PRE-SERVICE ENGLISH LANGUAGE TEACHERS' PERCEPTIONS OF COMPUTER SELF-EFFICACY AND GENERAL SELF-EFFICACY

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ABSTRACT
The primary aim of this study is to investigate pre-service English language teachers' perceptions of computer self-efficacy in relation to different variables. Secondarily, the study also explores the relationship between pre-service English language teachers' perceptions of computer self-efficacy and their perceptions of general self-efficacy.

To this end, in 2007-2008 Academic Year Fall Term a sample of 288 pre-service English language teachers at Çanakkale Onsekiz Mart University was surveyed. Three basic research instruments were used to collect data: The Computer Self-Efficacy Scale (Aşkar and Umay, 2001), The General Self-Efficacy Scale (Schwarzer and Jerusalem, 1995), and a survey questionnaire designed to obtain personal information and previous computer experience from the participants. The data were analyzed with the use of descriptive statistics. Frequencies and percentages were calculated and t-test, one-way ANOVA, and correlation analyses were used in the analysis of the data. The significant level was taken as .05.

The findings indicated that pre-service English teachers had a moderate level of computer self-efficacy perceptions. Computer experience, frequency of use and gender were identified to create a significant difference in the perception of computer self-efficacy ($p < .05$). Concerning grade levels, only between 1st and 4th ones a significant difference was found ($p<.05$). The correlation analysis between general sense of self-efficacy and computer self-efficacy revealed a moderate and a positive correlation between the two psychological constructs. Finally, the regression analysis showed that computer experience was the variable that affected the computer self-efficacy beliefs of pre-service English teachers most.
Key words: Computer self-efficacy, general self-efficacy, pre-service English teachers

INTRODUCTION

The rise in computer technology in recent years has given way to its use as an instructional tool in educational settings. Both teachers and learners greatly benefit from using it. While it enables teachers to address to different learning styles, helps provide effective instruction by assisting them in every activity in the teaching process, it increases learner motivation, minimizes pressure and fear, and enhances social development of learners (Şahin and Yıldırım, 1999; Akkoyunlu, 2002; Demirel, 2002; Yalın, 2004; Koç, 2005).

The successful use of technologies in the classroom depends on several factors such as funding, dynamic lesson plans, decisions concerning hardware, software, and so forth (Bitner and Bitner, 2002: 95). Yet, whether all these factors will yield the wanted learning outcomes or not is usually determined by one individual, the teacher since it is the teacher's skills, beliefs, attitudes, perceptions, opinions, personality, knowledge, among many other factors, that affect the choices she makes about what, when, and how to teach through using computer technologies (Nespor, 1987; Bitner and Bitner, 2002). Among these factors, however, computer affect "such as attitudes, values, and self-judgments can exert a profound effect on behaviors" (Milbrath and Kinzie, 2000: 373). Therefore, if teachers are expected to be effective users of computer technologies, it is essential that they have positive attitudes and high self-efficacy perceptions in using them.

As in other subject areas, there is a strong interest in technology use in foreign language teaching and learning as well. Two decades ago while the researchers were more concerned about describing and examining computer technology, today the focus is on investigating how to use it to teach and learn languages more effectively (Liu *et al.*, 2002). Several studies have proved that the use of computer technologies have a positive effect on the achievement level of language learners (Lai and Kristonis, 2006: 1). Promoting learners' motivation (Lee, 2000; Hamerstorm *et* al., 1985) and self-esteem (Dunkel, 1990), providing experiential learning (Lee, 2000), enhancing specific language skills such as reading (Chun and Plass, 1996; Tozcu and Coady, 2004), writing (Al-Jarf, 2004) and vocabulary learning (Liu, 1994; Tozcu and Coady, 2004) are all among the benefits of computer technology use in foreign language classrooms. Apart from these advantages, using computer technologies in language classrooms also prepare learners for today's information society because through the authentic tasks like keeping electronic portfolios, writing e-mails, conducting on-line chats, doing online research can help them learn not only the foreign language but also the use of computers (Wang, 2005).

Despite these advantages, however, integration of computer technologies in classroom teaching still bears some problems. Financial and technical problems are certainly beyond what teachers can handle in their own classrooms, yet those problems related to affect, that is self-efficacy beliefs, values, judgments, can be solved through support and education and it should start with pre-service teacher education.

The concept of self-efficacy

Self-efficacy, a psychological construct first proposed by Bandura in 1977, can be described as "a belief about one's own capability to organize and complete a course of action required to accomplish a specific task" (Eggen and Kauchak, 2007: 310). As can be understood from the definition, self-efficacy "is concerned ... with judgments of what one can do with whatever skills they possess" (Bandura, 1986: 391). It consists of two components, efficacy expectations, which are related to belief in personal capacity to affect behavior, and outcome expectations, which is a belief that the behavior will result in a particular outcome (Albion, 1999). Several research studies indicate that depending on these sources of judgments, individuals have negative or positive ideas about a behavior before they undertake it and these ideas affect their course of action (Bandura, 1986; Albion, 2001).

People's beliefs about their capability of succeeding on particular tasks are influenced by four main factors: past performance, modeling, verbal persuasion, and psychological state (Bandura, 1986). Of these, successful past performance on similar tasks, in other words "enactive experience", is the most important factor influencing self-efficacy (Eggen and Kauchack, 2007). The second factor is modeling in which self-efficacy for a behavior is increased by observing similar people performing the behavior successfully. A third factor is verbal persuasion, which can encourage individuals to do tasks. Finally, different psychological states such as anxiety, stress, fatigue, hunger can influence self-efficacy beliefs and thus individuals can feel incapable of handling a task (Albion, 1999; Scholz *et al.,* 2002).

As mentioned above, the most significant effect of self-efficacy beliefs on human behavior is their influence on "people's decisions, goals, their amount of effort in conducting a task, and the length of time they would preserve through obstacles and difficulties" (Khorrami-Arani, 2001: 18). Therefore, it is commonly associated with motivation and academic success. People with high self-efficacy set themselves higher goals, stick to them, and undertake the action. They invest more effort, time and energy than those low in self-efficacy. If they fail, they recover more quickly and seek ways to accomplish their goals (Scholz *et al*., 2002).

Self-efficacy has been found to be domain specific. In other words, an individual can have high self- efficacy in one domain or situation, for instance physical activities, while he has low self-efficacy perceptions in another, for instance mathematics. It is for this reason that self-efficacy as a psychological construct and its relationship with behavior have been investigated in different disciplines such as business, psychology, medicine, sports, and career development in relation to different variables including gender, experience, age and so forth. Similarly, in the field of education, research studies that have been carried out to understand self-efficacy beliefs of teachers and learners shed light on the effects of these beliefs on their behavior (Hazır Bıkmaz, 2004: 289).

In recent years, however, the idea that self-efficacy could be a universal construct has attracted attention and several researchers have started studying it (Sherer *et al*., 1982; Schwarzer and Jerusalem, 1995; Chen et al., 2001; Scholtz *et al*. 2002). As a result, a generalized sense of self-efficacy (GSE), which can be defined as "situation-independent competence belief", that is, a global confidence in one's abilities in different situations, has been conceptualized (Scherbaum, 2006: 1048). There have been many criticisms of GSE, most of which have been specifically related to its measurement. However, several psychometric studies have proved that it is a unidimensional, universal and measurable construct (Sherer *et al.*, 1982; Schwarzer and Jerusalem, 1995; Chen *et al.*, 2001; Scholtz *et al.*, 2002; Scherbaum, 2006).

Computer self-efficacy

Computer self-efficacy is also based upon Bandura's self-efficacy theory. It is defined as "a judgment of one's capability to use a computer" (Compeau and Higgins, 1995: 192). In general, it is believed that people who have high self-efficacy in the use of computers will invest more time and be more willing to learn and do new things with computers (Kinzie, Delcourt and Powers, 1994).

Computer self-efficacy has been investigated in several contexts including business (eg. Compeau and Higgins, 1995) and education with students at all levels (eg. Summers, 1990, Kinzie, Delcourt and Powers, 1994; Karsten and Roth, 1998; Aşkar and Umay, 2001; Akkoyunlu and Kurbanoğlu, 2003) as well as teachers (eg; Marcinkiewicz, 1994, Yusuf, 2005; Özçelik and Kurt, 2007).

The findings of these studies show that owning a computer, previous successful experience and the frequency of access to computers have high correlation with computer self-efficacy (Karsten and Roth, 1998, Hakverdi *et al*., 2007; Torkzadeh and Koufterous, 1994, Houle, 1996). Another study by Kinzie, Delcourt and Powers (1994) indicates that positive attitudes toward computer technologies are significantly related to computer self-efficacy. In several other studies perceived computer self-efficacy has been found to be significantly correlated with the decisions about using them (Hill, Smith and Mann, 1987; Marcinkiewicz, 1994). Likewise, many studies conducted in Turkey also reveal similar results (see Aşkar and Umay, 2001; Akkoyunlu and Orhan, 2003; Yılmaz *et al.*, 2006; Hakverdi *et al*., 2007).

As for the measurement of computer self-efficacy, many instruments have been developed. One of the most popular of these is a scale developed by Murphy *et al.* (1989 cited in Khorrami-Arani, 2001). In Turkey, the computer-self efficacy scale, which was developed by Aşkar and Umay (2001), is a well known and frequently used one in the field of computer self-efficacy of pre-service teachers.

Teachers and computer self-efficacy

As the pedagogical effectiveness of using computers is widely recognized, all teachers are expected to use them as teaching and learning tools in their classrooms. To do this, however, teachers themselves should be willing to use them. Different studies investigating the relationship between teachers' use of computer technologies and different variables such as self-efficacy beliefs, attitudes towards and knowledge about computer technologies, perceptions of computers as educational tools so and so forth have revealed that there is a significant correlation between all these variables (Koç, 2005). In other words, the acceptance of computers and their use in the teaching and learning processes as a tool is largely determined by the beliefs, perceptions, and attitudes of teachers (Bitner and Bitner, 2002; Aşkar and Umay, 2001; Milbrath and Kinzie, 2000; Albion, 1999). Therefore, not only should all these psychological constructs be investigated closely but also ways to improve them should be sought.

Several research studies show that teachers who have high self-efficacy use computer technologies in their classes more (Aşkar and Umay, 2001, Özçelik and Kurt, 2007). However, to develop such self-efficacy, teachers need to be introduced to computer technologies systematically and be engaged in activities that will provide them with positive experiences with regard to computer use (Valanides and Angeli, 2008). To this end, starting from 1998 in Turkey, Computer I and II and Instructional Technologies and Material Development compulsory courses have been integrated into teacher education programs. Thus, pre-service teachers are expected to posses both skills in the use of computer technologies and positive belief in their capacity to integrate them into their teaching (Albion, 1999).

In this context, self-efficacy beliefs appear to forecast the likely use of computers by pre-service teachers in their future work settings, since people's beliefs about their capabilities are so central and pervasive in human action (Bandura, 1989). Both in Turkey and abroad several studies have been conducted to investigate the computer self-efficacy perceptions of teachers as cited above. The literature on foreign language teachers' perceptions are, however, scarce. This particular study, therefore, sets out to contribute to the understanding of computer-self efficacy perceptions of pre-service English teachers.

PURPOSE OF THE STUDY

This study investigated the computer self-efficacy of pre-service English teachers with regard to different variables such as gender and grade differences, the frequent use of computers, and computer experience. Also, this study examined the likely relationship between the computer self-efficacy perceptions and general self-efficacy perceptions of pre-service teachers. With these purposes in mind, the present study tried to answer the following research questions:

1. What are the computer self-efficacy perceptions of pre-service English teachers?
2. Is there a difference between the computer self-efficacy perceptions of pre-service English teachers and their gender, grade level, the frequency of computer use, and computer experience?
3. Is there a correlation between computer self-efficacy perceptions and general self-efficacy perceptions?
4. Which variable is the most important predictor of computer self-efficacy?

METHODOLOGY

Method

In this study survey methodology design was used to describe pre-service English teachers' computer self-efficacy perceptions as well as general self-efficacy perceptions.

Setting and Participants

The study was conducted at Çanakkale Onsekiz Mart University in 2007-2008 academic year. 286 pre-service teachers at the Faculty of Education, English Language Teaching (ELT) Department participated in the study. The distribution of the sample in relation to gender and grade level is given in Table 1 below.

Table 1: Demographic information about the participants

Category	Level	*f*	%
Gender			
	Male	232	80.6
	Female	56	19.4
Grade			
	Preparation	63	21.9
	1st year	61	21.2
	2nd year	48	16.7
	3rd year	57	19.8
	4th year	59	20.5

Of the 288 pre-service teachers who participated in the study, 232 of them (80.6 %) were female while 56 of them (19.4 %) were male. The difference in the numbers is not surprising because teaching departments are mostly preferred by female students in Turkey. Also when the number of students enrolled in the ELT Department at the time of the study is taken into account, which is 600, it is seen that almost half of the students were reached, which indicates a high degree of representativeness.

The participants in the study were also asked to answer three questions in order to reveal their relation to computers. Table 2 provides information that describes the pre-service teachers' computer experience, frequency of access to computers and possessing a computer.

Table 2: Participants' characteristics in relation to computers

Category	Level	*f*	%
Possessing a computer (N=288)	*Yes*	184	63.9
	No	104	36.1
Experience (N=284)	*No experience at all*	6	2.1
	Limited experience	32	11.3
	Some experience	90	31.7
	Quite a lot of experience	132	46.5
	A lot of experience	24	8.5
Frequency of use (N= 285)	*Everyday continuously*	42	14.7
	A couple of hours a day	98	34.4
	A couple of hours a week	68	23.9
	A couple of days a week	62	21.8
	A couple of hours a month	14	4.9
	Never	1	.4

184 student teachers (63.9 %) reported that they had computers, while 104 of them (36.1 %) stated that they did not have any computers. The relatively high percentage of the pre-service teachers' possessing a computer can be taken as an indicator of their familiarity with computers. As informally observed, every year the number of student teachers having computers is increasing, which may be the sign that they will, as teachers in the future, integrate computers more in their teaching since different research findings show that familiarity is an important factor in the use of computers while teaching (Aşan, 2003; Edwards, 2005).

The answers given to the question related to computer experience revealed that a majority of students were experienced in their use of computers while only 6 student teachers (2.1 %) reported that they had no experience at all.

To the question about the frequency of use, pre-service teachers' answers varied. Nearly half of the students reported using computers every day continuously (42; 14.7 %) or a couple of hours a day (98; 34.4 %). Only a small number of students reported using them a couple of hours a month (14; 4.9 %) or never (1; .4 %).

Instruments

To investigate the research problem in this study three main data collection instruments were used. The Computer Self-Efficacy Scale (Aşkar and Umay, 2001), The General Self-Efficacy Scale (Schwarzer and Jerusalem, 1995) and a survey questionnaire designed to obtain personal information and previous computer experience from the participants.

The computer self-efficacy scale was created by Aşkar and Umay in 2001 and has 18 items with Cronbach's Alpha Coefficient 0.71. It is designed as a 5-point Likert scale with response categories of: *always, usually*, *sometimes*, *rarely,* and *never*.

The second instrument used in the study is the general self-efficacy scale which was developed by Schwarzer and Jerusalem in 1995 in German and translated into different languages including Turkish (Scholtz *et al.*, 2002). The scale measures beliefs in one's capability of different tasks in a variety of different situations. It consists of 10 items. The items on the original scale are rated on a 4-point scale with the anchors *not at all true* to *exactly true.* However, for the purposes of this particular study a 5-point Likert scale was used with the anchors *exactly true*, *true*, *sometimes true*, *not true*, and *not at all true*. The reliability analysis was carried out to determine that the instrument with these new anchors was also reliable and as a result Cronbach's Alpha Coefficient was found to be .88, which points at a high reliability (Büyüköztürk, 2002).

Finally, in order to derive personal information about the participants as well as their experience in the use of computers and frequency of access, a survey questionnaire was given.

The analysis of the data

The data obtained via the research tools were analyzed with the use of SPSS 15. Descriptive analysis, correlation analysis, One-Way ANOVA, and multiple regression analyses were conducted to investigate the research questions.

While interpreting the mean values, boundaries of each response in the 5- point Likert scales from 1 to 5 were calculated by dividing the serial width 4 by the number of responses 5 and found to be 0.8. Depending on this calculation, the accepted boundaries for each response are presented 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

A score of 3.4 and above on the scales was taken as the indicator of moderate efficacy perception while 4.2 and above a high one. Any score below 3.4 was taken as an indicator of low efficacy perception.

Findings and Discussions

The findings of the study are discussed under each research question in detail below.

1. The computer self-efficacy perceptions of pre-service English language teachers

The initial analysis of the data obtained through the Computer Self-Efficacy Scale indicated that the total mean of pre-service English language teachers' computer self-efficacy perceptions was 3.31 (SD:.65) (see Table 3). This finding indicates that pre-service English language teachers in this study did not have high self-efficacy perception in the use of computers.

When a detailed analysis was done to reveal the highest and lowest means obtained from the scale, it was seen that although pre-service teachers' self-efficacy perceptions related to computers were not so high to some extent they believed that they were skilful users of computers (see Table 3).

Table 4: Distribution of the answers given to the Computer Self- Efficacy Scale (N=288)

No	Items	Mean	SD
16	If I try hard, I can solve the problems related to computers.	3.65	1.01
4	I think I can use the computer efficiently.	3.46	1.13
7	I surf in the computer and make new discoveries.	3.39	1.06
11	It is easy for me to write all kinds of things on the computer.	3.34	1.15
13	I am talented about computers.	3.27	1.14
9	I feel competent when computers are concerned.	3.26	1.14

17	At-the-moment solutions while working with computers are enough for me.	3.14	1.01
10	I know what to do when I meet a new thing while working with computers.	3.07	1.05
6	I believe that I master computer terminology and concepts.	2.99	1.14
2	I think of computers almost as a part of me.	2.65	1.25
15	I panic when a problem occurs while working with computers.	2.58	1.20
14	I believe that I have a special talent toward using computers.	2.40	1.29
5	Computers fail me.	2.18	.87
12	I have always believed that it is impossible for me to master computers totally.	2.13	1.28
8	Most part of the time I spend with computers is a waste.	2.09	.89
3	I fear that I might do something wrong while working with computers.	1.96	1.03
18	I feel nervous while working with computers.	1.85	.94
1	I use computers while planning my day.	1.66	.98
	Computer Self-Efficacy	**3.31**	**.65**

Specifically, the mean values of items 3 and 18 (Mean= 1.96, Mean= 1.85 respectively) indicate that students were comfortable with computer technology. Similarly, the mean values of items 16 and 4 (Mean: 3.65 and 3.46 respectively) support the idea that students had moderate self-efficacy perceptions with regard to computers. However, when the fact that none of the mean values of the items above is over 4 is considered, it can be inferred that computers do not have a huge part in the pre-service teachers' lives. Likewise, the mean value of item 1 (Mean= 1.66) supports the idea that computers are not an integral part of student teachers' lives. Similar conclusions were drawn by several researchers in Turkey as well. For instance, in the studies on pre-service mathematics teachers (Aşkar and Umay, 2001), science teachers (Akkoyunlu and Kurbanoğlu, 2003) and biology teachers (Yılmaz *et al*., 2006) a low level of familiarity with computers and computer self-efficacy perceptions was reported.

2. Pre-service English teachers' personal and computer related characteristics and their levels of computer self-efficacy perceptions

To find out whether there is a significant difference between the male and female participants' perceptions of computer self-efficacy, independent samples t-test was carried out. The following table shows the results.

Table 4: Computer self-efficacy in relation to gender differences (N= 288)

Gender	N	Mean	SD	T	df	Sig.
Female	232	3.22	.64	-4.663	286	**.000**
Male	56	3.66	.59			

According to Table 4, the difference between the female and male participants' perceptions is statistically significant ($p<.05$, Cohen's *d*: .7148). The male participants reported higher self-efficacy perceptions (Mean= 3.66) when compared to the efficacy beliefs of female participants (Mean= 3.22). This finding regarding a higher level of self-efficacy perception on the part of the male student teachers is consistent with the literature on gender differences in general and many other research studies investigating gender and computer use/self efficacy (see Chen, 1986; Comber *et al.*, 1997; Cassidy and Eachus, 2002). Generally speaking, male students have high level of ability perception than female students (Özyurt, 2004). Similarly, in terms of computer self-efficacy, males on average have higher computer self-efficacy than females (Torkzadeh & Koufteros, 1994; Cassidy and Eachus, 2002; Cheong *et al.,* 2004).

However, it should be noted that several recent studies have identified greater gender equivalence in use and skills levels (Sam *et al.*, 2005; Akkoyunlu and Orhan, 2003) while some others have also proved that students' majors and the models they are provided with are important variables that affect the way they feel self-efficacious about technology (Holcomb *et al.*, 2004). For example, in a study on computer self efficacy of pre-service teachers at Computer Teaching and Instructional Technologies Department female students' computer self-efficacy perceptions were found to be high, which can be regarded as an indicator of the importance of the major of the students (Akkoyunlu and Orhan, 2003). Therefore, more research should be done on gender differences before definite conclusions may be drawn.
Table 5 illustrates grade level differences in relation to pre-service English teachers' computer self-efficacy perceptions.

Table 5: Computer self-efficacy perceptions of pre-service teachers at different grade levels (N= 288)

Grade Level	N	Mean	SD
Preparatory	63	3.10	.69
1st grade	61	3.25	.71
2nd grade	48	3.40	.48
3rd grade	57	3.29	.67
4th grade	59	3.52	.60

As can be seen in the table, a gradual increase in the computer self-efficacy perceptions of pre-service teachers parallel to the rise in grade level was detected. This finding is in conformity with Torkzadeh and Koufteros's study (1994), where it was reported that students' perceptions rose significantly alongside grade levels. However, it is also notable that in none of the grades in this study the rise went over 4.00. In other words all through the levels, the perceptions of student teachers were low, not going beyond moderate level. Yet, specifically between the 1st and 2nd grade student teachers it could be expected that the rise would be significant since they took Computer I and II courses in the 1st year and Instructional Technologies and Material Development course in the 2nd year. This might raise a question about the effectiveness of these courses. In line with this argument, Hakverdi *et al.* (2007) also found out that pre-service science teachers' computer self-efficacy was not correlated with number of related courses they took. In another study on physics teachers, Akdeniz and Alev (1999) reported that practicing physics teachers could not functionally use computer technologies in their classes due to the ineffectiveness of the courses they took during their undergraduate studies. All these findings indicate that the effectiveness of these courses should be investigated closely and necessary content changes should be made accordingly so that pre-service teachers could feel more knowledgeable, skillful and efficacious in computer use.

On the other hand, to understand whether this change in perceptions regarding grade level is statistically significant, one-way ANOVA test was used (Table 6).

Table 6: One-way analysis of variance (ANOVA) for computer self-efficacy in relation to grade levels

		Sum of Squares	df	Mean Square	F	Sig.
Computer self-efficacy	**Between Groups**	6.115	4	1.529	3.721	**.006**
	Within Groups	116.283	283	.411		
	Total	122.398	287			

As a result, a statistical significance was found between the computer self-efficacy perceptions of pre-service teachers and their grade level ($p < .05$). Further analysis was carried out to better understand within which groups this significance was seen (Table 7).

Table 7: Post Hoc Tukey HSD Test for computer self-efficacy perceptions in relation to grade levels

	Grade Level (I)	Grade Level (J)	Mean (I-J)	Sig.
Computer self-efficacy	Preparatory	1st grade	-.1515	.681
		2nd grade	-.2988	.107
		3rd grade	-.1900	.484
		4th grade	-.4251	**.002***
	1st grade	Preparatory	.1515	.681
		2nd grade	-.1473	.757
		3rd grade	-3.8463E-02	.998
		4th grade	-.2736	.133
	2nd grade	Preparatory	.2988	.107
		1st grade	.1473	.757
		3rd grade	.1088	.909
		4th grade	-.1263	.849
	3rd grade	Preparatory	.1900	.484
		1st grade	3.846E-02	.998
		2nd grade	-.1088	.909
		4th grade	-.2351	.278
	4th grade	Preparatory	.4251	**.002***
		1st grade	.2736	.133

		2nd grade	.1263	.849
		3rd grade	.2351	.278

As is evident in Table 7, Post Hoc Tukey HSD test revealed a significant difference only between the computer efficacy perceptions of the 1st and 4th grade student teachers (p< .05). However, it should be noted that the significance found here may be in support of the significance of experience on computer self-efficacy perceptions rather than grade levels. That is, naturally through the years student teachers spend more time working with computers due to certain course requirements and this may affect their self-efficacy perceptions**.**

As for the variable, possessing a computer, again the statistical analysis showed a significant difference (p<.01) (Table 8).

Table 8: Computer self-efficacy in relation to possessing a computer

Possessing a computer	N	Mean	SD	t	df	Sig.
Yes	184	3.52	.57	8.276	286	**.000**
No	104	2.93	.62			

At this point, however, it would not be wrong to claim that owning computers also means more time spent on them, which leads to greater experience. From this perspective, therefore, this result might also contribute to the fact that computer self-efficacy is more related to experience.

In literature one of the factors influencing computer self-efficacy has been identified to be the frequency of computer use. A similar conclusion was reached in this study as well (see Table 9).

Table 9: Mean values for computer self-efficacy perceptions in relation to frequency of use

Frequency of computer use	N	Mean	SD
Everyday continuously	42	3.72	.62
A couple of hours a day	98	3.64	.45
A couple of days a week	62	3.12	.60
A couple of hours a week	68	2.93	.58
A couple of hours a month	14	2.50	.42
Never	1	2.17	.
Total	285	3.31	.66

As the table illustrates, those student teachers who reported to use computers every day either continuously or a couple of hours appeared to have higher perceptions of computer self-efficacy (Mean= 3.72; Mean=3.64 respectively).

To further detect whether the differences in means observed at different levels was a significant one, one- way ANOVA test together with Post Hoc Tukey HSD test were carried out (Table 10 and 11).

Table 10: One-way analysis of variance (ANOVA) for computer self-efficacy in relation to frequency of computer use

		Sum of Squares	df	Mean Square	F	Sig.
Computer self-efficacy	**Between Groups**	38.756	4	9.689	32.998	**.000**
	Within Groups	81.923	279	.294		
	Total	120.679	283			

The ANOVA test revealed a significant difference between the computer self-efficacy perceptions of student teachers and their frequency of computer use (p<.01). The Post Hoc Tukey HSD, similarly, revealed significant relationships between different frequency levels of computer use.

Table 11: Post Hoc Tukey HSD Test for computer self-efficacy perceptions in relation to frequency of computer use

	Frequency of computer use (I)	Frequency of computer use (J)	Mean (I-J)	Sig.
Computer self-efficacy	Every day continuously	A couple of hours a day	8.480E-02	.915
		A couple of hours a week	.7902	**.000**
		A couple of days a week	.6061	**.000**
		A couple of hours a month	1.2171	**.000**
	A couple of hours a day	Every day continuously	-8.4801E-02	.915
		A couple of hours a week	.7054	**.000**
		A couple of days a week	.5213	**.000**
		A couple of hours a month	1.1323	**.000**
	A couple of hours a week	Every day continuously	-.7902	**.000**
		A couple of hours a day	-.7054	**.000**
		A couple of days a week	-.1841	.299
		A couple of hours a month	.4269	.056
	A couple of days a week	Every day continuously	-.6061	**.000**
		A couple of hours a day	-.5213	**.000**
		A couple of hours a week	.1841	.299
		A couple of hours a month	.6110	**.001**
	A couple of hours a month	Every day continuously	-1.2171	**.000**
		A couple of hours a day	-1.1323	**.000**
		A couple of hours a week	-.4269	.056
		A couple of days a week	-.6110	**.001**

As expected, the findings support that between those student teachers who reported to use computers a couple of hours a day and everyday continuously no significant change was observed ($p > .05$). On the contrary, between those who reported frequent use and less frequent use a statistically significant difference was found. In other words, the more time student teachers spend with computers, the more self-efficacious they feel. Similarly, in a study Albion (2001: 321) found that "the amount of time spent using computers was the factor that contributed most to the variance in self-efficacy for computer use". In their study Özçelik and Kurt (2007) reported that those practicing teachers' self-efficacy perceptions who always used computers were higher than the ones who did not. In brief, the frequency of use appears to be one of the major factors affecting sense of computer self-efficacy.

In relation to frequency of use, computer experience was another point of question in this study. Table 12 shows the mean values for computer self-efficacy perceptions of student teachers reporting difference in computer experience.

Table 12: Mean values for computer self-efficacy perceptions in relation to computer experience

Computer experience	N	Mean	SD
No experience	6	2.20	.36
Limited	32	2.39	.41
Some	90	3.02	.43
Quite a lot	132	3.62	.43
A lot	24	4.18	.36
Total	284	3.31	.66

As discussed in relation to different variables so far, student teacher's computer self-efficacy perception rises as they become more experienced with computers. The gradual development in computer self-efficacy in relation to experience was evident in this research too (see Table 12). In related literature experience has been identified as the most important factor influencing computer self-efficacy, too (Hill *et al.,* 1987; Karsten and Roth, 1998: Aşkar and Umay, 2001; Hakverdi *et al*., 2007). However, some studies also report that the quality of the experience has an impact on computer-self efficacy perceptions as well (Karsten and Roth, 1998; Yılmaz *et al.,* 2006). In other words, negative and positive experiences with computers create different results in the perception of computer self-efficacy.

As Table 13 and 14 illustrate, the ANOVA test and Post Hoc Tukey HSD also pointed out statistically significant differences between these variables (p<.01).

Table 13: One-way analysis of variance (ANOVA) for computer self-efficacy in relation to computer experience

		Sum of Squares	df	Mean Square	F	Sig.
Computer efficacy	**Between Groups**	72.322	4	18.081	101.805	**.000**
	Within Groups	49.550	279	.178		
	Total	121.873	283			

Table 14: Post Hoc Tukey HSD Test for computer self-efficacy perceptions in relation to computer experience

	Computer Experience (I)	Computer Experience (J)	Mean (I-J)	Sig.
Computer self-efficacy	No experience	Limited	-.18804	.854
		Some	-.81465	**.000**
		Quite a lot	-1.41144	**.000**
		A lot	-1.97367	**.000**
	Limited	No experience	.18804	.854
		Some	-.62661	**.000**
		Quite a lot	-1.22339	**.000**
		A lot	-1.78562	**.000**
	Some	No experience	.81465	**.000**
		Limited	.62661	**.000**
		Quite a lot	-.59679	**.000**
		A lot	-1.15902	**.000**
	Quite a lot	No experience	1.41144	**.000**
		Limited	1.22339	**.000**
		Some	.59679	**.000**
		A lot	-.56223	**.000**
	A lot	No experience	1.97367	**.000**
		Limited	1.78562	**.000**
		Some	1.15902	**.000**
		Quite a lot	.56223	**.000**

Except those student teachers who had no or limited experience, for all the other experience levels significant differences were found (p<.05). In other words, the computer self-efficacy perceptions in relation to experience are so sharp that even between quite a lot and a lot of experience it is possible to capture the difference between the perceptions.

3. Computer self-efficacy perceptions and general self-efficacy perceptions

One of the starting points of this research was to look into general self-efficacy of pre-service English teachers and investigate whether it had a correlation with computer self-efficacy. To do this, firstly overall self-efficacy was analyzed and found out to be at a moderate level (Mean= 3.77; SD=.54) but higher than computer self-efficacy as previously given in Table 3 (Mean=3.31; SD=.65).

The correlation analysis, on the other hand, revealed a positive correlation between these two variables (r=.310, p<.01).

Table 15: Pearson Product-Moment Correlation between computer self-efficacy and general self-efficacy perceptions

	1	2
1. Computer self -efficacy	1.000	.310**
2. General self-efficacy		1.000

*Note: p<.001** N=288*

4. Most important predictor of computer self-efficacy

Multiple regression analysis was employed to examine the causal effect of the predictor variables i.e. gender, computer experience, the frequency of use, grade level and general self-efficacy upon the dependent variable computer self-efficacy. 3 cases with missing data were left out from the analysis, the sample was reduced to N=285. The summaries of the linear multiple regression analyses are presented in Table 16.

Table 16: Regression analysis results

Variable	B	SD_B	β	T	p	Dual r	Partial r
Constant	1.041	.220	-	4.737	.000	-	-
Gender	.200	.057	.120	3.503	.001	.267	.206
Grade level	-.013	.016	-.029	-.808	.420	.201	-.049
Possesing computer	-.153	.054	-.112	-2.818	.005	-.440	-.167
Computer experience	.460	.030	.614	15.200	.000	.774	.675
Frequency of use	-.088	.024	-.152	-3.697	.000	-.497	-.217
General self-efficacy	.240	.042	.198	5.755	.000	.307	.327

R=.829 R^2=.687

$F_{(6, 276)}$=101.049 p=.000

Using the enter method, a significant model emerged ($F_{(6, 276)}$=101.049, p=.000) and a high level and significant relationship was found between the variables (R=.829, R^2=.687, p<.01). The predictor variables jointly explained almost 69 % of the variance on computer self-efficacy. According to the standardized regression coefficients (β), the relative importance order of the predictor variables was computer experience, general self-efficacy, gender, frequency of use and possessing computer. The fact that computer experience and computer self-efficacy is significantly correlated has already been identified by several researchers (Anderson and Maninger, 2007; Hill *et* al., 1987; Karsten and Roth, 1998; Aşkar and Umay, 2001). However, what is notable here is that in this study the general self-efficacy perception was found to be the second most significant variable creating a difference in computer self-efficacy perceptions of pre-service teachers. This finding suggests that individuals' global self-efficacy plays an important part in the way they feel about their capabilities to successfully perform a particular behavior.

When the t-test results about the regression coefficients were analyzed, it was seen that except grade level all other predictor variables had a significant effect on computer self-efficacy perceptions of pre-service English teachers (p<. 05).

CONCLUSION

This study investigated the computer self-efficacy perceptions of pre-service English teachers in relation to gender, grade levels, possessing computers, frequency of computer use, computer experience and general self-efficacy perceptions.

As discussed in detail in the previous section, the findings of this study are mostly consistent with the results of previous research on pre-service teachers' computer self-efficacy. In this study, the overall computer self-efficacy perceptions of the pre-service English language teachers in this sample was found to be moderate. The former studies also showed that pre-service teachers' computer efficacy was generally at a moderate level (Aşkar and Umay, 2001; Akkoyunlu and Kurbanoğlu, 2003; Yılmaz *et al*., 2006). However, Akkoyunlu and Orhan (2003) and Hakverdi *et al.* (2007) found a higher perception of computer self-efficacy among pre-service teachers at Computer Teaching and Instructional Technologies Department and Science Teaching Department. Therefore, it might be concluded that pre-service teachers' majors might create a difference in computer self-efficacy perceptions (Akkoyunlu and Orhan, 2003; Holcomb *et al.*, 2004).

In this study a parallel increase in the pre-service teachers' computer self-efficacy perceptions and grade levels was identified. However, a statistically significant difference was detected only between the 1st and 4th grade pre-service English teachers' perceptions despite the computer and information technologies courses they took at 1st and 2nd grades. This finding suggests that grade level is a questionable variable in explaining computer self-efficacy perceptions of pre-service teachers. Although there are studies supporting the finding that students' perceptions significantly raise in relation to grade levels (Torkzadeh & Koufteros, 1994; Akkoyunlu and Kurbanoğlu, 2003), in some others no significant difference was reported (Yılmaz *et al.*, 2006; Hakverdi *et al.*, 2007). It is certain that today most students become familiar with computers quite at an early age. Therefore, it is understandable that students are ready to use them when they start university. However, the low levels of computer self-efficacy found for all grade levels in this study indicate that students are not really so much

familiar with computers. Moreover, it could be inferred that the courses taken during teacher education related to computers and the use of them as educational tools fall short in providing pre-service teachers with the necessary knowledge, skills, and sense of efficacy that they should have in order to integrate computer technologies in their future teaching successfully.

On the other hand, the findings of this research further verified that those variables, i.e. computer experience, general self-efficacy, frequency of use, possessing a computer, gender create significant differences in computer self-efficacy perceptions of pre-service teachers. In the literature several studies also indicate that these variables are related to one another (Anderson and Maninger, 2007).

This study also showed that there was a positive correlation between the pre-service English teachers' computer self-efficacy and general self-efficacy perceptions. The general self-efficacy was identified to be at a moderate level but higher than computer self-efficacy. This finding suggests that general self-efficacy can indeed be regarded as situation-free but the correlation between the two psychological constructs further suggests that it might be difficult to raise an individual's domain specific self-efficacy perception without increasing the global one initially. Certainly this idea calls for further research.

Lastly, the multi regression analysis revealed that among the variables considered in this research, computer experience was the most important predictor of computer self efficacy. This finding is in line with the findings of several other research studies (Hill *et* al., 1987; Karsten and Roth, 1998; Aşkar and Umay, 2001), pointing out the importance of providing pre-service teachers with the necessary experience and knowledge during their education. (Albion, 1999).

IMPLICATIONS

The results of this study have some significant implications for teacher educators. Firstly, those specific courses that aim to equip pre-service teachers with knowledge, skill and confidence regarding computer use should be reconsidered in the light of the research done in this field. Content and procedural renovations could be made and implemented which could then be followed by research to determine whether the intended behavioral, cognitive and affective changes have taken place.

However, it should be borne in mind that helping student teachers' build high level of computer self-efficacy is a collective endeavor. That is, secondly, all educators regardless of the courses they teach should seek ways to contribute to the training of pre-service teachers in computer use. They can do it, in the first place, by modeling good manipulation of computers in their own teaching. As Bandura states (1986) one of the sources of self-efficacy beliefs is observing others performing the behavior successfully. And next, they can encourage pre-service teachers to integrate more computer work in the tasks they assign since positive past experience helps increase high self-efficacy beliefs. Well-thought, well-structured tasks accompanied with good examples can assist student teachers during this process.

In conclusion, it should not be forgotten that self-efficacy is closely related to motivation, success and is a predictor of future behavior. For this reason, during their education if pre-service teachers are not encouraged to build high level of computer self-efficacy, the likely integration of computers in their future teaching will be at risk.

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