (ODE), in general, is defined as an educational model in which the learner is in a remote location from the instructor's and in which the interaction between them is achieved through communication environments and technologies. Comparable to other institutions, the system at Anadolu University (AU) Open Education Faculty (OEF) utilizes various information and communication technologies (ICT) to provide academic services. Unique needs of different learner groups require a well organized integration of a range of ICTs. These environments may play both a "fundamental" and a "supportive" role in different services. Although Anadolu University's traditional ODE programs employ latest information technologies, textbooks still remain the core of the ODE system as the primary learning material.

In addition to textbooks, many other support services are offered to learners including TV programs, e-exam, digital versions of TV programs, e-book, synchronized virtual classroom, tutorial services through video conference, and face-to-face academic tutoring services. With the exception of face-to-face academic tutoring, all fundamental and support services are carried out with an approach that places the individual needs of learners at the center. Intrinsically motivated, learners study the content and the materials on their own pace.

One of the most significant factors affecting learner motivation is teacher-learner interaction (Picciano, 2001). Academic tutoring service of Anadolu University OEF is a face-to-face initiative that promotes greater teacher-learner interaction. Courses covered in the academic tutoring service provide the only opportunity for a face-to-face communication. Distance learners evaluate and utilize this service for better understanding the content in a physical environment where they feel responsible, interact with other learners, and assure their level of achievement.

The feeling of responsibility for one's own learning is reported to ensure active participation and to decrease the feeling of isolation felt by the distance learner (Saba & Shaerer, 1994). Learners must interact with teachers and others as a social entity, "real person", to avoid the feeling of isolation. The concept of social presence was introduced and defined by Short and colleagues (1976) as the "the salience of the other in a mediated communication and the consequent salience of their interpersonal interactions" (p.65). There are growing numbers of studies that focus on improving social presence in distance education because distance learning environments lack many communicative advantages contemporary face-to-face environments carry. Research has reported that teacher immediacy behaviors have an important role on shaping learners' perceptions of social presence (Christophel, 1990; Gorham, 1988; Hackman & Walker, 1990).

Derived from Mehrabian's (1969) work, immediacy is conceptualized as those nonverbal behaviors that reduce physical and/or psychological distance in interpersonal communication. Similarly, Thweatt and McCroskey (1996) defined immediacy as communicative behaviors that reduce perceived distance by individuals.

[1] Anadolu Üniversitesi Açıköğretim Fakültesi, 26470
Tel:222 335 05 80 Dh: 25 33 Eposta: mbozkaya@anadolu.edu.tr
[2] Anadolu Üniversitesi Açıköğretim Fakültesi, 26470
Tel:222 335 05 80 Dh: 25 33 Eposta: ieaydin@anadolu.edu.tr

Copyright © The Turkish Online Journal of Educational Technology 2002

Therefore, teacher immediacy can be portrayed as verbal and nonverbal behaviors that reduce physical and psychological distance between teachers and learners. Immediacy perceived by the learner in a learning environment can be viewed as an indicator of reduced feeling of isolation. Immediacy is categorized and investigated under two sub-factors as verbal and nonverbal.

Nonverbal immediacy is recognized more as a psychological trait because it involves behaviors like eye contact, body posture, gestures, physical proximity, touching, and smiling. Mehrabian's (1971) research suggested that such nonverbal cues increase the sensory stimulation of interlocutors which in turn lead to more intense, more affective, more immediate interactions. He suggested that nonverbal behaviors such as facing toward someone, standing close to someone, and touching form the immediacy among individuals. In the same vein, nodding to approve, smiling, and intentionally using gestures and stressing some words, as well, are acknowledged as nonverbal immediacy behaviors (Andersen, Andersen & Jensen,1979; Newliep, 1997).

Studies on the teacher immediacy included behaviors such as talking about experiences that have occurred outside class, communicating with learners before and after classes, using humor to attract attention, encouraging learners to actively participate and ask questions, addressing learners by name, praising learners' work or comments, and providing feedback on learners' work. Her results suggest that these types of behavior also contributed significantly to students' affective learning. Depending on the words selected, verbal immediacy serves to improve psychological feeling of closeness among individuals. For example, instead of word like "you" and "me", using the word "us" enhances feelings of closeness and association (Gorham, 1988). Learners in such a teacher's class are expected to possess positive attitudes toward learning and display more interaction with others. Increased interaction among learners, in return, positively affect their perceptions of social presence, acknowledging others as real individuals (Hackman & Walker, 1990).

In addition, teachers' verbal and nonverbal immediacy behaviors have significant effects on learners' feeling of satisfaction regarding the teacher and the environment (Andersen 1979). Research (Andersen 1979; Biner, 1993; Gunawardena & Zittle, 1997) indicated a positive relationship between social presence and learners' level of satisfaction. Neill (1991) also stated that verbal and nonverbal immediacy behaviors reduce the psychological distance and improve learners' performance. According to Knapp (1980), higher levels of social presence and learner performance result in elevated learner motivation.

The current study, conducted in OEF at Anadolu University, investigated the effects of verbal and nonverbal teacher immediacy behaviors on learners' perceptions of social presence and their level of satisfaction regarding the teacher and the learning environment in Academic Tutoring services offered for distance "Introduction to Economics" class. Satisfaction reflects the students' overall attitude toward the components of a distance education course. Biner, Dean, and Mellinger (1994) identified seven distinct dimensions of course satisfaction: Teacher/content, technology, classroom management, personnel, timely delivery of materials to students, support services, and interaction with the teacher out of the classroom. However, within the scope of this study, only environment and teacher dimensions are included for analyses.

2. METHODOLOGY

2.1. Framework of the Research

Araştırma deneme yöntemiyle gerçekleştirilen bir çalışmadır. The population of the study consisted of learners enrolled to the "Introduction to Economics" class who are also receiving face-to-face Academic Tutoring service in OEF at Anadolu University. From that population, the sample included 213 learners attending Academic Tutoring service in Eskisehir, Turkey. Academic Tutoring Services was first launched in 16 cities with 390 faculty members in 1999 (Serter ve Çekerol, 2002). By the year 2007, face-to-face tutoring services are offered in 73 centers with 861 faculty members on local cooperating universities' campuses at evenings and weekends. The service starts at the first week of January and continues through the end of May and includes 10 most challenging courses over a variety of fields.

Two scales were used to assess perceptions of Academic Tutoring instructors regarding verbal and nonverbal communication behaviors. A 5-point Likert type scale developed by Richmond and colleagues (2003) was employed to assess nonverbal immediacy behaviors. This scale included 19 items that covered behaviors such as gestures, eye contact, and body language. The reliability coefficient for the scale was found to be .70.

To assess verbal immediacy behaviors, a 5-point Likert type scale developed by Hackman and Walker (1990) was utilized. Items in this scale reflected behaviors such as providing feedback, attracting students' attention, and addressing learners by their name. The reliability coefficient for the scale was found to be .90.

Copyright © The Turkish Online Journal of Educational Technology 2002

To assess the effects of learners' attendance to Academic Tutoring service on their social presence, a scale with 19 items was developed by the researchers. The scale reliability was found to be .93. Of those 19 items, 13 were designed to assess the effects of the learning environment and 6 were designed to assess the effects of teacher interaction.

Another 5-point Likert type scale with 25 items was used to assess learners' satisfaction regarding the instructor and the environment in Academic Toturing. First part of the scale included statements regarding instructors' encouragement of learners to cooperate, communicating with learners out side the classroom, using visuals, providing support out side the classroom, and designing the content. The second part used to investigate learners' purposes to attend, whether the environment was helpful to learners, and whether being in the same space with the instructor influenced their perceptions of social presence. The reliability coefficient for the scale was found to be .91.

500 copies of each scale was printed out and administered to learners who were enrolled to "Introduction to Economics" class. Administration of scales were completed one week before the semester ended on May 16th, 26 under the supervision of the researchers. After eliminating forms that were incomplete or missing many items, the sample of the study consisted of 213 learners.

The primary aim of the current study was examining the effects of verbal and nonverbal teacher immediacy behaviors on learners' perceptions of social presence and their level of satisfaction regarding the teacher and the learning environment in Academic Tutoring services offered as a supporting aspect in a distance education class, "Introduction to Economics", in OEF at Anadolu University. Hypotheses of the study are listed below:

- There is a relationship between verbal and nonverbal teacher immediacy behaviors and learners' perceptions of social presence.
- There is a relationship between verbal and nonverbal teacher immediacy behaviors and learners' level of satisfaction regarding the learning environment.
- There is a relationship between verbal and nonverbal teacher immediacy behaviors and learners' level of satisfaction regarding the instructor.

Based on the hypotheses above, objectives of the study are defined as below:

1. In what direction and to what extent verbal and nonverbal teacher immediacy behaviors affect learners' perceptions of social presence?
2. In what direction and to what extent verbal and nonverbal teacher immediacy behaviors affect learners' level of satisfaction regarding the learning environment?
3. In what direction and to what extent verbal and nonverbal teacher immediacy behaviors affect learners' level of satisfaction regarding the instructor?

2.2. Data Analysis

Various statistical procedures were utilized in the study with the *p* value of .05 accepted as the level of meaningfulness. In addition to investigating means, correlation coefficients were analyzed to inspect the relationship between the teacher immediacy behaviors and two dependent variables of learners' social presence and level of satisfaction

Statistical procedures were handled by using SPSS 10.0 and the result are presented at the end of the paper

3. Results

This section presents the results depending on the statistical analyses. Scales consisted of a total of 84 items in a five-point Likert type format ranging from 1=Strongly agree to 5=Strongly disagree. Boundaries of each response (from 1 to 5) was calculated by dividing the serial width (4) by the number of responses (5) and found to be 0.8. Depending on this calculation, boundaries for each response are accepted as below:

1	= 1+ 0.8	= 1.8
2	= 1.8 + 0.8	= 2.6
3	= 2.6 + 0.8	= **3.4**
4	= 3.4 + 0.8	= 4.2
5	= 4.2 + 0.8	= 5

Copyright © The Turkish Online Journal of Educational Technology 2002

The value of 3.41 was accepted as accept the threshold and values equal and over that number are acknowledged as positive

Table 1
Means of Verbal, Nonverbal Immediacy Behavior, Social Presence and Satisfaction Scales

Scales	Mean Scores
Verbal Immediacy	2,86
Nonverbal Immediacy	3,50
Social Presence	3,40
Satisfaction	3,37

According to the results, it is recognized that nonverbal immediacy behavior had the highest mean (M=3.50) among all variables. Means of learners' social presence (M=3.40) and satisfaction level (M=3.37) were close to each other. Teacher verbal immediacy behavior received the lowest mean with a value of 2.86. After inspecting the items in the verbal teacher immediacy scale, it is observed that the lowest means were associated with these three items: Teacher addressing learners by their name (M=1.70); allowing learners to address the instructor by his/her name (M=1.79); and communicating with learners out side the classroom (M=1.83). Investigating the level of learner satisfaction, it is observed that these two items received lower ratings from other items: "I attend to Academic Tutoring hours to gather with other distance education learners" (M=2.39) and "I attend to Academic Tutoring hours to meet new people" (M=2.41). On the other end, learners reported that this service helped them to better perform in exams (M=4.00), revealing that learners utilize this service primarily for exams. In the social presence scale, items of "I feel at ease in joining discussions in the class" (M=3.12) and "I feel comfortable in expressing my thought to my peers in the class" (M=3.21) were rated lowest. However, learners reported that attending the Academic Tutoring service helped them feel like a part of the community (M=3.60). In the nonverbal teacher immediacy scale, while the lowest mean was given to the item stating the instructor depended heavily on personal notes or notes on the board (M=2.5), highest ratings were given for items stating that the instructor was acting naturally (M=4.3), the instructor was joyous and smiling(M=4.1), and the instructor achieved eye contact with learners (M=4.1),

Table 2
Correlations between Verbal Immediacy Behavior, Nonverbal Immediacy Behavior, Social Presence, and Satisfaction

		Nonverbal	Verbal	Social Presence	Satisfaction
Nonverbal	Pearson Correlation	1.000	.524**	.312**	.400**
	Sig.(2-tailed)		.000	.000	.000
	N	211	211	206	207
Verbal	Pearson Correlation	.524**	1.000	.412**	.476**
	Sig. (2-tailed)	.000		.000	.000
	N	211	211	206	207
Social Presence	Pearson Correlation	.312**	.412**	1.000	.768**
	Sig.(2-tailed)	.000	.000		.000
	N	206	206	207	203
Satisfaction	Pearson Correlation	.400**	.476**	.768**	1.000
	Sig. (2-tailed)	.000	.000	.000	
	N	207	207	203	208

** Corelation is significant at the .001 level (2-tailed).

As it can bee seen in Table 2, the highest correlation was observed between social presence and level of satisfaction. Regarding this finding, it can be concluded that when learners feel like a part of a community, they feel more satisfied regarding both the instructor and the environment. In addition, correlations of both social presence and level of satisfaction with verbal immediacy behaviors were higher than those with nonverbal immediacy behavior. That is, learners perceive verbal messages and behavior more positively that nonverbal messages or behaviors.

Copyright © The Turkish Online Journal of Educational Technology 2002

Table 3
Correlation between Verbal Immediacy Behavior, Nonverbal Immediacy Behavior, and Satisfaction Subfactors

		Satisfaction with environment	Satisfaction with teacher	Nonverbal	Verbal
Satisfaction with environment	Pearson Correlation	1,000	.738**	.260**	.288**
	Sig.(2-tailed)		.000	.000	.000
	N	208	208	207	207
Satisfaction with teacher	Pearson Correlation	.738**	1.000	.459**	.562**
	Sig. (2-tailed)	.000		.000	.000
	N	208	208	207	207
Nonverbal	Pearson Correlation	.260**	.459**	1.000	.524**
	Sig.(2-tailed)	.000	.000		.000
	N	207	207	212	211
Verbal	Pearson Correlation	.288**	.562**	.524**	1.000
	Sig. (2-tailed)	,000	.000	.000	.
	N	207	207	211	211

** Correlation is significant at the 0.01 level (2-tailed).

Investigating the table above, it is observed that level of satisfaction with the environment did not have strong correlations with verbal and nonverbal teacher immediacy behavior. Level of satisfaction with the teacher have moderate correlations with verbal and nonverbal teacher immediacy behavior, although correlations with verbal behaviors were higher than those for nonverbal behaviors.

4. CONCLUSION AND IMPLICATIONS

Academic Tutoring services carried out in OEF at Anadolu University are known as an environment in which the learners see themselves, their teachers and other learners as real individuals. In this study, the effects of this service forming learners' perceptions of social presence are discussed.

The relationship between the teacher's verbal and non-verbal immediacy behaviors and the learners' perceptions of social presence and levels of satisfaction is investigated in this study. The primary aim of the study was to determine the direction of the relationship between the teacher's immediacy behaviors and learners' perceptions of social presence. It was found that there is a moderate and positive correlation between them. Studies in the literature, similarly, report that teachers' verbal and nonverbal immediacy behaviors have a positive influence on the learners' perceptions of social presence (Anderson& Anderson 1982; Gunawerdana & Zittle, 1997). On the other hand, it can be said that creating the feeling of social presence in the learner is a significant determinant of the efficiency of learning. Findings of the study parallel the findings of previous research in the literature. The results indicated that learners see themselves as a part of the community and learn better when they attend Academic Tutoring services. They emphasized that they use this service especially for being successful in the exam and that they will encourage their friends to take advantage of this service.

Regarding the dimensions that create the feeling of social presence in the learner, Williams and Ware (1976) emphasized that encouraging learners to participate in the lesson, providing individual feedback, and communicating with learners outside the classroom may be effective. In this study, learners' perception of social presence has been found close to the critical value of 3.41. This finding indicates that learners cannot benefit from the teacher's verbal immediacy behaviors to the desired extent. A plausible explanation for this can be the abundance of the learners participating in Academic Tutoring services. Therefore, as opposed to what the literature suggests, in this study, learners couldn't evaluate the teacher positively about giving individual feedback, and communicating with learners outside the classroom.

The second and third aims of the study targeted determining the direction of the relationship between teachers' verbal and nonverbal immediacy behaviors and learners' satisfaction levels concerning the environment and the teacher. As a result of the analyses carried out, a moderate relationship has been found between those variables. When the level of satisfaction concerning the environment is associated with the teacher's verbal (.288) and nonverbal (.260) immediacy behaviors, it is indicated that neither immediacy behavior has a significant

Copyright © The Turkish Online Journal of Educational Technology 2002

influence on determining the satisfaction level of the learners concerning the environment. This finding can be explained by the learners' desire to make use of this environment just for being successful in the exams (M=3.99). Although learners wanted to utilize Academic Tutoring services for each course (M=4.1), they perceives this environment as an opprtunity that will help them having a degree. In the ARCS (**A**ttention **R**elevance **C**onfidence **S**atisfaction) Model proposed by Keller (1987), learners' desire to have a degree as a result of learning is seen as one of the most significant external factors in determining learners' level of satisfaction concerning learning. Similarly, in this study, it can be said that learners' desire to make use of this service to pass their exams has a significant influence on determining the level of satisfaction concerning the environment.

When learners' level of satisfaction concerning the teacher is associated with the teacher's verbal (.562) and non-verbal (.459) immediacy behaviors, it is observed that verbal immediacy behaviors increase the satisfaction levels of learners. Presenting the content as respecting different points of views (M=3.57), asking questions related to the content (M=3.48), and using the expression 'we' while presenting the content (M=3.41) are evaluated as the most prominent factors which satisfy learners about the teacher's verbal immediacy behaviors.

On the other hand, teacher's nonverbal immediacy behaviors such as having eye contact with learners (M=4.06), acting in a natural way (M=4.27), and using facial expressions while presenting the content (M=3.91) are also appraised to be positive factors in increasing learners' satisfaction levels concerning the teacher. In parallel with the previous research findings in the literature, immediacy behaviors of teachers who address their students with their names, have eye contact, and smile while presenting the content contribute to learners' satisfaction and social presence levels in a positive way. (Christophel, 1990; Gorham, 1988; Neuliep, 1997; Sanders&Wiseman, 1990; Walker Heckman, 1991).

In addition to these findings, it can be seen that there is a high correlation between learners' perceptions of social presence and their satisfaction levels (.768). While this suggests that learners perceive Academic Tutoring services as an environment which enables them to be socially present, it may be inappropriate to reach conclusions merely based on the findings of this study. More detailed studies with the similar objectives should be conducted and their results should be compared with those of this study. Particularly, it is suggested that more qualitative studies investigating the effects of face-to-face environments in distance education on learners' social presence should be conducted to support quantitative findings. Besides, investigating the relationship between the perception of social presence and other components of the OEF (television, internet, videoconferencing, etc) may provide more comprehensive information about future applications.

REFERENCES

Andersen, J. F., &Andersen, J. (1982). *Nonverbal immediacy in instruction, Communication in the Classroom*. Englewood Cliffs, NJ: Prentice Hall.

Andersen, J. F. (1979). Teacher immediacy as a predictor of teaching effectiveness. New Jersey: Transaction Books.

Andersen, J., Andersen, P., & Jensen, A (1979). The measurement of nonverbal immediacy. *Journal of Applied Communication*, 7, 153-180.

Biner, P. M. (1993). The develepment of an instrument to measure student attitudes toward televised courses. *The American Journal of Distance Education*, *7*(1), 62-73.

Biner, P.M, Dean, R, S., ve Mellinger, A.E. (1994). Factors underlying distance learner satisfaction with televised college-level courses. *The American Journal of Distance Education, 8* (1), 6071.

Christophel, D. M. (1990). The relationship among teacher immediacy behaviors, student motivation and learning. *Communication Education*, 39. 323-340.

Gorham, J. (1988). The relationship between verbal teacher immediacy behaviors and student learning. *Communication Education*. 37. 40-53.

Gunawardena, C. N., &Zittle, F.J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *The American Journal of Distance Education, 1*1(3), 8-26.

Hackman, M & Walker, K. (1990). Instructional communication in the televised classroom: the effects of system design and teacher immediacy on student learning and satisfaction. *Communication Education.* 39. 196-206.

Keller, J. M. (1987). The systematic process of motivational design. *Performance&Instruction* (Nov/Dec), 1-8.

Knapp, M.L. (1980). *Essentials of nonverbal communication*. New york:Holt, Rinehart and Winston.

Neill, S. (1991). *Classroom nonverbal communication*. London: Routledge.

Mehriban, A. (1967). Attitudes inferred from non-immediacy of verbal communication. *Journal of Verbal Learning and Verbal Behavior*, 6, 294-295.

Copyright © The Turkish Online Journal of Educational Technology 2002

Newliep, J. (1997). Communication Research: a cross-cultural comparison of teacher immmediacy in American and Japanese College classrooms. *Communication Education*, 24(4), 431.

Picciano, A., G.(2001). *Distance Learning: Making Connections Across*. Merrill Prenticehall. P. 70-74.

Richmond, V. P., McCroskey, J. C., & Johnson, A. E. (2003). Development of the Nonverbal Immediacy Scale (NIS): Measures of self- and other-perceived nonverbal immediacy. *Communication Quarterly, 51,* 502-515.

Saba, F., & Shearer, R.L. (1994). Verifying the key theoretical concepts in a dynamic model of distance education. *American Journal of Distance Education, 8*(1), 36-59.

Sanders, J. A. , & Wiseman, R. L.(1990). The effects of verbal and nonverbal teacher immediacy on perceived cognitive, affective and behavirol learning in the multiculturel classroom. *Communications Educations*, 39, 341-353.

Serter, N.,& Çekerol, K.(2002). "Açıköğretim Fakültesi Akademik Danışmanlık Hizmetleri" Uluslar arası Katılımlı Açık ve Uzaktan Eğitim Sempozyumu, 2002.

Short, J., Willliams, B., & Christie, B (1976). *The social psychology of telecommunications*. London: Wiley.

Thweatt, K. S., & McCroskey, J. C. (1996). Teacher nonimmediacy and misbehavior: Unintentional negative communication. *Communication Research Reports*, 13 (2), 98-204.

Williams, R., & Ware, J. (1976). Validity of student ratings of instrucation under different incentive conditions: A further study of the Dr. Fox effect. *Journal of Education Psychology,* 69. 48-56.

Copyright © The Turkish Online Journal of Educational Technology 2002

TURKISH EFL STUDENT TEACHERS' PERCEPTIONS ON THE ROLE OF ELECTRONIC PORTFOLIOS IN THEIR PROFESSIONAL DEVELOPMENT

Assist. Prof. Zeynep KOCOGLU
Yeditepe University
zbkocoglu@yeditepe.edu.tr

ABSTRACT
There has been vast evidence to support the potential of electronic portfolios (e-portfolio) as tools for enhancing reflective thinking and professional development of student teachers. However, no study has been carried out to specifically determine English as a Foreign Language (EFL) student teachers' perceptions on the role of e-portfolios in their professional development. Therefore, this descriptive study investigated the perceptions of EFL student teachers on e-portfolios as a learning tool. Results of analysis of student teachers' interviews identified several themes, indicating that e-portfolios helped student teachers keep current with innovations in the digital world; a fancy tool that serves them in the job search; and a collection of materials that showed their best work; an opportunity to work collaboratively which in turn support their ongoing professional development. However, the student teachers in this study did not believe that electronic portfolios can be an important tool to develop reflective thinking.

Keywords: Foreign Language Teacher Education, Reflective Thinking, Teaching Portfolios, Electronic Portfolios

INTRODUCTION

Although portfolios have been used extensively in arts and architecture, they have been introduced to teacher education in the 1980s (Lyons, 1998a). Since then, educational researchers and practitioners cite the increasing use of portfolios as an assessment and learning tool in teacher education programs (Barton and Collins, 1993; Loughran and Corrigan, 1995; whole issue of Teacher Education Quarterly, Winter 1998). A portfolio in teacher education could simply be defined as a collection of information about a student teacher's abilities gained in different contexts over time. This information could include a wide variety of materials, such as lesson plans, tests, learner work, photographs of classroom, philosophical statements, self-assessment and written commentaries, formal evaluations, certificates and transcripts (Wade & Yarbrough, 1996). However, portfolio is not just used as a collection of evidence of learning but also as an effective learning tool. Portfolio-based learning is an approach based on experiential learning. Experiential learning is a cycling learning process that begins with experience, continues with reflection and later leads to action, which itself becomes an evidence and an experience for reflection (Kolb 1981). Portfolio development is also a cyclical process of collecting, reviewing/reflecting, and learning from experience. Therefore, for educational purposes, it is essential that portfolio does not become a mere scrapbook of artifacts and narratives, but should contain reflections on learning and teaching experiences. In sum, several studies (Borko, Michalec, Timmons & Siddle, 1997; Davies and Willis, 2001; Loughran and Corrigan, 1995; Lyons, 1998b; Shulman, 1998; Wade and Yarbrough, 1996; Winsor and Ellefson, 1995, Zubizaretta, 2004) have reported that developing portfolios promote reflective thinking because they "provide a systematic, continuous way of planning, supporting and monitoring a teacher's professional advance" (Bird, 1990, p.244).

On the other hand, several studies (Dutt-Doner and Gilman, 1998; McKinney, 1998; Stone, 1998) also showed some limitations of using portfolios in teacher education such as storage, maintenance, and accessibility. Student teachers collect a variety of artifacts in their portfolios. Most portfolios that are being used in teacher education programs are mainly printed and compiled in a 3-rings binder (i.e., paper portfolios). As Georgi and Crowe (1998) argued, this storage, maintenance, and accessibility problems can be solved through the use of technology, i.e., through developing electronic portfolios.

ELECTRONIC PORTFOLIOS IN TEACHER EDUCATION

An electronic portfolio, sometimes referred to as "multimedia portfolio, e-folio, webfolio" (Kilbane & Milman, 2003, p. 7) is similar to paper portfolio; however, the medium used to present and organize the portfolio artifacts is different. It is organized by using a combination of media tools such as audio/video recordings, multimedia programs, database, spreadsheet and word processing software as well as CD-ROMs and the World Wide Web with hypermedia links connecting that evidence to the objectives of the course and program (Kilbane & Milman, 2003). According to Barrett (2000), an electronic portfolio includes the use of electronic technologies that allows the portfolio developer to collect and organize artifacts in many formats. Numerous advantages associated with the use of electronic portfolios have been suggested by the literature (see for example, Barrett, 2005; Strudler & Wetzel, 2005; Tosh, Light, Fleming and Haywood, 2005; Williams, Wetzel, & Wilhelm,

Copyright © The Turkish Online Journal of Educational Technology 2002

2004): (1) increase in the technology knowledge and skills, (2) facility in distribution, (3) storage of many professional documents, and (4) increase in accessibility. With the creation of electronic portfolio, student teachers not only can showcase the best work as a professional, but also exhibit the knowledge and skills in using technology. Therefore, teacher education programs have begun to explore the use of technology as a tool in the development of portfolios. However, still remains a question to be answered, such as student teachers' perceptions of electronic portfolio development and its impact on their professional development. The literature in this area describes what electronic portfolios are, how they are used, and why they are used in teacher education. However, there is little research to discuss preservice teachers' perception of developing e-portfolios. Wilson, Wright, and Stallworth (2003) and Wright, Stallworth, and Ray (2002) investigated 111 preservice majors (foreign language, language arts, mathematics, and science) about electronic portfolio development in science and/or math teacher education. For the knowledge of the researcher, no study was conducted on perspectives about electronic portfolio development in EFL teacher education. Therefore, the main purpose of this study was to describe EFL student teachers' perceptions on the role of electronic portfolios in their professional development.

THE RESEARCH CONTEXT

The present study was conducted at the Faculty of Education in the Department of Foreign Language Education at a Turkish University. From 1998, all faculties of education in Turkey follow a standardized curriculum prescribed by the Higher Education Council (YOK, 1998) to train and educate future teachers for the schools of the Ministry of Education (cited in Cakiroglu & Cakiroglu, 2003). In their fourth-year of their teacher education program, the student teachers must satisfy a practice teaching requirement. During the 1st semester of their senior year, student teachers are given opportunities to observe EFL classes in primary and secondary schools. In the 2nd semester of their senior year, student teachers are engaged in student teaching. In the department the present study was conducted, the student teachers were also required to develop teaching portfolios as one of the requirements of practice teaching component of the program. For these portfolios, they are required to do some tasks that encourage them to reflect on their teaching such as writing journals, making lesson plans and presentations, writing self- and peer-evaluations, and engaging in written dialogues with the cooperating teachers and university supervisors.

THE PARTICIPANTS

The sample for this study included five senior level teacher candidates (one male and four females) completing their undergraduate degree in the Department of Foreign Language Education at a large Turkish University. All these student teachers were graduates of Teacher Lyceum age range between 20-22 years old. These participants volunteered to participate in the study, and met the criteria required for a purposive sample, that is, they are "the sources that will most help to answer the basic research questions and fit the basic purpose of the study" (Erlandson, Harris, Skipper, and Allen, 1993).

THE DATA COLLECTION AND ANALYSIS

Primary source of data collection for this study was interviews with the student teachers. The interview questions were developed by the researcher based on the literature she reviewed. Each student teacher who volunteered to participate in the study was interviewed concerning preparation of e-portfolio before and after the completion of the portfolio by the researcher herself. The interviews were conducted in English and were recorded.

Since the participants talked about their electronic portfolios in the interviews, it is essential to mention briefly about the portfolios they develop even though they were not the primary source of data for this study.

All the student teachers in this department were required to collect artifacts such as lesson plans, self- evaluation and peer-evaluation sheets, or reflective narratives required by the instructors in pen/paper portfolios. These portfolios were 3-ring notebooks or folders, organized with dividers and sections for paper-based documents demonstrating each task or activity for particular courses. The documents under investigation in this study, however, were electronic portfolios each participant voluntarily prepared during the methods course (Fall 2002-1st semester) and subsequent semester of practice teaching (Spring 2003-2nd semester). Each student teacher decided which software he/she would use to develop and organize his/her electronic portfolio. The portfolio artifacts included several classroom observation tasks, evaluation papers, student teacher narratives and student teachers' journals.

In order to find out the perspectives of the student teachers regarding the impact of e-portfolio preparation on their professional development, a content analysis by using Miles and Huberman's model (1994) was conducted to identify conceptual themes, i.e., what the participants mainly talked about in interviews.

Copyright © The Turkish Online Journal of Educational Technology 2002

First the interviews were transcribed, and then by reading each participant's transcripts, the researcher identified the conceptual themes by finding out the recurring words and ideas. Then, she coded them into "conceptual categories" and used these categories to create a matrix of major themes of each participant. Then, the researcher compiled all of the themes first, and then sorted these themes under possible headings to answer the research question. Under each heading, supporting quotes from each participant were listed and discussed. Some themes seemed to overlap one another, but it was impossible not to mention one theme within another in order to support the result. The reader will find some themes fully discussed in one section while only mentioned in another.

The findings will be reported in two sections. First section is about the pre-portfolio construction phase when student teachers were introduced to the e-portfolio. Second section is about the post-portfolio construction phase when the student teachers were finalizing their e-portfolios. In both sections, student teachers' perceptions about e-portfolios were reported.

RESULTS AND DISCUSSION

Pre-portfolio construction phase

The pre-portfolio construction phase was the beginning of the 1st semester when student teachers started to go to cooperating schools to observe, the same semester in which data collection also began. In this phase, pre-interviews were conducted with the student teachers. In the content analysis of these interviews, two themes on early beliefs about e-portfolio preparation emerged: "Portfolio as a tool for job search" and "Portfolio preparation as an overwhelming and time-consuming process."

Portfolio as a tool for job search

The e-portfolio as a 'tool for job search' is the term used by student teachers in pre-interviews to express how they saw their portfolios. Four of the five student teachers said that they would use it as a "fancy" document in their search for a job.

When asked how she saw her portfolio in the future, Didem immediately replied

> I want it to be a fancy portfolio, and I want to have something that I could take to job interviews. It will show that I had a different experience from other teachers when I applied for the job.

Burcu also visualized herself with her portfolio in a job interview situation "I want to show my portfolio to the person who is interviewing me. I want my portfolio to put me in the market as a teacher." Furthermore, she said, "right now, my goal is to prepare my portfolio with good work so that I can present myself and get a job." She expected the portfolio to present her and open the doors for job opportunity.

One student Mete, on the other hand, indicated that the portfolio was not for an employer, but for themselves. She would use it for her own purposes. It would help her remember what worked and did not work in her practice teaching:

> I do not believe that it is for other people. I do not see my portfolio as a tool to find a job. But I see it as a tool for myself to look at it when I am a teacher, to look what I did right or wrong. Actually, it shows how I develop as a teacher.

Student teachers, therefore, expressed a big advantage over other teacher candidates in the job process with their portfolios by showing the future employer the knowledge and the skills they learned in their teacher training. This finding is consistent with the findings of Hurst, Wilson and Cramer (1998) and Anderson and DeMeulle (1998), which suggested that the portfolio would help them to obtain a teaching position when they applied for a job.

Portfolio preparation as an overwhelming and time-consuming process

Student teachers knew that the portfolio preparation process would not be an easy one: in their terms, it was going to be a "tiresome" and "time-consuming" process. They were introduced to the requirements of practice teaching and observation of schools as well as to the requirements of portfolios when the data collection started. Ayşe's sense of frustration was evident when she said, "I don't know where to begin." Burcu expressed similar distress. She remarked, "I knew that we would prepare a portfolio for school experience course because my friends told me before. But I am really scared about this project." Ahmet was also uncertain: "It (portfolio)

Copyright © The Turkish Online Journal of Educational Technology 2002

seems an overwhelming activity." Didem's reaction was even more dramatic: "I am not sure what I will put in there. I am a little bit scared by this idea."

The student teachers in this study also expressed their concerns about the amount of time involved in portfolio preparation. Comments from them during the pre-interview revealed some frustrations about developing their first portfolio in the first semester. Ayşe expressed her feelings by saying that

> Finding time and preparing good material for this portfolio is going to be hard because I am not sure how to make them. I think in the first couple of weeks it will be hard to figure out what and how I should prepare them, and when I should prepare them.

On the other hand, when asked how much time he might spend on preparing his electronic portfolio, Ahmet said "Very little. I will be honest about that. Hopefully I will spend a little bit of time since I know a lot about computers, but I think I will spend more time on deciding what kind of things I will prepare rather than how I will prepare."

The participants also emphasized that working on the appearance of the portfolio made the process even more time-consuming. Student teachers were very concerned about how their artifacts would look and often talked about the need to type their artifacts. Esra was especially concerned with typing in order to improve the appearance: "I am typing them on the computer because it looks better." Like Esra, Burcu also saw the need to make revisions based on appearance. She used the term "polished," which means anything in the portfolio "that needs to be changed or corrected. I want no mistakes in it. I want it polished and look nice."

It is evident that developing electronic portfolios were seen overwhelming and time-consuming by the student teachers at the beginning of the project. The participants reported that one of the most time consuming part of the process would be preparing the required portfolio items and the appearance of the portfolio. Additionally, they also revealed that finding time to develop the necessary technical skills was a challenge, and would require more attention. Zidon (1996) also reported that student teachers stated that time was a limiting factor when constructing their portfolios. Many of them did not start working on their portfolios on time because of their time commitments to their responsibilities as a student teacher during their practice teaching. A lack of time to prepare the portfolio was the major challenge student teachers faced as reported in the literature (Dutt-Doner & Gilman, 1998; Harris & Curran, 1998; McKinney, 1998; Stone, 1998).

Post-portfolio construction phase

The post-portfolio construction phase was after the student teachers completed their portfolios at the end of 2nd semester. They reflected upon their experiences and thoughts about portfolios in their post-interviews. The content analysis of these interviews revealed five aspects of the portfolio construction process: support; collection of best work; opportunity for continuing learning; the development of technological skills and reflective thinking.

Support in the form of collaboration

The student teachers cited difficulties with the portfolio preparation and sought solutions to those problems. One solution came in the form of support from their classmates and from the researcher herself. These student teachers revealed that their portfolio preparation process was collaborative with support from each other as well as from faculty members and the researcher. This agrees with what Burke, Fogarty, and Belgrad, (1994) had to say about collaboration. She says, "though schools usually focus on students working alone, the real world allows and encourages people to talk, ask questions, get help and receive feedback" (p. xvi). The student teachers in the present study talked with each other, their cooperating teachers and the researcher. For instance, Didem explained that the help and support she received from her classmate Ayşe was important to her success:

> She helped me because I was having problems with the portfolio, especially with the electronic journal. I talked with her, asked her what she wrote. She described what she did and it helped me in writing my reflective statements.

Student teachers in this study reported that support from peers was very important in their success in developing their electronic portfolios. Working with peers gave student teachers an opportunity to view ideas and experiences from a different perspective. Student teachers' verbal interaction with each other is not only stimulating, but also it acts as a principle catalyst for reflective development as Korthagen found in his study (1992). Peers acted as consultants with each other and participated in the sharing of knowledge and information.

Copyright © The Turkish Online Journal of Educational Technology 2002

They also collaborated with the faculty members and the researcher herself. The researcher provided technical support to them by scheduling individual lab hours for help or providing assistance during chosen lab hours. Student teachers expressed how they felt the lab hours helped them with the development of the electronic portfolios. As Burcu said, "I think you (the researcher) did a good job for organizing those lab hours for us."

As evidenced, collaboration and support are essential elements in this project, which is consistent with the findings of other studies. For instance, Kieffer, Faust, Morrison and Hilderbrand (1996) study also supported the notion of collaboration for portfolio users. They indicated that portfolios provided opportunities for student teachers to gather a variety of responses by communicating to peers and instructors either orally or through electronic journals.

Collection of best works

Student teachers have revealed another aspect of portfolio preparation that agreed with many other researchers. They saw their portfolios as a physical product of their own that showed their professional development. They wanted to document their practice teaching in an organized way, and the portfolio provided them with an opportunity to create a professional collection of materials that represented an important period of their training and development as a foreign language teacher. Ayşe's words provided the code for this section by saying that: "the portfolio shows your best works . . . shows where you started and where you are now at the end of the year." She thought that

> I think I have grown as a teacher and a learner. I see this in my lesson plans I put in my portfolio. The lesson plans in the beginning of the semester were not as creative as the ones at the end of the semester.

Didem wrote in one of her journal entries "it (portfolio) helps me to reflect back. I looked the previous artifacts in the first day of my practice teaching; I see the mistakes I made and I did not do the same mistakes in my final portfolio." She had an opportunity to go back in her portfolio to see where she is at the moment, and be aware of what she was doing in her practice teaching.

These student teachers revealed an enthusiasm about portfolios: the portfolio is personal, and representative of the person who prepared it, and it is the collection of "best work." The notion of best work is valued by other researchers including Calkins (1994), and Graves (1992).

Furthermore, they expressed a sense of pride in their finished product. For example, Didem said, "at first I thought I don't want to do this portfolio, with all these practice teaching requirements, but once you finished it and see the results you are proud of yourself that you can do it." Burcu, for example, was very proud of her portfolio. She concluded that:

> I want you to know that although at one point, I thought I made a mistake by signing up for this electronic portfolio project. But now I am lucky to participate it. But it was well worth it, especially when I look back at it months later and I was proud of my work.

The student teachers accepted the responsibility that this portfolio was reflection of themselves and that the artifacts reflected their skills as teachers. Arter and Spandel (1992) said that ownership implies control over what goes into the portfolio and that ownership is a big responsibility for the portfolio constructors. These student teachers said from the very beginning of this study that the portfolios "are my best work that represents me as a person," or "a unique way to show my accomplishments." The use of "me" in these quotations actually shows the sense of ownership felt by the student teachers. This finding is consistent with the findings of other studies that having a portfolio (traditional or electronic) allowed student teachers to feel a sense of accomplishment in the finished product, and a means to keep and organize most of the important and best works from courses and practice teaching (Dutt-Dover & Gilman, 1998; Johnson, 1999; McKinney, 1998, Wetzel and Strudler, 2006).

Opportunity for ongoing learning

Learning was evident throughout the portfolio preparation process. However, what was becoming more evident to these student teachers by constructing a portfolio was the "ongoing" process of learning (Wolf, 1996). Each student teacher developing portfolio seemed to sense professionalism as the semester progressed. However, they did not understand the process they were undergoing at the very beginning of this project. It was not until

Copyright © The Turkish Online Journal of Educational Technology 2002

they started to prepare their artifacts that they understood what was expected from them. They recognized exactly what was happening in terms of professional development when the portfolios were completed. Ayşe's view of the portfolio also changed as she talked about why it was prepared:

> I prepared items for the course first and put them in the portfolio. But then I realized what I have done is something valuable, I learned from it (portfolio) and it will affect my teaching in the future because I see my growth in it.

Esra also was not sure about the purpose of preparing a portfolio at first, and said she believed it (portfolio preparation) was a time consuming process. But then she realized that the purpose of the portfolio preparation was " to increase our awareness of what we learned in schools and to show them what we observed and which aspects of this observation is beneficial for us."

All of the participants saw their portfolios as a good resource for displaying their learning and professional development. In addition, specifically, portfolios contain the teacher narrative section that is specifically related to professional development. This section makes powerful statements about the student teacher. It states what an individual believes, and the remainder of the portfolio shows how that student teacher relates his or her practice to their philosophy. Student teachers stated that the portfolio helped them reveal their professional beliefs about education in general, and about foreign language education, in particular. Didem said in her post-interview, "my beliefs of education are important. It is a combination of who I am and what I have learned. And I believe that culture must be taught within foreign language courses. You must include culture to your activities." And, in one of her lesson plans, she used examples from English speaking countries. She not only stated what her beliefs were, but also backed up those statements with her practices.

These student teachers developed their portfolios over one year, and especially over the course of their practice teaching, and their portfolios emerged from this process of collecting evidence that represented their growth. This process does not end with the graduation; as the student teachers mentioned they also plan to add items to their portfolios that show their new experiences and new knowledge. Therefore, the portfolios will continue to grow and change with their new experiences, and it gives them an opportunity for an ongoing learning and professional development.

The Development of technological skills

Through the development and maintenance of an electronic portfolio, student teachers used technology throughout the second semester. Preparing an electronic portfolio enhanced student teachers' professional development in terms of increased technology knowledge and use. The participants seemed more proud of their electronic portfolios than their paper portfolios. Even though at the beginning they seemed to be overwhelmed by the idea of preparing an electronic portfolio, at the end they mentioned that preparing it helped them develop their technical skills. For instance, as Burcu said "I was really scared at the beginning. But now, in terms of technology, I feel more confident, and I can now say that I can use a computer." All student teachers in this study agreed that they had learned new computer skills in the process of preparing their electronic portfolio. They reported learning how to import and download internet files, how to use a scanner or how to create hyperlinks between the portfolio items. When talking about her experience with the scanner, Didem stated, "I learned how to scan. I had never used a scanner before. Now I feel comfortable using a scanner. That is definitely a skill I learned by preparing this portfolio."

Esra described what she had learned about technology, especially videotaping, and how she felt it was going to help her in her future teaching. She said:

> For my electronic portfolio, I decided to videotape the lessons I taught in practice teaching. So, I learned how to set up the video cameras. Learning how to do these things helped me to understand more about how technology can be integrated into language teaching. After I graduate and when I have my own classroom, this knowledge will help me to videotape my classes so that I can watch myself. This will help me understand what skills I still need to develop.

Burcu was very proud of the PowerPoint presentation that she created for her electronic portfolio. She described what she learned about PowerPoint from doing this presentation:

> I saw that PowerPoint slides are more useful than the traditional OHP. This program provides color and action to any lesson. Using sounds, pictures and even video clips

Copyright © The Turkish Online Journal of Educational Technology 2002

add excitement and interest to a lesson. This will help students motivate and participate more.

The student teachers all reported that preparing paper and electronic portfolios were worth doing. They felt a sense of accomplishment in technology skills as a result of participating in the electronic portfolio project. This finding is in consistent with the findings of McKinney (1998), Richards (1998), Wetzel and Strudler, 2006 and Piper (1999), which suggested that student teachers indicated a positive attitude toward the use of electronic portfolios in their teaching, and that they learned new technological skills as they developed their electronic portfolios.

Reflective thinking

Reflective thinking facilitates improvement in professional practice by helping student teachers examine what they are actually doing in the classroom, such as how they teach, or how they assess students' understanding or how they plan lessons. Reflection in the portfolio helps them to see themselves better. Data from the interviews revealed that the student teachers, however, did not consider developing an electronic portfolio as a reflective activity. They believed that electronic portfolio preparation actually hindered their reflectivity because they were very much concerned with the technicality of the electronic portfolios so that they might have given importance to the outlook of their electronic portfolios rather than the content (Kocoglu, Akyel and Ercetin, 2008). Like the teachers in Orland-Barak's study (2005), the student teachers in the present study depicted the experience of having an electronic portfolio as "favorable image" (p. 36) of their teaching, therefore they focused on presenting a favorable image through their portfolios as a neat and professional collection of their teaching practice. Burcu said, for instance, "My reflections are there, but I don't think they are critical reflections. I thought mostly about the appearance." Ayşe said that "to reflect on yourself as a teacher, you need to think about your beliefs that you were taught in your teacher training. But what I did was to organize the screen." The findings of the present study did not confirm the findings that the process of developing portfolios (paper) help student teachers better understand the complexities of teaching and become reflective practitioners (Loughran and Corrigan, 1995; Winsor and Ellefson, 1995). A number of other studies also suggested that portfolio development was also a useful tool for supporting reflection (Dana and Tippins, 1998; McKinney, 1998; Zembal-Saul, 2001, Wade and Yarbrough, 1996). This study, however, found out that in terms of the student teachers' perspectives, developing an electronic portfolio did not enhance their reflective thinking.

CONCLUSIONS

This study reported the perspectives of student teachers on portfolio preparation. Results of data analysis identified several themes, indicating how the student teachers perceived the role of portfolio before and after the portfolio construction. In pre-portfolio construction phase, student teachers saw the portfolio as a tool that serves them in the job search process. The portfolio audience took an important role in the process. The student teachers said in their pre-interviews that they were producing evidence with the notion that someone with the power to provide them with a job would be reading and viewing their portfolios.

Initial interviews revealed expectations about portfolios, but also it created a sense of being "tired" by it. They believed that portfolio preparation was a tiresome and time-consuming process, which needed support from faculty and classmates. When asked about the purpose of the portfolio in pre-interviews, the student teachers said it was to get a good course grade and meet graduation requirements.

In post-portfolio construction phase, they believed their portfolios were collections of materials that showed their personal and professional development. The student teachers cited difficulties with the portfolio preparation and sought support from their course instructors and their classmates. However, they did not work alone; they collaborated with each other. They discussed with each other the ideas they had and offered advice to one another. Collaboration was an important practice during the portfolio preparation process, and this finding coincides with the findings of others who have viewed collaboration as a productive practice (Kieffer, Faust, Morrison & Hilderbrand, 1996; Graves, 1994; Routman, 1994).

In their post-interviews, student teachers also reflected upon their portfolios. They looked closely at their strengths and weaknesses. They were actually proud of their portfolios and what they had achieved, especially when they finished their electronic portfolio. They also indicated that portfolio preparation process was an ongoing developmental process. In the end, they admitted that the portfolio preparation process did not actually finish. As Burcu said, "it will never be over. There will be more to add and more to change as time goes on." For these student teachers, the portfolio preparation process provided them with the opportunity to monitor their professional growth. In addition, as discussed by Wright, Stallworth and Ray, electronic portfolios also required

Copyright © The Turkish Online Journal of Educational Technology 2002

time, commitment, planning and evaluation (p.60). The student teachers indicated positive attitudes about the use of technology in developing their electronic portfolios.

First of all, the findings of this study show that electronic portfolios are an important element for the professional development of a student teacher, helping them keep current with innovations in the modern digital world. However, the student teachers in this study did not believe that electronic portfolios can be an important tool to develop refelctive thinking. Therefore, further research is needed to investigate whether electronic portfolios are as effective as paper portfolios in enhancing reflective thinking in terms of reflective narratives/portfolio artifacts written by the student teachers.

Second, the findings of this study imply that if a teacher education program plans to implement electronic portfolios as an effective tool for reflective activities, the student teachers need to be first trained sufficiently in technology use to be able to create such a technological tool. In other words, teacher education programs need to provide adequate facilities with the appropriate hardware and software as well as lab hours for student teachers to work on their electronic portfolios.

REFERENCES

Anderson, R.S., & DeMeulle, L. (1998). Portfolio use in 24 teacher education programs. *Teacher Education Quarterly*, 25 (1), 23-31.

Arter, J.A. & Spandel, V. (1992). Using portfolios of student work in instruction and assessment. *Educational Measurement: Issues and Practice,* 11, 36-44.

Barrett, H. (2005). White paper: Researching electronic portfolios and learner engagement. Available at: www.helenbarrett.com/reflect/whitepaper.pdf

Barton, J., & Collins, A. (1993). Portfolios in teacher education. *Journal of Teacher Education,* 44 (3), 200-210.

Bird, T. (1990). The schoolteacher's portfolio: An essay on possibilities. In: Millman, J. & Darling-Hammond, L. (Eds.), *Handbook of teacher evaluation: Elementary and secondary personnel*. Sage, Newbury Park, CA. pp. 241-256.

Borko, H., Michalec, P., Timmons, M. & Siddle, J. (1997). Student teaching portfolios: A tool for promoting reflective practice. *Journal of Teaching Education*, 48 (5), 347-357.

Burke, K, Fogarty, R & Belgrad, S. (1994). *The Mindful School: The Portfolio Connection*. Palatine: IRI/Skylight Training & Publishing.

Çakiroglu, E. & Cakiroglu, J. (2003). Reflections on teacher education in Turkey. *European Journal of Teacher Education,* 26, 253-264.

Calkins, L. (1994). Drafting and revision: Letting our words instruct and surprise us. In Calkins, L. (Ed.), *The Art of Teaching Writing*. Heinemann, Portsmouth, NH, pp. 107-123.

Dana, T. M., & Tippins, D. J. (1998). Portfolios, reflection and educating prospective teachers of science. In Fraser, B. J. & Tobins, K. G. (Eds.), *International Handbook of Science Education*. Kluwer Academic, Dordrecht, Netherlands, pp. 719-732.

Davies, M.A. & Willis, E. (2001). Through the looking glass . . . Preservice professional portfolios. *Teacher Educator*, 37 (1), 27-36.

Dutt-Doner, K. & Gilman, D.A. (1998). Students react to portfolio assessment. *Contemporary Education*, 69 (3), 159-166

Erlandson, D.A, Harris, E.L., Skipper, B.L., & Allen, S.D. (1993). *Doing Naturalistic Inquiry: A Guide to Methods*. London: Sage.

Georgi, D & Crowe, J. (1998). Digital portfolios: A confluence of portfolio assessment and technology. *Teacher Education Quarterly*, 25 (1), 73-84.

Graves, D. (1994). Help children to revise their work. In Graves, D.H. (Ed.), *A Fresh Look at Writing*. Heinemann, Portsmouth, NH, pp. 23-36.

Harris, M. & Curran, C.M. (1998). Knowledge, attitudes and concerns about portfolio assessment: An exploratory study. *Teacher Education and Special Education,* 2 (21): 83-94.

Hurst, B., Wilson, C., & Cramer, G. (1998). Professional Teaching Portfolios: Tools for Reflection, Growth, and Advancement. *Phi Delta Kappan, 79*(8), 578-82.

Johnson, J. (1999). Professional teaching portfolios: A catalyst for rethinking teacher education. *Action in Teacher Education*, 21 (1), 37-49.

Kilbane, C. R., & Milman, N. B. (2003). *The digital teaching portfolio handbook: A how-to guide for educators*. Boston: Allyn and Bacon.

Kieffer, R., Faust, M., Morrison, L. & Hilderbrand, C. (1996). *Questions about portfolio processes*. (Instructional Resource). Athens, GA: National Reading Research Center, The University of Georgia and The University of Maryland College Park.

Copyright © The Turkish Online Journal of Educational Technology 2002

Kocoglu, Z., Akyel, A. & Ercetin, G. (in press) Pen/Paper and Electronic Portfolios: An Effective Tool for Developing Reflective Thinking of Turkish EFL Student Teachers?. *Mediterranean Journal of Educational Studies, 13(1)*.

Kolb, D. A. (1981). Learning styles and disciplinary differences. In Chickering, A. W. (Ed.), *The Modern American College*. San Francisco: Jossey-Bass.

Korthagen, F.A.J. (1992). Techniques for stimulating reflection in teacher education seminars. *Teaching and Teacher Education*, 36, 11-15.

Loughran, J., & Corrigan, D. (1995). Teaching portfolios: A strategy for developing learning and teaching in preservice education. *Teaching and Teacher Education*, 11 (6), 565-77.

Lyons, N. (1998a). Reflection in teaching: Can it be developmental? A portfolio perspective. *Teacher Education Quarterly*, 25 (1), 115-127.

Lyons, N. (1998b). Portfolios and their consequences: Developing as a reflective practitioner. In Lyons, N. (Ed.), *With portfolio in hand: Validating the new teacher professionalism*. Teachers College Press, NY, pp. 247-264.

McKinney, M. (1998). Student teachers' electronic portfolios: Integrating technology, self-assessment, and reflection. *Teacher Education Quarterly*, 25, 85-103.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (Thousand Oaks, CA, SAGE).

Orland-Barak, L. (2005). Portfolios as evidence of reflective practice: What remains untold? *Educational Research,* 47 (1): 25-44.

Piper, C. H. (1999). *Electronic portfolios in teacher education*. Unpublished Dissertation, EdD, University of the Pacific, Stockton, CA.

Richards, R.T. (1998). Infusing technology and literacy into the undergraduate teacher education curriculum through the use of electronic portfolios. *T. H. E. Journal*, 25 (9), 46-51.

Routman, R. (1994) Critical issues in meaningful evaluation, in: R. Routman, (Ed.) *Innovations changing as teachers and learners in K-12* (Portsmouth, NH: Heinemann), 43-67.

Shulman, L. (1998). Teacher portfolios: A theoretical activity. In N. Lyons (Ed.), *With portfolio in hand: Validating the new teacher professionalism*. Teachers College Press, New York, pp. 23-37.

Stone, B. A. (1998). Problems, Pitfalls, and Benefits of Portfolios. *Teacher Education Quarterly*, 25 (1), 105-14.

Strudler, N., & Wetzel, K. (2005) The diffusion of electronic portfolios in teacher education: Issues of initiation and implementation. *Journal of Research on Technology in Education,* 37(4), 411-433.

Tosh, D., Light, T.P., Fleming, K. & Haywood, J. (2005). Engagement with Electronic Portfolios: Challenges from the Student Perspective. *Canadian Journal of Learning and Technology, 31(3).* Retrieved from http://www.cjlt.ca/content/vol31.3/tosh.html

Wade, R.C. & Yarbrough, D.B. (1996). Portfolios: A tool for reflective thinking in teacher education? *Teaching and Teacher Education*, 12, 63-79.

Wetzel, K. and Strudler, N. (2006). Costs and benefits of electronic portfolios in teacher education: Student voices. *Journal of Computing in Teacher Education*, 22 (3), 69-78.

Williams, M., Wetzel, K. & Wilhelm, L. (2004). Trials and tribulations of reflective practices in preservice teacher electronic portfolios, in: C. Crawford, N. Davis, J. Price & D. Willis. (Eds), *Technology and Teacher Education Annual*, (Norfolk, VA: Association for Advancement of Computing in Education), 301-306.

Wilson, E.K., Wright, V.H. & Stallworth, B.J. (2003). Secondary preservice teachers' development of electronic portfolios: An examination of perceptions. *Journal of Technology and Teacher Education*, 11(4): 515-527.

Winsor, P. J., & Ellefson, B. A. (1995). Professional portfolios in teacher education: An Exploration of their value and potential. *The Teacher Educator*, 31, 68-91.

Wolf, K. (1996). Developing an effective teaching portfolio. *Educational Leadership*, 53 (6), 34-37.

Wright, V.H., Stallworth, J. & Ray, B. (2002). Challenges of electronic portfolios: Student perceptions and experiences. *Journal of Technology and Teacher Education*, 10 (2), 49-61.

YOK. (1998). *Egitim Fakultesi Ogretmen Yetistirme Lisans Programlari*. Retrieved September 21, 2004, from http://www.yok.gov.tr/egitim/ogretmen/ogretmen_yetistirme_lisans/giris.pdf

Zembal-Saul, C. (2001). *Web-based portfolio development in a professional development school context*. Paper presented at the annual meeting of the American Educational Research Association, Seattle, WA.

Zidon, M. (1996). Portfolios in preservice teacher education: What the students say. *Action in teacher Education*, 18 (1), 59-70.

Zubizaretta, J. (2004). *The learning portfolio: Reflective practice for student learning* (Bolton, MA, Anker Publishing Company).

Copyright © The Turkish Online Journal of Educational Technology 2002

USING MULTIMEDIA SOCIAL STORIES TO INCREASE APPROPRIATE SOCIAL ENGAGEMENT IN YOUNG CHILDREN WITH AUTISM

Selda OZDEMIR
Gazi Universitesi
Gazi Egitim Fakultesi
Ozel Egitim Bolumu
seldaunaldi@yahoo.com

ABSTRACT
The purpose of this study was to examine the effectiveness of the multimedia social stories on the duration of appropriate social engagement of 3 young children with autism. Using a multiple-baseline-across-participants design, the multimedia social stories were implemented, and observations of 10-min play sessions were conducted three times per week. Study results showed an increase in the duration of appropriate social engagement for all participants and two participants also showed generalization to a classroom setting. The results from the study provide support for the use of the multimedia social stories without additional behavioral management techniques in increasing the social engagement of children with autism. Recommendations for future research and potential benefits of the multimedia social story interventions are discussed.
***Key Words**:* Autism; Multimedia Social Stories; Social Engagement; Intervention; Young Children.

Autism is a developmental disability that significantly impacts verbal and nonverbal communication and social/emotional behavior (Koegel & Koegel, 1995). It is best described as a spectrum of disorders since there appears to be great variability in the severity and types of deficit that may be present (Gillberg & Coleman, 2000; Quill, 1997). The most pervasive and universal feature of autism is a deficit in social skills. Indeed, the word "autism" means "within oneself" (Kanner, 1943). Kanner reported, "The fundamental disorder is the children's inability to relate themselves in the ordinary way to people and situations from the beginning of life" (Kanner, 1943, p.242).

The importance of social competence and acquisition of social skills in various domains is not in question. While typically developing children may acquire needed social skills by observing others, individuals with autism frequently have difficulty in social stimuli and social interactions. Wing (1988) classified the social interaction difficulties of individuals with autism into three categories: (a) social recognition, which is described as a lack of interest in others; (b) social communication, which includes trouble expressing one's self and having a limited understanding of body language; and (c) social imitation and understanding, which includes an inability to understand the thoughts or feelings of others or to engage in imaginative play. Unless appropriate social behaviors become part of the child's repertoire, the long-term goal of functioning independently in the community may never be realized.

Since Kanner's (1943) early description of autism, there has been considerable research in identification and appropriate interventions for children with autism. Studies that have focused on cognitive and social competencies of children with autism have noticed strengths in visual-perceptual skills (Lincoln, Courchesne, Kilman, Elmasian, & Allen, 1988: Rodgers, 2000; Siegel, Minshew, & Golstein, 1996) and pictographic stimuli (Garretson, Fein, & Waterhouse, 1990). Visual displays of skill sequences, in particular, have helped with skill acquisition of daily living skills (Pierce & Schriebman, 1994; Roberson, Gravel, Valcanten, Maurer, 1992). Therefore, a social skill intervention that combines visually cued instruction may assist individuals with autism to acquire social skills.

Given the unique learning needs of individuals with autism, social stories may provide an effective strategy to improve social competence. Carol Gray, a special education teacher, developed social stories in order to enable individuals with an autistic spectrum disorder to "read, interpret, and respond effectively to their social world" (Gray, 1994, p.5). A social story is a concise narrative about a situation, concept, behavior, or social skill that is written and implemented according to specific guidelines. Social stories are designed to bring predictability to a situation by providing specific and relevant social cues as well as defining the appropriate responses to a social situation. Social stories try to address both sides of the social equation by improving the social understanding of the child with an Autistic Spectrum Disorder, as well as the person interacting with the child.

The construction of a Social Story uses concrete, easy to understand text enhanced by visual supports. The text and illustrations should reflect the child's reading skills, attention span and cognitive ability. Pictures, maps, photos or symbols used as illustrations are printed in black and white to reduce distractions and limit any unintentional relay of misinformation. The child's needs determine the topic of the story, while the child's

Copyright © The Turkish Online Journal of Educational Technology 2002

perspective determines the focus of the story. The story is written in the first person, as if the child is telling the story. The social story uses positive language and states desired responses positively.

Gray identified four types of sentences that can be used to write social stories-descriptive, directive, perspective, and control- to explain abstract situations, often trough the use of analogies (Gray, 1997). Descriptive sentences provide information about the behavior of most people in a given social situation. These sentences also identify reasons for certain social behaviors. Descriptive sentences do not give information to the child about expected behavior in the targeted situation, but they appear to be very helpful for the explanation of social events (Gray & Garand, 1993). Directive sentences explain to the child what the desired response to a certain social situation is and what the child should try to say or do in a given situation. Gray suggests that directive sentences are more effective when they are written in positive terms (Gray & Garrand, 1993). Perspective sentences involve incorporating another person's view into the social story. These sentences are designed to enhance the child's understanding of how other people view the targeted social situation. Finally, control sentences provide the child with personal strategies to use in order to recall and apply the given information. The child may write these sentences.

According to Gray (1997), these components should be written in ratio. The basic social story ratio consists of two to five descriptive, perspective, and affirmative sentences for every directive sentence. This ratio exists because it emphasizes one expected behavior at a time. Whereas the first three sentences establish the setting, people's perspectives, and a particular command, the single remaining directive sentence highlights the main lesson-the appropriate behavior for the child. By having this ratio, children with autism focus on one direction at a time.

A growing body of literature has examined the effectiveness of social stories with individuals with autism. Existing literature showed that social stories were effective in decreasing aggressive behavior (Adams, Gouvousis, Van Lue, & Waldron, 2004; Gray & Garand, 1993; Romano, 2002; Rowe, 1999), increasing appropriate behaviors (Agosta, Graetz, Mastropieri, & Scruggs, 2004; Cullain, 2000; Graetz, 2003; Kuoch & Mirenda, 2003, Smith, 2001), increasing the use of appropriate social skills (Barry & Burley 2004; Hagiwara, 1998; Pettigrew, 1998), increasing greeting behavior and initiation of play activities (Feinberg, 2001), increasing on-task behavior (Brownell, 2002), increasing appropriate meal-eating behavior (Staley, 2001) and decreasing precursors of tantrum behaviors (Simpson & Myles, 2002).

In a review of research literature on social stories, Reynhout and Carter (2006) suggested that interpretations of extant studies are frequently confounded by inadequate participant description and the use of social stories in combination with other interventions. The researchers concluded that although social stories stand as promising intervention, further research is needed to determine the exact nature of their contribution and the components critical to their efficacy. In addition, Kuoch and Mirenda (2003) offered a limited review of research of 10 social story interventions. Several limitations in the research were noted including non- conformity of many of the stories with recommended guidelines, flawed and weak research designs and confounding effects as additional interventions were often employed with social stories.

Although an increasing amount of literature suggests that social stories can be effective for individuals diagnosed with autism, many lack rigorous methodological standards and use the social story intervention in conjunction with other treatments, making it difficult to identify the source of the behavioral change. Additional empirical social story research is essential to further develop this promising intervention in the field of autism.

The purpose of this study was to determine if a multimedia social story intervention could increase the duration of appropriate social engagement in young children with autism. This study adds to the literature by introducing a medium of presentation. The multimedia social story intervention allows children to learn new social behaviors through social stories presented on a computer. As multimedia social story intervention uses the characteristics of the social stories in a structured and attractive presentation with visual stimuli and sound made by the computer system. This study also extends to which multimedia social stories effectively increase the duration of appropriate social engagement of children with autism without the addition of planned behavior management systems.

METHOD

Participants

Three children with an existing clinical diagnosis of autistic disorder were participated in the study. All subjects had been found eligible for special education services in their school district under the category of autism as defined by their school based on the federal guidelines. Each child also had the following characteristics: (a)

Copyright © The Turkish Online Journal of Educational Technology 2002

meet the full criteria for autism according to DSM-IV-TR (APA, 2000) (b) functional verbal communication, (c) able to read and comprehend words at the pre-kindergarten level, as measured by the Peabody Individual Achievement Test, Revised (PIAT-R; Markwardt, 1989), (d) ability to follow directions, and (e) access to peers with inclusive education, (f) fine motor skills that allow for manipulation of a computer, such as moving the mouse or clicking its button.

John was a 6-year, 2-month old Caucasian male, clinically diagnosed with autism at the age of 3. As assessed by the Childhood Autism Rating Scale (CARS; Schopler et al., 1980), John had a mild level of autism. John was receiving special education services as a student with autism. He was fully included in a kindergarten class and received speech and language services. Teachers reported that John followed classroom routines, but sometimes had difficulty with transitions. According to teacher report on the Social Skills Rating System (SSRS; Gresham and Elliot, 1990), he received a standard score of 96, indicating his social skills at the lower end of the average range. John could play simple games with prompting and answer social questions but did not initiated social interactions.

Gerard, was a 6-year, 4-month old Caucasian male diagnosed with autism and at a mild level according to the Childhood Autism Rating Scale (CARS). Gerard was fully included in a kindergarten *class* and received special education services. According to teacher report on the SSRS, he received a standard score of 81, indicating his social skills were delayed. As reported by his teachers, Gerard was able get most of his needs and wants met using his language. However, he preferred to play alone and rarely initiated any social interactions.

Kenny, was a 5-year, 6 months old African American male diagnosed with autism at a mild level according to CARS. Kenny was fully included in a preschool class and received special education services. According to teacher report on the SSRS, he received a standard score of 79 indicating his social skills were delayed. Kenny communicated mostly using phrases and simple sentences, although these communication intents were most often directed to adults. He preferred to play by himself and would only engage in social behaviors with prompting.

The six three typical peers, three males and three girls, were selected by their teachers. Two typical peers were grouped with each child with autism: one selected as a play partner during intervention sessions and the remaining one became play partner during play sessions for the generalization probes.

The Multimedia Social Stories

A set of multimedia social stories were developed for participant children according to Gray's outlines. The HyperCard software was used in order to create multimedia social stories. This program has a book like format which contains text of the social stories, movies of the social skills corresponding to the social story sentences; audio capability that read aloud sentences using a synthesized computer voice, and a navigational button clickable by the participants. Each multimedia social story included information specific to the session's play activity along with short movies corresponding to the social story sentence on each page. Following the development of a set of social stories, the researcher taught three participants the basic skills such as moving the mouse to move the cursor on the display and clicking the play button to start the movie for using the computer. The researcher, then introduced each participant to their multimedia social stories and allowed participants operate the multimedia social story each day immediately before the play session. At the end of the story reading, the researcher asked the target child four questions to assess his comprehension of the story. If the target child did not correctly answer a question, the peer was given an opportunity to provide the correct response. The experimenter would repeat the question and the correct response. If the target child did not provide the correct response, the researcher would model the correct response until the target child responded correctly.

Setting

This study was conducted at a school located in upstate New York. All training sessions took place in the play room. A Panasonic video camera set on a tripod was placed in the play room in order to videotape play sessions. The camera was positioned opposite the side of the table with the pile of games on it, in order to capture both the child and peer as they played. Videotapes of the play sessions were later scored by the researcher and a trained research assistant.

Dependent Measures

The three primary dependent social measures were, (1) appropriate social engagement with peer, (b) inappropriate social engagement with peer, and (c) the absence of engagement with peer. All baseline and experimental sessions were video taped. The video was then transferred to DVD format at the end of the each

data collection. The initial coding was done by the principal researcher after each session to assess student performance and guide the progression of the study. To assess interobserver agreement, a second observer coded thirty percent of all sessions, recording social engagement codes. The rater was trained by the investigator and scored practice videotapes until interrater reliability reached a level of .80. A second by second comparison method (Maclean, Tapp, & Johnson, 1985) was employed for assessing agreement for social engagement codes, and kappa coefficients ranged from for John .72 to.94 (M=.89), for Gerard .83 to .97 (M=.93), and for Kenny .85 to .99 (M=87).

Design

A multiple baseline design across participants was used to examine the effectiveness of the multimedia social stories on the social engagement of three children with autism. This design requires the intervention to be implemented in a staggered fashion across three different series so that each participant serves as a control for the other participants (Kazdin, 1982).

Procedure

The principal researcher observed the participant children across two weeks of school day and noted child activity preferences and materials that target children touched or manipulated. A list of preferred activities was generated for each of the following activity categories: Art/Pretend Play, Games, and Building Activities. Second, the researchers interviewed classroom teachers and obtained information about whether the intervention goal of increasing specific social skills matched the child's needs. Additionally, before the first day of intervention, the primary researcher met with each typical peer for three 15-min orientation sessions. The researcher overviewed the appropriate social interactions with peers and modeled each skill individually for peers and role played appropriate interactions with them.

Baseline and Intervention

Observations of the three participants and their training peers were conducted at the play room of the participants' school during regular school hours. During the baseline condition, the researcher brought each target child and his training peer to the play room and allowed the target child operate a multimedia generic story. After the first reading of the multimedia story, the researcher showed target child the comprehension questions and asked him his answers. Then the target child and typical peer were asked to play in the play area for 10 minutes.

Intervention data were collected three times per week for participant children. Each play session was 10 minutes in duration. In the beginning of each play session, a social story which described the day's activity was operated instead of a generic story. During one out of every five intervention sessions, ten-minute covert probes were performed to collect a sample of data immediately prior to the intervention session.

During the intervention sessions, the researcher introduced the multimedia social story first to John. When the researcher started intervention with John, two other participants remained in the baseline until John met criterion 1. Criterion 1 required that intervention data for appropriate social engagement indicated: (a) an increase in level, (b) an accelerated slop, (c) and increase in median and (d) no overlap with baseline data. When John met the Criterion 1, the researcher began intervention with Gerard. This process continued until all three participants started the intervention.

Maintenance

Two maintenance probes were conducted after the final intervention session. In order to decide when the intervention would be faded, a second criterion was established. According to Criterion 2, fading began after 15 intervention sessions and when four out of last six intervention points for appropriate social engagement were at least 40 percent greater than baseline for four of the last six data points. When a target child met with this criterion, then the multimedia social story operated every other session (Fade A). Operating the multimedia social story in every other session continued for 6 sessions. If the duration of appropriate social engagement remained at least 40% greater than baseline for four of the last five data points, no story was read to participant children. This no story condition (Fade B) continued for five sessions. For the generalization, each time a target child met the first Criterion or the second criterion, generalization probes were administrated. Target children were observed with a non training peer in the play room and in their regular classroom for 10-minute sessions.

RESULTS

Duration of Appropriate Social Engagement with Peers

Duration of appropriate social behaviors across baseline, intervention and follow-up phases for each participant are presented in Figure 1. According to the multiple baseline design, these data show increases in duration of

Copyright © The Turkish Online Journal of Educational Technology 2002

appropriate social engagement for all participant children following the initiation of the multimedia social story intervention.

During baseline, John spent a minimal amount of time with his peer, and directed most of his comments to the researcher. While the researcher refrained from interacting with John, John continued to seek adult attention. John's mean of appropriate social engagement with a peer during baseline was 43.67 seconds. Following the introduction of the intervention the duration of John's appropriate social engagement with a peer significantly increased. During intervention sessions, John's duration of appropriate social engagements ranged from 180 second in the third intervention session to 492 seconds in the fifteen intervention session with a mean of 301.46 seconds. When the intervention was conducted every other session for six sessions, John's duration for appropriate social engagement ranged from 412 seconds to 490 seconds and his mean duration increased to a mean of 467.17 seconds. When the intervention faded for the second time (Fade B), John's duration of appropriate social engagement again dropped slightly to a mean of 436.83 seconds. Data were collected for an additional six sessions with no intervention. John's mean duration dropped to 330.25 seconds during this No Story condition. Although there was a decrease on John's appropriate social engagement during Fade B and No story conditions, John continued to display an increase over baseline in his duration of appropriate social engagement. Following the introduction of the intervention the duration of Kenny's appropriate social engagement increased to a mean of 376.13 seconds. Intervention data indicated that there was an increase in the level of the data and accelerating trend was evident.

During baseline sessions, Gerard's mean duration appropriate social engagement was 81.17 seconds. With the introduction of the intervention, the duration of Gerard's appropriate social engagement significantly increased. Similar to John, there was an increase in the level of the data and accelerating trend was evident. During fifteen intervention sessions, Gerard's duration of appropriate social engagement ranged from 274 seconds in the first intervention session to 463 seconds in the twelve intervention session with a mean of 388 seconds. When the intervention was conducted every other session for six sessions Gerard's duration of social engagement increased to a mean of 419.83 seconds. During the Fade B condition, Gerard's appropriate social engagement decreased slightly to a mean of 374.83 seconds. Data were collected for an additional six sessions with no intervention. Gerard's mean duration dropped to 325.83 seconds with a range of 289 to 367 seconds. Although there was a decrease on Gerard's appropriate social engagement during Fade B and No story conditions, Gerard continued to display an increase over baseline in his duration of appropriate social engagement.

As shown in Figure 1, Gerard participated in ten play sessions with a novel peer. His duration of social engagement ranged from 81 seconds during baseline to 423 seconds during the fifth probe. Generalization data suggest that Gerard showed significant improvement over baseline performance in his kindergarten class after the introduction of the multimedia social story intervention. Gerard's duration of appropriate social engagement with peers also increased in his kindergarten classroom.

During baseline sessions Kenny primarily engaged with parallel play. Kenny's mean duration appropriate social engagement was 82.58 seconds. Following the introduction of the intervention the duration of Kenny's appropriate social engagement increased to a mean of 376.13 seconds. Intervention data indicated that there was an increase in the level of the data and accelerating trend was evident. When the intervention was conducted every other session for six sessions, Kenny's duration of appropriate social engagement ranged from 394 seconds to 451 seconds and his mean duration increased to a mean of 425.83 seconds. During Fade B condition, Kenny's duration of appropriate social engagement decreased slightly to a mean of 377.33 seconds. Data were collected for an additional six sessions with no intervention. Kenny's mean duration again dropped to 292.57 seconds with a range of 210 to 340 seconds. However, despite Kenny's slowly decreasing trend, Kenny's level of appropriate social engagement remained higher than during baseline observations.

As shown in Figure 1, Kenny participated in ten play sessions with a novel peer. His duration of social engagement ranged from 72.33 seconds during baseline to 328.33 seconds during the fifth probe. However, generalization data suggest that Kenny displayed little improvement over baseline performance in his preschool classroom.

Copyright © The Turkish Online Journal of Educational Technology 2002

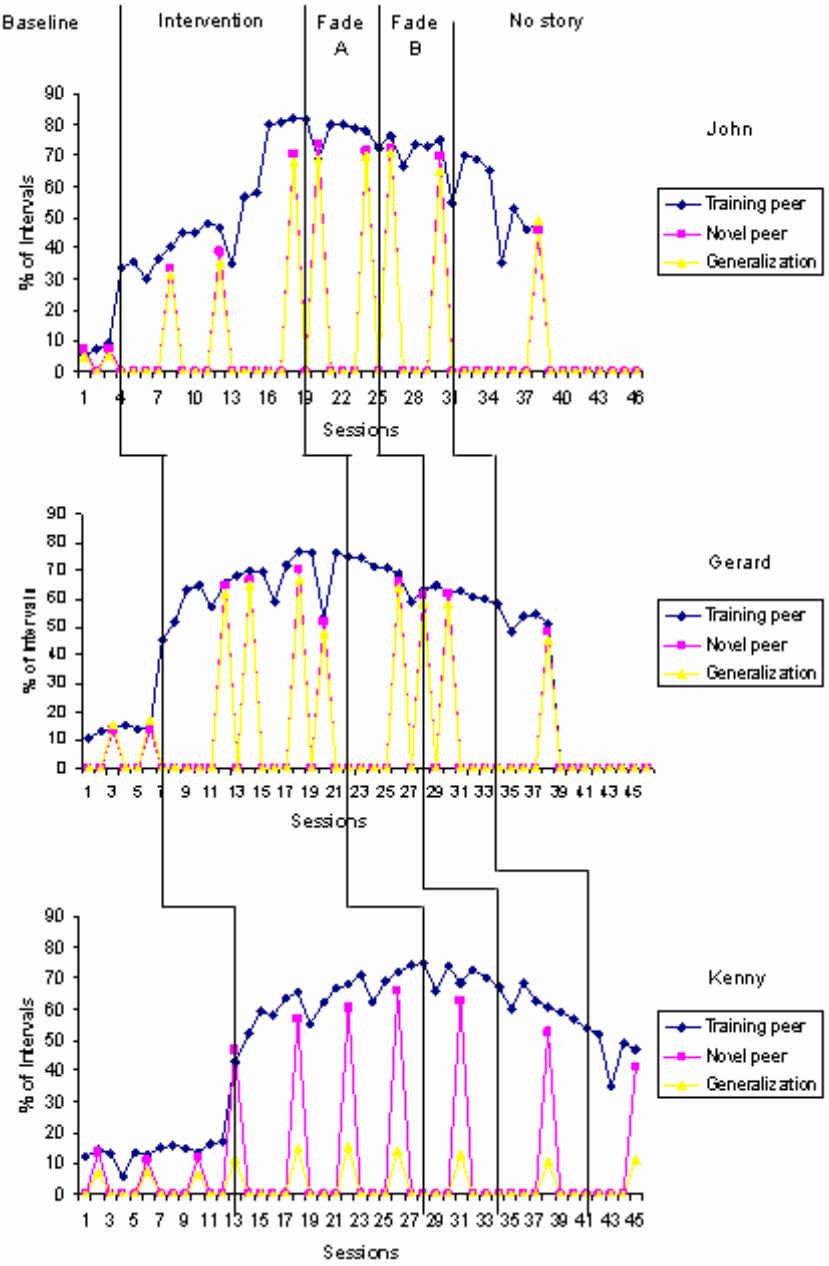


Figure 1. Percentage of appropriate social engagement with peers.

DISCUSSION

The present study evaluated the effects of multimedia social stories on the duration of appropriate social engagement of three children with autism. The study results showed that the multimedia social story interventions were effective in increasing the duration of appropriate social engagement of all children participated in this study. The social stories developed for the study were written according to the Gray's guidelines (1993). Following the implementation of the multimedia social story intervention, all target children demonstrated longer time spent socially engaged with peers compared to baseline performance. Treatment effects were generalized to the kindergarten classrooms by two of the three participants.

The effects of the multimedia social story intervention appeared to be most promising for John and Gerard across intervention and maintenance phases. Although all participants displayed a significant increase in the time spent socially engaged with peers, only John and Gerard generalized this improvement over classroom environments. During baseline sessions, John and Gerard appeared to barely acknowledge their play partners, and their play was imitative and lacked creativity and imagination. As the intervention progressed, both John

Copyright © The Turkish Online Journal of Educational Technology 2002

and Gerard appeared less static and more dynamic in the use social behaviors with play partners. In fact, an impressive change in the duration of appropriate social engagement was observed on the first day of the multimedia social story intervention and maintained themselves above baseline levels throughout the intervention and maintenance phases. Although marked improvements in Kenny's social interactions with his play partner and a novel peer in the intervention setting were observed, the same effects were not found in his preschool classroom. The reason for the lack of setting generalization would be the lack of similarity between the intervention setting and the actual classroom. Another reason would be that Kenny would have needed more amount of practice in order to generalize appropriate social engagement into his classroom.

The present study contributes in several ways to the effectiveness of social story literature. First, findings from this study demonstrate the potential benefits of using the multimedia social story intervention as the sole intervention to increase the duration of appropriate social engagement of children with autism. The results of this study were similar to those found previously for children with autism populations (Barry & Burley, 2004; Thiermann & Golstein, 2001). Second, this study added to the literature by looking at generalization and maintenance of the multimedia social story intervention, areas often over looked in previous research. Third, multiple-baseline experimental design was used in the present study. Many studies on the effectiveness of social stories have used nonexperimental designs that are plagued by threats to internal and external validity (Kuoch and Mirenda, 2003; Reynhout and Carter, 2006). Furthermore, the children in this study did not receive any type of reinforcement or behavior modification strategies while participating in play sessions. Removing strategies such as prompting techniques, token systems, and other reinforcement systems reduced the potential for confounds within the study. Therefore, one can conclude that the multimedia social story intervention was primarily responsible for the change in the duration of appropriate social engagement of children participated in the study.

In summary, the multimedia social stories effectively increased the duration of social engagement of three children who participated in this study. Generalization to a second setting was evident for two of the three participants. Maintenance of increased social interaction was noted for all three participants. Overall, results from this study contribute to the social story literature for improving the duration of appropriate social engagement of children with autism. The present study lends empirical support to the notion that children with autism, specifically young children with autism, can be taught and can learn appropriate social engagement.

Because of the rapid increase in the use of computers in educational environments, there are important opportunities for applications of the multimedia intervention conducted in this study (Hayes & Bybee, 1995). One of the most important applicability of using multimedia social story intervention is that once operating the multimedia social story intervention is learned by a child with autism, additional human resources are not needed to implement the intervention (Hagiwara & Myles, 1999).

Specifically, this study supports the need for continued research in the use of the multimedia social stories to increase social interaction of young children with autism. However, future research should try to build an empirical base for the various components of the multimedia social story intervention with children with autism. Further research would also benefit from comparing the amount of practice needed to generalize the social behaviors into the natural environment with typically developing children. In the current study, the length of the phases of the study makes it difficult to predict if the results would be maintained over time. It may have been useful to continue in the intervention phase for a longer period of time for Kenny in order to support the maintenance skills. It would be also interesting to compare the generalization of social behaviors between children who are initially exposed to a multimedia social story within a structured setting, versus those who are introduced to the multimedia social story within a natural setting. Future research may focus on introducing the multimedia social stories in a natural setting as well as in a structured setting and compare the result both.

REFERENCES

Adams I., Gouvousis, A., Van Lue, M., & Waldron, C. (2004). Social story intervention: Improving communication skills in a child with autism spectrum disorder. *Focus on Autism and Other Developmental Disabilities, 19(2)*, 87-84.

Agosta, E., Graetz, J. E., Mastropieri, M. A., & Scruggs, T. E. (2004). Teacher-researcher partnerships to improve social behavior through social stories. *Intervention in School and Clinic, 39(5),* 276-287.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders-fourth edition-text revision.* Washington, DC: Author.

Barry, L. M., & Burley, S. B. (2004). Using social stories to teach choice and play skills to children with autism. *Focus on Autism and Other Developmental Disabilities, 19,* 45-51.

Brownell, M. D. (2002). Musically adapted social stories to modify behaviors in students with autism: Four case studies. *Journal of Music Therapy, 39,* 117-144.
Feinberg, M. J. (2001). *Using social stories to teach specific social skills to individuals diagnosed with autism.* Unpublished doctoral dissertation, California School of Professional Psychology, San Diego.
Garretson, H., Feil, D., & Waterhouse, L. (1990). Sustained attention in autistic children. *Journal of Autism and Developmental Disorders, 20,* 101-114.
Gillberg, C., & Coleman, M. (2000). *The biology of autistic syndromes.* London: MacKeith Press.
Gillberg, C., & Steffenburg, S. (1987). Outcome and prognostic factors in infantile, autism and similar conditions: A Population-based study of 46 cases followed through puberty. *Journal of Autism and Developmental Disorders, 17,* 273-287.
Graetz, J. E (2003). P*romoting social behaviors for adolescents with autism using social stories.* Unpublished dissertation, George Mason University.
Gray, C. (1993). *The original social stories book.* Arlington, TX: Future Horizons.
Gray, C. (1994). *The new social stories book.* Arlington, TX: Future Horizons.
Gray, C. A. (1997, February). *Social stories and comic strip conversations: Unique methods to improve social understanding.* Paper presented at the Autism 1997 Conference of Future Horizons, Inc., Athens, GA.
Gray, C., & Garand, J. (1993). Social Stories: Improving responses of students with autism with accurate social information. *Focus on Autistic Behavior, 8,* 1-10.
Gresham, F. M., & Elliot, S. N. (1990). *Social skills rating system manual,* American Guidance Service, Circle Pines, MN.
Hagiwara, T., & Myles, B. S. (1999). A multimedia social story intervention: Teaching skills to children with autism. *Focus on Autism and Other Developmental Disabilities, 14(2),* 82-95.
Hays, J., Bybee, D. L. (1995). Defining the greatest need for educational technology. *Learning and Leading with Technology, 23(2),* 48-50.
Kanner, L. (1943). Autistic disturbance of affective contact. *Nervous Child, 2*, 217-250.
Kazdin, A. E. (1982). *Single-Case Research Designs: Methods for Clinical and Applied Settings.* New York: Oxford University Press.
Koegel, R. L., & Koegel, L.K. (1995). *Teaching children with autism.* Baltimore, MD: Paul H. Brooke.
Kuoch, H., & Mirenda, P. (2003). Social Story interventions for young children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 18*, 219-227.
Lincoln, A. J., Courchesne, E., Kilman, B. A., Elmasian, R., & Allen, M. (1998). A study of intellectual abilities in high-functioning people with autism. *Journal of Autism and Developmental Disorder, 18,* 505-524.
MacLean, W. E., Tapp, J. T., & Johnson, W. L. (1985). Alternate methods and software for calculating interobserver agreement for continues observation data. *Journal of Psychopathology and Behavioral Assessment, 7,* 65-73.
Markwardt, F. C., Jr. (1989). Peabody Individual Achievement Test, Revised. Circle Pines, MN: American Guidance Service.
Pierce, K. C., & Schreibman, L. (1994). Teaching daily living skills to children with autism in unsupervised settings through pictorial self-management. *Journal of Applied Behavior Analysis, 27,* 471-481.
Quill, K. A. (2000). *Do-watch-listen-say: Social and communication intervention for children with autism.* Baltimore: Brookes.
Pettigrew, J. (1998). *Effects of the modeling of verbal and nonverbal procedures for interaction with peers through social stories* (Doctoral dissertation, Texas Woman's University, 1998). *Dissertation Abstracts International, 59,* 1452.
Reynhout, G. & Carter, M. (2006). Social stories for children with disabilities. *Journal of Autism and Developmental Disorders, 36,* 445-449.
Roberson, W. H., Gravel, J. S., Valcante, G. C., & Maurer, R. G. (1992). Using a picture task analysis to teach student with multiple disabilities. *Teaching Exceptional Children, 24,* 12-15.
Rodgers, J. (2000). Visual perception and asperger syndrome: Central coherence deficit or hierarchization deficit? *The International Journal of Research and Practice, 4,* 321-329.
Romano, J. (2002). *Are social stories effective in modifying behavior in children with autism?* Unpublished doctoral dissertation, Farleigh Dickinson University.
Rowe, C. (1999). Do social stories benefit children with autism in mainstream primary schools? *British Journal of Special Education, 26(1),* 12-14.
Schopler, E. C., Reichler, R., & Renner, B. (1988). The Childhood Autism Rating Scale (CARS). Los Angeles, CA: Western Psychological Services.
Siegel, J., Minshew, N., & Goldstein, G. (1996). Wechsler IQ profiles in diagnosis of high-functioning autism. *Journal of Autism and Developmental Disorders, 26,* 389-406.
Simpson, R. L., & Myles, B. S. (1998). Aggression among children and youth who have Asperger's Syndrome: A different population requiring different strategies. *Preventing School Failure, 42(4)*, 149-153.

Copyright © The Turkish Online Journal of Educational Technology 2002

Smith, C. (2001). Using social stories to enhance behavior in children with autistic spectrum difficulties. *Educational Psychology in Practice, 17*, 337-345.

Staley, M. J. (2001). *An investigation of social-story effectiveness using reversal and multiple-baseline designs.* Unpublished doctoral dissertation, University of Kansas.

Thiermann, K. S., & Goldstein, H. (2001). Social stories, written text cues, and video feedback: Effects on social communication of children with autism. *Journal of Applied Behavior Analysis, 34,* 425-446.

Wing, L. (1988). The continuum of autistic characteristics. In E. Schopler & G. B. Mesibow (Eds.), *Diagnosis and assessment in autism* (pp.91-110). New York Plenum Press.

Writing with Symbols. (2000). (Version 2), Solana Beach, CA: Mayer-Johnson.

Copyright © The Turkish Online Journal of Educational Technology 2002

VIRTUAL STUDENTS' PERCEPTIONS OF E-LEARNING IN IRAN

Jafar YAGHOUBI
Assistant Professor, Department of Agricultural Extension and Education,
Faculty of Agriculture, Zanjan University, IRAN
Tel: 98-241-5152349, Fax: 98-241-5283202
E-mail: Jafar230@yahoo.com

Iraj MALEK MOHAMMADI
Professor and Senior Research Fellow, Institute for Social Science Studies (IPSAS), University Putra Malaysia (UPM), 43400 Serdang, Selangor, Malaysia
Email: irajmalek@ipsas.upm.edu.my

Hooshang IRAVANI
Associate Professor, Department of Agricultural Extension and Education, Faculty of Agriculture, Tehran University, Tehran, Iran

Mohammad ATTARAN
Assistant Professor, Department of Foundations of Education, Tarbiat Moallem University, Tehran, Iran

Ahmad GHEIDI
Assistant Professor, Department of Agricultural Extension and Education,
Faculty of Agriculture, Zanjan University, IRAN

ABSTRACT
With the emergence of the Internet, e-learning has increasingly become the promising solution that continues to grow day after day. Considering students' perception toward e-learning is important in successful development of e-learning in higher education, since attitude of user towards application of information technology is one of the most effective factors. This paper examines perception of virtual students' attitudes towards e-learning in Iran. A descriptive–correlation survey approach was used in this study. Students (n = 110) filled in a web-based closed questions questionnaire. Reliability and validity of instrument were determined by investigating the attitudes of e-learning specialists in Tehran University and application of Cronbach's Alpha (α=0.88.) Descriptive and inferential statistics were used to analyze the data using SPSS Win13. Questionnaires received were analyzed, putting the students' perceptions in relation to gender, age, knowledge of computers and attitudes to advantages and disadvantages of e-learning. Results showed that students have positive perception to e-learning. Liner regression analysis indicated that 68% of variation in virtual students' perceptions of e-learning was determined by the four variables of: Students' assessment about competency of e-learning, access to internet, computer and internet usage and assessment of current higher education system's shortcomings.
Key Words: E-learning, Perception, Higher Education

INTRODUCTION

Advances in Information and Communication Technology (ICT) are opening up new opportunities for distance learning. The use of ICT in delivery of education has major implications for learners and institutions. It is widely accepted that advances in information technology and new developments in learning science provide opportunities to create well-designed, learner-centered, interactive, affordable, efficient, flexible e-learning environments (Khan, 2005). Higher education institutions in developing countries often have problems keeping up-to-date with advances in international science and technology. E-Learning offers many opportunities for supporting education in higher education in developing countries such as Iran. The term e-learning embraces a variety of electronic delivery media, for example web-based multimedia, interactive television, virtual classrooms, video conferencing, and so forth. E-learning, as a positive reaction by universities to the challenge introduced by IT, is characterized by: (1) separation in time and/or space between the teacher and students, among the students themselves, and between the students and educational resources; (2) interaction between the teacher and students, among the students, and between the students and educational resources by means of one or more media, especially through the Internet; and (3) a process of teaching and learning not limited to the immediate time and/or place (Oh 2003).

In this paper e-learning is defined as teaching and learning that are delivered, supported, and enhanced through the use of digital technologies and media. We consider it mostly off campus learning through synchronous or asynchronous which may encompass a few face to face meetings, but the default mode occurred by distance.

Copyright © The Turkish Online Journal of Educational Technology 2002

Every college and university in developed countries is discovering exciting new ways of using information technology to enhance the process of teaching and learning and to extend access to new populations of students. Long sides, many universities in developing countries like Iran are investing significant capital for developing virtual universities or virtual sections in the conventional campus.

E-learning in Iran is still in its infancy stages and there are only a few online programs. The history of e-learning in Iran at present time did not exceed more than 6 years, yet from a realistic point of view we might say that e-based learning in Iran has had a 5 year experience and even younger. E-learning in Iran is delivered by both the private sector and government organizations. There have been risen a plenty of virtual universities or centers like Amirkabir University of Technology, Iran University of Science and Technology, Shiraz virtual University and some Islamic virtual collages and centers like Islamic virtual centers and Faculty of the Science of Hadith.

Several studies have been published exploring student perceptions and expectations regarding e-learning (Wang, 2004). Recent studies by the National Center for Education statistics show a growing demand and acceptance of online learning (Waits & Lewis, 2003).Online access can affect how successful students will be in Web-based classes (Anawati & Craig, 2006). Previous research into online collaboration and education in international environments indicates that maintaining contact and access is essential to educational success or students' affective and cognitive development. This contact involves (a) keeping students involved in online projects and (b) building a kind of online community essential to educational success (Vogel et al., 2001). Students who have been involved in e-learning courses are generally very positive about their experiences. At the University of Wisconsin, 80% of the students who took a blended learning course indicated they thought the experience was worthwhile and that they would recommend a course offered in online format to others (Aycock, Garnham, & Kaleta, 2002).

E-learning has been promoted as being more cost effective, convenient, and increasing opportunities for life-long learning. It has demonstrated several advantages over traditional learning, especially in allowing "learning anytime and anywhere." Students have access to online course materials independent of time and place. It also allows students to reflect on the learning materials and their responses, and permits them to work at their own pace, regardless of race, sex, disability or appearance (Richardson & Swan, 2003; Swan et al., 2000).

The process of changing traditional education into a modern one in the Iranian society involves many critical problems which can be summarized as following according to recent studies (Dilmaghani, 2003; Noori, 2003):

- Lack of realistic comprehension concerning the process of learning
- Ambiguous understanding about students' educational needs in different levels
- Defective implementation of computer hardware and software
- Weak IT education
- Faint IT infrastructure
- No realistic point of view or strategic program for higher education
- Budget and equipment shortages
- Influential atmosphere of political, social and economic situations
- Lack of information literacy

Some studies indicate that students have more positive attitudes about the course and their learning in an online context (Sandercock & Shaw, 2000; Spiceland & Hawkins, 2002; Stringer & Thomson, 1998; Wegner, Hollyway, & Garton, 1999).

Sanders and Morrison-Shetlar (2002) examined student attitudes with regard to the Web-enabled learning component in a general biology course for undergraduate non-majors. Their results showed a positive effect on student learning, problem-solving skills, and critical thinking skills, with females responding more positively than males.

Learner motivation is one of the key factors affecting student performance and learning, particularly online learning success (Cole, Field & Harris, 2004; Ryan, 2001). If students perceive some benefits to their learning, they will likely be more motivated to perform well. As McKeachie (2002) observes, “Students who are motivated to learn will choose tasks that enhance their learning, will work hard at those tasks, and will persist in the face of difficulty in order to attain their goals.”

As a result, it is seen that learners' perception plays substantial role in improving efficiency of e-learning system. In this context, the main purpose of present study is to provide an overview of the perceived advantages and

Copyright © The Turkish Online Journal of Educational Technology 2002

disadvantages of e-learning system from the perspective of virtual students by analyzing various aspects of instruction at virtual universities in Iran. Knowing that this type of education system is in its starting stage in Iran, perceptions of e-learners would help decision makers in related fields in better understanding of the systems requirements and potentials. This paper adds to the growing body of literature exploring students' attitudes towards e-learning viewed by virtual students in Iran.

METHODOLOGY

The data for this study are based on students' experiences taking an online learning unit offered by the University of Technology, Iran University of Science and Technology (IUST) and Shiraz University through their websites. Currently about 2200 Iranian students are taking e-learning courses at B.S. and M.S. degree programs in Iran.

Sharable Course Objects (SCOs), which are created by using sound, text, graphic and animation are accessible to students, registered for that course, in the Learning Management System (LMS) system, through the internet or intranet. Selected universities use SCORM standard for their courses and SCOs are mostly made in flash environment. These universities offer CDs as part of their educational system, related to the online courses or as general information. It should be noted that live classes with audio and video are not compulsory at the moment in Iran. This is mainly due to insufficient bandwidth, available to end users. So, in virtual branch of these universities, all courses (except practical courses and laboratories) are digitized and saved with high quality. Students can attend on-line classes whenever and wherever they have access to the Internet. One important fact in selecting virtual universities mentioned above is that they all use blended learning method, which has been recognized as the most effective way for virtual learning in the world.

Due to the ability of most LMS systems, all on-line activities of students can be recorded, such that the details of their connectivity are available to professors, administrators and supervisors. According to the educational rules of universities in Iran, students are not allowed to be absent from classes more than a predefined level. Although courses are available on-line to all students at all times, which is considered as the most important benefit of virtual learning, students must follow a weekly schedule to attend these classes; else they will receive a warning note, and finally a failing grade.

The methodological approach of this study employed an analytical method (correlational study). The study population consists of virtual graduate students in Iran (N=240). Currently only Amirkabir University of Technology, Iran University of Science and Technology (IUST) and Shiraz University have started their activities by accepting virtual students at M.S. level. So, virtual graduate students in these universities were the target population who have been selected by using stratified randomization method (n=118).

On the basis of review of the literature, a questionnaire was developed to collect the necessary data. The questionnaire covered four areas: 1) demographic characteristics such as age, sex, university, and field of study; 2) extent of computer and internet use which were measured on a five-point Likert scale which ranged from 1(very little) to 5 (very much); 3) advantages of e-learning system which were measured on a five-point Likert scale which ranged from 1(strongly disagree) to 5 (strongly agree); and 4) disadvantages of e-learning system which were measured on a five-point Likert scale that ranged from 1(strongly disagree) to 5 (strongly agree).

Content and face validity of instrument were established by investigating the attitudes of e-learning specialists in Tehran University, Iran. A pilot study was conducted with 25 students in Tehran University. Questionnaire reliability was estimated by calculating Cronbach's Alpha. Reliability for the overall instrument was estimated at 0.88. Students filled in a web-based closed questions questionnaire. Email addresses for this population were obtained from their engaged faculty's websites. The web-based HTML format of the questionnaire was designed. The compiled data were saved at a data bank designed for this purpose. After the initial mailing and two follow-ups (resending a letter and a copy of the questionnaire by email), a total of 110 students responded. Data collected were analyzed using the Statistical Package for the Social Sciences (SPSS13). Appropriate statistical procedures for description (frequencies, percent, means, and standard deviations) and inference were used.

RESULTS

Personal characteristics of respondents

Approximately 84.9% of Virtual graduate students who participated in the study, between 24 to 29 years and only 15.1% more than30 year. The mean age of respondents was 26.3 years. 53.8% of respondents were male and 46.2% were female. About 81.2% of respondents were employed, while about 18.8% were unemployed.

Copyright © The Turkish Online Journal of Educational Technology 2002

Among employed students, 79.5% were employed full time and 20.5% were employed part time. Grade point average of graduate students during their B.S. education was 15.73.

Respondents' perceived level of computer and Internet use

Computer and internet skills affected students' use of electronic information resources. For this research, computer and Internet use were measured using a five-point Likert-type scale. Table1 shows the skills of the respondents use the internet. As shown in Table1, the most important uses are Internet surfing and email. The least are chat, news groups and data banks.

Table 1: Respondents' perceived level of computer and Internet use (n=110)

Computer and internet use	Mean	SD.	C.V.
Internet surfing (on-line)	4.49	0.81	0.18
E-mail	4.45	0.62	0.14
Excel	4.30	0.54	0.13
PowerPoint	4.16	0.52	0.13
Word	4.07	0.94	0.23
Chat	2.40	1.47	0.61
News groups	2.15	1.39	0.65
Data bank	1.65	1.46	0.88

Scale1) Very little; 2) little; 3) somewhat; 4) Much; 5) Very much

Perceptions about advantages of e-learning system in front of traditional system

Perceptions of virtual students about advantages of e-learning system versus traditional system were measured. In order to identify and explore students' perceptions and experience about advantages of e-learning, students' comments were obtained via web based questionnaire. Quantitative data was obtained by asking students to indicate if they agreed or disagreed with a series of statements about their experiences and preferences regarding the use of online learning tools on a 5 point Likert scale (1=Strongly Disagree and 5=Strongly Agree). The results from the survey suggest that the students view online learning favorably. Table 2 provides a summary of the results obtained. As indicated in Table 2, the respondents rated 7 items as being in "high importance" and 4 items as being in "average importance" category. The two highest rated items were "Flexibility in time and place" and "Ease and quick share of learning materials".

Table2: Virtual student's perceptions toward advantages of e-learning system

Advantages	Mean	SD.	C.V.
Flexibility in time and place	4.80	0.40	0.08
Ease and quick share of educational material	4.56	0.59	0.13
Improved collaboration and interactivity among students	4.50	0.66	0.15
Access to higher education for all applicants	4.46	0.71	0.16
Possibility of working with e-learning	4.44	0.76	0.17
Accommodates different types of learning styles	4.10	0.81	0.20
Quick feedback	4.06	0.83	0.20
Wide and diverse interactions	3.93	1.14	0.29
Confidence	3.85	1.12	0.29
Easy updating of learning material	3.69	1.13	0.31
More focused on the learner	3.33	1.12	0.34

Perceptions about disadvantages of e-learning system in front of traditional system

Perceptions of virtual students about disadvantages of e-learning were also measured. The virtual students were asked to indicate their perceptions regarding the disadvantages of e-learning system as compared to traditional system. In order to identify and explore students' perceptions and experiences about disadvantages of e-learning, students' comments were obtained via web based questionnaire. As indicated in Table 3, the respondents rated 6 disadvantages as being in "high importance", 4 items as "average importance" and 1 item as "low importance" category. The highest rated disadvantage of e-learning system was "technology issues" factor which included whether the existing technology infrastructure could accomplish the educational goals, whether additional tech expenditures could be justified, and whether compatibility of all software and hardware could be achieved.

Copyright © The Turkish Online Journal of Educational Technology 2002

Table3: Virtual student's perceptions toward disadvantages of e-learning system

Disadvantages	Mean	SD.	C.V
Technology issues	4.80	0.54	0.11
Reduced social and cultural interaction	4.70	0.48	0.10
Inappropriate content	4.48	0.95	0.21
Lack of readiness in faculty members	4.29	0.96	0.22
Slow Internet connections	4.15	0.93	0.22
Up-front investment	4.10	0.79	0.19
Students weakness in computer skills	3.63	0.95	0.26
Less awareness of student with learning style in virtual environments	3.58	0.85	0.24
Students weakness in Internet skills	3.55	0.92	0.26
Students weakness in self directed learning	3.21	1.13	0.35
Students weakness in Internet skills	2.81	0.79	0.28

Correlation between selected dependent variables with perception of virtual students

The Pearson coefficient of correlation was used to identify correlation between selected dependent variables with perception of virtual students regarding e-learning. The relationship between some selected respondents' characteristics with perception of virtual students regarding e-learning is presented in Table 4. There was a significant relationship found between level of Internet use, level of computer use, access to internet, assessment of traditional higher education system's shortcomings and students' assessment about competency of e-learning.

Table4: Correlation between selected dependent variables with perception of virtual students regarding e-learning

variables	r	P
Level of Internet Use	0.714**	0.007
Level of computer Use	0.534*	0.026
Access to internet	0.556*	0.017
Assessment of traditional higher education system's shortcomings	0.601*	0.010
Students' assessment about competency of e-learning	0.734**	0.001

$P \leq 0.01$:** $p \leq 0.05$:*

Liner regressions for prediction of changes in perception of virtual students

Linear regression was used for prediction of changes in perception of virtual students regarding e-learning. Stepwise regression analysis indicated that 68% (R2=0.680) of variation in students' perceptions of e-learning was determined by four variables: Students' assessment about competency of e-learning, access to internet, computer and internet usage, and assessment of traditional higher education system's shortcomings. The relationship is described in the following formula:

$Y=7.861+0.525X1+0.266\ X2 +0.459X3 + 0.255X4$

Table5. Linear regression for prediction of changes in perception of virtual students regarding e-learning

Variable	B	Beta	T	Sig
Students assessment about competency of e-learning (x_1)	0.346	0.525	3.254	0.004
Access to internet(x_2)	0.467	0.266	4.214	0.002
Level of Internet Use (x_3)	0.259	0.459	4.580	0.012
Assessment of traditional higher education system's shortcomings (x_4)	0.193	0.255	3.199	0.033
F=12.872		F Sig: 0.00		
R=0.725		R^2=0.680		

DISCUSSION

As shown in other studies (Sandercock & Shaw, 2000; Spiceland & Hawkins, 2002; Stringer & Thomson, 1998; Wegner, Hollyway, & Garton, 1999), results of this study indicated that students have positive perception toward e-learning.

Copyright © The Turkish Online Journal of Educational Technology 2002

Results about respondents' perceived level of computer and Internet use showed that most important users were using internet surfing and email. The least important uses were chat, news groups and data banks. As indicated by Richardson & Swan (2003), and Swan et al., (2000), the results from the survey showed that the two highest rated advantages of e-learning system were "flexibility in time and place" and "ease and quick share of learning materials" and the highest rated disadvantage was "technology issues". Regression analysis indicated that 68% of variation in students' perceptions of e-learning was determined by the four variables of: students' assessment about competency of e-learning, access to internet, computer and internet usage and assessment of current higher education system's shortcomings. Cole, Field & Harris, (2004) and Ryan (2001) also emphasize this point in their studies.

CONCLUSIONS

Deploying advanced higher education institutes and colleges equipped with modern e-learning facilities is one of today's urgent needs in developing countries like Iran. But the sustainability of such learning systems depends on making sound and realistic pedagogical strategies. New learning technologies need to be targeted so that they may develop applied learning skills in the students. As the writers of this paper have proposed, developing e-learning systems could be considered as a solution for the hazed situation of online higher education in Iran. If e-learning is to have a meaningful role in higher education, it is important that universities focus on students' attitudes and their expectations with regard to the role of e-learning within their higher education experiences.

E-learning represents an important, growing trend in the application of technology to facilitate student learning in Iran. The study presented here focused on virtual students' perceptions of e-learning among users with mostly limited prior e-learning experience. The findings provide important insight about students' perceptions of e-learning and raise practical considerations for its implementation. This study is thus just an initial effort at providing Insightful analyses to the policy makers of developing countries such as Iran's higher education institutes. Additional studies are recommended to extend the research on both professors' and students' perceptions to their overall attitude, such as willingness to use e-learning, their need for educational technology, as well as technical assistance and training support.

REFERENCES

Anawati, D., & Craig, A. (2006). Behavioral adaptation within cross-cultural virtual teams. IEEE Transactions on Professional Communication, 49, 44-56.

Aycock, A., Garnham, C., & Kaleta, R. (2002). Lessons learned from the hybrid course project. Teaching with Technology Today, 8(6). Retrieved December 14, 2007, from http://www.uwsa.edu/ttt/articles/garnham2.htm

Khan, B. H. (2005). Managing e-learning: Design, delivery, implementation, and evaluation. Hershey, PA: Information Science Publishing. (Website: http://BooksToRead.com/elearning)

Richardson, C. J., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. Journal of Asynchronous Learning Networks, 7(1), 68-84.

Sandercock, G., & Shaw, G. (2000). Learners' performance and evaluation of attitude towards web course tools in the delivery of an applied sports science module. Journal of Asynchronous Learning, 3(2), 1-10.

Spiceland, J. D., & Hawkins, P. C. (2002).The impact on learning of an asynchronous active learning course format. Journal of Asynchronous Learning Networks, 6(1), 68-75.

Stringer, S. B., & Thomson, J. S. (1998). Evaluating for distance learning: Feedback from students and faculty (pp. 2-7). ERIC Document Reproduction Service No. ED422879

Swan, K., Shea, P., Frederickson, E., Pickette, A. Pelz, W., & Maher, G. (2000). Building knowledge building communities: Consistency, contact, and communication in the virtual classroom. Journal of Educational Computing Research, 23(4), 389-413.

Vogel, D. R., van Genuchten, M., Lou, D., Verveen, S., van Eekout, M., & Adams, A. (2001). Exploratory research on the role of national and professional cultures in a distributed learning project. IEEE Transactions on Professional Communication, 44, 114-125.

Waits, T. & Lewis, L (2003). Distance education at degree-granting postsecondary institutions: 2000-2001 (NCES 2003-017). U.S. Department of Education, National Center for Education Statistics. Retrieved January 8, 2005 from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003017

Wegner, S., Hollyway, K. C., & Carton, E. M. (1999). The effect of internet-based instruction on student learning. Journal of Asynchronous Learning Networks, 3(2), 1-9

Wang, Y. S.(2004); "Assessment of Learner Satisfaction with Asynchronous Electronic Learning Systems"; *Information & Management*, Vol. 41, pp. 75-86.

Oh, C. H. 2003. Information communication technology and the new university: A view on e-learning. *The Annals of the American Academy* (585): 134-153.

Noori, M. (2003). Traditional Education or Learning with Computer. *Virtual University Conference at Kashan Payam-e Noor College: Conference Proceedings.* Kashan: Payam-e Noor.

Copyright © The Turkish Online Journal of Educational Technology 2002

Dilmaghani, M. (2003). National Providence and Virtual Education Development Capabilities in Higher Education. *Virtual University Conference at Kashan Payam-e Noor College: Conference Proceedings.* Kashan: Payam-e Noor.

Sanders, D., & Morrison-Shetlar, A. (2002). Student attitudes toward web-enhanced instruction in an introductory biology course. Journal of Research on Computing in Education, 33(3), 251-262.

Ryan, S. (2001). Is online learning right for you? *American Agent & Broker, 73*(6), 54-58.

Cole, M. S., Field, H. S. & Harris, S. G. (2004). Student learning motivation and psychological hardiness: Interactive effects on students' reactions to a management class. *Academy of Management Learning & Education, 3*(1), 64-85.

McKeachie, W. (2002). *McKeachie's Teaching Tips: Strategies, Research, and Theory for College andUniversity Teachers* (11th ed.). Boston, MA: Houghton Mifflin.

Copyright © The Turkish Online Journal of Educational Technology 2002