Elektronik Sosyal Bilimler Dergisi
Electronic Journal of Social Sciences
www.esosder.org
ISSN:1304-0278

Yaz-2011 Cilt:10 Sayı:37 (120-134) Summer-2011 Volume:10 Issue:37

FACULTY OF EDUCATION STUDENTS' SELF-EFFICACY PERCEPTIONS TOWARD ONLINE TECHNOLOGIES

EĞİTİM FAKÜLTESİ ÖĞRENCİLERİNİN ÇEVRİMİÇİ TEKNOLOJİLERE YÖNELİK ÖZ-YETERLİK ALGILARI

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Abstract

The purpose of this study is to investigate whether self-efficacy perceptions of undergraduate students at the Faculty of Education toward online technologies differ based on demographics (i.e., gender, area of study), computer and Internet experiences. The data obtained from 268 students (189 females, 79 males) in different area of studies in the Faculty of Education, at a university in the Western Blacksea Region of Turkey, were used in the analyses. There were no gender differences in the self efficacy mean scores of the students although the difference on the Internet competencies subscale was notably close to significant level in favor of the male students. However, the students with higher computer and Internet experiences indicated significantly higher scores on all subscales (i.e., Internet competencies, synchronous interaction, asynchronous I, asynchronous II) of the online technologies self-efficacy scale. The findings of this study and the related literature suggest that the students' self-efficacy perceptions toward the online technologies are highly related to their prior computer and Internet experiences.

Keywords: Online Technologies, Self-efficacy, Faculty of Education students, gender, Internet and computer experiences.

Öz

Bu çalışmanın amacı Eğitim Fakültesi'nde öğrenim gören lisans düzeyindeki öğrencilerin çevrimiçi teknolojilere yönelik öz-yeterlik algılarının demografik özellikleri (cinsiyet, çalışma alanı), bilgisayar ve İnternet tecrübelerine göre farklılık gösterip göstermediğini incelemektir. Analizlerde Türkiye'nin Batı Karadeniz Bölgesi'nde bulunan bir Eğitim Fakültesi'nde farklı çalışma alanlarındaki 268 öğrenciden (189 kız, 79 erkek) elde edilen veriler kullanılmıştır. İnternet yeterlikleri alt ölçeğinden elde edilen puanlardaki farklılık erkeklerin lehine anlamlılık düzeyine çok yakın olmasına rağmen öğrencilerin ölçeğin bütün alt boyutlarındaki öz-yeterlik ortalama puanlarında cinsiyet farkı bulunmamıştır. Fakat, daha fazla bilgisayar ve İnternet tecrübesine sahip öğrenciler çevrimiçi teknolojiler öz-yeterlik ölçeğinin bütün alt boyutlarında (Internet öz-yeterlikleri, eşzamanlı etkileşim, eşzamansız etkileşim I, eşzamansız etkileşim II) anlamlı derecede daha yüksek puan almışlardır. Bu çalışmanın bulguları ve ilgili alan yazın öğrencilerin çevrimiçi teknolojilere yönelik öz-yeterlik algılarının onların önceki bilgisayar ve Internet tecrübeleriyle oldukça ilişkili olduğunu işaret etmektedir.

Anahtar Kelimeler: Çevrimiçi teknolojiler, öz-yeterlik, Eğitim Fakültesi öğrencileri, Internet ve Bilgisayar tecrübeleri.

1. INTRODUCTION

Self-efficacy is "the belief in one's capabilities to mobilize the motivation, cognitive resources, and courses of action need to meet given situational demands" (Wood & Bandura, 1989, p. 408). In other words, self-efficacy can be considered as the belief in one's capabilities to perform a given task (Bandura, 1999). Self efficacy is highly associated with work related performance, learning and achievement, and adaptability to new technology (Gist & Mitchel, 1992). According to Bandura (1989), individuals with low self-efficacy are less likely to perform related behaviors in the future. Similarly, Whitty and McLaughlin (2007) discuss that "individuals with high assurance in their abilities often approach difficult tasks as challenges to be mastered, while those who doubt their capabilities shy away from such tasks" (p. 1438). There is considerable a number of research studies in the literature (e.g., Compeau & Higgins, 1995, Davis 1989, Doll & Torkzadeh 1988, Taylor & Todd, 1995) which investigated effects of self-efficacy on the use of computers. In general, these studies reflected direct positive relationship between computer self-efficacy and computer usage. Also, a review of related literature, conducted by Marakas, Yi, and Johnson (1998) suggests that computer self-efficacy plays a significant role in an individual's decision to use a computer. Similarly, according to the related literature (Nahl, 1997, Ren, 1999, Eastin & LaRose, 2000), self-efficacy perceptions were positively related to task performance on the Internet and the amount of Internet use.

However, some scholars (e.g., Durndell & Hagg, 2002; Eastin & LaRose, 2000) discuss that in today's world Internet self-efficacy can be distinguished from computer self-efficacy by considering the advances in the field of Internet or online technology and differences in the set of skills in using computers and Internet-based technologies. For instance, until recently most Internet access was obtained by using a desktop computer, but the rapid development of mobile and wireless technology (e.g., laptop computers, mobile phones) is changing this picture (Durndell & Haag, 2002). In addition, as discussed in the related literature, Internet or online technology use requires further set of skills such as maintaining a stable or wireless Internet connection, learning how to navigate on the Internet, and searching it for relevant information (Eastin & LaRose, 2000), using multimedia applications the Internet offers (Whitty & McLaughlin, 2007), uploading a file to an asynchronous or synchronous conferencing system (Miltiadou & Yu, 2000) as well as writing and publishing on the Internet through web-pages. Some of these Internet skills, such as opening a web browser, can be classified as easy or simple while some of them such as developing and publishing a Web-site, can be classified as sophisticated. The Internet or online technology use with further or sophisticated set of skills may be daunting, particularly for novice users with little computer and Internet experience (Eastin & LaRose, 2000; Whitty & McLaughlin, 2007). Thus, this study examines if there are differences in self-efficacy perceptions of the students at the Faculty of Education toward online technologies in different categories based on their computer and Internet experiences.

Purpose of the Study

The purpose of this study is to investigate whether the Faculty of Education students' self-efficacy perceptions toward online technologies in different categories (i.e., general Internet competencies, synchronous interaction, asynchronous I, asynchronous II) differ based on their computer (i.e., PC ownership) and Internet experience (i.e., usage opportunity, usage frequency, common Internet activities). In addition, the study investigates if there is any difference in the students' online technology self-efficacy levels based on their demographics (i.e., gender, area of study).

2. METHODOLOGY

Participants

A total of 294 students were voluntarily participated in the study in 2009 Spring semester. However, 26 participants' responses on the questionnaire were incomplete, and therefore their data were excluded from statistical analyses. Thus, the data obtained from 268 students (189 females, 79 males) in different study areas in the Faculty of Education, at Abant Izzet Baysal University, Turkey, were used in the statistical analyses.

Research Instrument

In this study a questionnaire consisting of two sections was used to collect data. The first section was used to collect data for demographical information (e.g., gender, study area), and computer and Web experiences (e.g., PC-ownership, Internet-usage-frequency, Internet-usage-purposes). The second section of the questionnaire contains a Likert type online technologies self efficacy scale with 30 items developed by developed by Miltiadou and Yu (2000).

Validity and Reliability of the Self-efficacy Scale

Translation and back-translation method was used to adapt the scale into Turkish. Initially, the items in the online technologies self-efficacy scale, developed by Miltiadou and Yu (2000), was translated from English to Turkish by the researcher which was then validated by a linguist. After that the Turkish version of the scale was translated back into English by an academician who is proficient in English and another linguist validated the translation. Then minor revisions are made on the Turkish version of the scale by comparing the original and the translated versions of the scale. The faculty members of different disciplines in the Faculty of Education were asked to administer the questionnaires, which consists of personal information section and online technologies self-efficacy scale, in their classes.

After collecting the data from Faculty of Education students (N=268), both the Barlett's Test of Sphericity and Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were performed to examine whether the data set was appropriate for a factor analysis. The KMO statistics showed 0.945

at a significance level of 0.000. Barlett's Test of Sphericity was also significant (chi-square = 6295.110 with 435 degree of freedom at P=0.000). According to these findings, a factor analysis of the scale items was appropriate.

Then a factor analysis (principle components, varimax rotation with Kaiser Normalization) was applied to clarify the structure of the scale. The analysis identified five factors with eigenvalues greater than one (>1) (i.e., 14.60, 1.97, 1.42, 1.31, 1.14) and the scree plot confirmed the result (See Figure 1).

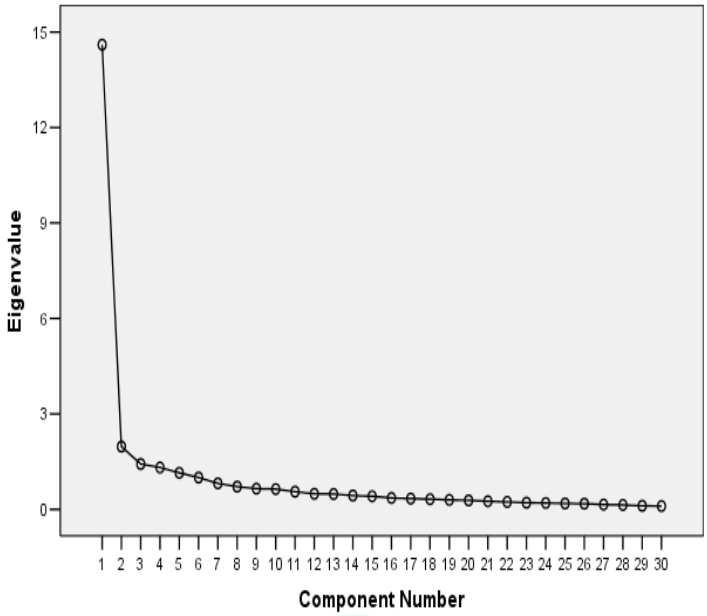

Figure 1: Scree plot

However, Factor 5 was removed from the scale since it only covers item 2 and item 9, and one of the items (item 2) loaded higher under Factor 2. Besides, item 9 (copying a block of text from a web site and pasting it to document in a word processor) was also eliminated since it did not have a sufficient factor loading (> ± 30) under any other related factors except the eliminated factor (i.e., Factor 5). In addition, although items 21 and 23 loaded higher under Factor 1 (Asynchronous Interaction II) they were moved to under Factor 2 (Asynchronous Interaction I) because these items were used under Factor 2 in the original scale developed by Miltiadou and Yu (2000). Also, the contents of the items 21 and 23 were more related to contents of other relevant items under Factor 2. Similarly, item 10 was moved to under Factor 3 (Internet Competencies) since the item was considered under Factor 3 while Miltiadou and Yu (2000) were developing the original scale. Moreover, item 10 was more related to contents of other relevant items under Factor 3 although it loaded higher under Factor 1.

The researcher considered names of the subscales in the original scale when naming the retained subscales in the Turkish version of the scale. Also, the retained subscales are consistent with the subscales in the original scale in terms of number of the subscales, names of the subscales, and the

contents of the related items. The retained items in highlights and responding factors or subscales in the scale are represented in Table 1. The factor loadings of the scale items under responding factors differ between 0.845 - 0.392, 0.750 – 0.650, 0.739-0.315 and 0.780-0.720 respectively for asynchronous interaction I, asynchronous interaction II, Internet competencies, and synchronous interaction factors or subscales. Although item 10 has a lower factor loading (0.315) under Factor 3, the majority of the items have sufficient and high factor loadings under responding factors. The high and sufficient factor loadings of the scale items can be considered as an indicator for the factorial validity and construct validity of the scale (Thompson & Daniel, 1996).

Table 1: Rotated factor loadings and Cronbach's α coefficients for the four factors (subscales) of the online technology self-efficacy scale

Items	Factor 1 Asynchronous Interaction II α = 0.91	Factor 2 Asynchronous Interaction I α = 0.92	Factor 3 Internet Competencies α = 0.89	Factor 4 Synchronous Interaction α = 0.89	Factor 5*
28	,750				
25	,723				
30	,684				
24	,683				
27	,678				
26	,671				
29	,650				
21	,565	,392			
10	,526		,315		
23	,514	,503	,339		
18		,845			
16		,807	,326		
15		,769	,364		
20		,708			
17		,694			
22	,482	,550			
19	,421	,510			,469
2	,308		,739		
1			,701		
3		,386	,684	,328	
4		,438	,651		
7	,343		,601		
8	,436		,581		
6	,324		,573		
5	,408		,564		
13				,787	
12	,312			,770	
14			,303	,756	
11	,389			,720	
9					,852
Eigenvalue	14,60	1,97	1,42	1,31	1,14
% of variance	19,905	17,135	15,296	11,237	4,635
Overall α= 0.96, total variance explained is 68,208 *Factor five was eliminated.					

Moreover, as indicated in Table 1, the internal reliability coefficients are high (α= 0.92, α= 0.91, α= 0.89, α= 0.89) respectively for asynchronous interaction I, asynchronous interaction II,

Internet competencies, and synchronous interaction subscales, and for the entire scale (α= 0.96). The reliability coefficiency for the entire scale is notably close to the Cronbach alpha value (α= 0.95) of the original scale in English. Furthermore, the number of retained factors and the reliability coefficiency (α= 0.96) found in this study are consistent with the alpha value (α= 0.94) and number of the factors were found in a recent study which was conducted in Turkey by Horzum and Çakır (2009). According to these findings, the scale has a high reliability and validity in general. The items and responding subscales in the online technologies self-efficacy scale are indicated in Table 2.

Table 2: The items and the factors (subscales) in the online technologies self-efficacy scale

Item No*	Subscale	Question I would feel confident…
1	Internet Competencies	Opening a web browser (e. *g.* Netscape or Explorer).
2	Internet Competencies	Reading text from a web site.
3	Internet Competencies	Clicking on a link to visit a specific web site.
4	Internet Competencies	Accessing a specific web site by typing the address (URL).
5	Internet Competencies	Bookmarking a web site.
6	Internet Competencies	Printing a web site.
7	Internet Competencies	Conducting an Internet search using one or more keywords.
8	Internet Competencies	Downloading (saving) an image from a web site to a disk.
10	Internet Competencies	Creating a simple web page with text, images, and links.
11	Synchronous interaction	Providing a nickname within a synchronous chat system.
12	Synchronous interaction	Reading messages from one or more members of the synchronous chat system.
13	Synchronous interaction	Answering a message or providing my own message in a synchronous chat system (one-to-many interaction).
14	Synchronous interaction	Interacting privately with one member of the synchronous chat system (one-to-one interaction).
15	Asynchronous Interaction I	Logging on and off an e-mail system.
16	Asynchronous Interaction I	Sending an e-mail message to a specific person (one-to one interaction)
17	Asynchronous Interaction I	Sending one e-mail message to more than one person at the same time (one-to- many interaction).
18	Asynchronous Interaction I	Replying to an e-mail message.
19	Asynchronous Interaction I	Forwarding an e-mail message.
20	Asynchronous Interaction I	Deleting messages received via e-mail.
21	Asynchronous Interaction I	Creating an address book.
22	Asynchronous Interaction I	Saving a file attached to an e-mail message to a local disk and then viewing the contents of that file.
23	Asynchronous Interaction I	Attaching a file (image or text) to an e-mail message and then sending it off.
24	Asynchronous Interaction II	Signing on and off an asynchronous conferencing system.
25	Asynchronous Interaction II	Posting a new message to an asynchronous conferencing system (creating a new thread)
26	Asynchronous Interaction II	Reading a message posted on an asynchronous conferencing system
27	Asynchronous Interaction II	Replying to a message posted on an asynchronous conferencing system so that all members can view it.
28	Asynchronous Interaction II	Replying to a message posted on an asynchronous conferencing system so that only one member can view it.
29	Asynchronous Interaction II	Downloading (saving) a file from an asynchronous conferencing system to a local disk.
30	Asynchronous Interaction II	Uploading (sending) a file to an asynchronous conferencing system.

* The item number indicates the item order in the initial version of the scale.
** Item 9 (copying a block of text from a web site and pasting it to document in a word processor) under Factor 5 was eliminated.
Source: Miltiadou and Yu (2000).

The descriptive results for the participants' scores on the subscales are represented in Table 3. Finally, the higher mean scores of the participants on the subscales indicate their higher or better self-efficacy perceptions toward the online technologies.

Table 3: The participants' scores on the subscales of the online technologies self-efficacy scale

Subscales	N	Items	Possible Range	Range	Mean ($\bar{X}$)	Std. Dev. (SD)
Internet Competencies	268	9	9-45	34	38.40	6.39
Synchronous interaction	268	4	4-20	16	16.75	3.99
Asynchronous Interaction I	268	9	9-45	36	40.05	6.28
Asynchronous Interaction II	268	7	7-35	27	28.83	5.88

Data collection and data analysis procedures

The collected data were analyzed through the Statistical Packages for Social Sciences (SPPS). After conducting the factor and reliability analyses, descriptive statistics, t-tests, one-way ANOVA and post –hoc tests were used to analyze the data.

3. RESULTS

The findings regarding the *gender issue*, *PC-ownership, Internet usage opportunity*, *Internet usage frequency, common activities (i.e., entertainment, chat, e-mail, news reading, discussion groups and forums)* and *area of study* are presented in this section.

Gender Issue

According to the t-test results in Table 4, there were no significant differences in the mean self-efficacy scores ($\bar{X}$) of the male (N= 79) and female students (N=189) on asynchronous interaction I subscale (t = .006, df = 266, p = .995), and on asynchronous interaction II subscale (t = 1.611, df = 266, p = .108) at .05 significant level. Similarly, the t-test results indicated that that mean self-efficacy scores of the male and female students on synchronous interaction subscale do not differ significantly (t = 1.789, df = 266, p = .075). Although, the gender difference on the Internet competencies subscale was close to significance level in favor of the male students (t = 1.912, df = 266, p = .057) it can be stated that there are no significant gender difference in the self-efficacy level of the students on all of the subscales. The insignificant differences in the online technology self-efficacy levels of the Turkish students based on gender can be explained by their near PC-ownership rates: a chi-square test showed that PC-ownership rate among the male students (60.8%, N=48 out of 79) is not significantly higher than that of among the female students (59.8%, N=113 out of 189) (χ^2 = .022, df = 1, p = .882).

Table 4: Differences in online technologies self-efficacy perceptions based on gender

	Internet Competencies				Synchronous Interaction			Asynchronous Interaction I			Asynchronous Interaction II		
Gender	N	$\bar{X}$	t	p	$\bar{X}$	t	p	$\bar{X}$	t	p	$\bar{X}$	t	p
Female	189	37.9	1.912	.057	16.4	1.789	.075	40.05	.006	.995	28.4	1.611	.108
Male	79	39.5			17.4			40.06			29.7		
*Degree of freedom (df)=266 in all cases. *P<.05													

PC-ownership

The t-test results in Table 5 indicated that mean self-efficacy scores of the PC-owner students (N=161) and the non-PC-owners (N=107) on all four subscales (Internet competencies, synchronous interaction, asynchronous interaction I, asynchronous interaction II) differ significantly at .05 level in favor of the PC-owner students.

Table 5: Differences in online technologies self-efficacy perceptions based on PC-ownership

	Internet Competencies				Synchronous Interaction			Asynchronous Interaction I			Asynchronous Interaction II		
PC-ownership	N	$\bar{X}$	t	p	$\bar{X}$	t	p	$\bar{X}$	t	p	$\bar{X}$	t	p
PC owners	161	40.1	5.795	.000*	17.4	3.843	.000*	41.0	3.323	.001*	30.3	5.606	.000*
Non-PC owners	107	35.7			15.6			38.5			26.4		
*Degree of freedom (df)=266 in all cases. *P<.05													

Internet Usage Opportunity

The participant students reported that 187 of them have an opportunity to access the Internet in their houses or dorms while 81 of the students do not have. The t-test results in Table 6 indicated that the mean self-efficacy scores of the students who have an opportunity to access the Internet in their houses or dorms (N=187) were significantly higher than the mean scores of the students who do not have opportunity (N=81) on all subscales (Internet competencies, synchronous interaction, asynchronous interaction I, asynchronous interaction II).

Table 6: Differences in online technologies self-efficacy perceptions based on Internet usage opportunity

	Internet Competencies				Synchronous Interaction			Asynchronous Interaction I			Asynchronous Interaction II		
Opportunity	N	$\bar{X}$	t	p	$\bar{X}$	t	p	$\bar{X}$	t	p	$\bar{X}$	t	p
Yes	187	39.3	3.842	.000*	17.2	2.923	.004*	40.8	3.339	.001*	29.5	3.079	.002*
No	81	36.1			15.7			38.1			27.1		
*Degree of freedom (df)=266 in all cases. *P<.05													

Internet Usage Frequency

The students reported their Internet-usage-frequencies as: never (N=2), between 1 and 5 hours in a month (N=31), between 1 and 5 hours a week (N=122), between 1 and 5 hours a day (N=100) and more than five hours a day (N=13). The *never* users (N=2) were excluded from the analysis in this section since their numbers were insufficient.

With the reference to Table 7, the one-way ANOVA results on differences based on the Internet-usage-frequencies indicated that there were significant differences in the mean self-efficacy scores of the students on all of the subscales: Internet Competencies (F=15.321, df=4/263, p=.000), synchronous interaction (F=13.161, df=4/263, p=.000), asynchronous interaction I (F=11.796, df=4/263, p=.000), and asynchronous interaction II (F=18.370, df=4/263, p=.000).

Moreover, after the one-way ANOVA, a post-hoc analysis for multiple comparisons among the self-efficacy mean scores was performed by using Tukey's honest significant differences (HSD) test. The post-hoc test results in Table 7 showed that the users who use the Internet more than 5 hours a day had significantly higher mean scores on all of the subscales (i.e., Internet competencies, synchronous interaction, asynchronous interaction I, asynchronous interaction II) than the users who use the Internet with lower frequency (i.e., between 1-5 hours a month). Similarly, the post-hoc test indicated that the users who use the Internet more than 5 hours a day had significantly higher mean scores on the asynchronous Interaction II, and the Internet competencies subscales than the users who use the Internet between 1-5 hours a week. In addition, the students who use the Internet between 1 and 5 hours a day had significantly higher self-efficacy mean scores on the all subscales than those of the students who use the Internet with lower frequency (i.e., between 1-5 hours a month, and between 1-5 hours a week). Furthermore, the students who use the Internet between 1 and 5 hours a week had significantly higher self-efficacy mean scores on all of the subscales than those of the students who use the Internet between 1-5 hours a month. These findings reveal that as the students' Internet usage frequencies increase, their online technologies self-efficacy levels increase notably as well.

Table 7: Differences in self-efficacy perceptions toward the online technologies based on Internet-usage-frequency

		Internet Competencies		Synchronous Interaction		Asynchronous Interaction I		Asynchronous Interaction II	
Internet-usage-frequency	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
(1) 1-5 hours a month	31	32.1	8.34	12.8	4.46	34.3	8.62	22.6	7.12
(2) 1-5 hours a week	122	37.7	5.99	16.5	4.05	39.5	6.22	28.1	5.60
(3) 1-5 hours a day	100	40.4	4.89	17.8	3.07	41.9	4.47	30.9	4.28
(4) More than 5 hours a day	13	43.5	1.61	19.3	1.32	43.6	1.75	33.3	2.63
F (ANOVA)		15.321 (P=.000)*		13.161 (P=.000)*		11.96 (P=.000)*		18.370 (P=.000)*	
Tukey HSD		(4)>(2) >(1)* (3)>(2) >(1)*		(4)>(1)* (3)>(1)* (2)>(1)*		(4)>(1)* (3)>(2) >(1)*		(4)>(2) >(1)* (3)>(2) >(1)*	
*P<0.05									

Common Internet activities

The t-test results in Table 8 showed that the students who have used the Internet for the five common activities (i.e., entertainment, chat, e-mail, news reading, discussion groups and forums) indicated significantly more positive self-efficacy perceptions toward the online technologies on all of the subscales

Table 8: Differences in online technology self-efficacy perceptions based on common Internet activities

			Internet Competencies				Synchronous Interaction				Asynchronous Interaction I				Asynchronous Interaction II			
	Yes	No	Yes	No			Yes	No			Yes	No			Yes	No		
Common Internet activities	N	N	$\bar{X}$	$\bar{X}$	t	p	$\bar{X}$	$\bar{X}$	t	p	$\bar{X}$	$\bar{X}$	t	p	$\bar{X}$	$\bar{X}$	t	p
Entertainment	182	86	39.6	35.7	4.886	.000*	17.5	15.1	4.820	.000*	40.9	38.1	3.510	.001*	29.4	26.7	3.214	.001*
Chat	150	118	39.5	36.8	3.512	.001*	17.7	15.4	4.958	.000*	40.8	39.0	2.451	.015*	29.9	27.3	3.741	.000*
E-mail	194	74	39.3	35.8	4.098	.000*	17.1	15.5	2.997	.003*	41.1	37.1	4.879	.000*	29.4	27.3	2.612	.010*
News reading	165	103	39.8	35.9	5.090	.000*	17.2	15.8	2.900	.004*	41.3	38.0	4.381	.000*	30.1	26.7	4.778	.000*
Education	206	62	39.3	35.1	4.723	.000*	16.9	16.1	1.429	.154	40.7	37.8	3.205	.002*	29.4	26.7	3.214	.001*
Research	244	24	38.8	33.3	4.154	.000*	16.8	15.2	1.936	.054	40.3	36.7	2.736	.007*	29.1	25.2	3.213	.001*
Discussion groups and forum	60	208	42.18	37.3	5.488	.000*	18.0	16.3	2.914	.004*	42.7	39.2	3.886	.000*	31.7	27.9	4.549	.000*
*P<0.05																		

Moreover, the students who have used the Internet for educational activities (e.g., reading electronic papers) and research activities (e.g., information searching through search engines, etc.) showed significantly higher self-efficacy perceptions on most of the subscales (i.e., Internet competencies, asynchronous interaction I, asynchronous interaction II) than the students who have not. However, the self-efficacy mean scores of the students who have and have not used the Internet for the educational and research activities did not differ significantly on the synchronous interaction subscale although the P value for the research activities (P= .054) was notably close the significance level.

Area of study

As displayed in Table 9, the one-way ANOVA results on differences based on the area of study indicated that there were significant differences in the mean self-efficacy scores of the students on all of the subscales: Internet competencies (F=6.306, df=8/259, p=.000), synchronous interaction (F=3.622, df=8/259, p=.001), asynchronous interaction I (F=3.606, df=8/259, p=.001), and asynchronous interaction II (F=5.392, df=8/259, p=.000).

Table 9: Differences in self-efficacy perceptions toward the online technologies based on area of study

Area of Study	N	Internet Competencies $\bar{X}$	Internet Competencies SD	Synchronous Interaction $\bar{X}$	Synchronous Interaction SD	Asynchronous Interaction I $\bar{X}$	Asynchronous Interaction I SD	Asynchronous Interaction II $\bar{X}$	Asynchronous Interaction II SD
(1) Computer Education and Instructional Technology (CEIT)	37	42.9	3.49	18.9	1.92	42.8	3.98	33.1	2.89
(2) Classroom Teaching	28	37.6	7.47	15.7	3.76	39.2	6.29	26.6	6.17
(3) Special Education	34	35.4	8.41	15.5	4.77	39.3	7.60	27.0	7.44
(4) Science Education	22	40.3	5.56	17.9	3.30	40.3	6.73	30.5	5.07
(5) Turkish Language Teaching	27	36.9	6.93	15.0	5.09	37.0	8.53	26.8	7.36
(6) Social Science Teaching	29	37.1	4.41	16.7	3.96	40.3	4.95	28.4	4.91
(7) English Language Teaching	29	40.2	3.81	17.7	3.43	42.2	3.82	30.3	3.64
(8) Psychological Counseling and Guidance (PCG)	30	34.9	6.59	15.9	4.15	36.9	6.93	26.6	5.10
(9) Math Education	32	39.5	4.85	16.87	3.48	41.2	4.41	29.2	5.70
F (ANOVA) Tukey HSD		6.306 (P=.000)*		3.622 (P=.001)*		3.606 (P=.001)*		5.392 (P=.000)*	
		(1) >(2)* (1) >(3)* (1) >(5)* (1) >(6)* (1) >(8)* (4) >(8)* (7) >(3)* (7) >(8)*		(1) >(2)* (1) >(3)* (1) >(5)* (1) >(8)*		(1) >(5)* (1) >(8)* (7) >(5)* (7) >(8)*		(1) >(2)* (1) >(3)* (1) >(5)* (1) >(6)* (1) >(8)*	
*P<0.05									

Furthermore, a post-hoc analysis for multiple comparisons among the self-efficacy mean scores was performed by using Tukey's HSD test. The post-hoc test results in Table 9 indicated that the students who were in the program of Computer Education and Instructional Technology (CEIT) had significantly higher mean score on the Internet competencies and asynchronous Interaction II subscales than the students in the six different areas of study (i.e., Classroom Teaching, Special Education, Turkish Language Teaching, Psychological Counseling and Guidance (PCG), and Social Science Teaching). Besides, the students in the program of English Language Teaching indicated higher mean score on the internet competencies subscale than the students in programs of Special Education, and PCG. Similarly, the students in the program of the PCG had lower self-efficacy mean score on the same subscale than the students in the study area of Science Education.

In addition, the post-hoc test showed that the students who were in the program of the CEIT had significantly higher mean score on the synchronous interaction subscale than the than the students in the five different study areas (i.e., Classroom Teaching, Special Education, Turkish Language Teaching, and PCG).

Moreover, the students in the study area of the CEIT indicated significantly higher self-efficacy mean score on the asynchronous interaction I subscale than the students in the study areas of Turkish Language Teaching, and PCG. Besides, the students in the study areas of Turkish Language Teaching, and PCG had lower mean scores on the same subscale than the students in the study area of English Language Teaching.

Finally, the results of post-hoc test indicated that the students in the study area of the CEIT had significantly higher self-efficacy mean scores on majority of the subscales (i.e., Internet competencies, synchronous interaction, asynchronous interaction II) than the students in most of the study areas (i.e., Classroom Teaching, Special Education, Turkish Language Teaching, Social Science Teaching, and PCG). The higher self-efficacy mean scores of the students in the study area of the CEIT can be explained by their higher computer and Internet experiences in comparison to the experiences of the students in the other study areas.

4. DISCUSSION

This study investigated whether self –efficacy perceptions of the Turkish students at the Faculty of Education toward online technologies differ based on demographics (i.e., gender, area of study), computer and Internet experiences. The findings regarding the gender issue indicated that self-efficacy mean scores of the Turkish male and female students do not differ significantly on all of the subscales although the difference on the Internet competencies subscale was notably close to significant level in favor of the male students. The insignificant gender difference in the online self-efficacy mean scores of the students on all of the subscales can be explained by the insignificant difference in the PC-ownership rates between the gender groups. The finding of this study regarding the insignificant gender difference on all of the subscales of the online technology self-efficacy scale is consistent with the findings of prior studies which revealed insignificant gender differences in the computer attitude (Shaw & Giacquinta, 2000; Teo, 2008), computer anxiety (Tekinarslan, 2008; Sam et all., 2005) computer self-efficacy (Johnson & Wardlow, 2004; Sam et all., 2005) and attitudes toward the Internet (Sam et all, 2005). In addition, the finding of this study regarding the insignificant difference in the PC-ownership rates of the male and female students supports the findings of recent prior studies which indicated greater gender equivalence in Internet and computer use, and opportunity to use the Internet (Sam et all., 2005; Shaw & Giacquinta, 2000; NITA, 2002; Green, 1998). As a result, based on the findings of the current study and recent prior studies (e.g., Shaw & Giacquinta, 2000; Sam et all, 2005; Tekinarslan, 2008) it can be stated that there is no gender difference in the online technology self-efficacy levels of the male and female students when they have equal opportunity to use computer and Internet technology.

In addition, the findings of this study revealed that the students with higher computer and Internet experience indicated higher scores on the online technology self-efficacy scale. Specifically, the t-test results showed that mean self-efficacy scores of the PC-owner students (N=161) and the non-PC-owners (N=107) on all subscales of the online technology self-efficacy scale differ significantly in favor of the PC-owner students. Moreover, the t-test results indicated that the mean self-efficacy scores of the students who have an opportunity to access the Internet in their houses or dorms (N=187) were significantly higher on all subscales than the mean scores of the students who do not have opportunity (N=81). Furthermore, the post-hoc test results, after one-way ANOVA, showed that the students who use the Internet more frequently had notably higher mean scores (e.g., more than 5 hours a day, 1-5 hours a week) on all of the subscales. Also, the students who used the Internet less frequently (i.e., 1-5 hours a month) had significantly lower mean scores on all of the subscales than the others who used the Internet more frequently (i.e., more than 5 hours a day, 1-5 hours a day, 1-5 hours a week).

Moreover, the t-test results showed that the students who have used the Internet for the five common activities (i.e., entertainment, chat, e-mail, news reading, discussion groups and forums) indicated significantly more positive self-efficacy perceptions toward the online technologies on all of the subscales. Additionally, the students who have used the Internet for educational activities (e.g., reading electronic papers) and research activities (e.g., information searching through search engines, etc.) showed significantly higher self-efficacy perceptions on most of the subscales (i.e., Internet competencies, asynchronous interaction I, asynchronous interaction II) than the students who have not. According to these findings, it can be stated that the students' online technologies self-efficacy levels increase in parallel to their Internet and computer experience in terms of PC –ownership, Internet usage opportunity, frequency, and common Internet activities . The finding of this study in terms of effects of prior computer and Internet experience on the students' online technology self-efficacy levels are consistent with the related literature (e.g., Compeau & Higgins, 1995; Doll & Torkzadeh 1988; Taylor & Todd 1995; Potosky, 2002; Liaw 2002; Eastin & LaRose, 2000) which indicated that computer and Internet experience are positively correlated with computer and Internet self-efficacy.

Furthermore, the post-hoc test results indicated that the students in the program of the CEIT indicated significantly higher self-efficacy mean scores on the majority of the subscales than the students in most programs. The reason behind the higher self-efficacy mean scores of the students in the program of the CEIT can be their higher computer and Internet experiences in comparison to the experiences of the students in the other programs. Similarly, prior studies indicated that undergraduates studying computer-related disciplines appeared to have higher self-efficacy towards Java programming (e.g., Askar & Davenport, 2009), computers and the Internet (Sam et all, 2005).

Finally, the findings of this study suggest that the Turkish Faculty of Education students' online technology self-efficacy levels are mostly associated with their prior Internet and computer

experience. According to the findings of this study and the prior literature, it can be stated that the more the students have computer and Internet experience, the better self-efficacy perceptions they will have toward online technologies.

5. CONCLUSION

As Bandura (1989) stated, individuals with low self-efficacy should be less likely to perform related behaviors in the future. Therefore, self-efficacy perceptions of teacher candidates toward online technologies are rather important to benefit from these technologies in their future teaching and learning environments. According to the findings of this study and prior literature (e.g., Shaw & Giacquinta, 2000; Sam et all, 2005), it can be suggested that the self-efficacy perceptions of the students toward online technologies are highly associated with their prior computer and Internet experience rather than their gender. As a result, it can be stated that, when the students have sufficient opportunities to use computers and the Internet, they have more chances to improve their computer and Internet experience and thereby their online technology self-efficacy perceptions.

REFERENCES

Aşkar, P. & Davenport, D. (2009). An Investigation of factors related to self-efficacy for Java programming among engineering students. *The Turkish Online Journal of Educational Technology (TOJET)*, 8(1), 26-32. http://www.tojet.net/volumes/v8i1.pdf [viewed 10 November 2009].

Bandura, A. (1982).Self-efficacy mechanisms in human agency. *American Psychologist,* 37 (2), 122-147.

Bandura, A. (1999). Self-efficacy: Toward a unifying theory of behavioral change. In R. F. Baumeister (Ed.), *The self in social psychology: Key readings in social psychology* (pp. 285–298). Philadelphia, PA: Psychology Press.

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

Davis, F. D. (1989). Perceived usefulness, perceived ease of use and user acceptance of information technology. *MIS Quarterly,* 13 (3), 319-340.

Doll, W. J. & Torkzadeh, G. (1989). The measurement of end-user computing satisfaction, *MIS Quarterly*, 12 (2), 259-274.

Durndell , A. & Haag, Z. (2002). Computer self efficacy, computer anxiety, attitudes towards the Internet and reported experience with the Internet, by gender, in an East European sample, *Computers in Human Behavior*, 18 (5), 521–535

Eastin, M. S., & LaRose, R. (2000). Internet self-efficacy and the psychology of the digital divide. *Journal of Computer-Mediated Communication,* 6(1). http://jcmc.indiana.edu/vol6/issue1/eastin.html [viewed 26 October 2009].

Gist, M. E. & Mitchell, T. R. (1992). Self-Efficacy: A Theoretical Analysis of Its Determinants and Malleability. *The Academy of Management Review*, 17, (2), 183-211

Green, K. C. (1998). *Campus computing 1998: The ninth annual survey of desktop computing and information technology in higher education*. Encino, CA: The Campus Computing Project.

Horzum, M. & Çakır, Ö. (2009). Çevrim İçi Teknolojilere Yönelik Öz Yeterlik Algısı Ölçeği Türkçe Formunun Geçerlik ve Güvenirlik Çalışması. *Kuram ve Uygulamada Eğitim Bilimleri / Educational Sciences: Theory & Practice 9* (3), 1327-1356

Johnson, D. M. & Wardlow, G. W. (2004). Computer experiences, self-efficacy, and knowledge of undergraduate students entering a land-grant college of agriculture by year and gender. *Journal of Agricultural Education*, 45 (3), 53-64, http://pubs.aged.tamu.edu/jae/pdf/Vol45/45-03-053.pdf [viewed 20 October 2009].

Liaw, S. S. (2002). An Internet survey for perceptions of computers and the World Wide Web: Relationship, prediction, and difference. *Computers in Human Behavior*, 18(1), 17–35.

Marakas, G. M., Yi, M. Y., & Johnson, R. D. (1998). The Multilevel and Multifaceted Character of Computer Self-Efficacy: Toward Clarification of the Construct and an Integrative Framework for Research. *Information Systems Research*, 9 (2), 126-163

Miltiadou, M. & Yu, C. H. (2000). *Validation of the online technologies self-efficacy scale (OTSES),* (ERIC Document Reproduction Service No. ED 445 672).

Nahl, D. (1997). User-centered assessment of two Web browsers: Errors, perceived self-efficacy, and success. *Journal of American Society for Information Sciences*, 34, 89-97.

NITA (National Telecommunications and Information Administration) (2002). *A nation on-line: How Americans are expanded their use of the Internet*. Washington DC: US Department of Commerce.

Potosky, D. (2002). A field study of computer efficacy beliefs as an outcome of training: the role of computer playfulness, computer knowledge, and performance during training. *Computers in Human Behavior*, 18 (3), 241-255.

Ren, W. (1999). Self-efficacy and the search for government information: A study of small-business executives. *Reference & User Service Quarterly*, 38 (3), 283-291.

Sam, H. K., Othman, A. E. A. & Nordin, Z. S. (2005). Computer self-efficacy, computer anxiety, and attitudes toward the Internet: A study among undergraduates in Unimas. *Educational Technology & Society*, 8 (4), 205-219.

Shaw, F. S. & Giacquinta, J. B. (2000). A survey of graduate students as end users of computer technology: New roles for the faculty. *Information Technology, Learning, and Performance Journal*, 18 (1), 21-39.

Taylor, S. & Todd, P. A. (1995). Understanding information technology usage: A Test of competing models. *Information Systems Research*, 6 (2), 144-176.

Tekinarslan, E. (2008).Computer Anxiety: A Cross-cultural Comparative Study of Dutch and Turkish University students. *Computers in Human Behavior*, 24 (4), 1572–1584

Teo, T. (2008). Assessing the computer attitudes of students: An Asian perspective. *Computers in Human Behavior*, 24, 1634 -642

Thompson, B. & Daniel, L.G. (1996). Factor analytic evidence for the construct validity of scores: A historical overview and some guidelines. *Educational and Psychological Measurement*, 56 (2), 197-208.

Whitty, M. T. & McLaughlin, D. (2007). Online recreation: The relationship between loneliness, Internet self-efficacy and the use of the Internet for entertainment purposes. *Computers in Human Behavior*, 23, 1435–1446

Wood, R. E., & Bandura, A. (1989). Impact of conceptions of ability on self-regulatory mechanisms and complex decision making. *Journal of Personality and Social Psychology*, 56, 407- 415.