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Prof. Dr. Ertuğrul USTA

Necmettin Erbakan University

ertugrulusta@gmail.com

Journal Secreteria

Veysel Bilal Arslankara

vbilalarslankara@gmail.com

Correspondence Address

Necmettin Erbakan Üniversitesi
Ahmet Keleşoğlu Eğitim Fakültesi A-Blok-127
Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü
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Investigation of The Attitudes of Secondary School Students with Different Learning Styles For E-Learning

Fatih KALECİ (iD)

Necmettin Erbakan University, Faculty of Political Sciences, Economics Department, Turkey

fkaleci@erbakan.edu.tr

ORCID No: https://orcid.org/0000-0001-6823-3773

Article Info	ABSTRACT
	In this study, it was aimed to investigate the attitudes of secondary school students with different learning styles towards e-learning. The study is a descriptive research designed as a relationship survey method. The sample of the study consists of 360 students in a public school in Konya in the 2018-2019 academic year. "Grasha-Riechmann Learning Styles Scale" and "Attitude Scale Towards E-Learning" were used as data collection tools in the research. Data were analyzed using descriptive statistics, independent t test and one way ANOVA. Data were analyzed using SPSS 25.0 statistical package program. According to the results of the study, when the learning styles were ranked as preferred, the students (35.2%) had "Independent" and at least (5.6%) "Avoidant" learning styles. The mean scores of students' attitudes towards E-learning were 4,12. This value shows that students' attitudes towards E-learning are positive. As a result of the study, the attitudes of the students towards E-learning show a statistically significant difference according to their learning styles (F (358) = 42.86, p <.01).

Introduction

In recent years, changes and developments in science and technology are closely related to education and training as well as in many other fields. Therefore, this effect has brought important innovations to the field of education. Thanks to this interaction, technology contributes to learning and resources and materials are provided for almost every subject area to be used directly in the lessons. Thus, the appearance and assessment methods of learning environments change radically (Gürol and Sevindik, 2001).

In this direction, different designs have been prepared to enable the course contents to reach the learners over the internet. Nowadays, all these developments give up to new learning tools and methods instead of traditional teaching and learning methods. In line with these innovations, technology has become increasingly important in the field of education. It has started to be supported by technology and even technology-based teaching systems have

emerged. With these new technology-based teaching systems and developments in educational technology, the demands for individual learning have gained importance.

It is accepted as important principles in terms of education and learning that the student can freely organize and maintain the learning initiatives, take part in the assessment of his / her own learning, actively participate in the learning process and progress according to his / her own pace. In line with these principles, the student-centered structure has become increasingly common.

At this point, in student-centered education, it is important to know the learning characteristics of the students and to determine their learning styles. Because knowing the learning styles helps to improve the weaknesses by identifying the strengths and weaknesses of individuals in the learning cycle, bringing together the most suitable individuals to work together and creating the most suitable teaching environments for the students (Peker, 2003).

Different methods have been developed on the use of computers and internet in education. One of these is distance education. Distance education is accepted as one of the searches for solutions of education problems that cannot be solved by traditional methods. Moreover, due to the opportunities and flexibility it provides, it is developing in a way to bring along the solution of problems that will arise (Informatics Council, 2004).

During the development process of distance education in our country, various studies have been made about the presentation of course contents to learners, designs have been developed and these designs have been continuously developed and put into practice. One of these applications is E-learning.

The results of the e-learning method adopted by the students and their results are important in terms of seeing the benefits of e-learning in educational environments. In addition, students are often offered the opportunity to benefit from E-learning applications to adopt E-learning and E-learning applications to spread.

Purpose of the research

The aim of this study is to determine the attitudes of secondary school students with different learning styles on their perspectives on e-learning applications.

In accordance with this purpose;

1. What are the learning styles of the students?

2. What are the attitudes of students with different learning styles towards mobile learning?

3. What is the relationship between the attitudes of the students with different learning styles towards mobile learning and their learning styles? The answers to the questions were sought in the research.

Method

The research has been conducted by using descriptive and relational scanning method which is one of the general survey models. In relational survey model researches, analysis can be done by correlation type and comparison. In determining the relationship by comparison, it is examined whether there is a difference between independent and dependent variables (Karasar, 2006).

Study Group

The study group consisted of 360 secondary school students attending a public school in Konya in the 2018-2019 academic year.

Data Collection Tools

In this research, "Grasha-Reichmann learning style scale", which was prepared by Grasha-Reichmann (1974) and adapted to Turkish translations by Sarıtaş and Süral (2010), was used in determining learning styles as a data collection tool. "Attitude scale for e-learning" was used by the Haznedar (2012) in a study of validity and reliability.

The required validity and reliability of the scales were completed by the researchers and the Cronbach Alpha internal consistency coefficient of the Grasha-Reichmann learning style scale was 0.81 and the Cronbach Alpha internal consistency coefficient of the attitude towards E-learning scale was 0.93. In this study, the internal consistency coefficients of the scales were 0.88 and 0.91, respectively. These results showed that the scales used were reliable.

Data Analysis

Descriptive statistics, t-test and one-way analysis of variance (Anova) were used as statistical techniques. All these statistical analyzes were performed with SPSS 25 program on computer. Cronbach Alpha was used to calculate the reliability coefficient of the scales.

Findings

In this section, based on the purpose of the research, the distribution of the learning styles of the students, their attitudes towards E-learning and the relationship between the two variables are presented.

Learning Style Findings

The scale subscale, in which each student obtained the highest average score, was accepted as the learning style. In the case of the equality of means, the sub-dimension with the narrower class width was preferred and learning styles of the students were determined. The distribution of the students according to their learning style preferences is presented in Table 1.

Table 1: Distribution of Students by Learning Style Preferences

	Learning Style					
	Independent	**Avoidant**	**Collaborative**	**Dependent**	**Competitive**	**Participant**
n	127	20	83	64	26	40
%	35.2	5.6	23.1	17.8	7.2	11.1
$\bar{X}$	4.24	4.23	4.32	4.23	4.33	4.08
Level	High	High	High	High	High	Medium
S_X	.71	.65	.82	.34	.65	.58

(n=360)

When Table 1 is examined;

When the learning styles of the students are ranked in the ratio of preference; 35.2% independent; 23.1% with Collaborative; Dependent with 17.8%; Participant with 11.1%;

Competitive rank with 7.2% and avoidant with 5.6%. According to the Grasha-Reichmann Learning Style Scal each learning style is either in "low", "medium", or "high" level. These levels are given on Table 1: (Saritas & Sural, 2010). Accordingly, participant learning style is medium level, while other learning styles are high level.

Findings of Attitudes towards E-learning

The 5-point Likert-type scale was given a score of 5 for the most positive response (strongly agree) and a score of 1 for the most negative answer (strongly disagree). Arithmetic means were calculated to determine whether students' attitudes towards E-learning were positive or negative.

The arithmetic averages of the attitudes towards e-learning were calculated out of 5. While the average neutral attitude of 3 is the determinant of negative attitude towards e-learning, scores below 3 are considered as an indicator of positive attitude above 3. The results of the attitudes of the students participating in the study towards E-learning are presented in Table 2.

Table 2: Findings Regarding Attitude Scores of Students for E-learning

	n	$\bar{X}$	S_X
All students	360	4,12	0,81

When Table 2 is examined; The average of the attitude scores of students towards E-learning was 4.12. This value shows that students' attitudes towards E-learning are positive.

Findings on the Relationship Between Learning Style and Attitude towards E-Learning

One-way analysis of variance was used to determine whether students' attitudes toward E-learning changed according to their learning style preferences. According to this; The learning style preferences of the students were taken as independent groups and their attitude scores towards E-learning were compared. The results are presented in Table 3.

Table 3: Comparison of Students' Learning Style Preferences and Attitude Scores for E-learning

Learning Styles	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Independent	Between	4399,82	2	1466,61	.581*
	Within Groups	743653,19	358	252,51	
	Total	748053,01	360		
Avoidant	Between	893,04	2	297,68	1.186
	Within Groups	660487,97	358	252,68	
	Total	661381,01	360		
Collaborative	Between	1525,11	2	381,28	.317*
	Within Groups	746132,98	358	253,61	
	Total	747658,09	360		
Dependent	Between	4399,82	2	1466,61	.581*
	Within Groups	743653,19	358	252,51	
	Total	748053,01	360		

Competitive	Between	893,04	2	297,68	1.186
	Within Groups	660487,97	358	252,68	
	Total	661381,01	360		
Participant	Between	1525,11	2	381,28	.317*
	Within Groups	746132,98	358	253,61	
	Total	747658,09	360		

(n=360) *p<0.05

According to Table 3; F statistics calculated for learning styles scale sub-dimensions respectively; .581; 1186; .317; .581; 1186; .317. For these "independent", "collaborative", "dependent" and "participant" learning styles, α = 0.05 was significant. So, according to the present study; It was found that students' attitudes towards E-learning changes according to their learning styles.

According to the students, E-learning increases learning effectiveness, facilitates learning, adapts to students' learning style, provides learning control and improves the quality of learning. In addition, students want to know to what extent their own learning will change before participating in an E-learning application.

Discussion and Conclusion

In this study, the attitudes of the students with different learning styles towards E-learning were examined and the results obtained in line with the sub-problems and the discussions about these results are given below.

When the students' learning styles preferences are examined; It is seen that the total of those who have "independent", "collaborative" and "participant" learning styles are more than those who prefer "dependent", "competitive"and "avoidant" learning styles.

This can be interpreted as the majority of them adopting and applying student-centered approaches. (Grasha, 2002). As a matter of fact, in Grasha's (2002) study; collaborative and participant learning styles were more prevalent in the classrooms where student-centered approaches focused on group work; it was stated that dependent and avoidant learning styles were more common among students in teacher-structured teacher-centered classrooms. This result is in line with the research findings.

According to the findings of the research, it was determined that the attitudes of the students towards E-learning were positive. This result may be due to the fact that students have sufficient knowledge and experience in e-learning. This finding is in line with Tekinarslan (2008), Özgür and Tosun (2010) studies.

Another result of the study is that there is a significant difference between the learning styles of the students' attitude scores towards E-learning. With this result, the learning styles that the students have at the beginning of the e-learning process can be identified, and if the learning and teaching environment is arranged in accordance with the learning styles of the students in the e-learning environment and this process is used effectively, it can be ensured that the students have positive attitude towards e-learning.

The results obtained from the research coincide with the results of similar studies in the literature. (Güngör and Aşkar, 2004; McNutt & Brennan, 2005; Federico, 2000; Ekici, 2003;

Şahin, 2008). Therefore, it is important to determine the learning styles of students at the beginning of the learning process and to design learning environments appropriate to the learning style. In addition, appropriate activities should be added for students with different learning styles.

Suggestions

The results of the study indicate that the majority of the participants adopt student-centered approaches. It is essential that students adopt a student-centered learning style to plan teaching environments appropriate to their dominant learning styles. Therefore, instead of teacher-centered and knowledge-based approaches, contemporary approaches to learning styles and individual differences should be included in the education-teaching process.

The small number of studies examining the relationship between learning style and attitudes towards E-learning in Turkey reveals the need for research on this subject. The effect of the learning styles of the students on their attitudes towards E-learning and the effectiveness of the learning styles in this relationship is an issue that needs to be emphasized. For this reason, it is recommended to conduct various researches on this subject.

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How to use Duolingo effectively in second language learning?: A Currere Essay

Oktay AKBAŞ ⓘD
Kırıkkale University, Faculty of Education, Turkey
oktayakbas@kku.edu.tr

ORCID No: https://orcid.org/0000-0001-7252-0660

ABSTRACT

The aim of this study is to focus on my feelings and my English learning experience with Duolingo. This study is also about managing their own learning process. This is a self-study. The autobiographical method of currere helps self-understanding, social understanding and subject matter. This study is based on my learning diary for three months of cultural and linguistic orientation course I have had when I first arrived in Kent State University. Learning diary revealed that myself feelings and reactions could be grouped in four categories: being against a change and learning, need for a physical activity, stress and emotions, democratic ways of learning. I think it is true to say that one of the major intellectual challenges is managing the entire process of learning. Currere essay is way of self-reflective thinking and learning. Writing a diary in this period of learning language and adapting to cultural switch was beneficial to my time spent on Duolingo. Duolingo main use for me was that it kept my mind on English, my mobile time was spent focused on the subject I was learning instead of scrolling in news, games, posts.

Introduction

I have always wanted to focus on my learning experiences and attempted different forms of learning. Last year, for instance, I tried to learn juggling. Learning process of juggling proved me one thing: "Learning is difficult". I came to a conclusion. It was easy to talk about learning, but is difficult to define or achieve it. In this LLP, I aimed to reveal some insights that might reflect my language learning experiences while using Duolingo, a popular mobile phone application.

Duolingo

Duolingo is a free language-learning platform that includes a language-learning website and app, as well as a digital language proficiency assessment exam. Duolingo offers all its language courses free of charge (Wikipedia, 2016). Duolingo is a basic tool which

encourages learner to use the target language. The program itself requires active participation. It also gradually disciplines them.

Lous von Ahn is the cofounder of Duolingo. He says ""I saw irony in that people were learning English to alleviate poverty, but they needed $1,000 to get out of poverty," meaning people trying to learn were paying excessive amounts to courses etc. He saw how the country's (Guatemala) poor -more than half live below the poverty line had no access to high-quality education. Approximately 1.2 billion people are learning a new language and 800 million of those people are learning English to get out Poverty. There are 170 million users worldwide. There are lessons to learn the popular E.U. languages, as well as Swahili, Arabic and Turkish among many others. He envisioned helping those stuck in low socioeconomic conditions in developing countries. But nowadays, the wealthy also use the app, in Germany, more people are learning Arabic for Syrian refugees (Roberts, 2017). Duolingo offers opportunity for disadvantaged groups.

Munday (2016) has reached the following results. Fırstly, people who studied Spanish to travel had the biggest improvement. People who were beginners had the biggest improvement and more advanced people had the smallest improvement. Forty six students from a first-year Spanish course (level A1) and sixteen from a more advanced course (level B2) used Duolingo for one university semester. If we combine the Strongly Agree with the Agree results we obtained, we observe that 82% found it helpful, 80.4% enjoyed using it and 78.3% were satisfied with the app. In addition, not too many students seem to disagree with these statements. Students in the beginners group believe that they may use Duolingo in the future without any prompt from a course. Most students in group advanced, on the other hand do not think they will continue using Duolingo. Other study showed that Duolingo is useful for beginners group (Vesselinov and Grego, 2012). Duolingo would be appropriate to be adopted at schools to entertain the students while learning since it is similar to a video game (Ahmed, 2016). When I was studying with Duolingo I remembered Skinner's teaching machines. Duolingo used immediate feedback, active learner response to inserted question, self-pacing, (Skinner, 1958). But Duolingo is not boring like teaching machines. Rochma and Triyono (2019) reported that employing mobile applications is clearly able to create autonomous language learning to a point, since it creates a competitive environment along with goals to be accomplished.

3S Understanding

Borth (2008) writes that ın our profession, especially, one is learner and thereby a leader. The moral authority of the educational leader comes first and foremost from being a learner (cited in Henderson, 2015). The purpose of lead learning invite the collegial study and practice of teaching for subject understanding embedded in democratic self and social understanding, abbreviated as 3S pedagogy. Lead learners engaged in the ongoing study of the 3S implications of their own practice (Henderson, 2015). While I am focusing on my subject learning, I think that I am not learning about the subject. Maybe, I am making more progress in democratic self and social learning. This process is named reflective inquiry and deliberative conversation by Henderson.

The method of Currere

The method of currere reconceptualized curriculum from course objectives to complicated conversation with oneself (as a 'private' intellectual), an ongoing project of self-understanding in which one becomes mobilized for engaged pedagogical action as a private and public intellectual with others in the social reconstruction of the public sphere." (Cited in Poetter, 2017). Currere is "…a four step process that involves viewing life experience and our interpretations of reality as a venture into curriculum theorizing, that is 'the scholarly effort to understand the curriculum, conceived… as complicated conversation" (Pinar, 2012) and meant to answer the question, "What has been and what is now the nature of my educational experience?"

Beliefs and Feelings in Process of Learning

Teaching is a feeling profession (Noddings, 2003; cited in Henderson, 2015). We can say that learning is a feeling work. Beliefs, feelings and images are important in learning process. There is a long history of suspicion that emotion is the enemy good reasoning and sound judgment and rightly so. Emotions can often control us instead of the reverse. Learners should have the self-control the emotion regulating skills (Schwartz and Sharpe, 2010). The process of compassionate critical thinking is a process that integrates not only information and logic but also feeling and emotion (Rabois, 2016).

Learning involves changing. In process of learning every new bit of knowledge, skill and feeling changes one's mind and body. Change is difficult (Noddings, 2003; cited in Henderson, 2015). When we are facing a mathematical problem our muscles tensed up, our blood pressure rose and our heart rate increased (Kahneman, 2011). This affects are similarly stress situation. It can be said that the learning process is stressful. Learner needs to discipline one's self, balance one's feelings and ask for help from others. This process involves making mistakes. Dewey states "we simply do something, and when it fails, we do something else and keep on trying till we hit upon something which works (Dewey, 2016). Learners need to embrace their failures and view them as a sign of progress (Edmondson, 2011).

The aim of this study is to focus on my feelings and my learning experience with Duolingo. I think it is true to say that "one of the major intellectual challenges students face upon entering college is managing their own learning (Ambrose at all. 2010)."

Method

Self-study was used in this study. Hamilton (1998) defines self-study as "the study of one's self, one's actions, one's ideas, as well as the 'not self'… Self-study also involves a thoughtful look at texts read, experiences had, people known, and ideas considered". Developmental portfolio self-study method can provide a scaffold for inquiry, making that inquiry public and open to the feedback an critique of your peers (Samaras, 2011, cited in Henderson, 2015).

The method of currere supports this study. The autobiographical method of currere, a method focused on self-understanding. Such understanding, I believe, can help us to understand our situation as a group. Pinar (2012) writes "provides a strategy for students of

curriculum to study the relations between academic knowledge and life history." These point to both temporal and cognitive movements in the autobiographical study of educational experience. At the same time I try to connect to my life story and learning experiences.

The data collection tool used in this study was a learning diary. Diary writing is a very effective and natural tool for both students and teachers since this informal writing enables students to reflect on what they have learned, how they have learned it, what kind of difficulties they have when they have to write in formal English or what helps them to overcome these and other difficulties in the process of learning English (Klimova, 2015).

Findings

Learning diary showed that myself feelings could be grouped in four categories: being against a change and learning, need for a activity, learning stress and democratic ways of learning.

Being against a change and learning

I have mentioned that it is difficult to learn. My existence is against a change and deep learning. While learning new things, I tend to switch back to my mother language, back to my comfort zone. In a sense, this is a form of running away from active engagement. To some extent, this is a way of relaxation (10/20/2016). Learning is an accumulative process which requires constant practice and making connections. When you use your mother language while learning new things in the target language, you do not or you cannot achieve deep learning. Now, even if I live in Ohio, I usually read Turkish Newspaper (11/25/2016).

Need for a activity

I recognize that physical activity is an obligation for process of learning. Not repeat myself, but learning involves mind, body, actions, responses or even reactions. One needs to perform physical tasks, actions for practice when learning, write, speak, participate (12/02/2016). When I study with Duolingo, I write. I clearly write my thought and emotions (11/15/2016).

Learning stress

I recognize that learning is creating stress for me. Feelings has an important role process of learning. I think that feelings and thinking works together in the brain. For example, in my own learning experience sometimes I felt very depressed sometimes felt very happy. Sometimes be shy when I speak English. I afraid of making mistake. (10/17/2016). I said that I need relaxing situations. I am angry. I am not learning English from Duolingo (12/03/2016).

June 18,

Today I am happy. I am good. I am improving.

Democratic ways of learning (Living)

Learning involves bestowing value on myself. When I come to Ohio, I understood important of democracy. So my low English level, I felt I had a disadvantage as a student and as a person (12/01/2016). Social justice is important to my daily life as an educator.

Results and Discussion

In this study, which has the characteristics of self -study and currere method, the focus is journey of understanding process. Henderson and Gornik (2007) effectively stated the main point of this study. They say "acknowledge that educators who choose to facilitate their

students personalized journeys of understanding cannot do so without undertaking a similar journey of understanding". My lead learning project connects with self-regulated learning, lead-learning experience, 'currere' and managing own learning. This study presents the reader with various autobiographical narratives written to inspire the reader to delve into their own currere and examine their own self-understanding.

Reflective writing and nonfiction writing is useful for understanding and learning. According to Reeves (2016), the impact of non-fiction writing on student achievement is manifested not only in language arts but also in math, science and social studies. At the same time proprioceptive writing is an excellent way to brainstorm, says Rabois (2016). Writing a diary in this period of learning language and adapting to cultural switch was beneficial to my time spent on Duolingo, I was using what I learned to write, and also recording myself, helping reflect on my own in time.

Duolingo main use for me was that it kept my mind on English, my mobile time was spent focused on the subject I was learning instead of scrolling in news, games, posts. Its well-rounded, has grammar, listening, writing and speaking all, something hard to fit in even curriculums. Its interactive, accessible, engages the learner and its free.

The feelings of stress, embarrassment, anxiety and the management of the process, handling the emotions and coping are all characteristics of second language learning. And so Duolingo as a tool for learning, shares these characteristics.

I think I have developed more on democratic self and social understanding. I am getting better at recognizing the new culture and tolerance. If learning is difficult and stressful, caring pedagogical artistry, democratic humanism in education, teaching involves bestowing value on others concepts can help us students and teachers (Henderson, 2015). Also we have to integrate subject matter understanding with democratic self and social understanding (Henderson, 2015). When we face a mathematical problem our muscles tense up, our blood pressure rises and our heart rate increases (Kahneman, 2011). This affects are similar to stressed situation. It can be said that the learning is stressful. So we should teach the student to not be embarrassed and not be afraid to make mistakes. This will decrease learning stress. Whenever we attempt to do something, we may sometimes make mistakes. Mistake is a natural part of the learning process, so we should encourage students not to feel embarrassed and not afraid of making mistakes. This will ultimately decrease learning stress and enhance their learning motivation. Wiggins and McTighe (1998) ask "Are students sufficiently free from fear to cultivate holistic facets of understanding?". This is a critical question when teaching for understanding.

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Using Technology in Education, Self-efficacy and Technology Acceptance Levels of Teacher Candidates[1]

Recep ÇAKIR iD
Amasya University, Department of Computer Education and Instructional Technology, Turkey
recepcakir@gmail.com

ORCID No: https://orcid.org/0000-0002-2641-5007

Yeliz ALTINTAŞ iD
Amasya University, Department of Computer Education and Instructional Technology, Turkey
ylzaltintas61@gmail.com

ORCID No: https://orcid.org/0000-0002-0313-8617

Feray UĞUR ERDOĞMUŞ iD
Amasya Üniversitesi, College of Design, Department of Computer Technology, Turkey
ferayugur@gmail.com

ORCID No: https://orcid.org/0000-0002-9401-3405

Özgen KORKMAZ iD
Amasya University, Department of Computer Engineering, Amasya, Turkey
ozgenkorkmaz@gmail.com,

ORCID No: https://orcid.org/0000-0003-4359-5692

Article Info	ABSTRACT
	The aim of this study is to determine the level of prospective teachers' acceptance of technology and their self-efficacy perception levels pertaining to using technology in education. In this study, mixed methods research design was used. The study group consists of 280 prospective teachers who currently study in various departments and classes at Amasya University, Faculty of Education. The data of the study were collected using personal information form, the technology acceptance scale, and the using technology in education self-efficacy perception scale. Mean, standard deviation, minimum and maximum values, independent samples t-test, ANOVA, regression and Pearson r correlation analysis were used to analyze the colllected data. Results showed that, prospective teachers' technology acceptance levels and the self-efficacy levels of using technology in education are high enough and these levels do not differ by gender. The score of the students in CEIT department

was higher than others. Moreover, the lowest levels was observed through the mean scores of the teacher candidates at the Mathematics Education Department. As teacher candidates use technology in education and self-efficacy belief levels increase, their level of acceptance of technology in education also increases. The teacher candidates express that they will use technology as a basis in their professional lives to enrich teaching practices and improve themselves and give their students better educational opportunuties.

Introduction

With the entire of technology into our lives, it has led to changes in many areas, especially education, that have decisive qualities in the future of the country. Technology in education is used to improve quality (NEMO, 2004). Also called 21st century skills, it is aimed to educate students as 'science literate individuals 'who can investigate, question, access and use information, make decisions effectively, collaborate, be confident and communicate effectively (Kaya & Yilayaz, 2013). In line with this goal, educational institutions aim to enrich the use of technology that teachers and students can use in and out of the classroom. The use of technology in education started with the use of tools such as overhead projector, video, radio, television for teaching purposes and is carried out today with computer, phone, internet and close technologies (Aksoy, 2003). Increasing employment opportunities bring with them the necessity of having a qualified workforce. The use of technology in education is seen as a necessity in order to cover this gap in the labor force and new job opportunities (Karaman, 2010). An education system that does not benefit from the technological possibilities of its current era cannot adapt to the needs of the individual and society. Therefore, it is emphasized that the technology used in education should always be used by moving to advanced levels (Karasar, 2004).

With the increase in technology-based hardware in schools, it is important for teachers to use the technological advantages offered more effectively (Sert, Kurtoğlu, Akıncı and Seferoğlu, 2012; Chen, Looi & Chen, 2010). Thus, the duty of our teachers, who have an important role in making education and training more qualified, becomes important (Şahin, 2011). It is necessary to determine the needs of the present day and to determine the extent to which the developing scientific, economic, social and technological developments affect the expectations needed by the society (Arpa, 2017). In order to give the desired results of the program, teachers who will use the program in practice need to integrate education and technology by adopting new approaches (Aygün, 2009). In a study conducted by Usta ve Korkmaz (2010) with teacher candidates, the attitudes of teachers who have intermediate and higher computer skills towards their profession differed significantly compared to teachers who have low computer skills. Furthermore, as the values of effective use of technology in their professional lives increase, their interest and attitudes towards their profession also increase (Usta & Korkmaz, 2010). Given the increase in technology competence in teachers and the increase in the relationship between technology competence and attitudes towards technology, a solid foundation of technology-based education should be established in the training of teacher candidates (Çetin, Çalışkan & Menzi, 2012).

There are studies in the literature that visibly involve different perspectives on teachers' use of technology. Sayginer (2016) stated in a study that individuals who own the internet and computers have a stronger ability to use them than those who do not. However, there was no correlation between teacher candidates' perceptions of these variables versus technology. In a study conducted by Akpınar (2003), he considered the institutions in which the teachers were trained to be aware of and benefit from the renewed technology as the primary source for informing the teachers. Similarly, in a study conducted by Erdemir, Bakırcı and Eyduran (2009) with teacher candidates, the teachers' lack of sufficient self-confidence was linked to the education taken during their student years. A survey of classroom teachers shows that teachers prefer to use traditional resources instead of using the technologies that come with computers (Adigüzel, 2010). A similar result also concluded that our teachers did not use the educational technologies used to help them to function adequately (Şişman, 2002). Teachers generally do not make any effort when it comes to the integration of technology into education, even if they have computer skills (Demiraslan & Koçak Usluel, 2005). Lack of adequate infrastructure, lack of alignment of the curriculum and lack of knowledge are the deficiencies stated for the teachers (Cagiltay, Çakıroğlu, Cagiltay & Çakıroğlu, 2001). In addition, many studies in the literature show that the technological competencies of teacher candidates are not compatible with the teaching required by today's conditions (Yılmaz & Ayaydın, 2015; Kahyaoglu, 2011; Kocasaraç, 2003; Tınmaz, 2004).

Davis (1989) describes technology acceptance model over the behavior of individuals in their use of technology. The perceived ease of use and perceived benefit of a new technology that has gained a place in life according to the technology acceptance model is greatly effective on acceptance by users. Perceived benefit is an individual's belief in the rise in their own performance in the use of information and communication technologies, while perceived ease of use is an individual's lack of effort in the use of information and communication technologies (Davis, 1989). In another study, it was stated that the wishes and behaviors of users to use technology provide convenience and benefits, that it is intended for their profession, that it is functional and that it provides visible benefits (Venkatesh & Davis, 2000). In a study by Liao and Chenung (2001), they emphasized the importance of the technology acceptance model for researchers in the process of uncovering the behavior of the individual in the use of technology.

Self-efficacy is defined as behaviors that occur when a desired effort is made in a designated area (Akkoyunlu & Orhan, 2003). For example, high self-efficacy may be demonstrated in psychomotor skills, while low self-efficacy may be demonstrated on self-expression. In this context, the level of self-efficacy depends on the individual and may be considered to vary according to interests and needs. Self-efficacy perception in individuals plays an important role in determining how to react to situations they face (Yaman, Cansüngü Koray & Altunçelik, 2004). In another study, individuals with high self-efficacy perception on the same subject were described as stable, patient, non-quitter, and self-efficacy perception was based on experience with frequency of use (Aşkar & Umay, 2001). It can be said that individuals with negative experiences often have low perceptions of self-efficacy.

As examined in the literature, our teachers have a large share in integrating technology into the educational process. Accordingly, the aim of this study is to describe the relationship between the students in terms of their level of acceptance of technology and their level of self-efficacy perception of using technology in education. For this general purpose, answers to the following questions were sought:

1. Are the using technology in education self-efficacy and technology acceptance levels of teacher candidates different according to the departments?
2. Are the using technology in education self-efficacy and technology acceptance levels of teacher candidates different according to their gender?
3. Are the using technology in education self-efficacy and technology acceptance levels of teacher candidates different according to class levels?
4. Is there a relationship between using technology in education self-efficacy and technology acceptance levels of teacher candidates?
5. What are the views of the teachers regarding the impact of technology on education?
6. What are the teacher candidates ' thoughts about using technology in their professional lives?

Method

Research Design

In this study, mixed research method was used to answer the research questions mentioned above. A descriptive survey model was used in the quantitative section. In the qualitative part, snowball technique was used in collecting data. The descriptive survey model is a research model that aims to describe a situation that has happened in the past or is still ongoing as it exists (Karasar, 2009). Interviews were conducted with the teacher candidates determined by the snowball technique used in the qualitative section. Later, the number of people interviewed by the propositions of the teacher candidates was increased.

Study Group

For the quantitative part of the study, the participants consist of 280 candidates who are studying in the Departments of Computer Education and Instructional Technology Education (CEIT), Science and Elementary Mathematics Education at Amasya University Faculty of Education. Easy sampling method was used to determine the working group. The distribution of teacher candidates by department and gender is summarized in Table 1.

Table 1. Characteristics of Participants by Gender and Department

Department	Female	Male	Total
Computer Education and Instructional Technology	38	30	68
Elementary Mathematics Education	93	29	122
Science Education	66	24	90
Total	**197**	**83**	**280**

The qualitative dimension of the study, the study group consisted of 9 randomly selected from CEIT (3), Science (2) and Elementary Mathematics Edcuation (4) departments. The study group consists of 5 women and 6 men. The distribution of teacher candidates by department and gender is summarized in Table 2.

Table 2. Characteristics of Participants by Gender and Department

Deaprtments	Female	Male	Total
Computer Education and Instructional Technology	2	1	3
Elementary Mathematics Education	3	1	4
Science Education	-	2	2
Total	**5**	**4**	**9**

Data Colection Tools

In the quantitative part of the study, the data were collected by the personal data form, the technology acceptance scale and the using technology in education self-efficacy perception scale, while in the qualitative dimension the semi-structured interview form was used as the data collection tool. The personal information form contains questions such as gender, age, grade level and department. The form was created by the researchers. In addition, an interview form consisting of 15 open-ended questions prepared by the researchers were used.

Technology acceptance scale

This scale was developed by Ursavaş, Sahin and McILROY (2014). The technology acceptance scale, which is used to measure the level of acceptance of technology by prospective teachers, consists of 37 items. There are 11 factors in this scale as; perceived usefulness of the content of the scale (4 items), perceived ease of use (3 items), attitude towards use (4 items), subjective norm (3 items), self-sufficiency (3 items), facilitating conditions (3 items), the technological chaos (3 items), anxiety (3 items), perceived entertainment (4 items), conformity (3 items) and behavioral intention (4 items). The quintet is a scale of the likert type. The reliability coefficient of the scale was determined by Cronbach Alpha. The lowest was found on the self-efficacy factor with 0.798, and the highest was found on the recreational factor with 0.909.

Using technology in education self-efficacy perception scale

It was developed by Tınmaz (2004) in order to measure teacher candidates ' perceptions about using technology in education. The scale is of the quintet likert type and consists of 28 items determined under the factors "belief in the positive impact of Technology in education" and "impact of Technology on the Undergraduate Program". Answers to items are listed as strongly disagree (1), disagree (2), undecided (3), agree (4), strongly agree (5). According to the validity and reliability studies, cronbach Alpha coefficient was obtained as 0.86.

Collection of Data

Collection of quantitative data: the teachers' candidates were reached through the instructors working at Amasya University Faculty of Education. The same questionnaires were applied to different grade levels of the designated departments. It took about two weeks for the data to be collected. Data for the study was collected during the fall semester of the 2018-2019 term.

Collection of qualitative data: Teacher candidates were reached using the snowball method. Baltacı (2018) describes the snowball method as being able to explain existing

situations with different cases by reaching from person to person. In chained research, the data collection process is completed when the data is satisfied (Kerlinger & Lee, 1999). The interviews of the teacher candidates at their available time lasted approximately 30 minutes. The interviews were written off after being recorded with a recorder. It took about 2 weeks for the data to be collected.

Data Analysis

For easy comparison of factors and total scores, the scores were converted to the lowest 20 and the highest 100. The percentages against the scores obtained from the scales are determined as follows:

- 20- 50: Low-level
- 21-69: Mid-level
- 70-100: High-level

The data collected for the quantitative part of the study were analyzed using descriptive analyses, independent sample t, Anova, regression and Pearson r correlation analyses. The qualitative data were encoded with Nvivo program and evaluated with content analysis.

Results

The results of the self-efficacy levels of teacher candidates to accept and use technology in education are summarized in Table 3.

Table 3. Self- efficacy perception levels of teachers' acceptance and use of technology in education

Factors	N	X	Sd	Min	Max
Level of Acceptance of Technology		142,2	22,3	59	185
Perception of Self-Efficacy-Belief		65,9	10,8	20	80
Perception of Self-efficacy- Impact on Undergraduate Programs	280	45,1	8,8	12	60
Perception of Self-Efficacy-Total Score		111,1	17,7	32	140

In Table 3, it is seen that the mean score of teacher candidates is 142.2 when technology acceptance levels are examined. Given that the lowest score is 59 and the highest score is 185, it can be said that the acceptance of technology in general levels of teacher candidates is high enough. As shown in Table 3, it is seen that the average level of self-efficacy perception of teacher candidates for the use of technology in education is 111.1. In terms of factors, the average for belief in self-efficacy factor is 65.9. Given that the score ranges are between 20 and 80, it can be said that teacher candidates have high enough self-efficacy beliefs. The other factor related to self-efficacy, the effect on the undergraduate program, has a mean of 45.1. according to the average, it can be said to be quite high considering that the point ranges are between 12 and 60. Accordingly, it can be said that the teacher candidates ' perceptions of self-sufficiency for use of technology in education in terms of both total points and factors are high enough. The findings on whether the levels of self-efficacy perception of teachers' acceptance and use of technology in education differ according to departments are summarized in Table 4.

Table 4. Acceptance and use of technology in education self-efficacy perception levels of teacher candidates according to departments

Variables		N	X	Sd.
Technology Acceptance Level	CEIT	68	158,1	17,8
	Math	122	134,3	18,6
	Science	90	141,2	24,1
	Total	280	142,3	22,3
Perception of Self-Efficacy-Belief	CEIT	68	73,6	6,3
	Math	122	62,5	9,6
	Science	90	64,8	12,2
	Total	280	65,9	10,8
Perception of Self-efficacy- Impact on Undergraduate Programs	CEIT	68	50,5	7,6
	Math	122	41,5	8,3
	Science	90	45,9	8,1
	Total	280	45,1	8,8
Perception of Self-Efficacy-Total Score	CEIT	68	124,2	11,6
	Math	122	103,9	14,9
	Science	90	110,7	19,4
	Total	280	111,1	17,7

When we examined the technology acceptance levels in Table 4, teacher candidates who are enrolled in the CEIT technology acceptance is higher compared to other departments, with the lowest score, it is observed that teacher candidates who belong to the Math Department is enrolled in. When the perceptions of self-efficacy for the use of technology in education are examined, it is observed that the highest means score is similarly in CEIT and the lowest average is Math Department. Table 5 summarizes the analyses, if these differences are significant.

Table 5. Acceptance and use of technology in education of teacher candidate's self-efficacy perception levels difference according to departments

Variables		Sum of Squares	df	Mean Square	F	p	Tukey
Technology Acceptance Level	Between Groups	24867,4	2	12433,7	30,12	,000	Between CEIT and Sci and Math
	Within Groups	114345,7	277	412,8			
	Total	139213,1	279				
Perception of Self-Efficacy-Belief	Between Groups	5579,7	2	2789,8	28,65	,000	Between CEIT and Sci and Math
	Within Groups	26973,1	277	97,4			
	Total	32552,8	279				
Perception of Self-efficacy- Impact on Undergraduate Programs	Between Groups	3682,7	2	1841,4	28,26	,000	Between CEIT and Sci and Math
	Within Groups	18047,7	277	65,2			
	Total	21730,4	279				
Perception of Self-Efficacy-Total Score	Between Groups	17840,9	2	8920,4	35,65	,000	Between CEIT and Sci and Math
	Within Groups	69305,1	277	250,2			
	Total	87146,0	279				

When Table 5 is examined, it is observed that there is a significant difference between the levels of acceptance of technology in education of the teacher candidates according to the department [$F_{(2-277)}=30,12$, $p<0.05$]. According to the results of the Tukey test, differentiation was determined to be present between all three sections. When examined Table 3, it can be seen CEIT Department' average is significantly higher then Math and Science Education departments, also Science Education Department' average is significantly higher than Match Department.

When Table 5 is examined, it is observed that there is a significant difference between the perceptions of self-efficacy in the use of technology in education of teacher candidates according to departments [$F_{(2-277)}=35,65$, $p<0.05$]. According to the results of the Tukey test, differentiation was determined to be present between all three departments. Factors examined in terms of the perception scores of teacher candidates and the use of technology in education self efficacy and self-competency beliefs [$F_{(2-277)}=28,65$, $p<0.05$], both undergraduate effect [$F_{(2-277)}=28,26$, $p<0.05$] significantly differentiation is observed. According to the averages, self-efficacy perceptions of CEIT department are significantly higher than those of the Department of Mathematics and Science Education. Furthermore, it is observed that the level of acceptance of technology in education of the Science Education Department is significantly higher than that of the mathematics education department. The findings on whether the levels of self-sufficiency of teachers' acceptance and use of technology in education differ according to gender are summarized in Table 6.

Table 6. Acceptance and use of technology in education self-efficacy perception levels of teacher candidates according to gender

Variables		N	X	sd	t	df	p
Technology Acceptance Level	Female	197	141,5	21,3	-0.898		0.370
	Male	83	144,1	24,7			
Perception Of Self-efficacy-Belief	Female	197	65,6	10,5	-0.622		0.534
	Male	83	66,5	11,4			
Perception of Self-efficacy-Impact on Undergraduate Programs	Female	197	44,8	9,1		278	
	Male	83	45,7	8,4	-0.741		0.459
Perception of Self-Efficacy-Total Score	Female	197	110,5	17,4	-0.750		0.454
	Male	83	112,2	18,4			

When Table 6 examined, both the level of acceptance of technology in education ($t_{(2-278)}=-0.898$, $p>0.05$) and perceptions of self-efficacy in the use of technology in education of teacher candidates ($t_{(2-278)}=-0,750$, $p>0.05$) are not different according to gender. The situation is similar in terms of factors. Accordingly, it can be said that the gender factor does not affect the acceptance levels of technology in education and the perception levels of self-efficacy for the use of technology in education. The findings on whether the levels of self-sufficiency of teachers' acceptance and use of technology in education differ according to grade levels are summarized in Table 7.

Table 7. Acceptance and use of technology in education self-efficacy perception levels of teacher candidates according to grade levels

Variables		N	X	Sd
Technology Acceptance Level	1.Grade	22	134,3	12,3
	2. Grade	50	139,1	18,4
	3. Grade	103	138,7	27,3
	4. Grade	105	149,0	18,5
	Total	280	142,3	22,
Perception of Self-Efficacy-Belief	1.Grade	22	63,0	8,7
	2. Grade	50	62,7	10,5
	3. Grade	103	64,8	12,9
	4. Grade	105	69,1	7,9
	Total	280	65,9	10,8
Perception of Self-efficacy- Impact on Undergraduate Programs	1.Grade	22	42,7	6,5
	2. Grade	50	43,0	7,4
	3. Grade	103	45,2	9,6
	4. Grade	105	46,5	8,9
	Total	280	45,1	8,8
Perception of Self-Efficacy-Total Score	1.Grade	22	105,7	13,7
	2. Grade	50	105,7	16,4
	3. Grade	103	110,0	21,1
	4. Grade	105	115,6	14,1
	Total	280	111,0	17,7

When Table 7 is examined, the highest technology acceptance levels mean is belong to 4th grade teacher candidates, the lovest mean is belong to first grades. The situation is similar when the perceptions of self-efficacy perception of technology in using education are examined. Table 8 summarizes the analyses to see if these differences are significant.

Table 8. Acceptance and use of technology in education of teacher candidate's self-sufficiency perception levels difference according to grades

Variables		Sum of Squares	df	Mean Square	F	p	Tukey
Technology Acceptanca Level	Between Groups	7975,9	3	2658,6	5,591	,001	Between 4. And 2., 3. Grade
	Within Groups	131237,3	276	475,5			
	Total	139213,1	279				
Perception of Self-Efficacy-Belief	Between Groups	1858,2	3	619,4	5,570	,001	Between 4. And 2., 3. Grade
	Within Groups	30694,5	276	111,2			
	Total	32552,8	279				
Perception of Self-efficacy- Impact on Undergraduate Programs	Between Groups	568,052	3	189,4	2,470	,062	-
	Within Groups	21162,344	276	76,7			
	Total	21730,4	279				
Perception of Self-Efficacy-Total Score	Between Groups	4348,8	3	1449,6	4,8	,003	Between 2. And 4. Grade
	Within Groups	82797,2	276	300,0			
	Total	87146,0	279				

When Table 8 is examined, it is observed that there are significant differences between the levels of acceptance of technology in education of teacher candidates according to classes $[F(3-276)=5,529, p<0.05]$. According to the results of the Tukey test, the differentiation was

determined between the teacher candidates studying in 4. grade and the teacher candidates studying in 2. and 3. grades. When the averages in Table 6 are examined, it is seen that the acceptance levels of technology in education are significantly higher for the teacher candidates who are studying in the 4. grade. Accordingly, it can be said that the level of acceptance of technology increases as the class degree increases.

When Table 8 is examined, it is observed that there is a significant difference between the self-efficacy perception towards using technology in education of teacher candidates according to grades [$F(3-276)=4,832$, $p<0.05$]. According to the results of the Tukey test, it was determined that the differentiation was between the teacher candidates who were studying in the 2. grade and 4. grade. From the point of view of the factors, it is observed that there is significant differentiation in the factor of belief [$F(3-276)=5,570$, $p<0.05$]. When the means in Table 6 are examined, it is seen that the difference is in 4. grade. Accordingly, as the grade degree increases, perceptions of self-efficacy towards use of technology in education can be said to increase. The findings regarding the relationship between the self-efficacy and use of technology in education are summarized in Table 9.

Table 9. Relationship between acceptance of technology in education and self-efficacy perception of use of Technology in education

	Perception of Self-Efficacy-Belief	Perception of Self-efficacy- Impact on Undergraduate Programs	Perception of Self-Efficacy-Total Score
Technology Acceptance Level	,775	,654	,800
	,000	,000	,000
	280	280	280

When Table 9 are examined, it can be seen significant corelation between levels of acceptance of technology in education and self-efficacy perception towards using technology in education of teacher candidates (r=0,800; p<0.001). There is also significant correlation on belief (r=0,775; p<0.001) and the impact of the undergraduate programs (R=0,654; p<0.001) factors. Accordingly, it can be said that as the levels of self-efficacy perception towards using technology in education increase, the levels of acceptance of technology in education also increase. The effect of self-efficacy perception level on acceptance level of technology is summarized in Table 10.

Table 10. Effect of self-efficacy perception level on technology acceptance level

	Cons.	Std. Error	t	p	Relation Part	Relation Partial
Constance	28,192	5,092	5,536	,000		
Perception of Self-Efficacy-Belief	1,242	,093	13,281	,000	,624	,472
Perception of Self-efficacy- Impact on Undergraduate Programs	,715	,114	6,252	,000	,352	,222

Technology acceptance level = 28.192 + 1.242 (Perception of Self-efficacy - Belief) + 0,715 (Perception of Self-efficacy- Impact on Undergraduate Programs); R^2 =0.65

When Table 10 is examined, it is observed that teacher candidates ' acceptance level of technology in education, its effect belief and undergraduate program all together affect 65% of the total variance.

Teacher candidates ' views on the impact of technology on education

In all the interviews, the concept of technology, the direction of facilitating our lives was expressed by the candidates of teachers. The areas of use of the technology are listed as health, transportation, industry, economics and space science, education.

When the impact of technology on education is taken into consideration, it is observed that the teacher candidates often focus on the benefits provided by the lesson. The teacher candidates' views that the use of technology in education saves both the teacher and the student time, provides immediate access to the desired information and facilitates both teaching and learning are noted. The views of ÖA3 and ÖA2 regarding this are given below:

ÖA3: I think the benefits for the teacher are saving time, less effort and easier communication with the parents of the students. To be effective in providing students with the opportunity to repeat the lesson and practice in order to keep the knowledge transferred....

ÖA2: The use of technology can be addressed to all students by eliminating individual differences and combining different learning styles.

When the distraction outside of the benefit stated in the opinion, the effect of the reduction of the teacher in the lesson, being unable to technology innovation, technological development and new technology such as negative thoughts of individuals well acquainted with difficulties in the adaptation process is located at. The views of ÖA5 and ÖA7 regarding this are given below:

ÖA5: To give an example from my own life, the understanding process of the students who have been in contact with technology for a very small amount of time during their life is somewhat distressed according to their other friends.

ÖA7: A lesson based entirely on technological means reduces the impact on the teacher, and at that time, the student becomes disconnected and distracted from the teacher.

Another issue emphasized by the teacher candidates is that the use of technology in education will contribute if it is used in the right place and time. The views of the ÖA8 regarding this are given below:

ÖA8: ... of course I think positive things about the use of technology, but they should be used at the right time and in the right place. I mean, if technology doesn't help me any more, it's not going to give the student any extra attention, it's going to cause a distraction. In other words, if I am going to give an example, I can explain a topic and a topic I'm describing, technology does not offer better opportunities here, I do not need to benefit from technology.

The other issue that the teacher candidates are twirling about is the increase in interest in the lessons handled with technology and the efficient passing of the courses. They also mentioned that it reduces the Individual Differences found among students during the learning phase. The views of ÖA2 and ÖA3 regarding this are given below:

ÖA2: By combining different learning styles with technology by eliminating these individual differences, all students can be addressed by teacher

ÖA3: Since it helps all sensory organs to work together by activating almost all of them, it makes it more interesting and interesting.

How do teacher candidates think to use technology in their professional lives?

When the teacher candidates' views on how to use technology in their professional lives are examined, it is seen that they express that they will use technology to enrich the teaching and improve themselves in order to make it more useful to their students. The views of ÖA1 and ÖA7 regarding this are given below:

ÖA1: I definitely use technology only for my students. Of course, to improve myself, I want to be able to give my students the maximum level of Education.

ÖA7: I intend to use technology to improve the quality of the educational services I provide to students in the future when I am a professional and to facilitate my daily life and to save time.

In terms of using technology, the candidates of teachers who are studying in Science Education and CEIT Departments, feel the need to use technology in education. However, some of the teachers in the Department of Mathematics Education think that the use of technology in education does not need much in some areas. The views of ÖA4 and ÖA7 regarding this are given below:

ÖA7: in our department, our job is to do a little bit more in a concrete way with pen and paper. Well, that's not possible on a computer either.

ÖA4: our department is very, very unnecessary. Since it is more of a numerical course, we can only reflect the questions.

Disscussion and Conclusion

Teacher candidates generally have high enough levels of acceptance of technology. The self-efficacy perceptions using technology in education in terms of both total points and factors are also seen to be high enough. When literature exemind, it was determined that the teachers developed a positive attitude towards technology and considered themselves to have a moderate level of proficiency in using technology (Öztürk, 2006; Çetin, Çalışkan and Menzi, 2012). Similarly, in the studies conducted by Tınmaz (2004) and Toker (2004) with the teacher candidates, the results were reached that the teacher candidates considered themselves sufficient in the use of technology.

The level of acceptance of technology in education of the teacher candidates who are studying in CEIT department is higher than in other departments. In addition, the teacher candidates who are studying in the Department of Science Education have higher acceptance levels of technology than the Department of Mathematics Education. An extensive study by Ursavaş, Şahin and Mcilroy (2014) on the technology acceptance levels of teacher candidates concluded that the difference in technology acceptance levels between branches stems from the technological expectations and attitudes of teacher candidates towards technology. Results from qualitative data support this judgment. In terms of using technology, the teacher candidates who are studying in CEIT department and Science Education department,

feel the need to use technology in education. However, some of the teachers in the Department of Mathematics Education think that the use of technology in education does not need much in some areas. Baki, Yalçinkaya, Özpınar and Uzun (2009) conducted a study with Primary Mathematics teachers and teacher candidates and suggested that teacher candidates and teachers should be raised awareness within the framework of instructional technology.

The self-efficacy perceptions towards use of technology in education of teacher candidates who are studying in the CEIT Department are higher than other departments. The candidates who are studying in the Department of Science Education are also higher than the teacher candidates who are studying in the Department of mathematics education. In terms of factors, it is observed that there are significant differences in the use of technology in education perception scores of teacher candidates in terms of both belief in self-sufficiency and its effect on the undergraduate program. When literatur examined, , it can be concluded that this differentiation varies between the groups in which the study was conducted. In a study conducted by Usta ve Korkmaz (2010) with the teacher candeidates in Primary Educatyion Departmen Social Science Department, it was concluded that their beliefs were high in terms of factors, but these belief scores did not differ in terms of departments. In addition, research on the positive contribution of technology to education is found in the literature (Yilmaz, Ulucan, Pehlivan, 2010; Yavuz, Coşkun, 2008; Karaoğlan Yilmaz, Binay Eyuboğlu, 2018; Inel, Evrekli, Balim, 2011).

The levels of acceptance of technology in education and self-efficacy perception of using technology in education do not differ in terms of gender. It is possible to find many studies on gender variables in the field. It is possible to find conclusions about the lack of effect of gender on self-efficacy levels (Yilmaz, Gerçek, Köseoğlu, Soran, 2006; Şad, Nalçali, 2015). However, in a study conducted by Ipek and Acuner (2011) with teacher candidates in Primary Education Department, male teacher candidates had higher score in computer self-efficacy beliefs than female teacher candidates. Similar results were reached in another study by Tekinarslan (2008). Besides, there are also studies in which women's perceptions of self-efficacy are high (Erdemir, Bakirci, Eyduran, 2009).

The technology acceptance levels of the teacher candidates in the fourth grade are higher than those of the teacher candidates in the second and third grades. The level of acceptance of technology increases as the class degree of teacher candidates' increases. When the self-efficacy perceptions are taken into consideration, the self-efficacy perceptions are higher in the fourth grade than in the second grade. In the same way, it is concluded that the higher the grade of teacher candidates, the higher their self-efficacy perceptions in using technology. Similarly, studies conducted with teachers and teachers show that with the increase in classroom level and experience in the profession, technology orientation and technological competence increase (Russell, Bebell, O'dwyer, O'connor, 2003; Çetin, Çalışkan, Menzi, 2012; Akın, Baştuğ, 2005). A study by Howard, Raina, Jones (2001) concluded that with the increase in age, attitudes towards technology, technological competence and use of technology showed a decrease.

There is a high level of positive correlation between the levels of self-sefficacy perception of teacher candidates to technology acceptance levels. As the levels of self-efficacy perceptions using technology in education increase, the levels of acceptance of technology in education also increase. The level of self-efficacy perception and acceptance of technology affects 64% of the total variance. In a study conducted by Ipek and Acuner (2011) with teacher candidates in Primary Edcuation Departmen, it was stated that computer self-efficacy belief levels of teacher candidates can be seen by looking at attitudes to technology use in education. Another study on computer self-efficacy perceptions of teacher candidates concluded that while computer self-efficacy perception increased, attitudes towards computer education increased also (Yenice, Özden, 2015). There are studies that there is no significant relationship between computer attitude and computer self-efficacy perception (Zhang, Espinoza,1998, Aktaran Yenice & Özden, 2015).

When the impact of technology on education is taken into consideration as a result of the interviews with the teacher candidates, the teacher candidates often focus on the benefits provided by the lesso. The use of technology in education reduces individual differences. A study conducted with teachers in the literature found that the use of technology in education benefits teaching (Yeşilyurt, 2006). Contributions to technology in education, teacher candidates, in addition to the distraction, the effect of the reduction of the teacher in the lesson, being unable to technology innovation, technological development and new technology gave individuals acquainted with difficulties in the adaptation process such as negative thoughts. Similar to this conclusion, a study on teachers in the literature found that teachers have incomplete aspects in using information and communication technologies and even the level of computer use is very low (Kayaduman, Sarıkaya & Seferoğlu, 2011).

Technology in education differs in its impact on education according to where and when it is used. Otherwise, it is seen that the use of technology in education can lead to negative consequences. 8 who are studying in private and public schools in the literature. In a study conducted with the students of the class, it was concluded that there were significant differences in the use of technology in science (Akpınar, Aktamış & Ergin, 2005).

In all interviews with the teacher candidates, it is observed that the views stated on how to use technology in their professional lives are to give the student a better education by enriching the teaching in the infrastructure and improving themselves. This shows that prospective teachers, who are stakeholders of the future, have a structure that is open to development.

Suggestions

- In order to increase the self-efficacy perception and technology acceptance levels, it may be suggested to include practical activity content related to technology use within the courses at the first and second grade levels.
- In order to increase the self-efficacy perception and technology acceptance levels, it may be suggested to include practical activity content related to technology use within the courses at Mathematics Education Department.

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The Effect of Augmented Reality Training on Teachers' Individual Innovativeness [2]

Mustafa SIRAKAYA (iD)
Kırşehir Ahi Evran University, Turkey
mustafasirakaya@gmail.com

ORCID No: https://orcid.org/0000-0002-7964-4399

Didem ALSANCAK SIRAKAYA (iD)
Kırşehir Ahi Evran University, Turkey
didemalsancak@ahievran.edu.tr

ORCID No: https://orcid.org/0000-0002-1821-5275

Article Info	ABSTRACT
	This study aimed to ascertain the effects of augmented reality training on teachers' individual innovativeness. The study group which consisted of 35 teachers utilized one group pretest-posttest experimental design. The teachers who volunteered to take part in the study received 40-hour augmented reality training. Individual Innovativeness Scale was used as the data collection tool in the research. For data analysis, descriptive statistics, related samples t-test and Wilcoxon signed-rank test were used. It was found that the majority of teachers was in the "pioneer" category before the training and displayed high level individual innovativeness. Based on post-training measurements, it was concluded that the teachers reached the category of "innovative" in individual innovativeness and there was an increase in the number of highly innovative teachers. It is concluded that augmented reality training positively improves teachers' individual innovativeness of. As a result of the analyzes, it was found that the individual innovativeness of teachers who were females, over 30 years and taught social subject matters changed significantly while the change in other groups was not significant.

Introduction

The unchanging rule of today's world is change and innovation. Constant developments and innovations make it necessary for individuals to adapt to new situations in a short time. Rogers (1995) defines innovativeness as the ability to adopt new situations by individuals or groups (institutions) before others. In a simpler definition; Hurt, Joseph and Cook (1977) address the concept of innovativeness as the willingness towards innovation and change. In another definition, it is emphasized that what is important in innovativeness

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[2] A part of this study was presented at 7th International Conference on Instructional Technology and Teacher Education.

is the capability to go beyond the known (Demirel & Seçkin, 2008). Braak (2001), on the other hand, defines innovativeness as the individual's willingness to embrace new situations. Taking these definitions into consideration, Kılıçer and Odabaşı (2010) reported that innovativeness is an umbrella concept that includes terms such as risk taking, creativity and skillfulness in thought leadership.

Persons' distinctive individual characteristics create different reactions to new situations, ideas, practices and objects. When individuals encounter new situations, they act according to their personal characteristics and culture (Yi, Fiedler & Park, 2006). Rogers (2003) defines individual innovativeness as the period (degree) of adopting new ideas. In a broader expression, Kılıçer (2011) defines individual innovativeness as individuals' willingness towards innovation, their ability to adopt innovation and their desire to benefit from innovations. Yuan and Woodman (2010) consider individual innovativeness as the period of change in individuals' attitudes towards innovation.

Differences may exist among individuals in terms of individual innovativeness such as degree of willingness for change and adoption of innovation earlier or later compared to others. The period of acceptance of innovation is different for each individual due to various factors. According to Rogers (1995), individuals are divided into 5 different categories in terms of their innovativeness:

- Innovators: They are willing to try innovations and take risks. They are generally the first to experience innovation within the social structure in which they are a member. They have the courage and self-confidence to take the risk of the innovation they are involved with.
- Pioneers: They try the innovation following the innovators in their social structure. They guide other individuals who have doubts about experimenting with innovation. Thus, they serve as bridges between the innovators and the group that adopts innovations later. They have an important role in thought leadership.
- Interrogators: They are cautious about new situations. They need more time to have detailed information before adopting innovation. They do not want to take risks by experiencing innovation without establishing a sense of trust.
- Scepticals: They are skeptical towards innovations and they shy away from them. They wait for others to experience and adopt innovations first.
- Laggards/Traditionalists: They are biased towards change and the last group to adopt innovation. They expect other groups to adopt innovation and get positive results first.

One of the most important building blocks of individual and social progress is innovativeness. Teachers have important duties in educating innovative individuals in line with the expectations and needs of the society. In this context, innovativeness is one of the important qualifications for teachers to have. Innovative teachers can use the new knowledge and skills actively in classes and do not adhere to classical methods and tools. They strive to develop themselves by closely following the developments related to their professions. They act as role models for students and society in the adoption and implementation of innovations (Kurbanoğlu & Akkoyunlu, 2007). Innovative teachers can

ensure the correct integration of information and communication technologies in the classrooms (Kocasaraç & Karataş, 2018). They are willing to use new approaches, methods and tools in the classroom to ensure that the learning-teaching process is more efficient. In this context, augmented reality emerges as a tool that attracts the attention of teachers.

Augmented reality can be defined as the technology that uses the real image as the background which is enriched with simultaneously added virtual objects (Azuma, 1997, 1999). In other words, the real image is supported by virtual data such as graphics, animations, videos, 3D models and GPS developed in computer environment (Perez-Lopez & Contero, 2013). Thus, it becomes possible for individuals to access information that they cannot perceive under normal circumstances. Unlike virtual reality, this important advantage allows users to stay in touch with the reality of the environment they are in and it allows the real environment to be enriched with virtual objects. These advantages have brought to the agenda the use of augmented reality in the classroom which has become an important topic for both researchers and educators in recent years. Previous studies concluded that the use of augmented reality in educational environments has many advantages such as:

- Facilitating learning (Delello, 2014; Enyedy, Danish & DeLiema, 2015; Wojciechowski & Cellary, 2013),
- Attracting student interest to lessons (Bressler & Bodzin, 2013; Delello, 2014; Ibáñez, Di Serio, Villarán & Delgado Kloos, 2014),
- Increasing student motivation for lessons (Billinghurst & Duenser, 2012; Estapa & Nadolny, 2015),
- Increasing classroom participation (Ivanova ve Ivanov, 2011; Sırakaya & Kılıç Çakmak, 2018),
- Enabling students to learn by having fun (Dunleavy, Dede & Mitchell, 2009; Huang, Chen &Chou, 2016; Yilmaz, 2016),
- Improving spatial ability of students (Bujak et al., 2013; Wojciechowski & Cellary, 2013),
- Providing learning of abstract concepts by concretizing them (Shelton & Stevens, 2004; Wojciechowski & Cellary, 2013).

This study aimed to ascertain the effects of augmented reality training, some of whose advantages were mentioned above, on teachers' individual innovativeness. For this purpose, the following sub-problems were sought to be answered:

- What is the level of teachers' individual innovativeness before receiving augmented reality training?
- What is the level of teachers' individual innovativeness after receiving augmented reality training?
- Is there a significant difference between teachers' individual innovativeness scores before and after augmented reality training?

- Is there a significant difference between teachers' individual innovativeness scores before and after augmented reality training based on their demographic characteristics?

Method

Research Design

The study utilized one group pre-test and post-test experimental design. In this type of experimental design, the subjects were measured in terms of the dependent variable with the same measurement tool before implementation (Büyüköztürk, Kılıç Çakmak, Akgün, Ö., Karadeniz & Demirel, 2008).

Study Group

The study group consisted of 35 teachers from different subject matters. Table 1 presents the distribution of the study group based on their demographic characteristics.

Table 1. Distribution of the study group based on demographic characteristics

Variable	Category	f	%
Gender	Female	16	45.7
	Male	19	54.3
Age	30 and under	10	28.6
	Over 30	25	71.4
Subject matter	Science areas (Mathematics, Science, Communication Technologies)	19	54.3
	Social areas (Classroom, Social Sciences, T Turkish)	16	45.7
Level of Education	Undergraduate	22	62.9
	Graduate	13	37.1
Professional Experience	10 years or less	21	60.0
	More than 10 years	14	40.0

Implementation Process

Teachers who volunteered to take part in the study were given 40-hour augmented reality training during the implementation period of the study. Training began by giving teachers basic information such as definition, historical development and types of augmented reality technology followed by introducing the augmented reality applications that can be used instructionally. In the course of the training, teachers were introduced to environments where they could develop their own augmented reality applications and they were given opportunities to use them in practice.

Data Collection Tool

"Individual Innovativeness Scale" developed by Hurt, Joseph and Cook (1977) and adapted to Turkish by Kılıçer and Odabaşı (2010) was used as the data collection tool in the study. Kılıçer and Odabaşı (2010) stated that the adapted scale was grouped under 4 factors ("Resistance to change", "Thought Leadership", "Openness to experience" and "Risk taking") and these four factors explained 52.52% of the total variance. They reported that the internal consistency coefficient of the scale was 0.82 and test-retest reliability was 0.87. The 5-point Likert scale consists of 20 items.

The following formula was used to calculate the individual innovation score: positive items - negative items + 42. Innovativeness profiles and innovation levels of individuals can be calculated according to the score obtained (Hurt, Joseph and Cook, 1977). Accordingly, if the score obtained is over 80 points, it is interpreted as "innovative", 69-80 points as "pioneer", 57-68 points as "interrogator", 46-56 points as "skeptic" and 46 points as "traditionalist". If score obtained is over 68, it is interpreted as "innovator- high level ", 64-68 points as "innovator- medium level " and 64- as "innovator- low level".

Data Analysis

Whether the data showed normal distribution or not was explored before the analyses. For this purpose, Shapiro-Wilk test (Büyüköztürk, 2007) and Q-Q Plot graphs were used because the number of participants was less than 50. Since p> .05 according to the results of Shapiro-Wilk test and the graphs indicated normal distribution, the t-test was used in the analysis of the data for the whole study group. The Wilcoxon signed rank test was used to determine whether there was a significant change in individual innovativeness based on participants' demographic characteristics because the number of subjects recommended for sub-samples was under 30 (Roscoe, 1975, Cited in: Büyüköztürk et al., 2008). In addition, descriptive statistics were used.

Findings

What is the level of teachers' individual innovativeness before receiving augmented reality training?

Table 2 presents the descriptive statistics regarding teacher scores obtained from individual innovativeness scale before the training.

Table 2. Descriptive statistics for the scores obtained from the individual innovativeness scale before the training

N	$\bar{X}$	Ss	Min	Max
35	77.31	7.809	57	90

Table 2 shows the mean score ($\bar{X}$ = 77.31) obtained by teachers in the individual innovativeness scale. According to this mean score, teachers' individual innovativeness profiles were in "pioneer" category. Table 3 demonstrates the distribution of teachers based on their innovativeness profiles before the training.

Table 3. Distribution before training based on innovativeness profiles

Profile	Frequency	%
Innovator	14	40.0
Pioneer	17	48.6
Interrogator	4	11.4
Skeptical	0	0
Traditionalist	0	0
Total	35	100

According to Table 3, the majority of teachers had "pioneer" (f =17,%=48.6) individual innovativeness profile. However, an important part of the teachers was found to have "innovator" (f= 14,%=40.0) profile. It is interesting to note that only 4 teachers (%=11.4) had

"interrogator" profile while none of the participants had "skeptical" or "traditionalist" profile.

Table 4 presents the findings in regards to teachers' individual innovativeness levels before the training.

Table 4. Distribution by level of innovativeness before training

Level	Frequency	%
Innovator- high level	31	88.6
Innovator- moderate level	2	5.7
Innovator- low level	2	5.7
Total	35	100.0

Table 4 shows that 31 teachers (%=88.6) were high level innovators, 2 teachers (%=5.7) were moderate level innovators and 2 teachers (%=5.7) were low level innovators. This finding can be interpreted to mean that teachers already had innovative characteristics.

What is the level of teachers' individual innovativeness after receiving augmented reality training?

Table 5 presents the descriptive statistics regarding teacher scores obtained from individual innovativeness scale after the training.

Table 5. Descriptive statistics for the scores obtained from the individual innovativeness scale after the training

N	$\bar{X}$	Ss	Min	Max
35	81.49	7.184	65	94

Table 5 shows the mean score ($\bar{X}$ = 81.49) obtained by teachers in the individual innovativeness scale. According to this mean score, teachers' individual innovativeness profiles were in "innovator" category. Table 6 demonstrates the distribution of teachers based on their innovativeness profiles after the training.

Table 6. Distribution after training based on innovativeness profiles

Profile	Frequency	%
Innovator	20	57.1
Pioneer	13	37.1
Interrogator	2	5.7
Skeptical	0	0
Traditionalist	0	0
Total	35	100

According to Table 6, the majority of teachers had "innovator" (f =20,%=57.1) individual innovativeness profile. However, an important part of the teachers was found to have "pioneer" (f= 13,%=37.1) profile. It is interesting to note that only 2 teachers (%=5.7) had "interrogator" profile while none of the participants had "skeptical" or "traditionalist" profile. Table 7 presents the findings in regard to teachers' individual innovativeness levels after the training.

Table 7. Distribution by level of innovativeness after training

Level	Frequency	%
Innovator- high level	33	94.3
Innovator- moderate level	2	5.7
Innovator- low level	0	0
Total	35	100.0

Table 7 shows that almost all teachers (f=33, %=94.3) were high level innovators at the end of the training. 2 teachers (%=5.7) were moderate level innovators while there were no teachers with low level innovative characteristics.

Is there a significant difference between teachers' individual innovativeness scores before and after augmented reality training?

In order to test the effect of augmented reality training on teachers' individual innovativeness, related samples t-test was applied to teachers' pretest and posttest scores. Table 8 presents these results.

Table 8. Pre-test-posttest related samples t-test results

Measurement	N	$\bar{X}$	Ss	sd	t	p
Pretest	35	77.31	7.809	34	-2.969	.005
Posttest	35	81.49	7.184			

Table 8 demonstrates that while teachers' individual innovativeness mean scores before the implementation was ($\bar{X}$ = 77.31), it increased to ($\bar{X}$ =81.49) after the implementation. This difference was analyzed by related samples t-test and a significant difference was found in favor of posttest (t$_{(34)}$= -2.969, p<.05). According to this finding, it can be argued that augmented reality training had a positive effect on the development of teachers' individual innovativeness.

Is there a significant difference between teachers' individual innovativeness scores before and after augmented reality training based on their demographic characteristics?

Wilcoxon signed rank test was conducted on to teachers' test and post-test scores in order to test the effect of augmented reality training on teachers' individual innovativeness based on demographic characteristics. The test results are given in Table 9.

When Table 9 is examined, it can be seen that based on gender, augmented reality training significantly changed female teachers' individual innovativeness (z = -2.846, p <.05), whereas the change in male teachers was not significant (z = -1.156, p> .05). When mean rank and totals of difference scores were taken into consideration, the difference was found to be in favor of the posttest. Based on this finding, it can be argued that augmented reality training had a significant effect on the development of female teachers' individual innovativeness, whereas the development in male teachers was not significant.

While, based on age, augmented reality training did not significantly change the individual innovativeness of teachers aged 30 and under (z = -1.876, p> .05), the change in teachers over the age of 30 was found to be significant (z = -2.238, p <.05). When mean rank

and totals of difference scores were taken into consideration, the difference was found to be in favor of the posttest. Based on this finding, it can be argued that augmented reality training had a significant effect on the development of individual innovativeness of teachers older than 30 years, whereas the development in teachers who were 30 or under was not significant.

Table 9. Pretest-posttest Wilcoxon signed rank test results

Variable	Category	Posttest Pretest	Rank Average	Rank Total	n	z	p
Gender	Female	Negative	3.33	10.00	3		
		Positive	9.17	110.00	12	-2.846	.004
		Equal	-	-	1		
	Male	Negative	6.56	59.00	9		
		Positive	12.44	112.00	9	-1.156	.248
		Equal	-	-	1		
Age	30 and under	Negative	3.33	10.00	3		
		Positive	6.43	45.00	7	-1.876	.074
		Equal	-	-	0		
	Over 30 -	Negative	7.17	64.50	9		
		Positive	15.11	211.50	14	-2.238	.025
		Equal	-	-	2		
Subject Matter	Science Areas	Negative	6.28	56.50	9		
		Positive	12.72	114.50	9	-1.266	.206
		Equal	-	-	1		
	Social Areas	Negative	4.17	12.50	3		
		Positive	8.96	107.50	12	-2.701	.007
		Equal	-	-	1		
Education	Undergraduate	Negative	6.44	58.00	9		
		Positive	15.00	195.00	13	-2.227	.026
		Equal	-	-	0		
	Graduate	Negative	3.83	11.50	3		
		Positive	6.81	54.50	8	-1.917	.055
		Equal	-	-	2		
Experience	10 years or less	Negative	6.13	49.00	8		
		Positive	13.42	161.00	12	-2.096	.036
		Equal	-	-	1		
	More than 10 years	Negative	4.00	16.00	4		
		Positive	8.33	75.00	9	-2.063	0.39
		Equal	-	-	1		

In analyzes based on subject matter, while the augmented reality training was found not to significantly change the individual innovativeness of teachers who taught subject matters in science areas (Mathematics, Science, Information Technologies) ($z = -1.266$, $p > .05$), the change in teachers in teachers who taught subject matters in social areas (Classroom, Social Sciences, Turkish) was significant ($z = -2.701$, $p < .05$). When mean rank and totals of difference scores were taken into consideration, the difference was found to be in favor of the posttest. Based on this finding, it can be argued that augmented reality training had a significant effect on the development of individual innovativeness of teachers who taught subject matters in social areas, whereas the development in teachers taught subject matters in science areas was not significant.

While augmented reality training was found to significantly change the individual innovativeness of teachers at undergraduate levels according to education level (z = -2.227, p <.05), the change was not significant among the teachers with graduate degrees (z = -1.917, p> .05). When mean rank and totals of difference scores were taken into consideration, the difference was found to be in favor of the posttest. Based on this finding, it can be argued that augmented reality training had a significant effect on the development of individual innovativeness of teachers with undergraduate degrees, whereas the development in teachers with graduate degrees in was not significant.

According to analysis results, augmented reality training provided significant changes in the individual innovativeness of teachers with 10 years or less experience (z = -2.096, p <.05) as well as the teachers with more than 10 years experience (z = -2.063, p <.05). When mean rank and totals of difference scores were taken into consideration, the difference was found to be in favor of the posttest.

Results and Discussion

It was concluded that teachers were in the "pioneer" category before the augmented reality training and they were highly innovative. Various studies in literature indicate that teachers (or teacher candidates) were included in "interrogator" category(Abbak, 2018; Adıgüzel, 2012; Başaran & Keleş, 2015; Çuhadar, Bülbül & Ilgaz, 2013; Kert & Tekdal, 2012; Korucu & Olpak, 2015; Örün, Orhan, Dönmez & Kurt, 2015; Olpak, Arıcan & Baltacı, 2018; Özbek, 2014; Öztürk & Summak, 2014; Yılmaz, 2018). This study found that teachers were "pioneers" before training while they were "innovators" after the training and there was an increase in the number of highly innovative teachers. This result may be related to the fact that the study group was composed of volunteer teachers. It may be argued that volunteering to learn how augmented reality technology is used in the classroom requires innovativeness. This outcome is in line with the fact that teachers displayed high level of innovativeness before the training.

Analyses showed that teachers' individual innovativeness can be positively influenced from augmented reality training. Augmented reality is a technology that provides significant advantages in educational environments (Billinghurst & Duenser, 2012; Delello, 2014; Estapa & Nadolny, 2015; Shelton & Stevens, 2004; Sırakaya & Kılıç Çakmak, 2018; Wojciechowski & Cellary, 2013). In addition to the advantages mentioned before, this study concluded that augmented reality training positively affected teachers' individual innovativeness. In the literature, there are no studies which explored augmented reality and individual innovativeness in relation with one another. Further studies may examine in more depth how augmented reality technology changes teachers' individual innovativeness.

Based on the analyses, it was concluded that augmented reality training positively affected the individual innovativeness of both male and female teachers, while the change in female teachers was statistically significant. The studies carried out in the literature made comparisons based on gender and concluded that there was no differentiation according to gender (Abbak, 2018; Başaran & Keleş, 2015; Kocasaraç, 2018; Konakman, Yokuş & Yelken, 2016; Yılmaz, 2018).

In terms of age, it was concluded that augmented reality training significantly improved the individual innovativeness of teachers over the age of 30, whereas it was not significant for teachers who were 30 and under was not significant. Çetin and Bülbül (2017) state that school administrators show significant resistance to change over the age of 40.

While the analyses based on subject matter showed that the development of teachers' individual innovativeness was significant in teachers who taught subject matters related to social areas, the development in teachers who taught subject matters related to science areas was not significant. Similarly, Kocasaraç (2018) reported that science and mathematics teachers were more open to innovation than social science and literature teachers. Kılıç (2015) and Kocasaraç (2018) reported that level of innovativeness does not differ based on the subject matters teachers teach, while Bitkin (2012) stated that level of innovativeness does not differ based on teacher candidates' departments.

While augmented reality training positively affected the individual innovativeness of teachers with both undergraduate and graduate education, the development was statistically significant for undergraduate teachers. Kocasaraç (2018), on the other hand, concluded that the level of education does not differentiate teachers' individual innovativeness.

Analyzes based on professional experience demonstrated that augmented reality training had a positive effect on the development of individual innovativeness of teachers with more than 10 years' experience as well as teachers with less than 10 years' experience. While Kocasaraç (2018) reported that teachers with less experience had more innovative features, there are studies that concluded teachers' professional experiences did not affect their level of innovativeness (Abbak, 2018; Kılıç, 2015; Kocasaraç, 2018; Yılmaz, 2018).

This study is limited to 35 teachers who volunteered to receive augmented reality training. Their willingness to learn a new technology limits the research results in terms of generalizability.

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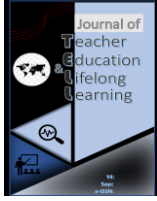
Educational Social Media Platforms And Edmodo Sample Application

Osman POLAT iD
Sinop University, Boyabat Vocational School, Department of Architecture and Urban Planning, Turkey
osmanpolat@sinop.edu.tr

ORCID No: https://orcid.org/0000-0001-8512-2418

Aslıhan SABAN iD
Necmettin Erbakan University, Ahmet Keleşoğlu Education Faculty, Department of Computer and Instructional Technology Education, Turkey
aslihansaban@gmail.com

ORCID No: https://orcid.org/0000-0002-8529-046X

ABSTRACT

The main objective of this study, analysis of educational social media platform to more effectively use the power of social media in the education environment and demonstrate the sample application referring to EDMODO with a high utilization rate by teachers and students due to studies on the use of educational social media platforms was not effective enough in Turkey. For this purpose, examined in depth teacher candidates' views on the use of the EDMODO and the views on the availability of educational purposes social media platforms in education. Working group of the research is composed 61 Computer and Instructional Technologies Education department teacher candidates who was studying 2014-2015 fall semester and prefer interpersonal communication course in elective course. The study was applied to mixed methods research based on the combined use of qualitative and quantitative research methods and grounded method.

Introduction

In recent years, different transformations have occurred with information and communication technologies. These transformations, which are and continue to be experienced, are social transformations involving social life and environment, social communication and social relations, and they also affect technology and use of technology

(Çoklar, 2010). Every day, we feel the effects of the internet and social media, which are important turning points in the world history, on economy, politics and socio-cultural life. This process of change and the resulting rapid developments in the world have had an effect in the field of education as well as in all other areas of life and brought about changes in the structure, process and scope of education along with the roles of people in this context (Mazman, 2009).

Many of the general-purpose social networking websites develop over time and offer several features and applications to the users; they are also platforms as well as social networks. Education and educators have not been indifferent to this attention, which is paid by users to general-purpose social networks, and the communication opportunities provided. In this context, many educational social network platforms have arisen, and the number of their users has increased substantially. EDMODO, Beyazpano, Edcanvas, Edublogs, SchoolTube, Edshelf, Glogster and Teachem are some of the educational social networks.

When the relationship between social network and education is reviewed in the studies conducted abroad, the usability of general-purpose social networks in education and the usability of educational social networks in education appear as two main headings. Due to the nature of general-purpose social networks, it is seen that they are not fully educational environments; social media tools are benefited from for educational purposes and most of the activities are performed within the framework of the social network 'Facebook'. The research conducted on educational social networks has been intensified after 2014, and most of these studies have focused on the social platform 'EDMODO'. In our country, the majority of the studies related to the use of social media as educational tools address the use of general-purpose social networks for educational purposes. Besides, there are almost no extensive studies concentrating on educational social networks. Many reasons such as language option, teachers' perspective on technology and the fear of going beyond the classic way result in the non-use of educational social networks and insufficiency of the studies in this field.

Purpose of the Study

As the studies on the use of educational social media platforms in Turkey are not adequate, this study aims to examine the educational social media platforms in order to use the power of social media in educational environments in a more effective way and to set forth a model implementation by reviewing the EDMODO platform, which is highly used by teachers and students. With this model implementation, the changes in the attitudes of the students towards the use of educational social media platforms will be investigated by integrating the EDMODO social platform into a blended education system. The research questions formed in this context are as follows:

1- What are the prospective teachers' opinions about the use of the EDMODO platform?

2- What are the prospective teachers' opinions about the usability of educational social media platforms in education?

3- Does the EDMODO platform provide a suitable environment for learning?

Method

Research Design

It was considered necessary to diversify the data and support them with complementary data for answering the research questions developed in this study. As a result of this necessity, the Mixed Method research, which is based on the joint use of qualitative and quantitative research methods, and the Embedded Pattern Method, were adopted in the study.

Mixed method researches are addressed as a separate category for the classification of the research methods and it is a rising research paradigm (Fırat, Yurdakul and Ersoy 2014). As a method, the mixed method concentrates on the collection, analysis and use of both qualitative and quantitative data in a single research. The mixed method research is mainly based on the fact that the joint use of both qualitative and quantitative methods enables the research problem to be understood better than what each method would result in separately (Creswell and Plano Clark 2007).

One of the most common mixed method researches used in educational researches is the embedded mixed method. In the researches of the embedded mixed method, the data are collected simultaneously, however, a form of data plays a supporting role. Embedded mixed method is suitable when the researcher has different questions requiring different kinds of data to increase the qualitative or quantitative pattern applications in line with the primary purpose of the research (Creswell and Plano Clark, 2011). The dominant research method in this design (experimental design) is used to answer the main research question, and the embedded method is used to answer the secondary research question based on the main research question (Plano Clark, Creswell, O'Neil Green and Shope, 2008).

In this study, quantitative research methods were used extensively, and qualitative research methods were employed to support and confirm the research data.

Participants

The study group of the research consists of 61 prospective teachers, 24 daytime and 37 evening education students studying at the Department of Computer and Teaching Technologies and receiving the course 'Communication between Individuals' in Ahmet Keleşoğlu Faculty of Education of Necmettin Erbakan University in Konya in the 2014-2015 academic year.

Data Collection Tools

As a mixed design was formed in the research, the research had both qualitative and quantitative dimensions, thus, the data were obtained with qualitative and quantitative tools.

EDMODO Adoption Questionnaire

The first section aims at identifying the prospective teachers' use of global social media, the second section consists of 5-point Likert type closed-ended questions to specify the prospective teachers' opinions about the EDMODO social platform during the 12-week implementation, and the third section is comprised of a single open-ended question. The

data collections tools were examined by browsing the theoretical information obtained by literature review regarding the closed-ended questions in the assessment tool, field studies and theses, the items of the data collection tool were formed as a draft by the researcher. The "Facebook Adoption Questionnaire' developed by Sacide Güzin Mazman (2009) was adapted to the EDMODO platform in parallel with the research questions and included in the item pool with her consent.

For the content validity of the data collection tool, attention was paid to the exemplification of the opportunities and elements provided to users by EDMODO and the items' assessment of the desired situation in the best way. It was attempted to develop the validity of the assessment tool by obtaining the opinions of 3 experts in the field of educational technologies on whether each statement in the assessment tool assessed the relevant aspect in terms of both content and technique. Moreover, to test the comprehensibility of the questions, the opinion of a Turkish field expert was obtained. Additionally, the draft questionnaire was read by 2 prospective teachers at the study group level, areas difficult to understand were identified and corrections were made. It was made ready for implementation after re-corrections in line with the opinions, suggestions and criticisms of the experts and students.

Interview

In this study, the opinions of the instructor about the EDMODO implementation were acquired with semi-structured interview forms. The interview was based on questions in line with the questionnaire to be applied to students, and the focus was set on educational social media platforms. Furthermore, questions were also prepared to get the evaluation of the instructor on the EDMODO evaluation and to learn the views on the effects of the implementation on students and the course. The interviews were held with semi-structured interview forms consisting of six questions at 8th and 12th weeks of the EDMODO implementation.

EDMODO Records and Statistics

In the research, the memberships of the participants on the EDMODO social media platform and the usage statistics were recorded for 12 weeks. These statistics contain information such as users' sharing of materials, sending assignments, likes and comments.

Data Analysis

In the research, frequency and percentage analyses were conducted for the data collected via the personal information form, and the data collected through the questionnaire and interview were analyzed qualitatively. The data obtained through the 'EDMODO Adoption Questionnaire', which forms the basis of the research and was used to provide quantitative data, were analyzed via SPSS 20 software and the data were subjected to descriptive analysis. The data obtained with the descriptive analysis approach are summarized and interpreted in accordance with the previously determined themes (Yıldırım & Şimşek, 2011). In this sense, findings, percentage and frequency scores were interpreted.

The answers of the prospective teachers, who constitute the qualitative and supportive section of the research, to the open-ended questions were examined with the content analysis approach. Content analysis is usually defined as a systematic analysis of the written and oral materials (Balcı, 1997). Content analysis can be considered as any technique for the objective and systematic identification of the materials received from several sources (Nachmias and Nachmias, 2000). The content analysis is built on the classification of what is said and how often it is said (Simon and Burstein, 1985). Through the content analysis, it was aimed to

reveal the common points in the content of a material (Mayring, 2000). The steps of the content analysis are as follows (Yıldırım and Şimşek, 2011):

In this study, the collected qualitative data were examined first. The data were coded and divided into themes. Codes and themes were organized. The findings were interpreted together with the quantitative data.

Results

The distribution of answers according to Social Network Usage Scale for educational purposes is as follows.

Table 1. Distribution of Answers to Educational Social Network Use Scale

Item	N	Min.	Max.	Avg.	sd
I easily signed up on EDMODO.	61	2	5	4,5902	0,7328
I use EDMODO easily.	61	3	5	4,4918	0,6433
I believe that EDMODO contributes to achieving the educational objectives.	61	1	5	4,0656	1,0381
I believe EDMODO makes positive contribution to my success in lessons.	61	1	5	3,6721	1,0670
I believe that EDMODO makes the lessons more enjoyable and the materials easily accessible.	61	1	5	3,9180	1,0757
I don't think there will be a security problem as EDMODO only serves educational purposes.	61	1	5	3,9508	1,1077
I find EDMODO successful at sharing sources and materials.	61	1	5	4,3115	0,9151
I follow the course-related announcements on EDMODO.	61	2	5	4,3607	0,8104
I follow the course-related homework and tasks on EDMODO.	61	2	5	4,4262	0,7987
I visit our EDMODO course group at least once a week.	61	2	5	3,6393	1,1019
I sign in EDMODO on my smartphone (mobile).	61	1	5	3,1475	1,6380
I consider educational social media platforms as new learning environments for education	61	1	5	4,1803	1,0164
I think educational social media platforms will eliminate temporal and spatial dependence.	61	1	5	4,1475	1,0217
I think foreign language is not a problem in using educational social media platforms	61	1	5	3,7541	1,1258

The results obtained from the data are as follows:

Findings and Interpretation on the First Sub-Problem

In the first sub-problem of the research, an answer was sought for "What are the prospective teachers' opinions about the use of the EDMODO platform?".

70.5% of the sample group selected the option "I strongly agree" and 21.3% selected "I agree" for the statement "I easily signed up on EDMODO". Accordingly, 91.8% of the study group stated they agreed the statement "I easily signed up on EDMODO", however, 3.3% did not agree with this expression and 4.9% stated that they had no idea about this matter. According to the frequency analysis and percentage distributions, it is revealed that the majority of the participants did not have any problems about signing up on the EDMODO platform.

57.4% of the sample group selected "I strongly agree" and 34.4% selected "I agree" for "I use EDMODO easily". Accordingly, 91.8% of the study group agreed with the statement "I use EDMODO easily", however, 8.2% had neutral views on the use of EDMODO. According to the frequency analysis and percentage distributions, it is revealed that the majority of the participants did not have any problems about signing up on the EDMODO platform. The statement 'When I become a teacher in the future, I will/will not use educational social media platforms in lessons, because... was directed to the sample group at

the end of the implementation, and the answers given were examined and divided into themes. 3 students expressed their opinions about the ease of use, and 1 student referred to the difficulty of use.

50.8% of the sample group selected "I strongly agree" and 34.4% selected "I agree" for the statement "I find EDMODO successful at sharing sources and materials". Accordingly, 85.2% of the study group agreed with "I find EDMODO successful at sharing sources and materials" while 11.5% expressed neutral opinions on it. 3.3 percent of the study group expressed their opinions by selecting "I strongly disagree". According to the frequency analysis and percentage distributions, most of the participants think that the EDMODO platform provides a successful environment for sharing course materials and sources.

According to the answers given by the sample group to the open-ended question and divided into the themes, 12 people expressed positive opinions with the theme "sharing information" in terms of educational contributions.

54.1% of the sample group selected "I strongly agree" and 31.1% selected "I agree" for the statement "I follow the course-related announcements on EDMODO". Accordingly, 85.2% of the study group followed the course-related announcements within the scope of the course 'Communication between Individuals' on the EDMODO platform. While 11.5% of the study group expressed neutral opinions, 3.3% stated that they disagreed with this statement.

57.4% of the sample group selected "I strongly agree" and 27.9% selected "I agree" for the statement "I follow the course-related homework and tasks on EDMODO". Accordingly, 85.2% of the study group followed the course-related announcements within the scope of the course 'Communication between Individuals' on the EDMODO platform. While 11.5% of the study group expressed neutral opinions, 3.3% stated that they disagreed with this statement.

27.9% of the sample group selected "I strongly agree" and 27.9% selected "I agree" for the statement "I visit our EDMODO course group at least once a week". Accordingly, 55.8% of the study group visited the EDMODO course group at least once a week during the implementation. While 21.3% of the study group stated neutral opinions on this statement, 23.0% did not agree with it.

32.8% of the sample group selected "I strongly agree" and 16.4% selected "I agree" for the statement "I sign in EDMODO on my smartphone (mobile)". Whereas 29.5% of the study group selected "I strongly disagree", 11.5% selected "I disagree" for this statement; 9.8% expressed neutral opinions. According to the frequency analysis and percentage distributions, at least half of the participants have positive attitudes towards the mobile use. According to the answers given by the sample group to the open-ended question and divided into the themes, 3 people expressed positive opinions with the theme "mobile" in terms of educational contributions.

It can be interpreted that all the students who took the course had positive approaches to the EDMODO platform as per their voluntary participation in this implementation, which was performed within the scope of the course, and the data of use.

Findings and Interpretation on the Second Sub-Problem

In the second sub-problem of the research, an answer was sought for "What are the prospective teachers' opinions about the usability of the EDMODO platform in education?".

42.6% of the sample group selected "I strongly agree" and 32.8% selected "I agree" for the statement "I believe that EDMODO contributes to achieving the educational objectives". Accordingly, 75.42% of the study group agree that the EDMODO platform makes contribution to the achievement of educational objectives. While 16.4% of the study group

stated neutral opinions for this statement, 3.3% selected "I disagree" and 4.9% selected "I strongly disagree". According to the answers given by the sample group to the open-ended question and divided into the themes, 7 people expressed positive opinions with the theme "compliance with the objective" in terms of educational contributions.

34.4% of the sample group selected "I strongly agree" and 36.1% selected "I agree" for the statement "I believe that EDMODO makes the lessons more enjoyable and the materials easily accessible". Accordingly, 70.5% of the study group agreed that the EDMODO platform provides makes the lessons more enjoyable and enables course materials to be accessed more easily. Whereas 4.9% of the study group stated neutral opinions for this statement, 4.9% selected "I disagree" and 4.9% selected "I strongly disagree". According to the answers given by the sample group to the open-ended question and divided into themes, 17 people expressed positive opinions with the theme 'access to information" and 6 people expressed positive opinions with the theme 'fun' in terms of educational contributions.

37.7% of the sample group selected "I strongly agree" and 34.4% selected "I agree" for the statement "I don't think there will be a security problem as EDMODO only serves educational purposes". Accordingly, 72.1% of the study group agree that the EDMODO platform does not have any security problems structurally. While 16.4% of the study group stated neutral opinions for this statement, 6.6% selected "I disagree" and 4.9% selected "I strongly disagree". According to the answers given by the sample group to the open-ended question and divided into the themes, 6 people expressed opinions with the theme "security" in terms of educational contributions.

42.6% of the sample group selected "I strongly agree" and 39.3% selected "I agree" for the statement "I think educational social media platforms will eliminate temporal and spatial dependence". Accordingly, 81.9% of the study group agree that educational social media platforms will eliminate temporal and spatial dependence. While 11.5% of the study group stated neutral opinions for this statement, 1.6% selected "I disagree" and 4.9% selected "I strongly disagree". According to the answers given by the sample group to the open-ended question and divided into the themes, 16 people expressed positive opinions with the theme "time-space" in terms of educational contributions.

19.5% of the sample group selected "I strongly agree" and 31.1% selected "I agree" for the statement "I think foreign language is not a problem in using educational social media platforms". Accordingly, 50.6% of the study group agree that foreign language is not a problem in using educational social media platforms. Whereas 26.2% of the study group stated neutral opinions for this statement, 8.2% selected "I disagree" and 4.9% selected "I strongly disagree". According to the answers given by the sample group to the open-ended question and divided into the themes, 1 person expressed his/her opinion with the theme "language problem" in terms of educational contributions.

21.3% of the sample group selected "I strongly agree" and 42.6% selected "I agree" for the statement "I believe EDMODO makes positive contribution to my success in lessons". Accordingly, 63.9% of the study group agree that EDMODO contributes positively to success in lessons. Whereas 19.7% of the study group expressed neutral opinions about this statement, 13.1% selected "I disagree" and 3.3% selected "I strongly disagree". According to the answers given by the sample group to the open-ended question and divided into the themes, 11 people expressed opinions with the theme "attention-motivation" in terms of educational contributions.

Findings and Interpretation on the Third Sub-Problem

In the third sub-problem of the research, an answer was sought for "Does the EDMODO platform provide a suitable environment for learning?".

49.2% of the sample group selected "I strongly agree" and 27.9% selected "I agree" for the statement "I consider educational social media platforms as new learning environments for education". Accordingly, 77.1% of the study group consider the educational social media platforms as new learning environments for education. While 16.4% of the study group expressed neutral opinions for this statement, 3.3% selected "I disagree" and 3.3% selected "I strongly disagree". For "Have you ever used an educational social media platform before?", 50.8% of the sample group said "Yes" and 49.2% said "No".

For "Are you thinking, as a prospective teacher, about using educational social media platforms in your lessons in the future?", 91.8% of the sample group said "Yes" and 8.1% said "No". 2 out of 31 prospective teachers who have used an educational social media platform before state that they will not use educational social media platforms in their lessons when they become teachers. Of 30 prospective teachers who did not use any educational social media platforms before, 27 people reported that they could use educational social media platforms in the future after the implementation with the EDMODO platform used within the scope of the course 'Communication between Individuals'.

In the answers given by the sample group to the open-ended question and divided into themes, almost all the positive opinions related to educational social media platforms and EDMODO were stated in the 1st and 2nd sub-problems together with their themes. 12 people expressed positive opinions with the theme "Requirement of the era", which were not stated in the 1st and 2nd sub-problems, regarding students' adoption of positive attitudes towards these platforms.

The drawbacks mentioned by the sample group constitutes the themes "difficulty in following (2 people), wasting time (3 people), problem with access (7 people), anti-sociality (3 people) and attention problem (1 person)".

Discussion and Conclusion

In this research, a model implementation was carried out for EDMODO, which is an educational social media platform. The contributions of the EDMODO platform to education and the opinions of prospective teachers about the use of EDMODO were examined, and the following conclusions were reached.

Within the scope of the implementation, the students who were taking the course 'Communication between Individuals' were requested to voluntarily participate in the implementation, and all the students who were taking the course participated in the implementation with a positive approach. The majority of the study group stated that they considered educational social media platforms as new learning environments and that these platforms would eliminate the temporal and spatial dependence for education.

Due to the fact that the students studying at the Department of Computer and Teaching Technologies, who formed the study group, had sufficient computer knowledge and all of them were using at least one social media platform, no problems occurred regarding the membership process and use of EDMODO. In conclusion, it is possible to say that EDMODO is easily used and adopted by students. This situation is similar to the relevant literature (Kongchan, 2012; Sırakaya, 2014; Kazez and Bahçeci 2016). While there is no problem with the use of the EDMODO platform with its interface partially translated into

Turkish, half of the study group believe that foreign language is a problem for the use of educational social media platforms. This situation is in parallel with the studies of Sarıkaya (2014), Kazez and Bahçeci (2016). Half of the study group did not consider foreign language as a problem or expressed neutral opinions about foreign language. In the studies conducted in foreign literature (Kongchan, 2012; Greco and Gates, 2012 and Elizabeth, 2012), they concluded that there was no problem in their own language.

The majority of the study group expressed positive opinions about the EDMODO platform and stated that they would use EDMODO when they became teachers in the future. These results are supported by Kongchan (2012), Türkmen (2012) and Sarıkaya (2014), who reached similar conclusions about EDMODO.

It is observed that EDMODO is a new application and there are a very low number of studies on this subject in the literature. According to these studies, it is possible to say that EDMODO can be used successfully in educational environments (Çankaya et al. 2014; Durak et al. 2015, Kongchan, 2008; Sanders, 2012). In addition, most of the study group stated that there were no security problems because EDMODO served only educational purposes, thus, it was concluded that the EDMODO platform provided a suitable environment for learning.

The majority of the study group expressed that they found EDMODO successful in sharing sources and materials, and that they followed the course-related announcements, homework and tasks related to the course on EDMODO. Kılıçkaya (2012) and Sarıkaya (2014) support the idea of the students that EDMODO enables a healthy communication outside the classroom.

As in the studies of Al-Said (2015) and Kazez and Bahçeci (2016) on the use of EDMODO in mobile devices, students think that the use of the system in mobile devices is useful and the item averages have been found between 'not sure and no idea'. It is assumed that the reason for uncertainty is that they do not use EDMODO on too many mobile devices or that the mobile application is completely in English.

Drawbacks encountered during the review of similar studies such as difficulty in following, wasting time and anti-sociality were also expressed by some students in this study.

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