

The Effect of The Teaching Practice Course on Pre-Service Elementary Teachers' Technology Integration Self-Efficacy

Erhan Ünal [1], Ahmet Yamaç [2], Ahmet M. Uzun [3]

[1] Afyon Kocatepe University, Turkey
Ahmet Necdet Sezer Kampusü, Gazligöl Street, 03200, Afyonkarahisar
Research Assistant, PhD (Computer Education and Instructional Technology)
E-mail: eunal@aku.edu.tr

[2] Erciyes University, Turkey
Erciyes University, 38039, Kayseri
Assistant Professor, PhD (Elementary Education)
E-mail: ahmetyamac@erciyes.edu.tr

[3] Afyon Kocatepe University, Ahmet Necdet Sezer Kampusü, Gazligöl Street, 03200, Afyonkarahisar
Research Assistant, PhD (Computer Education and Instructional Technology)
E-mail: auzun@aku.edu.tr

ABSTRACT

The aim of this study is to examine the effect of the teaching practice course on pre-service elementary teachers' TISE level. In this research both qualitative and quantitative research methods were used. The participants were 43 pre-service elementary teachers from a state university in Turkey. In the quantitative part of the study, these pre-service elementary teachers filled in the TISE scale before and after the teaching practice course. Also, semi-structured interviews were carried out with 13 voluntary pre-service elementary teachers about the sources of TISE. The results indicated that the TISE level of pre-service elementary teachers was increased during the teaching practice course. The sources of pre-service elementary teachers' TISE was discussed based on the sources of self-efficacy stated by Bandura.

Keywords: *self-efficacy, technology entegration, and elementary school teacher education.*

INTRODUCTION

Information and communications technology (ICT) has undergone continuous changes. These innovations and changes in ICT have led to changes and developments in education and its stakeholders such as national and international organizations, school administration, teachers, curriculum and students. ICT use in education ensures the learning and teaching process is conducted more effectively and more efficiently. The aim of instructional technology is to facilitate learning by activating appropriate technological processes and resources (AECT Definition and Terminology Committee, 2008). For this reason, ICT use in education provides benefits and advantages. Within this framework, there are projects about ICT integration in education all over the world. For example, in Turkey, the FATİH Project was been started to introduce technology use for learning and teaching (Ministry of National Education, 2013). In the USA, similar projects have been carried out. In different states, within one computer per student and per one teacher project, it is aimed to integrate technology into the curriculum (Gateway, 2004; Ingram, Willcutt, & Jordan, 2008). In Singapore, the Ministry of National Education prepared five-year plans on technology integration. Recently, the Singapore Ministry of Education (2015) has published the fourth master plan for ICT in education. Likewise, Korea introduced the 5th four years Master Plan for ICT in Education (The Korea Education and Research Information Service, 2014).

Technology integration, in which many countries have invested, is an important issue for education. For the success of these projects, teachers' technology integration in the teaching and learning process is a matter of great importance. Since today's teachers should use their technological knowledge and skills effectively, the Ministry of National Education (2008) in Turkey as well as the International Society for Technology in Education [ISTE] (2008) have prepared standards for determining teachers' competence with regard to technology use for learning and teaching. Teacher training programs have great

responsibilities to equip teachers with this competence; indeed, the success of technology integration is directly related to the quality of teachers. Teacher training programs should train pre-service teachers on the use of technological tools and skills and knowledge about technology integration into education (Gulbahar, 2008). The teacher training programs should provide opportunity for realizing the potential of available technologies and their use in education (Choy, Wong & Gao, 2009).

Pre-service teachers' views about technology integration affect their future use of technology. In this way Ertmer (1999) and Hew and Brush (2007) consider that teachers' knowledge, skills, thought, attitude and self-efficacy of technology integration were barriers toward technology integration. Therefore pre-service teachers' instructional beliefs and self-efficacy influence their instructional decisions and classroom practices (Pajares, 1997).

Technology Integration

Different definitions of technology integration exist in the literature. Hew and Brush (2007) defined technology integration as using computers, laptops, personal digital assistants (PDAs), software and Internet for instructional purposes at schools. Technology is a tool to facilitate learning. Therefore technology integration is related to technology use in the teaching and learning process (Perkmen, 2008). Reigeluth (2003) explained technology integration as using technology to enhance the quality of the teaching and learning process. According to these definitions, technology integration is seen as using technology to enhance the quality of instruction in classrooms. Therefore the learning and teaching process will be more effective and more efficient.

Self-Efficacy and Technology Integration Self-Efficacy

Bandura theorized self-efficacy and defined perceived self-efficacy as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives." (Bandura, 1994, p. 71). Self-efficacy beliefs have an impact on people's behaviors, because people who have a high self-efficacy belief tend to select challenging tasks, engage in tasks and persist in them (Pajares, 1997). Bandura (1977) stated that perceived self-efficacy is related to the emergence of behaviors and is important for developing new behaviors. Self-efficacy affects the selection of activities, persistence on difficulties, effort and performance.

Bandura's self-efficacy theory provides four sources of self-efficacy, mastery experiences, vicarious experiences, social persuasion and physiological and emotional states. These sources are appropriate ways of increasing a person's self-efficacy. Mastery experiences are the most effective way to promote self-efficacy because successful performance has a positive effect on a person's self-efficacy belief; in contrast, performance failures have a negative effect on self-efficacy belief. Another source of self-efficacy, "vicarious experiences", is explained as people observing other people's behaviors, and judging the successful and unsuccessful performances and evaluating these performances. After that people develop beliefs how to achieve a similar performance. "Social persuasion" is another source of self-efficacy. From people's friends, families and colleagues encouragement about their successes or failures in terms of performances affects their self-efficacy. The last source of self-efficacy is "physiological and emotional states". People's mood, stress, anxiety may affect a person's beliefs about judgements of related performance. Positive feelings about performance increase people's self-efficacy; in contrast, negative feelings decrease a person's self-efficacy (Bandura, 1994).

On the other hand, in the literature different forms of self-efficacy are discussed. One of them is teacher self-efficacy. Ashton (1984) described teaching self-efficacy as "the extent to which teachers believe that they have the capacity to affect student performance" (p. 28). Teaching self-efficacy was described as teachers' belief in their ability to change students' performance. Therefore teacher education programs should develop pre-service teachers' teaching efficacy. In other words, a teacher education program should develop relationships between teacher efficacy beliefs and teacher behavior (Ashton, 1984).

The other form of self-efficacy is technology integration self-efficacy ([TISE]). According to the literature, teachers' use of technology in education has been affected by different variables. One of these variables is teacher beliefs (Albion, 1999). Pajares (1992) reported a relationship between pre-service teachers educational beliefs and plans and instructional decision and practices. Consequently, teachers beliefs about the capacity of technology use in education demonstrate their instructional activities (Teo, Chai, Hung, & Lee, 2008). Teacher beliefs about technology use in education can be described as TISE. In another definition, TISE is perceived as the confidence of teachers and pre-service teachers while integrating technology in education (Nathan, 2009).

Teacher Training Programs

In Turkey the teacher training program is developed by the Higher Education Institution. While developing this program, entrance to the profession, general culture, subject matter teaching and pedagogical formation are taken into consideration, according to the law numbered 1739 issued by the Ministry of National Education. Teacher training programs contain lessons about subject area, general culture and the profession of teaching.

In general there are similar courses for the teaching profession. One of them is the teaching practice course. This course is aimed at providing pre-service teachers with experience on the teaching profession by implementing what they have learned from courses such as general culture, subject area and the profession of teaching (MoNE, 1999). From this course, pre-service teachers gain experience from primary schools, secondary schools or high schools.

All teaching training programs include the teaching practice course. Therefore, in the primary school teaching program it is carried out in the 7th and 8th semesters. This course lasts 8 hours per week in practicing primary schools under a practicing teacher and university advisor supervision. The goal of this course is for pre-service teachers to gain experience about the culture of the school, examine the educational environment, observe the teachers, study with student groups and individuals, participate in the other activities and internalize the teaching profession. By the end of this course, pre-service teachers learn about the curriculum, course books, student files, measurement and assessment. Consequently, pre-service teachers have the chance to practice theoretical knowledge in real life via practicing schools.

The teaching practice course affects pre-service teachers' beliefs (Al-Awidi & Alghazo, 2012), because pre-service teachers prepare lesson plans and materials before presenting a lesson; they solve any problems occurring in the class during the teaching practice. In this regard pre-service teachers' TISE level could be developed during this process, because Bandura (1994) reported that the sources of self-efficacy are mastery experiences, vicarious experiences, verbal persuasion and physiological and emotional states. Therefore, in this practice process the experiences gained by pre-service teachers such as presenting a lesson (mastery experiences), observing university advisors, instructors, practicing teachers, friends (vicarious experiences), encouragement and support of university advisors, instructors, practicing teachers, friends (verbal persuasion), feelings and thoughts (physiological and emotional states) will affect their TISE level (Al-Awidi & Alghazo, 2012; Albion, 1999; Bandura, 1994).

Research on Technology Integration

A variety of studies related to technology integration abound in the literature. One of the research areas related to technology integration is research on technology integration barriers. These studies on technology integration barriers include: access to hardware, lack of technical support and administration support, (Çakır & Yıldırım, 2009; Inan & Lowther, 2010; Wachira & Keengwe, 2011; Yıldırım, 2007); teachers' skills and beliefs about technology (Inan & Lowther, 2010); lack of technological leadership and support (Strudler & Wetzel, 1999; Yıldırım, 2007); barriers related to social, environmental, personal and curriculum matters (ChanLin, Hong, Horng, Chang & Chu, 2006); inadequate technological tools and insufficient training about technology integration (Koçak-Usluel, Kuşkaya-Mumcu & Demirarslan, 2007; Yıldırım, 2007), and insufficient collaboration between teachers (Yıldırım, 2007).

The other research field of technology integration is about identifying technology integration efficiency. In these studies, technology integration practices were evaluated by pre-service teachers, teachers, and administrators. The studies show that teachers had positive views about technology integration (Göktaş, Yıldırım & Yıldırım, 2008); pre-service teachers had a positive attitude toward technology integration (Brush, Glazewski & Hew, 2008); there was a relationship between pedagogical beliefs and technology integration (Chen, 2008; Ertmer, Ottenbreit-Leftwich, Sadık, Şendurur & Şendurur, 2012; Hermans, Tondeur, Braak, & Valcke, 2008; Kim, Kim, Lee, Spector, & DeMeester, 2013; Liu, 2011) in these studies.

On the other hand, there are few studies on developing teachers' or pre-service teachers' beliefs about technology integration after a course or training program (Al-Awidi & Alghazo, 2012; Brinkerhoff, 2006; Kopcha, 2012; Uslu & Bümen, 2012; Wang, Ertmer, & Newby, 2004). Therefore, in Turkey, further studies are needed aimed at evaluating the effect of teaching practice course on pre-service teachers' TISE level. In particular, it is necessary to examine pre-service teachers' development of beliefs about technology integration. In the technology integration literature research on TISE has not sufficiently concentrated on pre-service teachers' TISE level after the teaching practicing course. In this context, the problem of this research is "What is the effect of the teaching practice course on pre-service classroom teachers' TISE level?".

The Aim of the Study

The aim of this study is to examine the effect of the teaching practice course on pre-service elementary teachers' TISE level. The questions in the current study which we aim to answer are:

1. Is there a significant difference between the TISE level of pre-service elementary teachers before and after the student teaching experience?
2. What are the sources of pre-service elementary teachers' TISE level?

Significance of the Study

Projects have been carried out on technology integration into the curriculum all over the world. In this regard, different ICT tools such as hardware (computer, laptop, tablet PC, smart board, internet connection etc.), software and access to these technologies are provided, inservice teachers training programs are carried out and also to equip pre-service teachers with the necessary skills for technology use in education teacher training programs are updated (Lawless & Pellegrino, 2007). These projects are expected to be useful and increase the quality of education. The success of these projects depends on many factors. Teacher training programs are one of them. Therefore pre-service teachers should be equipped with technology integration skills and belief in using them. In this research pre-service teachers' development of TISE will be revealed. In other words, we will examine how pre-service teachers' beliefs are developed while integrating technology by using the necessary knowledge of general culture, special field and teaching profession. Through this research the effect of teacher training programs on pre-service teachers' TISE level will be evaluated. In addition, the success of technology integration projects will be predicted.

METHOD

Research Design

In this study both qualitative and quantitative research methods were used in order to answer research questions. "Mixed-methods research involves the use of both quantitative and qualitative methods in a single study. The use of both methods provides a more complete understanding of research problems than does the use of either approach alone" (Fraenkel, Wallen, & Hyun, 2012, p. 557). Among mixed method designs, the convergent mixed methods approach was used in this study. The purpose of convergent mixed methods design is to collect quantitative and qualitative data, analyze data and interpret

data. In this method, collecting two different datasets has the strengths of both quantitative and qualitative methods. Therefore data gathered from different sources will be interpreted and compared together (Creswell & Plano-Clark, 2007).

For the quantitative part of the study, TISE Scale was conducted in pre-service classroom teachers before and after the teaching practicing course. For the qualitative part of the study, after the teaching practicing course semi-structured interviews were conducted with pre-service elementary teachers. The semi-structured interviews aimed at determining pre-service elementary teachers' development sources of TISE. Therefore in the interview form open ended questions were prepared based on Bandura's (1994) view about the sources of self-efficacy, namely mastery experiences, vicarious experiences, verbal persuasion and physiological and emotional states. With these quantitative and qualitative methods we aimed at examining pre-service elementary teachers' sources of TISE during the teaching practice course.

Participants

The participants of this research were 43 pre-service elementary teachers at a state university in Turkey. These pre-service classroom teachers filled in the TISE scale before and after the teaching practice course. On the other hand, semi-structured interviews were carried out with 13 voluntary pre-service elementary teachers about the sources of TISE.

Data Collecting Tools

To collect quantitative data, the TISE scale was used. The scale was developed by Wang, Ertmer, and Newby (2004) and adapted into Turkish culture by Ünal (2013). The TISE scale has 19 items in Turkish. The scale used a five-point Likert Scale ranging from 5 (strongly agree) to 1 (strongly disagree). Higher scores in the TISE scale mean that a pre-service elementary teacher has a higher TISE level. In this research Cronbach alpha value which indicates the reliability of the scale was estimated as .90 in the pre-test and .87 in the posttest.

To collect qualitative data, a semi-structured interview form was prepared. The questions were related to the sources of TISE and were based on Bandura's views on sources of self-efficacy namely mastery experiences, vicarious experiences, social persuasion and physiological and emotional states (Al-Awidi & Alghazo, 2012; Bandura, 1994). These questions were:

1. Which personal experiences affected your beliefs to integrate technology in your class?
2. Who affected your beliefs about integrating technology in your class?
3. How did people encourage you to use technology in your class?
4. How do you feel while integrating technology in your class?

Data Analysis

The data gathered from the TISE scale were analyzed using SPSS 18.0. To examine pre-service elementary teachers change of TISE level before and after teaching practice the paired sample *t*-test was used.

In the qualitative part of the study, data were collected about the sources of TISE. Therefore all interviews were recorded and then transcribed. The interviews were analyzed based on the sources of self-efficacy stated by Bandura. According to Marshall and Rossman (2011), data reduction and data interpretation are the purpose of data analysis in qualitative research. Researchers reduce data by separating collected data into manageable sections and make sense of participants' views and actions before interpreting data. Creswell (2013) stated that qualitative analysis is an inductive process. Therefore researchers are able to obtain codes and themes from collected data.

In this research, first of all interviews were reviewed and transcribed. Then the transcribed data were

read. While reading the data, two researchers took theoretical and thematic notes on the basis of word, sentence or paragraph. After that a code list was generated and these codes were categorized according to Bandura's view about the sources of self-efficacy, namely mastery experiences, vicarious experiences, social persuasion and psychological and emotional states. The two researchers' analysis results were compared and agreement or disagreement on the results were determined and a resolution was then made. To ensure the reliability of data analysis, the $[\text{Agreement} / (\text{Agreement} + \text{Disagreement}) \times 100]$ formula was used (Miles & Huberman, 1994) and the reliability of this analysis was calculated as 79%. According to Miles and Huberman (1994), the reliability of data analysis should be above 70%. Therefore the data analysis in this study was accepted as reliable.

RESULTS

Question 1: Is there a significant difference between the TISE level of pre-service elementary teachers before and after the student teaching experience?

In order to determine if there was a significant difference between the TISE level of pre-service elementary teachers before and after the student teaching experience, the paired sample *t*-test was conducted and the results are shown in Table 1.

Table 1. Paired Samples t-Test Results for TISE level

Variable	Pre-test		Post-test		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
TISE	69.47	8.21	74.88	6.77	-3.72	.001*

* $p < .005$

As seen in Table 1, the TISE level of pre-service elementary teachers increased during the teaching practice course ($t(42) = -3.72, p < .005$). The *p*-value was significant showing that there is a significant difference between the mean scores of TISE level before and after the teaching practice course. The means of the pre-test and post-test TISE scores were $X = 69.47$ and $X = 74.88$.

Question 2: What are the sources of pre-service elementary teachers' TISE level?

Pre-service elementary teachers' sources of TISE were categorized according to Bandura's view. Therefore the main categories, sub-categories and frequencies of pre-service elementary teachers' sources of TISE in each category are presented in Table 2.

Table 2. Categories and Sub-Categories of Pre-Service Elementary Teachers' Sources of TISE

Category/ Subcategory	f
Mastery Experiences	18
Microteaching practices	7
Teaching activities in practice school	8
Activities at university	3
Vicarious Experiences	14
Teacher educators	5
Practice teacher in school	5
Friends	4
Social Persuasion	9
Teacher educators	5
Family	3
Practice teachers in school	1
Psychological and Emotional States	14
Happiness/ positive/ Emotional relief	9
Anxiety/the difficulties of class control	5

Mastery Experiences

As seen in Table 2, the most effective sources of pre-service elementary teachers' TISE were mastery experiences ($f = 18$). Bandura (1994) stated that the most effective way for a strong self-efficacy belief is mastery experience. Therefore, in the context of pre-service elementary teachers, the TISE level was mostly affected by their personal experiences such as micro-teaching at university, teaching activities conducted in the practice school and other activities in university.

In addition, Bandura (1994) implies that an individual's successes as a result of his or her interaction with the environment led to enhanced self-efficacy. According to Pajares (2002), individuals are involved in various tasks and activities in their routine life. They make interpretations based on the results of their behaviors and form a belief of "self" in terms of their efficacy. In their subsequent actions individuals act in accordance with previously developed beliefs (Pajares, 2002). Against this background, one of the sources of TISE, mastery experiences, is explored in this study in order to clarify the following question: "What kind of personal experiences affected pre-service primary school teachers' TISE development"? Based on the interview results, the majority of the pre-service primary school teachers ($n = 8$) indicated that technology integration efforts during school experiences are the most effective factor which contributed to their TISE development. Some students ($n = 7$) indicated that micro-teaching practices they experienced in their university had an effect on their TISE development, while others indicated that other practices they experienced in university affected their TISE development. For instance, a teacher candidate discussed the contribution of school experiences as follows:

"I have tried to improve myself by using various technologies which were demonstrated in the micro-teaching courses I took at my university. In addition, before starting the teaching experience, based on my observations, I realized that students liked technology-supported instruction. For this reason, I tried to use technology in my lessons."

Another teacher candidate stated his/her opinions as follows:

“While I was teaching children to tell the time, using the clock application became effective. Students were engaging in the course. However, when I drew the clock on the blackboard, I didn’t see the students actively participating in the lesson. After seeing this, I decided that the use of technology is beneficial.”

Regarding the contribution of micro-teaching that pre-service teachers experience in their university, one pre-service teacher said:

“The micro-teaching practices that we experienced in our university supported my usage of technology in my teaching experiences. It supported my teaching, resulting in effective teaching.”

In terms of other experiences about technology usage, one pre-service teacher said: “I made different presentations in the courses that I took at my university. During these presentations, I made use of computers, which made my work easier.”

Interviews revealed that the mastery experiences of pre-service teachers contributed to their TISE development. The teacher candidates plan their teaching on a weekly basis by using their observations about the teaching activities they have witnessed. Thus, the teacher candidates gain experience leading to improvements in their TISE. Likewise, the pre-service teachers obtain skills in terms of technology usage in their micro-teaching experiences which contributed significantly to their TISE development. As a result, these findings are consistent with Bandura’s (1994) view about self-efficacy development: “The most effective way of creating a strong sense of efficacy is through mastery experiences”.

Vicarious Experiences

Another source affecting individuals’ self-efficacy development is vicarious experience. Students develop a belief of self-efficacy by observing and modeling other people’s behaviors. If individuals do not have any particular experiences about the related task or the activity, they regard other successful people as “models”. The successful outcomes and actions modeled through other behaviors affect the development of the student's self- efficacy (Bandura, 1994; Pajares, 2002). Seeing successful people with similar characteristics promotes the observer’s belief that the observer has the same capability to achieve a specific goal. In the same manner, seeing other peoples’ failure decreased the observer’s perception of his or her efficacy. The degree of the perceived similarity to the model being observed has a serious impact on perceived self-efficacy. In this context, as one of the sources of TISE, vicarious experience is investigated based on the following main question: Who affected your technology use in your teaching activities? The teacher candidates reported that the most influential factor affecting TISE beliefs stems from modeling the instructors of their universities and the mentors of their practice schools (n = 5) and then modeling their peers who apply in the same practice schools (n = 4). Regarding the TISE beliefs that were developed through modeling the instructors of the pre-service teachers who work in their university, one student reported:

“The instructors who used technology in classroom encouraged me to utilize technology in my teaching activities. My instructors told me how to use technology in an efficient manner, such as the pros and cons of a specific technology. Therefore, I used technology since I believed that technology would be beneficial for my students.”

In a similar way, another pre-service teacher said:

“In the math class, the instructor told us how to use the Geogebra program and computer-assisted mathematics instruction. Thereby, he provided me with the ability to use the technology effectively.”

Regarding the source of vicarious experiences of TISE development related to the mentors in practice schools, one of the pre-service teachers said:

“My mentor in the practice school made students watch a video in the lessons and he asked questions about what the students had learnt. He projected the course book he used on to the blackboard.”

Another pre-service teacher reported:

“My mentor in the practice school fully utilized technology in his lessons. He tried to find related videos from the internet, making students watch the videos that he recorded himself. As a result, all the students understood the lesson. This kind of technology usage seriously affected me. Thus I learnt how I could teach with the help of technology.”

In addition, one pre-service teacher indicated that they obtained various experiences by modeling their peers. For example, one of the pre-service teachers stated her beliefs as follows: “A friend of mine was teaching phonics. She was making students listen to the song that she prepared by using the technology.”

When pre-service teachers' views are analyzed, it could be said that they built their TISE beliefs by modeling other people in their environment, because, in situations when individuals regard themselves as incompetent, they observe models who they think are more competent. In this way, it could be postulated that pre-service teachers develop TISE beliefs vicariously (Pajares, 2002). When pre-service teachers see that other people are capable of using technology in their teaching activities, they realize that they are also capable of utilizing that technology for their teaching activities.

Social Persuasion

Social persuasion is also regarded as an important source of self-efficacy development. If individuals are convinced verbally that they have the ability to perform a given task, their self-efficacy beliefs are promoted and they are more likely to exert extra effort to achieve a specific goal (Bandura, 1994). Pre-service teachers' views about social persuasion were explored based on the following question: “How did the people around you encourage you to use technology in lessons?”

According to the views of pre-service teachers, the social persuasions of their instructors at their university were the most influential factor in contributing to their TISE development ($n = 5$). Then the social persuasions of their families contributed to their TISE development ($n = 3$). Finally, pre-service teachers reported that the social persuasions of their mentors in practice schools contributed to their TISE development ($n = 1$). Regarding the persuasions and encouragements of their instructors, one pre-service teacher reported:

“My instructors at university gave special attention to technology. For example, one of my instructors said that using an animated car instead of a toy would be more effective. When I tried this, I realized that my teaching was more effective.”

Regarding family encouragement and persuasion, one pre-service teacher said:

“My father uses technology very effectively. He uses computers, tablets and cell phones very well. This affected me. In addition, he has the belief that: if you are going to be a teacher you should have knowledge about this which made me be ambitious.”

It could be argued that the TISE beliefs of pre-service teachers are slightly affected by the social persuasions of their environment. In this regard, it was found that family and instructor support in terms of social persuasion contributed positively to pre-service teachers' TISE development.

Psychological and Emotional States

Psychological and Emotional States are another source of self-efficacy. Emotional states such as anxiety, stress and moods affect individuals' beliefs about their capabilities to achieve a certain task (Bandura, 1994). The effect of psychological and emotional states on pre-service teachers' TISE

development was explored based on the following questions: How did you feel while you are using technology in your class? What kind of positive and/or negative emotions did you experience? How did these emotions affect your technology use? The majority of the pre-service teachers reported that they were in a positive emotional state ($n = 9$), while some of them said they were in a negative emotional state ($n = 6$). One of pre-service teachers who was in a positive emotional state reported: "Technology appeals to many senses. For this reason, it is logical for me to conduct technology-supported lessons which also give me pleasure."

Likewise, another pre-service teacher said:

"Since technology captures my students' attention very well, I feel calm myself. Since all of my students are engaged in listening to the lesson, I feel calm myself. As a result I become happy."

Regarding negative emotional state, one of pre-service teachers reported his anxiety:

"When I use technology, I sometimes feel anxious. For example, if I cannot project the presentation at the blackboard, or if similar problems occur, I feel tense because, at such times, I believe that I will fall behind the lesson plan."

In sum, individuals' experiences of emotional states while they are performing a certain task can affect their self-efficacy about that task in a positive or negative manner (Bandura, 1994). The pre-service teachers' emotional states affect their belief of TISE. For example, pre-service teachers who possessed positive emotional states are more likely to use technology in their class than other pre-service teachers who possess negative emotions. A pre-service teacher who has negative emotional state about using technology is less likely to use technology in his/her class.

DISCUSSION AND CONCLUSION

This study explored the effect of the teaching practice course on pre-service elementary school teachers' TISE level. This research was designed as a mixed method study. For the quantitative part of the study, pre-service elementary teachers filled in the TISE scale before and after their teaching practice course. Quantitative data indicated that, pre-service elementary teachers' TISE level increased from the pre-test to the post-test. Furthermore, semi-structured interviews were conducted with 13 pre-service elementary teachers to examine the sources of their TISE. The semi-structured interview form was prepared in accordance with Bandura's view about sources of self-efficacy, namely mastery experiences, vicarious experience, social persuasion and psychological and emotional states. Qualitative data showed that all sources were effective on pre-service elementary school teachers' TISE and mastery experiences was the most effective one.

Similar findings related to effect of the field experiences and professional development programs on pre-service teachers' beliefs have been reported in the literature. Hoy and Spero (2005) found that pre-service teachers' teaching self-efficacy increased during the teaching practice course; Gao, Xiang, Chen, and McBride (2013) noted that teaching experience increased pre-service physical education teachers' teaching self-efficacy; Kopcha and Alger (2011) reported that pre-service teachers' teaching self-efficacy increased after a technology supported curriculum during field experience; Flores (2015) found that a field based science method course influenced pre-service teachers' teaching self-efficacy level. Şimşek (2008) designed a technology integration program for pre-service teachers and found that pre-service teachers' attitudes towards technology were positive and enhanced. Wang, Ertmer, and Newby (2004) stated that vicarious experiences and goal setting increased pre-service teachers' TISE level while Al-Awidi and Alghazo (2012) also found that the teaching experience course increased pre-service teachers' TISE level.

In this study, the results showed that pre-service elementary teachers' TISE level increased after their teaching practice course. The course enabled them to gain some experience in technology integration and these affected their beliefs about integrating technology. The experiences which pre-service teachers gained by themselves, in particular, greatly affected their TISE development. Their experiences of micro-

teaching at university, teaching activities in their practice school and other activities in university influenced their TISE level. This study found that mastery experiences, as Bandura (1994) stated, are the most effective way to gain self-efficacy.

The other source of TISE is vicarious experience. So, in this context, pre-service elementary teachers observed different people for technology integration such as instructors at university, practice school advisors and peers. By observing these people technology integration practices, they increased their TISE level.

Verbal persuasion and psychological and emotional states affected pre-service elementary teachers' TISE development. In this study, verbal persuasion by practicing school teachers was shown to have a serious effect on pre-service elementary teachers' TISE development, because encouragement and support about integrating technology into education from practicing school teachers could help develop pre-service elementary teachers' beliefs. Also, people such as instructors at university, peers and others should support and give feedback to pre-service elementary teachers about technology integration. In this way their TISE level could be increased. On the other hand, pre-service elementary teachers' feelings influenced their TISE development, because their positive feelings could influence their technology integration in a positive way. Likewise, negative feelings could influence their technology integration in a negative way.

LIMITATIONS AND SUGGESTIONS

Technology integration is affected by different barriers. Ertmer (1999) and Hew and Brush (2007) stated that teachers' self-efficacy belief about technology integration is one of these barriers. For successful technology integration, these barriers should be eliminated. In this regard, the teaching practice course is seen as important because pre-service teachers have the chance to practice what they have learned about the subject area, general culture and profession of teaching in a real learning environment. In the real environment, pre-service teachers interact with practicing school teachers, instructors at university, and their peers. Therefore pre-service teachers' technology integrated teaching plans and activities in lessons should be examined and observed seriously by practicing schools and instructors so that students get feedback and advice about technology integration practices. Since pre-service teachers' TISE level could be influenced positively, they should take as their models instructors, teachers, peers and other people around them who integrate technology into education successfully. These people should encourage pre-service teachers to use technology so that pre-service teachers can integrate technology into education in the future.

Finally, there are some limitations in this study. Firstly, this study was conducted with only 43 pre-service elementary teachers. It could be conducted with more pre-service teachers from different departments in future studies. Secondly, this study is limited because it only used data gathered from the TISE scale and the semi structured interview form. Future studies using observation and document analysis may reveal pre-service teachers' TISE level in more detail.

REFERENCES

- Al-Awidi, H. M., & Alghazo, I. M. (2012). The effect of student teaching experience on pre-service elementary teachers' self-efficacy beliefs for technology integration in the UAE. *Educational Technology Research and Development*, 60(5), 923-941. doi: 10.1007/s11423-012-9239-4
- AECT Definition and Terminology Committee. (2008). Definition. In A. Januszewski & M. Molenda (Eds.), *Educational technology: A definition with commentary*. New York, Lawrence: Erlbaum.

- Albion, P. (1999). Self-efficacy beliefs as an indicator of teachers' preparedness for teaching with technology. In *Proceedings of the 10th International Conference of the Society for Information Technology & Teacher Education (SITE 1999)* (pp. 1602-1608). Association for the Advancement of Computing in Education (AACE).
- Ashton, P. T. (1984). Teacher efficacy: A motivational paradigm for effective teacher education. *Journal of Teacher Education, 35*(5), 28-32. doi: 10.1177/002248718403500507
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*, 191-215. doi: 10.1016/0146-6402(78)90002-4
- Bandura, A. (1994). *Self-efficacy*. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71-81). New York, NY: Academic Press. (Reprinted in H. Friedman [Ed.], *Encyclopedia of mental health*. San Diego: Academic Press. (1998))
- Brush, T., Glazewski, K. D., & Hew, K. F. (2008). Development of an instrument to measure pre-service teachers' technology skills, technology beliefs, and technology barriers. *Computers in the Schools, 25*(1-2), 112-125. doi: 10.1080/07380560802157972
- ChanLin, L. J., Hong, J. C., Horng, J. S., Chang, S. H., & Chu, H. C. (2006) Factors influencing technology integration in teaching: A Taiwanese perspective. *Innovations in Education and Teaching International, 43*(1), 57-68. doi: 10.1080/14703290500467467
- Chen, C. H. (2008). Why do teachers not practice what they believe regarding technology integration?. *The Journal of Educational Research, 102*(1), 65-75. doi: 10.3200/JOER.102.1.65-75
- Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage.
- Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.
- Cakir, R., & Yildirim, S. (2009). What do computer teachers think about the factors affecting technology integration in schools. *İlköğretim Online, 8*(3), 952-964.
- Ertmer, P. A. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(4), 47-61. doi: 10.1007/BF02299597
- Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadık, O., Şendurur, E., & Şendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education, 59*(2), 423-435. doi:10.1016/j.compedu.2012.02.001
- Flores, I. M. (2015). Developing pre-service teachers' self-efficacy through field-based science teaching practice with elementary students. *Research in Higher Education, 27*, 1-19.
- Fraenkel, J., Wallen, N., & Hyun, (2012). *How to design and evaluate research in education*. New York, NY: McGraw-Hill.

- Gao, Z., Xiang, P., Chen, S., & McBride, R. (2013). The influence of student teaching on physical education student teachers' self-efficacy and outcome expectancy beliefs. *Teaching, Research, and Media in Kinesiology*, 2, 1-15.
- Gateway. (2004). *One-to-One laptop initiatives: Providing tools for 21st century learners*. Folsom, CA: Center for Digital Education.
- Göktaş, Y., Yıldırım, Z. & Yıldırım, S. (2008). The keys for ICT integration in K-12 education: Teachers' perceptions and usage. *Hacettepe University Journal of Education*, 34, 127-139.
- Hermans, R., Tondeur, J., Braak, J. V. & Valcke, M. (2008). The impact of primary school teachers' educational beliefs on the classroom use of computers. *Computers & Education*, 51(4), 1499–1509. doi:10.1016/j.compedu.2008.02.001
- Hew, K., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Education Technology Research and Development*, 55(3), 223-252. doi: 10.1007/s11423-006-9022-5
- Hoy, A. W., & Spero, R. B. (2005). Changes in teacher efficacy during the early years of teaching: A comparison of four measures. *Teaching and teacher education*, 21(4), 343-356. doi: 10.1016/j.tate.2005.01.007
- Inan, F. A., & Lowther, D. L. (2010). Factors affecting technology integration in K-12 classrooms: A path model. *Educational Technology Research and Development*, 58(2), 137–154. doi: 10.1007/s11423-009-9132-y
- Ingram, D., Willcutt, J., & Jordan, K. (2008). *Laptop initiative evaluation report*. University of Minnesota: Center for Applied Research and Educational Improvement.
- ISTE (International Society for Technology in Education) (2008). NETS for Teachers. Retrieved from <http://www.iste.org/standards/nets-for-teachers/nets-for-teachers-2008.aspx>
- Kim, C., Kim, M. K., Lee, C., Spector, J. M., & DeMeester, K. (2013). Teacher beliefs and technology integration. *Teaching and Teacher Education*, 29, 76-85. doi: 10.1016/j.tate.2012.08.005
- Kopcha, T. J. (2012). Teachers' perceptions of the barriers to technology integration and practices with technology under situated professional development. *Computers & Education*, 59(4), 1109–1121. doi: 10.1016/j.compedu.2012.05.014
- Kopcha, T. J., & Alger, C. (2011). The impact of technology-enhanced student teacher supervision on student teacher knowledge, performance, and self-efficacy during the field experience. *Journal of Educational Computing Research*, 45(1), 49-73. doi: 10.2190/EC.45.1.c
- Lawless, K. A., & Pellegrino, J. W. (2007). Professional development in integrating technology into teaching and learning: Knowns, unknowns, and ways to pursue better questions and answers. *Review of Educational Research*, 77(4), 575-614. doi: 10.3102/0034654307309921
- Liu, S. H. (2011). Factors related to pedagogical beliefs of teachers and technology integration. *Computers & Education*, 56(4), 1012–1022. doi:10.1016/j.compedu.2010.12.001

- Marshall, C., & Rossman, G. B. (2011). *Designing qualitative research* (5th ed.). Thousand Oaks, CA: Sage.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: SAGE.
- MoNE (1999). Öğretmen adaylarının Milli Eğitim Bakanlığına bağlı eğitim öğretim kurumlarında yapacakları öğretmenlik uygulamasına ilişkin yönerge [Guideline for teaching practice in schools at Ministry of National Education]. *Tebliğler Dergisi*, 2493.
- MoNE. (2008). *Öğretmenlik mesleği genel yeterlikleri [General competencies about teaching profession]*. Ankara: Milli Eğitim Basımevi.
- MoNE Fatih Project. (2013). Retrieved from <http://fatihprojesi.meb.gov.tr/tr/index.php>
- Nathan, E. J. (2009). *An examination of the relationship between pre-service teachers' level of technology integration self-efficacy (TISE) and level of technological pedagogical content knowledge (TPACK)*. (Unpublished doctoral dissertation, University of Houston).
- Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, 62(3), 307-332. doi: 10.3102/00346543062003307
- Pajares, M. (1997). Current directions in self-efficacy research. *Advances in Motivation and Achievement*, 10(149), 1-49.
- Pajares, F. (2002). *Overview of Social Cognitive Theory and of Self-Efficacy*. Retrieved from <http://www.emory.edu/EDUCATION/mfp/eff.html>
- Perkmen, S. (2008). *Factors that influence pre-service teachers' technology integration performance*. (Unpublished doctoral dissertation, Iowa State University).
- Reigeluth, C. M. (2003). Knowledge building for use of the internet in education. *Instructional Science*, 31, 341-346. doi: 10.1023/A:1024694228065
- The Korea Education and Research Information Service. (2012). White Paper on ICT in Education Korea. Retrieved from http://english.keris.or.kr/whitepaper/WhitePaper_eng_2014.pdf
- Singapore Ministry of Education. (2015). The fourth Masterplan for ICT in Education. Retrieved from <https://ictconnection.moe.edu.sg/masterplan-4>
- Strudler, N. B., & Wetzel, K. (1999). Lessons from exemplary colleges of education: Factors affecting technology integration in pre-service programs. *Educational Technology Research and Development*, 47(4), 63-81. doi: 10.1007/BF02299598
- Şimşek, C. S. S. (2008). Students' attitudes towards integration of ICTs in a reading course: A case in Turkey. *Computers & Education*, 51(1), 200-211. doi: 10.1016/j.compedu.2007.05.002

- Teo, T. , Chai, C. S., David, D., & Lee, C. B. (2008). Beliefs about teaching and uses of technology among pre-service teachers. *Asia-Pacific Journal of Teacher Education*, 36(2), 163-174. doi: 10.1080/13598660801971641
- Uslu, O., & Bümen, N. T. (2012). Effects of the professional development program on Turkish teachers: Technology integration along with attitude towards ICT in education. *The Turkish Online Journal of Educational Technology*, 11(3), 115-127.
- Usluel, Y. K., Mumcu-Kuşkaya, F., & Demiraslan, Y. K. (2007). ICT in the learning-teaching process: Teachers' views on the integration and obstacles. *Hacettepe University Journal of Education*, 32, 164-179.
- Wachira, P., & Keengwe, J. (2011). Technology integration barriers: Urban school mathematics teachers' perspectives. *Journal of Science Education and Technology*, 20(1), 17-25. doi: 10.1007/s10956-010-9230-y
- Wang, L., Ertmer, P. A., & Newby, T. J. (2004). Increasing pre-service teachers' self-efficacy beliefs for technology integration. *Journal of Research on Technology in Education*, 36(3), 231-250. doi: 10.1080/15391523.2004.10782414
- Yildirim, S. (2007). Current utilization of ICT in Turkish basic education schools: A review of teacher's ICT use and barriers to integration. *International Journal of Instructional Media*, 34(2), 171-186.