



## EVALUATION OF PROSPECTIVE SCIENCE TEACHERS' COMPUTER SELF-EFFICACY

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### Abstract

The purpose of this study is to investigate prospective science teachers' computer related self-efficacy perceptions in terms of gender, general academic achievement and grade level. This is a descriptive field survey. The study group of the research comprised of totally 226 students. "Computer-related Self Efficacy Perception Scale" and "Demographic Information Form" were used as data collection tools. In the analysis of the data, descriptive statistics, independent t-test, one-way ANOVA and Pearson correlation coefficient were used. At the end of the study, computer-related self-efficacy perception scores of teachers were determined as in medium level. While it was found out that computer-related self-efficacy perception scores of prospective teachers differed significantly according to gender and grade level, it was determined that they didn't differ significantly according to general academic achievement. It was revealed that there were high and medium-level positive relationships between prospective teachers' computer-related self efficacy perception scores and gender, grade level and academic achievement.

**Keywords:** Computer self-efficacy perception, prospective science teachers, gender, grade level, general academic achievement

### INTRODUCTION

Self-efficacy, which is perceived as one of the most important concepts of Bandura's social learning theory, is defined as "one's belief in being able to successfully conduct the behavior necessary to cope with given situations" (Bandura, 1977). Bandura (1986) defines self-efficacy as self-evaluation of individuals who organize necessary activities in order to display specific performance and their capacity to conduct these activities successfully. Perceived self-efficacy is explained as a concept related to one's self-capacity towards realizing an attitude or achieving a task (Bandura, 1977).

Self-efficacy perception provides individuals with motivation, happiness and a sense of achievement (Pajares, 2002).

It is seen that self-efficacy, which is a concept developed in the field of social psychology, has been adapted to many fields and used in different disciplines (O'Leary, 1985; Lev, 1997; Schunk, 1985). Computer self-efficacy belief is one of these fields of study (Compeau and Higgins, 1995; Hill, Smith and Mann, 1987). Computer self-efficacy perception is defined as "an individual's judgment of his self in using computers" (Delcourt and Kinzie, 1993; Compeau and Higgins, 1995; Khorrami, 2001). A great many studies related to the belief of computer self-efficacy have been carried out in the literature (Miura, 1987; Murphy, Coover and Owen, 1989; Torkzadeh and Koufteros, 1994; Aşkar and Umay 2001; Hill, Smith and Mann 1987; Seferoglu, 2005). In this context, the purpose of this study is to investigate prospective science teachers' computer related self-efficacy perceptions in terms of gender, general academic achievement and grade level.

## METHOD

### Study design

This is a descriptive study in the survey model.

### Study Group

The study group of the research comprised of totally 226 prospective teachers attending the Science Teaching Department of Education Faculty, Kırşehir Ahi Evran University. Of the prospective teachers who took part in the study, %35,8 were (81) male while %64,2 were (145) female. As for the grade point averages, it was determined that %20,8 of prospective teachers had 1,00-1,99 success averages while %67,7 of them had 2,00-2,99 and %11,5 had 3,00-4,00. On the other hand, it was found out that %16,4 of them (37) were enrolled in the first grade while %16,4 (37) were in the second grade, %55,8 of them (126) in the third grade and %11,5 of them (26) were in the fourth grade.

### Data Collection Tools

In data collection, "Computer-related Self Efficacy Perception Scale" developed by Ekici (2004) and demographic information form were used. *Computer-related Self Efficacy Perception Scale* is a likert-type scale consisting of totally 10 items. The scale comprises of two sub-scales which are *basic skills related to computers* and *skills on using computer for specific purposes*. Cronbach Alpha value for the whole scale was found to be .87. In this study, Cronbach alpha value of the scale was found to be .89. As for the demographic information form, it was prepared in line with expert opinions.

### Data Analysis

In data analysis, SPSS 15.0 (Statistical Package for Social Sciences) programme was used. While analyzing data, descriptive statistics, independent t-test, one-way ANOVA and Pearson correlation coefficient were used.

## FINDINGS

### 1. Prospective Teachers' Computer Self-Efficacy Perception Points

Table 1. Prospective Teachers' Computer Self-Efficacy Perception Points

	<b>X</b>	<b>SD</b>	<b>Minimum</b>	<b>Maximum</b>
Total of computer self-efficacy perception point scale	29,94	9,27	10,00	50,00
Basic skills dimension	15,11	5,03	5,00	25,00
Specific skills dimension	11,78	3,78	4,00	20,00

As can be seen in Table 1, prospective students' average of computer self-efficacy points ( $X=29,94$ ) is higher than the scale average ( $X=25,00$ ). This situation can be considered as that computer self-efficacy points of prospective teachers who took part in the study are at medium level, in other words, positive.

### 2. Distribution of Prospective Teachers' Computer Self-Efficacy Perceptions according to Gender

Table 2. t-test Results of Prospective Teachers' Computer Self-Efficacy Perceptions according to Gender

	<b>Gender</b>	<b>N</b>	<b>X</b>	<b>SD</b>	<b>t</b>	<b>p</b>
Total of computer self-efficacy perception point scale	Male	81	30,97	10,22	,886	,003
	Female	145	29,53	8,70		
Basic skills dimension	Male	81	15,90	5,53	,847	,007
	Female	145	14,89	4,73		
Specific skills dimension	Male	81	12,92	3,94	,410	,001
	Female	145	11,71	3,70		

\* $p<0.05$

As can be seen in Table 2, while female prospective teachers' average point for the whole scale was found to be  $X= 29,53$ , that of males was found to be  $X= 30,97$ . In basic skills dimension of the scale, female prospective teachers' average point was calculated as  $X= 14,89$  whereas it was calculated as  $X=15,90$  for males. On the other side, in the specific skills dimension, female prospective teachers' average point was  $X= 11,71$  while for males it was calculated as  $X= 12,92$ . According to the result of the t-test that was performed, there exists a significant difference between gender and computer self-efficacy perception statistically at  $p<0,05$  level in favour of males.

### 3. Distribution of Prospective Teachers' Computer Self-Efficacy Perception Points according to Grade Level

Table 3. ANOVA results of Prospective Teachers' Computer Self-Efficacy Belief Levels according to Grade Level

Dimensions of the scale	Grade level	N	X	SD	F	p	Tukey Test
Total of computer self- efficacy perception point scale	1	37	27,90	7,12	5,941	.001*	1 and 2
	2	37	28,47	9,11			1 and 3
	3	126	29,41	8,29			1 and 4
	4	26	31,45	8,23			
Basic skills dimension	1	37	19,42	5,97	6,294	.000*	1 and 2
	2	37	20,01	6,41			1 and 3
	3	126	21,20	5,13			1 and 4
	4	26	21,96	6,23			
Specific skills dimension	1	37	8,17	3,12	4,193	.007*	1 and 2
	2	37	9,41	2,62			1 and 3
	3	126	10,11	3,42			1 and 4
	4	26	11,78	4,21			

\*p<0.05

When Table 3 is examined, it was determined that both in the general of the scale and its dimension computer self-efficacy perception points got higher as the grade level got higher and that prospective teachers in the 4<sup>th</sup> grade were at the highest level. In the results of the Tukey post hoc test which was performed to determine between which classes this difference occurred, it was seen that there was a significant difference between the 1<sup>st</sup> grade and the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> grades.

### 4. Distribution of Prospective Teachers' Computer Self-Efficacy Perception Points according to General Academic Achievement Level

Table 4. ANOVA Results of Prospective Teachers' Computer Self-Efficacy Belief Levels according to General Academic Achievement Level

Dimensions of the scale	General Academic Achievement	N	X	SD	F	p
Total computer self- efficacy perception point scale	1,00-1,99	47	24,00	7,12	8,722	.060
	2,00-2,99	153	25,04	9,11		
	3,00-4,00	26	27,41	8,29		
Basic skills dimension	1,00-1,99	47	16,33	5,97	10,542	.010
	2,00-2,99	153	17,27	6,41		
	3,00-4,00	26	18,13	5,13		
Specific skills dimension	1,00-1,99	47	5,78	3,12	4,980	.081
	2,00-2,99	153	7,11	2,62		
	3,00-4,00	26	6,94	3,42		

\*p<0.05

When Table 4 is examined, it was determined that both in the general of the scale and its dimensions computer self-efficacy perception points got higher as the general academic achievement level got higher. In the results of the variance analysis (ANOVA) which was performed to see if that difference was a significant difference or not, it was found out that

prospective teachers' computer self-efficacy perception points did not show a statistically significant difference according to general academic achievement.

### 5. Relationship between Prospective Teachers' Computer Self-Efficacy Perception Points and Gender, Grade Level and General Academic Achievement

**Table 5.** Pearson Correlation Coefficient Results between Prospective Teachers' Computer Self-Efficacy Perception Points and Gender, Grade Level and General Academic Achievement

		Gender	Grade Level	General Academic Achievement
Total of computer self-efficacy perception point scale	r	,371(**)		,669(**)
Basic skills dimension	r		,733(*)	,593(**)
Specific skills dimension	r			,602(**)

\*\* 0.01

As can be seen in Table 5, there exists a medium-level, positive and significant relationship between gender and the total of computer self-efficacy perception scale ( $r=0.371$ ,  $p<0.01$ ). Between the general academic achievement and the total of computer self-efficacy perception scale ( $r=0.669$ ,  $p<0.01$ ), it was determined that there was a medium-level, positive and significant relationship at the basic skills dimension level ( $r=0.593$ ,  $p<0.01$ ) and the specific skills dimension level ( $r=0.602$ ,  $p<0.01$ ). Between the grade level and the basic skills dimension, a high-level, positive and significant relationship was found ( $r=0.733$ ,  $p<0.01$ ).

## DISCUSSION

In this study, prospective teachers' average of computer self-efficacy points was found to be higher than the scale average ( $>25,00$ ). Findings of the study correspond with the study results of Uzun, Ekici and Sağlam (2010). A Significant difference that was in favour of males was determined between prospective teachers' computer self-efficacy perception points for the general of the scale. ( $p<0.05$ ). Studies of Işıksal and Aşkar (2003) and Miura (1987) support these findings. Another result of this study is that a significant difference was detected between prospective teachers' computer related self- efficacy perception points and grade level they study at ( $p<0.05$ ). This difference was determined to be between the 1<sup>st</sup> and 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> grades. This finding shows a parallelism with the study results of Ekici and Bahçeci (2006) and Kutluca (2009). It was also found out that prospective teachers' computer self-efficacy perception points did not show a statistically significant difference according to general academic achievement.

## CONCLUSION

In the study, results of the research titled as Evaluation of Prospective Science Teachers' Self-Efficacy Perceptions are as follows:

Prospective science teachers' average of computer self-efficacy points was found to be higher than the scale average. According to the analysis results, A Significant difference that was in favor of males was determined between computer self-efficacy perception and gender. It was found out

that there was a significant difference between the 1<sup>st</sup> and 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> grades that prospective teachers study at.

It was determined that prospective teachers in the 4<sup>th</sup> grade were at the highest level in terms of their computer self-efficacy perception points. It was also found out that prospective teachers' computer self-efficacy perception points did not show a statistically significant difference according to general academic achievement. On the other hand, there exists a medium-level, positive and significant relationship between gender and the total of computer self-efficacy perception scale. Between the general academic achievement and the total of computer self-efficacy perception scale, it was determined that there was a medium-level, positive and significant relationship at the basic skills dimension level and the specific skills dimension level. Between the grade level and the basic skills dimension, a high-level, positive and significant relationship was found. Under the light of these results, it can be said that prospective science teachers' computer self-efficacy perceptions are developing in a positive way.

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