# The Effect of Use of Information and Communication Technologies on Elementary Student Teachers' Perceived Information Literacy Self-Efficacy*

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**Abstract**

The aim of this research is to investigate and evaluate elementary student teachers' perceived information literacy self-efficacy in terms of the use of information and communication technologies (ICT). The relational survey method which determines the relationships between two or more variables was used in the research. The data gathered from 1801 student teachers who are attending at the fourth class of Departments of Computer and Instructional Technologies, Science, English, Elementary Mathematics, Grade, Social Studies, and Turkish Education in the Faculty of Education in Atatürk, Ondokuz Mayıs, Marmara, Gazi and Dokuz Eylül universities with using the ICT survey and perceived information literacy self-efficacy scale (ILSES). The use of the ICT survey consists of questions related to student teachers' demographic information and ICT usage. The ILSES consists of question about perceived competencies on searching, using and producing the information. Frequency, arithmetic mean and one way ANOVA were used to analyze the data. For the significant results in p <.01 level, Scheffe test was used to find out which groups have caused the difference. The findings of the research revealed that most of the elementary student teachers use ICT frequently, at least at intermediate level and access ICT from multiple locations. Furthermore, elementary student teachers' computer experience; skills and frequency of computer and internet use, access opportunities to computer and internet has significant effect on their perceived information literacy self-efficacy.

**Key Words**

Information Literacy, Perceived Self-Efficacy, Elementary Student Teachers, Information and Communication Technologies.

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Rapid changes in information and communication technologies (ICT) have forced individuals of twenty first century to adapt themselves to live in information society. Individuals who live in harmony with the information society, can be characterized as independent and self-regulated learners who have lifelong learning skills (Mori, Shimizu, Ishida & Tominaga, 2003; Tuckman & Sexton, 1990). One of the important bases of lifelong learning can be information literacy.

Information literacy, first introduced by Zurkowski in 1974, has been defined as a set of skills for solving information problem according to ALA (American Library Association, 1989). As Toffler (1998) mentioned, 2000s' ignorant people would not be ones who cannot read or write, but ones who learn, forget, and re-learn the same information so information literacy will be the way to cope with the enormous amount of information. Information literacy can offer opportunities for lifelong learning in personal and professional context (Breivik, 1999; Bruce, 1997; Hancock, 1993).

There have been some studies on how information literacy skills can be gained in early ages (ALA, 1989; Carr, 1998; Doyle, 1994; TTKB, 2002; TTKB & RTÜK, 2007; UNESCO, 2004). These studies focus on helping students gain information literacy skills. Moreover, teachers who have the most important role in this process should be taken into consideration. Kurbanoğlu and Akkoyunlu (2007) stated that the importance of information literacy in all levels of formal education has been emphasized for a long time but the integration of information literacy skills in teacher education has been neglected. As Carr (1998) mentioned that information literacy courses should be taught in teacher training to train teachers who can use effective resources and who can help their students to gain information literacy skills (searching for information, using information and synthesizing information etc.).

Teacher competencies have been renewed regarding to cover information literacy skills and ICT skills (ALA, 1989; ISTE, 2000; MEB (Ministry of National Education), 2006). In order to use information literacy and ICT skills effectively and efficiently, teachers' self-efficacy should have been developed. Zimmerman (1995) defines self-efficacy as one's belief in his/her ability to achieve a task. Individuals could not succeed only with their abilities (Bandura, 1977). If an individual have an ability to perform a task but he/she does not believe that he/she will successfully achieve the goal then he/she cannot perform the task (Gawith, 1995).

One's perceived self-efficacy about a subject matter determines how he or she will be resistant to the difficulties and how much effort he or she will put in accomplishing a task. Individuals, who have high perceived self-efficacy believe that they will be successful, and they will continue to endeavor until finishing the task. On the other hand, individual who have low perceived self-efficacy is afraid of being unsuccessful, and he/she will quit the difficult activities (Pajares, 2002; Kear, 2000).

An individual can have high self-efficacy in one subject matter but he/she can have low self-efficacy in another one (Cassidy & Eachus, 2002). There are so many studies about various topics' self-efficacy, for example; perceived computer and internet self-efficacy or web usage self-efficacy (Eachus & Cassidy, 2004; Karsten & Roth, 1998; Mcilroy, Sadler & Boojawon, 2007; Paraskeva, Bouta & Papagianni, 2008; Torkzadeh, Chang & Demirhan, 2006; Torkzadeh & Dyke, 2002; Whitty &McLaughlin, 2007), perceived information literacy self-efficacy (Akkoyunlu & Kurbanoğlu, 2004; Ann & Sheila, 2007; Beile O'Neil, 2005; Cannon, 2007; Kurbanoğlu, 2003; Kurbanoğlu, Akkoyunlu & Umay, 2006; Sheehy, 2001; Usluel, 2007).

The related literature indicates that it is important to gain information literacy skills in early ages and also formal education institutions are responsible for that (Erdem & Akkoyunlu, 2002; Kurbanoğlu & Akkoyunlu, 2007; Spitzer, Eisenberg & Lowe, 1998). Therefore, student teachers who will be teachers in elementary schools should have information and ICT skills which have been defined in teacher competencies by ISTE (2000) and MEB (2006). Student teachers, who do not pay attention or do not have information literacy skills, cannot train information literate individuals in their professional life (Johnson & O'English, 2004; Wilson, 1997). The present study has been conducted to determine elementary student teachers' perceived information literacy and use of ICT to understand the relations between level of information literacy and ICT use.

## Aim of the Research

The aim of this research is to investigate and evaluate elementary student teachers' perceived information literacy self-efficacy in terms of use of information and communication technologies. In the scope of the aim the following questions were formulated:

1. What is the level of elementary student teachers' perceived information literacy self-efficacy?
2. What are elementary student teachers' experiences, skill levels, frequency of ICT use and access opportunities to ICT?
3. Does elementary student teachers' perceived information literacy self-efficacy be affected by

a) computer experience,

b) skill level of computer use,

c) frequency of computer use,

d) access opportunities to computer,

e) skill level of internet,

f) frequency of internet use and

g) access opportunities to internet?

## Method

Relational survey method was used in the research. Information about the population and sample, data collection instruments and data analysis techniques of the research are given below.

### Population and Sample

The population of the research consists of elementary school student teachers who have been studied in the last year of the education faculties. The criterion sampling technique was used to form the sample of the research. In the criterion sampling method, individuals who have the characteristics which will be observed in the study are selected for the sample (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, & Demirel, 2008). The criteria used to select the sample are as follows: education faculties which have senior students teachers at all these departments: Computer Education and Instructional Technologies, Science Teaching, Elementary School Mathematics Teaching, English Language Teaching, Elementary School Teaching, Social Sciences Teaching and Turkish Language Teaching. The sample has been consisted of 1801 elementary school student teachers who were trained at the last year of the departments, which mentioned above, in Atatürk, Ondokuz Mayıs, Marmara, Gazi and Dokuz Eylül Universities. Among the participants, 57% (n=1025) were male and 43% (n=773) were female.

### Instruments

The data were collected using "the use of information and communication technology survey" and "the Information literacy self-efficacy scale (ILSES)". Student teachers' experience, skill level, frequency of ICT use and access opportunities to ICT were asked in the use of ICT survey. The ILSES was 7 points Likert type scale which was developed by Kurbanoğlu, Akkoyunlu & Umay (2006). The original ILSES's Cronbach alpha was 0.92. The scores of the ILSES were categorized as 5-7 = High, 3-4.99 = Medium and 0-2.99 was low level of information literacy self-efficacy.

### Analysis of Data

Data were analyzed using descriptive statistics such as frequency, arithmetic mean and ratio. To determine the effects of variables on information literacy self-efficacy, one-way analysis of variance (ANOVA) were used in $p<.01$ level. If the result of the variance analysis were significant, the Scheffe test was used to find out which groups have caused the difference.

## Results

### Student Teachers' Perceived Information Literacy Self-Efficacy Level

Student teachers' perceived information literacy self-efficacy mean score was 5.49. This finding showed that student teachers' perceived information literacy self-efficacy level was high in other words they perceive themselves as sufficient in performing the tasks related to information literacy.

### Student Teachers' Use of ICT

Student teachers have used ICT for 4-6 years (43.7%), more than 6 years (32.7%), for 1-3 years (21.9%) and less than one year (1.7%). Student teachers' level of computer skills are at intermediate level (65%), advanced level (22. 8%) and beginner level (12.2%). Student teachers use computer often (43.7%), always (35.3%, n=630), rarely (20.3%) and never (0.7%). Student teachers' skill level of internet is at intermediate level (57.5%), advanced level (33.5%) and beginner level (9%). Student teachers use internet often (47%), always (31.9%), rarely (20.5%) and

never (0.6%). As seen from the findings, most of the student teachers use computer and internet frequently at least at intermediate level. Nearly half of the student teachers (45%) access computer and internet from multiple locations (home, internet cafe and university).

### Effect of Student Teachers' Computer Experience on Perceived Information Literacy Self-Efficacy

Student teachers' computer experience has significant effect on their perceived information literacy self-efficacy scores [$F_{(3\text{-}1784)}$=20.283, p<.01]. The Scheffe test show that students who use computer more than 6 years (**x**=5.64) and between 4-6 years (**x**=5.51) have higher perceived information literacy mean scores than students who use computer for 1-3 years (**x**=5.26).

### Effect of Student Teachers' Skill Levels of Computer Use on Perceived Information Literacy Self-Efficacy

There is significant difference in student teachers' perceived information literacy self-efficacy regarding to skill level of computer use [$F_{(2\text{-}1788)}$=79.17, p<.01]. Scheffe test show that ILSES' score of students who see themselves as the beginner group (**x**=5.01) was lower than both intermediate level group (**x**=5.50) and advanced level group (**x**=5.80). Also Scheffe test show significant difference in intermediate and advanced groups' mean scores.

### Effect of Student Teachers' Frequency of Computer Use on Perceived Information Literacy Self-Efficacy

Student teachers' perceived information literacy self-efficacy differs significantly regarding to frequency of computer use [$F_{(3\text{-}1782)}$=20.339, p<.01]. Scheffe test show that student teachers who use computer always has higher ILSES score (**x**=5.64) than students who use computer frequently (**x**=5.47) and rarely (**x**=5.27).

### Effect of Student Teachers' Opportunities to Computer Access on Perceived Information Literacy Self-Efficacy

Access opportunities to computers has significant effect on perceived

information literacy self-efficacy [$F_{(6\text{-}1768)}$=3.089, p<.01]. Students who access computers from multiple locations (home, internet cafe and university) has highest ILSES mean score (**x**=5.63).

### Effect of Student Teachers' Skill Levels of Internet Use on Perceived Information Literacy Self-Efficacy

There is significant difference in ILSES mean scores among using internet at beginner, intermediate and advanced level [$F_{(2\text{-}1761)}$=96.531, p<.01]. Students who see themselves as advanced level (**x**=5.78) have higher perceived information literacy self-efficacy mean score than intermediate level group (**x**=5.41) and beginner level group (**x**=4.91).

### Effect of Student Teachers' Frequency of Internet Use on Perceived Information Literacy Self-Efficacy

Frequency of internet use has significant effect on perceived information literacy self-efficacy [$F_{(3\text{-}1750)}$=22.327, p<.01]. Student teachers who use internet always has higher ILSES mean score (**x**=5.67) than students who use internet frequently (**x**=5.48) and rarely (**x**=5.24).

### Effect of Student Teachers' Opportunities to Internet Access on Perceived Information Literacy Self-Efficacy

Student teachers' access opportunities to internet has significant effect on their perceived information literacy self-efficacy scores [$F_{(6\text{-}1714)}$=5.354, p<.01]. Scheffe test show that students who access internet from multiple locations (home, university and internet cafe) has higher ILSES mean score (**x**=5.70) than students who access internet from internet cafe only (**x**=5.39).

## Discussion

This research findings show that student teachers' perceived information literacy level is high. Student teachers in this study would have empowered their information literacy skills through research homework and projects. Certainly, having experience in doing researches or project may not be sufficient to explain the high level of information literacy. As literature shows, positive experiences (Bandura, 1986; Del-

court & Kinzie, 1993) and knowledge and skill levels (Pajares, 2002) are related to the high perceived information literacy. In this respect, student teachers would have strengthen their perceived information literacy level through having positive experiences on developing skills of accessing information, using information and constructing knowledge. Findings of the study also indicated that most of the student teachers use ICT at least for four years at intermediate level. When these findings considered as a whole, it can be interpreted that having positive and continuous experiences in doing researches would have effected development of their ICT skills and perceived information literacy self-efficacy. Moreover, this study revealed that student teachers' perceived information literacy self-efficacy is affected by computer experience, skill levels and frequency of computer and internet use, and access opportunities to computer and internet. Some previous studies provided similar findings (Akkoyunlu & Yılmaz, 2005; Usluel, 2007). Student teachers who use ICT at advanced level for a long time and who access to ICT from multiple locations have higher perceived information literacy self-efficacy scores. As Bandura (1986) and Pajares (2002) stated self-efficacy can be supported by knowledge, skills and experiences, research homework and projects which emphasize on developing student teachers' skills in using ICT and information literacy skills (searching information, using information and constructing knowledge effectively and efficiently) should be integrated to the courses. Besides ICT infrastructure of universities should be enriched and easily be accessed by students. As a conclusion; ICT and information literacy skills should be integrated in to the courses or an information literacy course should be toughed which use project based learning. This approach can be a systematic way to enrich student teachers' ICT and information literacy competencies. For further studies various data collection techniques can be used to find out and compare high school student teachers' information literacy skills and perceived information literacy in more number of teaching programs.

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