REVIEW OF INTERNATIONAL GEOGRAPHICAL EDUCATION
ISSN: 2146-0353 • © RIGEO • 10(2), SPRING, 2020

www.rigeo.org

Research Article

The Effect of a Textbook Preparation Process Supported by Instructional Technology Tools on the TPACK Self-Confidence levels of Prospective Social Studies Teachers

Fatma TORUN[1]
Adıyaman University, Adıyaman, TURKEY

[1]Assist. Prof;. Adıyaman University, Faculty of Education, Department of Social Studies Education, Adıyaman, Turkey. ftorun [at] adiyaman.edu.tr ORCID: 0000-0002-2701-7377

Abstract

The aim of this study is to determine the effect of a textbook preparation process supported by instructional technology tools on the TPACK (Technological Pedagogical Content Knowledge) self-confidence level of prospective Social Studies teachers. The research was carried out using a sequential descriptive design with a mixed method design. Quantitative data were collected before and after the implementation process and the qualitative data were collected after the implementation process. Quantitative data were collected by the Technological Pedagogical Content Knowledge (TPACK) Self-Confidence Scale; and qualitative data were collected by a metaphor form and a BLOB tree self-assessment form. Quantitative data were analyzed by a Paired Samples t-test and qualitative data were analyzed by content analysis. A total of 53 prospective Social Studies teachers, from a public university in Turkey, participated in the research. The results of the analyses showed there were statistically significant differences between pre-test and post-test scores in the levels of TPACK self confidence amongst prospective Social Studies teachers. The self-confidence scores were in favor of the post-test. Furthermore, while prospective teachers have created negative metaphors about their TPACK self-confidence before the implementation process, they created more positive metaphors after the implementation process. According to the results of the BLOB tree self-assessment, it was revealed that the TPACK self-confidence levels increased amongst the prospective Social Studies teacher participant group.

Keywords
TPACK, Instructional Technologies Tools, Prospective Social Studies Teachers, Textbook, BLOB Tree

To cite this article: Torun, F. (2020). The Effect of a Textbook Preparation Process Supported by Instructional Technology Tools on the TPACK Self-Confidence levels of Prospective Social Studies Teachers. *Review of International Geographical Education (RIGEO), 10*(2), 115-140. Retrieved from http://www.rigeo.org/vol10no2/Number2Spring/RIGEO-V10-N2-6.pdf. doi: 10.33403/rigeo.691943

Submitted: 26.12.2019 • **Revised:** 19.03.2020 • **Accepted:** 30.03.2020

Nowadays, technology is widely used in education. Moreover, instructional technologies, software, programs and applications have been specifically developed for use in education. In the early 2000s, guidelines about how digital technology should be used in education (Mason, Berson, Diem, Hicks, Lee, & Dralle, 2000) and publications (Martorella, 1997; Becker 1999; Hicks, Lee, Berson, Bolick, & Diem, 2014) called for teachers to use digital technology effectively.

It is very important to use technology in the learning and teaching process to increase the success and quality of education; to ensure permanent learning occurs; and to achieve world standards (Korkmaz & Ünsal, 2016). For this purpose, more emphasis was placed on the use of classroom technologies in schools and today, many contemporary classrooms are equipped with a variety of technologies. In modern classrooms, resources such as computers, televisions, LCD projectors, document cameras, internet access, and even interactive whiteboards are becoming increasingly popular. However, the presence of technology alone in the classroom is not sufficient for a quality education to occur. Teachers should work continuously to improve their competence and knowledge of technological innovations, with particular focus on how the use of technological tools can improve student learning. Learning the best practices of instructional technology is a critical process for the success of both new and experienced teachers (Russell, Waters, Turner, 2014).

The efficient use of technology in classrooms is not only related to classroom equipment but is also related to teachers' attitudes and beliefs about technology. Research has shown that there is a relationship between teacher beliefs about the nature of learning and the integration of technology into educational environments. It has been determined that the teacher's use of technology is more common if they hold beliefs about the use of student-centered pedagogies. Another factor influencing teacher beliefs about using technology is the educational value perceived by the teacher in terms of how technology affects educational objectives (Watson, 2006). If the teacher does not believe in the educational value of technology, he/she will choose not to use it. However, although there is a positive attitude and belief in the teacher's use of technology, the desire to use technology may be adversely affected over time due to poor access to technology, or unwilling students, or insufficient knowledge about how to use technology (Kim, Kim, Lee, Spector, & DeMeester, 2013; Shifflet, & Weilbacher, 2015).

Nowadays, young people are perceived as "digital natives" and it is assumed that they use technology very effectively. However, this perspective can cause incomplete learning to occur. Use of technologies such as phones, tablets or computers may not be sufficient for young people to effectively adapt to the use of technology in the classroom. In this respect, it is necessary to create learning environments where prospective teachers can use instructional technologies (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012). Prospective teachers, who will be future educators/teachers, should have sufficient knowledge, skills and level of self-confidence in the preparation, development and use of instructional technology tools. Therefore, prospective teachers should be received training about the knowledge and skills required for the effective use of such tools. A lack of knowledge causes a lack of self-confidence, and this can prevent teachers or prospective teachers from using

instructional technologies. In order to avoid poor self-confidence, teachers should be equipped with sufficient knowledge and skills about technology in prospective training. In this respect, more attention should be paid to the use of technology in the education of prospective teachers.

In terms of Social Studies education, the use of technology in courses has a special importance. Social Studies consists of many different disciplines such as History, Geography, Economy, and Sociology. Therefore, Social Studies includes concepts, facts, skills and values which belong to many different fields and are also quite abstract; this makes it difficult to teach Social Studies in a concrete way to ensure the learning becomes meaningfully retained. In this respect, the teaching and learning process for Social Studies can be made more enjoyable by using a range of instructional technology tools. In addition, the use of instructional technology tools can more easily represent and enable learning to occur about abstract subjects. It is thought that if prospective Social Studies teachers have sufficient knowledge and skills about the use of instructional technology tools, gained from their undergraduate education, it will positively affect their levels of self-confidence about the use of technology in the classroom. It is thought that the increased levels of self-confidence amongst prospective teachers will contribute to both their future professional life and the more effective processing of the Social Studies course.

Conceptual Framework

TPACK and TPACK's Components

The Technological Pedagogical Content Knowledge (TPACK) framework for teacher education can be defined as a new field of knowledge comprised of the interaction of three bodies of knowledge: content, pedagogy, and technology. Both theoretical and practical interactions of these knowledge groups include the types of flexible information required to successfully integrate the use of technology into teaching (Koehler, Mishra & Cain, 2013). The simplest definition of TPACK is that teachers can integrate technology into education for effective teaching (Koehler, Mishra, Kereluik, Shin & Graham, 2014). The main framework of TPACK was created by Mishra and Kohler (2006) based on Shulman's model of Pedagogical Content Knowledge (PCK). This framework is based on the definitions by Shulman (1986) to explain how teachers understand educational technologies and how pedagogical content knowledge interacts with technology to provide effective teaching. TPACK involves teaching understanding how technology, pedagogy and content knowledge interact in their lessons (Rosenberg & Koehler, 2015). TPACK also provides details about the scope and boundaries of the types of knowledge that teachers should have when integrating technology into education (Koh, Chai & Lee, 2015). Graham (2011) stated that TPACK has the potential to provide a theoretical groundwork for teacher education programs to develop students' technology integration skills. Within the framework, TPACK contains seven components including three basic knowledge components (content, pedagogy, technology). The framework and explanations of these components are shown in Figure 1.

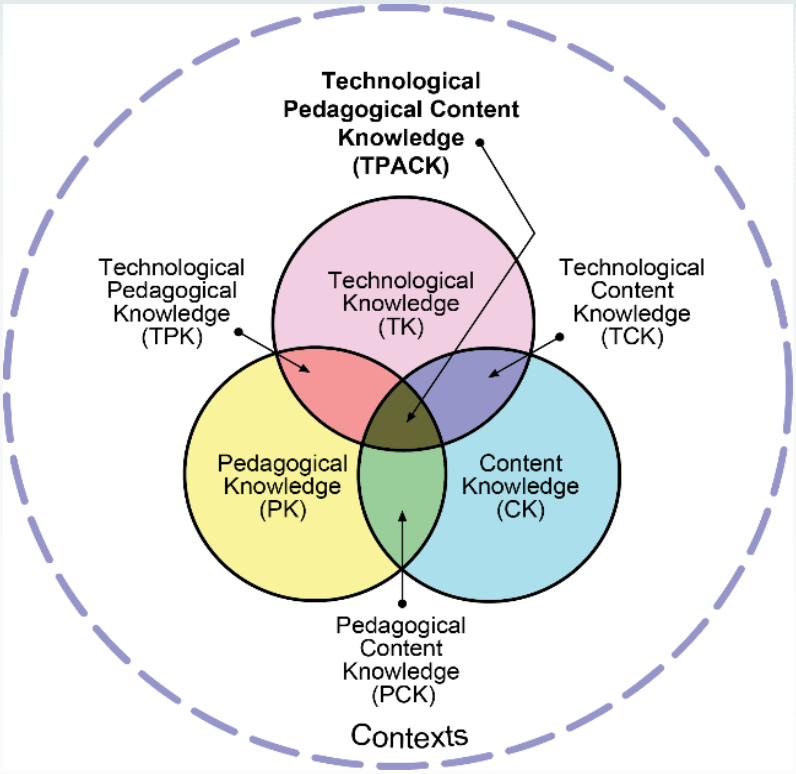

Figure 1. Schematic view of TPACK (Koehler & Mishra, 2009).

1. Content Knowledge (CK): Teachers' knowledge about the subject to be learned or taught. Shulman (1986) stated that this information includes concepts, theories, ideas, organizational frameworks, evidence and evidence information, as well as knowledge of practices and approaches to developing such information.
2. Pedagogical Knowledge (PK): Teachers' knowledge about teaching and learning methods or applications and processes. This component includes the planning of teaching, the methods and techniques used in the classroom and the information needed to evaluate the students.
3. Technological Knowledge (TK): Teachers' knowledge about how to use the computer and related software.
4. Technological Content Knowledge (TCK): This is an understanding about how technology and content affect and restrict each other. With this knowledge, teachers can have a deep understanding of how the subject can be changed by the application of specific technologies.
5. Pedagogical Content Knowledge (PCK): This is the pedagogy knowledge necessary for teaching the content. According to Shulman (1986), this knowledge enables the teacher to find different ways to explain the subject and allows the teacher to adapt the teaching materials to alternative concepts and prior knowledge.
6. Technological Pedagogical Knowledge (TPK): This is the knowledge about how some technologies can change teaching and learning. This knowledge includes the relationship between technology and pedagogical design, methods and strategies.
7. Technological Pedagogical Content Knowledge (TPACK): Technological pedagogical content knowledge is an understanding about the interactions

between content, pedagogy and technology knowledge. TPACK is the basis of effective teaching with technology and includes knowledge about facilitating the learning of specific content with appropriate pedagogy and technology (Koehler, & Mishra, 2006).

Rationale and Aim of Study

All teachers who want to integrate technology into their courses must understand TPACK. Martorella (1997) said that Social Studies teachers should embrace technology to carry the class, and the world moves out of the school walls when the digital world begins to move into classroom. Martorella stated that individuals create a second personality using technology, and the presence of technology everywhere has changed the understanding of citizenship. Since then, many studies have been conducted about the use of technology in Social Studies (Mason et. al. 2000; Ehmen, 2002; Tally, 2007; Bal & Kandemir, 2013; Akşin, 2014; Akman, 2014; Sheffield, 2015; Turgut, Aydın, Yigit, 2019). However, there is research to show that technology has not been sufficiently integrated into the Social Studies courses over the last two decades (Tally, 2007; Ehman, 2002).

Research related to Social Studies revealed that Social Studies teachers considered themselves sufficient in their understanding about and use of Pedagogical Content Knowledge (PCK) strategies but weaker in their understanding and use about Technological Pedagogical Content Knowledge (TPACK) strategies (Bal & Kandemir, 2013). The work of Koh and Chai (2016) also supports such information. In their study, they examined teachers using TPACK and found that teachers used more PCK than TPACK and it was suggested that this problem could be solved by increasing the using of technology in the classrooms (Koh & Chai, 2016). Turgut, Aydın, Yigit (2019) examined the TPACK competencies of Social Studies teachers. As a result of the study, it was determined that teachers considered themselves sufficient in all sub-dimensions of TPACK; however, findings from the interviews with teachers state the teachers had problems when using TPACK knowledge during the teaching process and needed in-service training (Turgut, Aydin, & Yigit, 2019). Akşin (2014) reached a similar result in his study to determine the TPACK competencies of Social Studies teachers. As a result of the study, it has been revealed that teachers are competent in their content knowledge and pedagogical content knowledge, but their technological knowledge is not sufficient. Therefore, Akşin (2014) stated that teachers' levels of competency in the use of TPACK were not sufficient. Akman (2014) examined the levels of perception about TPACK self-efficacy amongst Social Studies teachers and prospective teachers. Research findings revealed a medium relationship existed between the technology knowledge and content knowledge of Social Studies teachers. However, a weak relationship was found between the technology knowledge and content knowledge of prospective teachers.

Yeh, Hsu, Wu and Chien (2017) stated that levels of confidence in the understanding and use of TPACK is based on the practitioner and may develop with experience. Yes, Hsu, Wu and Chien (2017) also stated that teachers had a theoretical understanding about the use of TPACK but were weak at the point of application. Research has revealed that not only teachers but also prospective teachers consider themselves insufficient to use instructional technologies

(Tondeur, Pareja Roblin, Braak, Fisser, & Voogt, 2013). The literature review about TPACK mentioned above, determines that most of the studies were aimed at revealing the prospective teachers's attitudes, self-confidence or proficiency levels about TPACK. The purpose of some of these studies were to develop prospective teacher's levels of self-confidence or self-efficacy in TPACK. The aim of the current study is to determine the effect of the Social Studies textbook preparation process, by using instructional technologies, on the levels of self-confidence in the use of TPACK by prospective Social Studies teachers. For this purpose, ten different instructional technology tools were taught to prospective teachers. Once this had occurred, the prospective teachers designed a sample Social Studies textbook using the instructional technology tools. In this process, all the prospective teachers have actively learned to use these instructional technology tools. The levels of self-confidence about the use of TPACK by prospective teachers was determined by the TPACK self-confidence scale, a metaphor form and a BLOB tree self-assessment form. Instructional technology tools used in the study were grouped in to word-cloud tools, concept mapping tools, canva, QR codes, and augmented reality.

Word cloud tools (wordle, wordart (tagul) and worditout): These three word-cloud tools are instructional technology applications and their use allows word-clouds to be prepared. Word-clouds can be used in courses for preparatory work, attention and evaluation (Önal, 2018). Use of the three tools to create content-related word-clouds were prepared in the sample textbook.

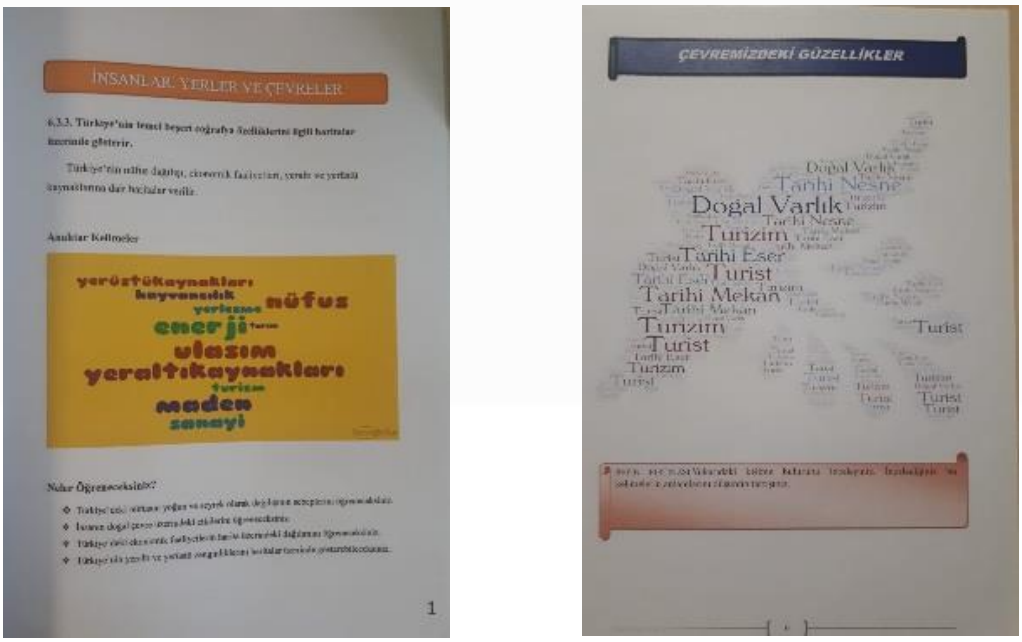

Figure 2. The word-cloud examples in textbook which were prepared by prospective teachers

Concept mapping tools (bubble.us, mindmeister, popplet): All three of these tools are computer-based concept mapping applications. The relationship between concepts can be visualized in a simple and understandable way by using these applications.

Also, pictures, maps, figures, diagrams or an icon can be added to the concept maps (Tanık Önal, 2018). Use of the three tools to create content related concept maps related were prepared in sample textbook. The concept mapping examples are presented below.

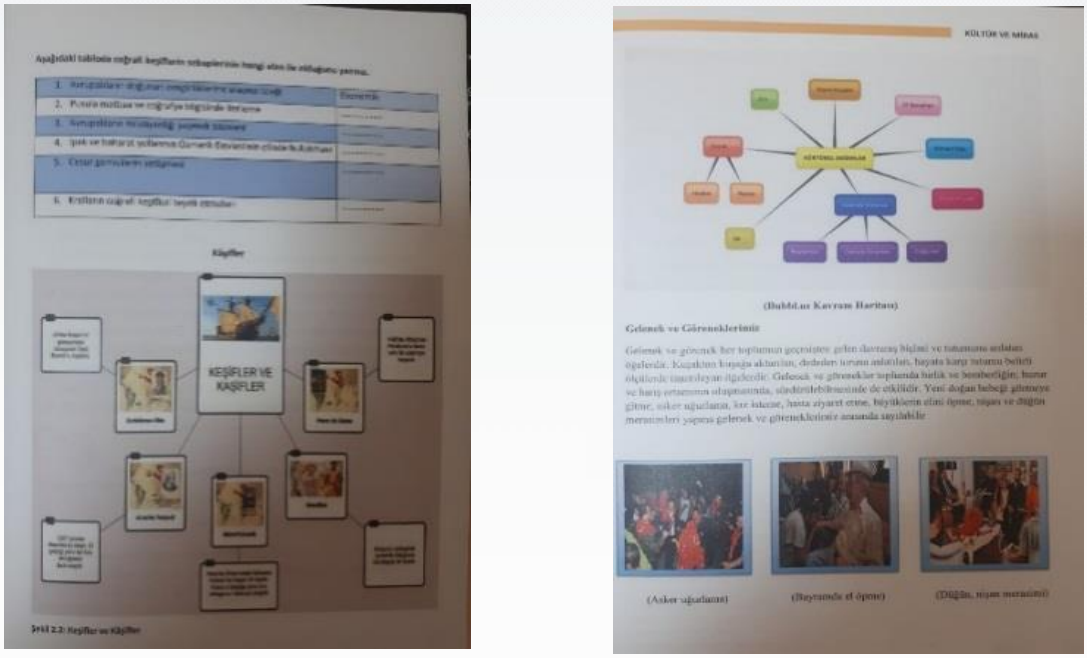

Figure 3. The concept maps examples in the textbook which were prepared by prospective teachers

Canva: This application is a visual design tool. Many visual designs can be prepared such as banners, posters, flyers, business cards, covers or presentations with this application (https://dijitalmaden.com). Canva was used in the preparation of the covers for the sample textbook. Examples of the book covers prepared with this tool are presented below.

Figure 4. The textbook cover examples for the textbook which were prepared by prospective teachers

QR Code: A QR Code is a two-dimensional barcode that can be read by smartphones. It allows more than 4000 characters to be encoded in a two-dimensional barcode. QR Codes can be used to view the user's text, open a URL, save a contact in an address book, or create text messages (https://www.the-qrcode-generator.com/whats-a-qr-code). Prospective teachers provided additional knowledge in their sample textbook by using a QR Code or using this tool in the answer section.

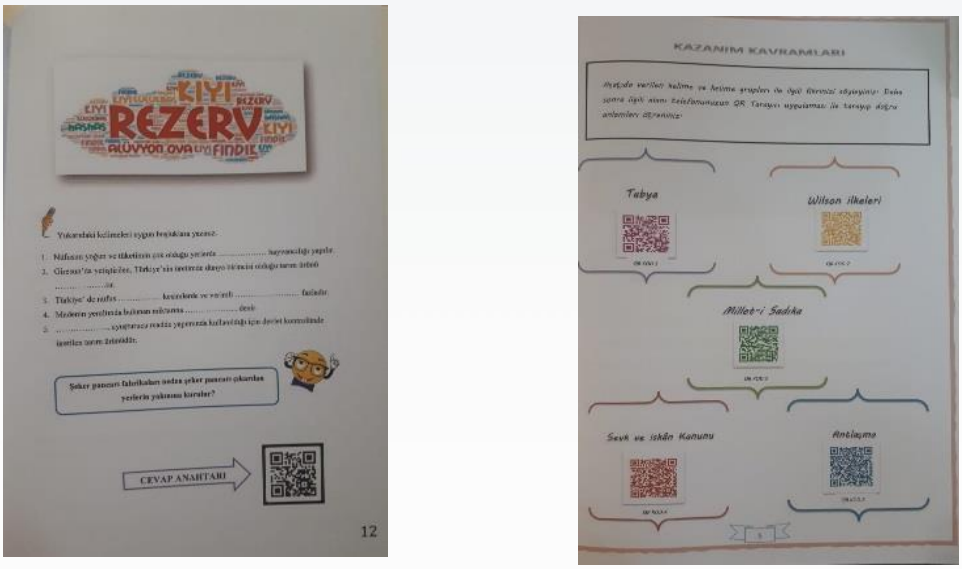

Figure 5. The QR code examples in textbooks which were prepared by prospective teachers

Augmented reality (aurasma and augment): This is a technology that enables the creation of 3D images by placing virtual objects or images from a real-world image (Azuma, 1997). In recent years, this technology has been used frequently in education. The augmented reality tool was used to place audio, video or both audio and video materials in the sample textbook.

Figure 6. The aurasma examples in the textbook which were prepared by prospective teachers

As mentioned above, there is a relationship between the use technology in education and the self-confidence levels of teachers' about the use of technology. In this respect, it is important to provide prospective teachers with the opportunity to use more instructional technology in their prospective training to improve their knowledge and skills about TPACK and to increase their levels of self-confidence in its use. Using technology is especially important in Social Studies courses because typically the use of technology applications are less because not much teaching occurs about how to use technology. As a result of the literature review, it was determined that similar instructional technology tools were not used to develop the levels of self-confidence in the use of TPACK by prospective Social Studies teachers. The purpose of the current study is to determine the effect of a textbook preparation process, supported by instructional technology tools, on the levels of self-confidence about the use of TPACK amongst prospective social studies teachers. Within the scope of this purpose, the following sub-goals are determined:

To determine the levels of self-confidence about TPACK amongst prospective Social Studies teachers before and after the implementation process;

To determine the metaphorical content levels of self-confidence about TPACK amongst prospective Social Studies before and after the implementation process; and,

To determine the BLOB tree self-assessment levels of self-confidence about TPACK amongst prospective Social Studies teachers' before and after the implementation process.

Methodology

Model of the Research

The research design used for this study was mixed methods. Cresswell (2019) defined the mixed method as a research approach in which researchers use both quantitative and qualitative data sets related to problem situations, and benefit from the advantages of these two data sets. Creswell (2009) stated that mixed methods consists of six different designs in terms of time to collect data. Sequential descriptive design was used in this research. In this design, quantitative data is usually collected first and qualitative data is then collected to strengthen quantitative data. Analyses of the data are often interrelated and are combined at the stage of interpretation or discussion of the data (Cresswell, 2009). In this research, a pre-test was applied using the TPACK self-confidence scale before the implementation process and before the first part of the quantitative data was collected. After the implementation process, data were collected with both the TPACK self-confidence scale, and the metaphor form, and the BLOB tree self-assessment form. The opinions of prospective teachers about before and after the implementation process were determined in qualitative data collection tools, but these data were collected only at the end of the process. In addition, qualitative data analysis was used to strengthen quantitative data. The data obtained were analyzed at different times. The results obtained from quantitative and qualitative data are combined in the discussion and conclusion part and discussed together.

Participants

Participants included in the study were determined by a purposeful sampling method. In the purposeful sampling method, the researcher can identify individuals or groups who suitable for their project' purpose as a research sample. In studies for which this type of approach is primarily determined, the aim is not to generalize to a large universe (Robson, 2015). The aim of this study is to determine the effect of a textbook preparation process, which was supported by instructional technology tools, on the levels of self-confidence about TPACK amongst prospective Social Studies teachers. In order to use instructional technology tools, it is necessary to be taught the appropriate content in a course. In the current Social Studies Undergraduate Program of 2018-2019, this content was in the scope of 3rd Grade Instructional Technologies and Material Design course. In order to reach the aim of the research, 3rd grade prospective Social Studies teachers are determined as study participants. A total of 61 third-grade prospective Social Studies teachers participated in the study. However, some of them were excluded from the study process because some of them were not included in the pre-test or post-test data collection stage. A total of 53 third-grade prospective Social Studies teachers participated in the study: 21 males and 32 females who were studying at a public university in the 2018-2019 academic year. These prospective teachers have graduated the Computer I and II courses in which basic knowledge about computer use has been taught. However, they did not attend any courses related to instructional technologies.

Data Collection Tools

The TPACK self-confidence scale, a metaphor form and a BLOB Tree self-assessment form were used as data collection tools.

TPACK self-confidence scale. The scale was developed by Graham, Burgoyne, Cantrell, Smith, Clair and Harris (2009) and was adapted to Turkish by Timur and Taşar (2011). The scale consists of 31 items. The scale was prepared in the form of a 5-point Likert rating (5 = Strongly Agree, 1 = strongly disagree). Only items 16–20 also included 0 (I do not know these kinds of technologies). In this respect, the maximum score is 155 while the minimum score is 26. Timur and Taşar (2011) stated that the scale has a Cronbach Alpha value of .92 for the whole scale. In this study, the scale's pretest Cronbach Alpha coefficient was found 0.94 and posttest Cronbach Alpha coefficient 0.93. Before starting this research, a literature review was made in line with the purpose of the study and scales suitable for the purpose of the study were examined. As a result of the research, it was decided to use this scale as a data collection tool, both considering the literature and the purpose of the study.

Metaphor form. In this study, the researcher asked the prospective Social Studies teachers that "How do you resemble yourself, metaphorically, about your use instructional technology tools before and after the implementation process? And why?" In order to determine the metaphors from the prospective Social Studies teachers. The researcher prepared a metaphor form and gave it to all participants. The researcher wanted the prospective teachers to reply in a metaphorical way, such as *"At the beginning of the semester, I was like …… about using instructional Technologies, because……" and "end of the semester, I was like …… about using instructional Technologies,*

because……" The metaphor form was given to prospective teachers after the implementation process because they have almost no knowledge of using instructional technologies before implementation process. Before creating metaphor, it is necessary to have prior knowledge about the content. Lakoff and Johanson (1980) defined a metaphor in the following way: "a metaphor is to understand and experience something according to the other". Forceville (2017) stated that metaphor should be understood as one of the basic mechanisms of human cognition. In this respect, it is necessary to have knowledge that can make cognitive connotation to create metaphor. For this reason, in the study, instructional technologies were taught to prospective teachers before creating metaphor.

BLOB tree self-assessment form. The BLOB Tree is a written material that includes pleasant characters called BLOB, who have no gender or age, to help facilitate and encourage meaningful discussions about difficult issues or situations (Wilson & Long, 2018). The tree can represent a place, group, organization or situation (Wilson & Long, 2015). Blobs indicate the emotions of individuals in their situations. Individuals or groups can identify the actions or feelings of themselves or others with a group of BLOB who represent themselves, so that they can discover their feelings. In this study, two BLOB tree self-assessment forms were given to each student. Before and after the process of using instructional technologies, they were asked where they saw themselves in this tree. Then, they were asked to explain why they saw it at the point they indicated.

Implementation

The implementation period of the study continued for 12 weeks and consists of four stages. In the first stage, the TPACK self-confidence scale was applied before the prospective Social Studies teacher were given any training. In the second stage, the prospective teachers were taught about instructional material design and participated in practical training related to different instructional technologies. After this training, the prospective teachers designed a sample Social Studies textbook. At this stage, prospective Social Studies teachers used content, pedagogical and technology knowledge together to design the textbook. In the third stage, the prospective teachers presented the textbook and both the researcher and peers evaluated the book. In the last stage, the TPACK self-confidence scale, the metaphor form and the BLOB Tree self-assessment form were applied in order to determine the level of self-confidence about TPACK from the prospective teachers. During the process, interactive communication occurred between the researcher and prospective teachers via a social network platform (EDMODO) which was already used by instructors and their students. Through this network, the researcher gave feedback to the prospective teachers about the products they prepared by using instructional technology tools. The implementation process is described in detail in the Table 1 below.

Table1
Implementation Process of The Study

Week	Implementation	Explanation of the implementation process
Week 1	Presentation of the implementation and pre-test application	In the first week, the researcher informed the prospective teachers about the implementation process. A preliminary implementation of the TPACK Self-Confidence Scale was carried out.
Week 2, 3, 4	Training on material design	At the beginning of the implementation process, prospective teachers were divided into groups. There were two prospective teachers in each group. EDMODO, a social learning environment, was introduced and prospective teachers were registered here. In this process, prospective teachers trained on material design principles and elements, visual design principles, rules to be considered in the design of printed and written materials. And examples of materials were presented by researcher.
Week 5	Teaching of instructional technology tools was started. Wordle Worditout Wordart (TAGUL)	Firstly, word-cloud development tools were taught to prospective teachers. Sample clouds were prepared and controlled.
Week 6	Concept Mapping Tools Bubble.us Mindmeister Popplet	Concept mapping preparation tools were taught to prospective Social Studies teachers. Then, concept maps were prepared in accordance with Social Studies content and training was given about how to use them in the textbook.
Week 7	Canva QR Code	Visual design preparation training was taught with Canva program. Then, using this program, sample cover designs for the Social Studies textbook were prepared. Training on the use of QR code application is provided. Examples of how visual, written, audio and video materials are used in textbooks have been prepared by this application.
Week 8	Teaching Augmented Reality Applications Aurasma Augment	Training on how to use the augmented reality applications is provided. Sample augmented reality applications were prepared by prospective teachers.
Week 9, 10, 11	Presentation and evaluation of the textbook	The prospective teachers, who formed groups of two, designed a sample Social Studies textbook. Prospective teachers prepared the textbook using the above-mentioned instructional technology tools. Then, the prospective teachers presented the textbook. The book was evaluated by both researcher and peers.
Week 12	Application of the post-tests	At the end of the process, the TPACK Self-Confidence Scale, the metaphor form and the BLOB Tree self-assessment form were applied to the prospective Social Studies teachers.

Data Analysis

The TPACK self-confidence scale was analyzed by using the SPSS program. First of all, the normality of the data was tested. For this purpose, the pre-test-post-test difference scores were calculated and the normality of the difference scores was analyzed. For normality analysis, skewness and kurtosis coefficients, Histogram, Q-Q Plot and Branch-Leaf graphics were examined. It was determined that all of these showed normal distribution. In addition, since the number of participants was greater than 50, the data were analyzed with the Kolmogrov Smirnov test. As a result of this test, it was determined that the data

were normally distributed. Kolmogorov Smirnov normality test results related to the study are presented in Table 2 below.

Table 2
Kolmogorov Smirnov Normality Test Result

	Kolmogorov-Smirnov[a]		
	Statistic	Df	p
Difference score	.083	53	.200*
a.Lilliefors Significance Correction			

The pre-test and post-test were conducted to determine the self-confidence levels about TPACK from prospective Social Studies teachers. The quantitative data were analyzed with the paired samples t-Test. The effect size of the analyses was determined using the standardized effect size Cohen d. The effect size formula for the paired samples groups t-test and the effect size of this analysis on the study are shown below. This effect size was made using the classification by Cohen (1988). According to this classification, it means $d \leq 0,2$ "small" effect size, $0,2 < d < 0,8$ "medium" effect size and $d \geq 0,8$ "large" effect size.

Prospective teachers' metaphors about their usage of instructional technologies were analyzed by using content analysis. All metaphors are transferred to the computer and divided into categories according to the meanings they contain. The concepts and definitions that do not contain metaphoric meaning have been determined and they have been removed from the categories. Content analyses were made with the help of an expert. The reliability of the study analyses was determined by using the "Consensus / (Consensus + Disagreement)" formula (Miles & Huberman, 1994). A total of 50 metaphors were created before the implementation by prospective teachers. 45 of these metaphors were agreed and there was disagreement about 5 of them (blank notebook, school beginner, unripe fruit, crawling baby, and baby). In this context, the reliability coefficient was determined as 45/45 + 5 = 0.9 for metaphors created before the process. A total of 53 metaphors were created after the implementation. 47 of these metaphors were agreed and there was disagreement about 6 of them (Picasso, book, bright, adult, star cluster, solid apartment). The reliability coefficient was determined as 47/47 +6 = 0.88 for metaphors created after the process. Miles and Huberman (1994) stated that an 80% agreement between coders is sufficient for the reliability of the codes. The results obtained before (.90) and after (.88) the process revealed that the reliability was high in the study. In the BLOB tree self-assessment, each BLOB in the form is given a number from 1 to 17 starting at the base of the tree. The answers of prospective teachers are given as frequency. While collecting data with the BLOB tree, the prospective teachers were asked about their reasons indicated on the tree. It was directly quoted from prospective teachers' answers. The place where prospective teachers indicated themselves in the BLOB tree was classified as 'lower', 'middle' and 'upper' in the findings section. This classification was based on the expressions used by the prospective teachers in defining the place they are located.

Findings

Results on the Analysis of Quantitative Data

The purpose of this study is to determine the effect of a textbook preparation process which was supported by instructional technology tools on the self-confidence levels about TPACK from prospective Social Studies teachers. In this context, the first sub-purpose of the study was expressed as "to determine prospective Social Studies teachers' TPACK self-confidence levels before and after the implementation process". Findings related to this sub-purpose is presented in Table 3.

Table 3
T-Test Results of Prospective Social Studies Teachers' TPACK Self-Confidence Scores

TPACK self confidence scale							**t- Testi**		
	N	$\bar{x}$	ss	*R*	P	Cohen d	d	t	P
Pretest	53	3,04	0,69	0,53	.000	1,21	52	8,84	.000*
Posttest	53	3,79	0,56						

When the Table 3 is examined, there is a significant difference between the pre-test and post-test scores of the prospective Social Studies teachers, t(52)=8,84, p<.05. When the average scores of a pre-test ($\bar{x}$= 3,04) and a post-test ($\bar{x}$ = 3,79) are examined, it is clear that this difference is meaningful in favor of the post-test. The effect size of the t-test was found to be d = 1,21. This finding can be interpreted that the implementation process in the study has a large effect on the development of self-confidence levels about TPACK from the prospective Social Studies teachers.

Findings on the Analysis of Qualitative Data

Findings from the metaphor form. *Metaphors created before implementation processing.* The second sub-purpose of the study was expressed as "to determine the metaphorical content of prospective Social Studies teacher' about their levels of TPACK self-confidence before and after the implementation". Findings related to this sub-purpose is presented in Table 4.

Table 4
Prospective Social Studies Teachers' Metaphors About Their Use of Instructional Technologies Before the Implementation Process

Lack of knowledge and skills	**f**	**Backward ness**	**f**	**Insufficiency**	**f**	**Uselessness**	**f**	**Fear**	**f**
Apprentice	7	Touch telephone	3	Half picture	1	Sapling	1	School beginner	1
Blank notebook	3	Desktop Computer	2	Light at the end of the tunnel	1	Disconnect TV	1	Thirst in the desert	1
Kid	2	Blank notebook	1	Toddlers	1	Reed	1	Baseless building	1

Baby	2	Bicycle	1	Bicycle Rider	1	Rosebud	1	Fish out of the water	1
Empty plate	2	Rural settlement	1	Empty frame	1	Robot	1	Bud	1
Unfruitful tree	1			Star	1	Smart board	1		
Unripe fruit	1								
A big zero	1								
Sapling	1								
Empty pit	1								
Empty box	1								
Empty page	1								
Empty tin	1								
Blank canvas	1								
Total	25		8		6		6		5

Five themes were created when the metaphors of prospective teachers were analyzed. These themes are named as 'lack of knowledge and skills', 'backwardness', 'inadequacy', 'uselessness' and 'fear'. The prospective Social Studies teachers created the most metaphors under the 'lack of knowledge and skills' theme (f = 25). This finding can be interpreted as prospective teachers use technology in their daily lives, however they have difficulty in integrating the technology into the teaching process. In this respect, it is thought that levels of self-confidence about TPACK from prospective teachers was low before the implementation. The prospective teacher expression is abbreviated as PT. Some examples of metaphors from the prospective teachers are presented below.

At the beginning of the semester;

"…I was like an apprentice. Because I had no knowledge of instructional technologies, such as an apprentice who got a job with a master. (PT 16). "… I was a child. Because I felt like a child without a reading and just started school (PT 6). (*Lack of knowledge and skills*)

"… I was like a touch telephone. Because at the beginning of the semester, I looked like a phone with no special features (PT 3)." "…I was like a desktop computer. Because I was like a desktop computer with simple applications, I only had general knowledge about instructional technologies (PT 11)." "…I was like a rural settlement. Because I knew what classical teachers knew. I was like a village (PT 28)." (*Backwardness*)

"… I was like a half picture. Because I knew about instructional technologies but I was not able to use it (PT 9)." "…I was like toddlers. Because I was inadequate in instructional technologies such as the infant (PT 45)." "…I was like an empty frame. Because what I know about instructional technology tools is just a framework. It wasn't full (PT 43)." (*Insufficiency*)

"…I was like a disconnected TV. Because I was like a closed TV that couldn't just give people new information (PT 5)." "… I was like a rosebud. It is meaningless because there is no color around. My classical knowledge was nothing as a monotonous teacher (PT 23)." (*Uselessness*)

"…I was like a person thirsty in the desert. Because I felt helpless as someone who was thirsty in the desert because of my lack of technology (PT 14)." "…I was like a fish out of water. I was scared as a fish out of water because I did not know how to use them (PT 22)." (*Fear*)

Metaphors created after the implementation process. When analyzing the metaphors of the prospective teachers after the implementation process, five themes were determined. These themes are 'equipped', 'useful', 'open to innovation', 'advanced', 'guide'.

Table 5
Prospective Social Studies Teachers 'Metaphors About Their Use of Instructional Technologies After the Implementation Process

Equipped	**f**	**Useful**	**f**	**Openness to innovation**	**F**	**Advanced**	**F**	**Guidance**	**F**
Expert	4	Tree	2	Headworker	4	Smart phone	4	Compass	2
Ripe fruits	2	Plug-in TV	1	Walking Baby / Child	2	Advanced computer	2	Guidance	2
Set of stars	1	Bread	1	A hungry hound	1	Car	1	Polar Star	1
Table	1	Opened flower in the desert	1	Strong apartment	1	Motorcycle Rider	1	Mirror	1
Opened flower	1	Diamond	1	Student internship	1	Urban settlement	1		
Scholar	1	Ney	1	Book	1				
Adult	1	Book	1						
Full jug	1	Bright	1						
Full box	1	Spring	1						
Full pool	1	Sounding bird	1						
Completed puzzle	1								
Book	1								
Picasso	1								
Total	17		11		10		9		6

When Table 5 is examined, it was determined that after the implementation process, the prospective teachers created the most metaphors under the 'equipped' theme (f = 17). During the implementation process, the instructional technology tools mentioned above were taught to prospective Social Studies teachers, and a learning environment was created to enable them to actively use these tools. Prospective teachers gained the necessary knowledge and skills related to the use of these tools. Therefore, the levels of self-confidence about TPACK from prospective teachers who have related knowledge and skills has increased after the implementation. Some examples of the metaphors from the prospective Social Studies teachers' are presented below.

At the end of the semester;

"… I was an expert. Because I have learned these technology tools, I know how to use them and I've become a qualified teacher to teach my students, I'm like an expert (PT

30). …. I was like full pool. Because I added what I learned on what I know. I feel like a full pool of myself (PT 8)". (*Equipped*)

"… I was like bread. Because I've been through a lot of stages and I've become useful. Just like bread (PT 7). … I was like an opened flower in desert. Because at first, I thought the tools of instructional technologies were hard. After I learned everything, I saw that it was fun. Now I can color around like a flower in the desert (PT 14). (*Useful*)

"… I was like a smart phone. Because I feel like a smartphone installed with many features and apps (PT 3). … I was a car. Because I've been become a car that has been completed a long way in a short time with my learned (PT 25)". (*Advanced*)

"… I was like a headworker. Because I learned these technologies and became a mid-level expert. I'm aiming to be an expert (PT 16). … I was like a student internship. Because when I learned about these technologies, my fears and excitement decreased. Preparing a book using these technologies showed that it was not impossible to use them. But I have to improve myself so I'm like a student internship (PT 16)". (*Open to innovation*)

"… I was like a compass. Because I can now guide my students to use instructional technologies effectively (PT 9). … I was like polar star. Because I can guide people after learning these Technologies (PT 13)." (*Guide*)

Pre- and post- implementation process prospective Social Studies teachers's BLOB tree self-assessments. The third sub-purpose of the study was expressed as "To determine the BLOB tree self-assessments of prospective Social Studies teachers' about their levels of self-confidence with TPACK before and after the implementation". After the implementation process, two BLOB tree self-assessment forms were given to prospective Social Studies teachers. Afterwards the prospective teachers were asked "Where did you see yourself in the BLOB tree about the using of instructional technology tools at the beginning of the semester, and where do you see yourself now as a prospective Social Studies teacher? Why is that?". The BLOB tree self-assessment form presented Figure 7.

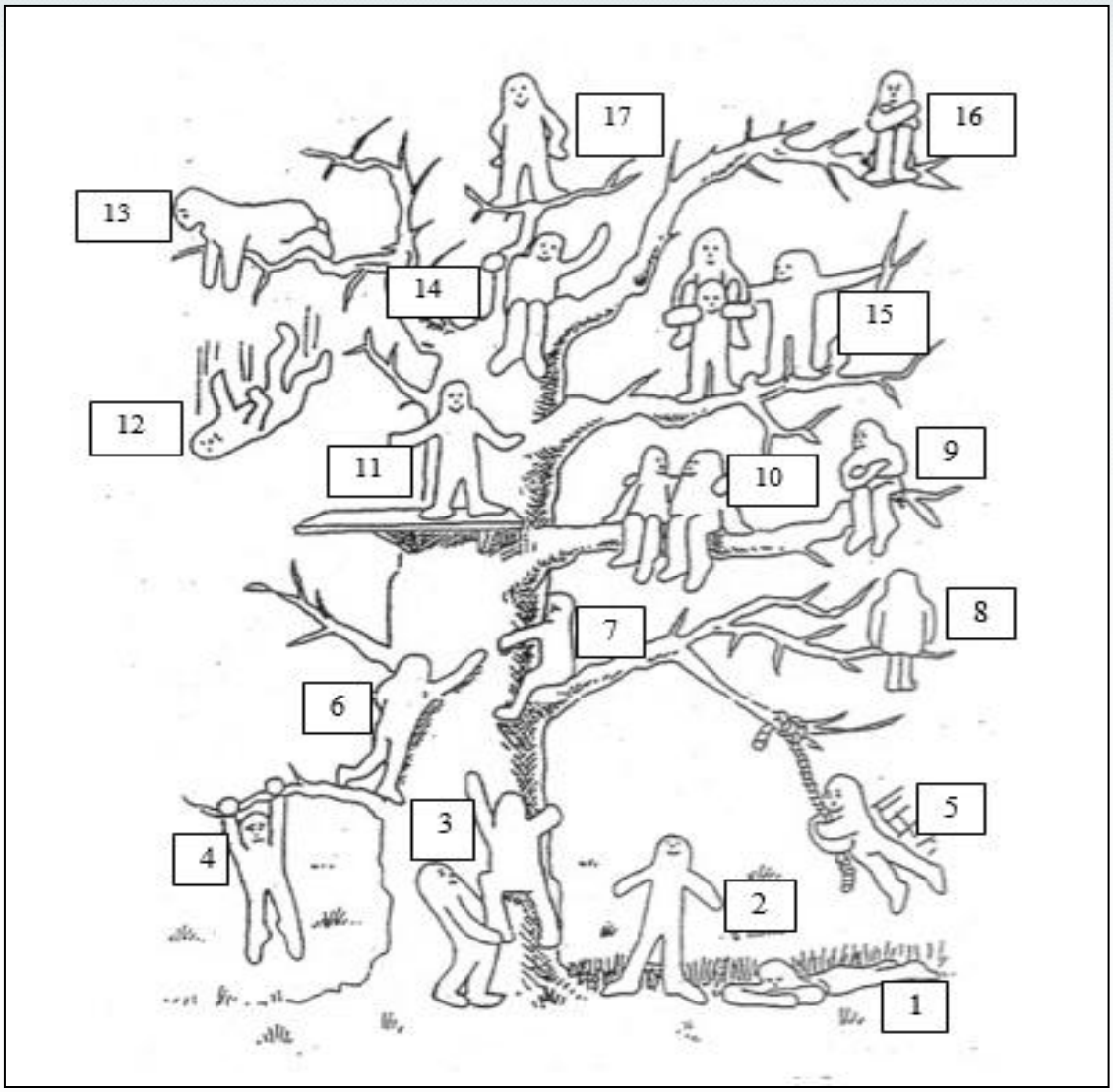

Figure 7: BLOB Tree (Pip Wilson and Ian Long, 2018)

The BLOB tree is usually used to determine the emotional attitudes of individuals to a person, place, situation or event. In this study, it was used to determine prospective teachers' TPACK self-confidence before and after implementation process. Prospective teachers' answers are presented in frequency table (Table 6).

Table 6
Frequency Table of Prospective Social Studies' BLOB Tree Self-Assessments

BLOB tree place number	**Before the implementation process** F	**After the implementation process** F
BLOB 1	7	-
BLOB 2	10	-
BLOB 3	20	-
BLOB 4	3	1
BLOB 5	1	-
BLOB 6	6	-
BLOB 7	3	3
BLOB 8	1	-
BLOB 9	-	1
BLOB 10	1	4

BLOB 11	-	18
BLOB 12	-	-
BLOB 13	-	-
BLOB 14	-	17
BLOB 15	-	-
BLOB 16	1	-
BLOB 17	-	9
Total	53	53

When the BLOB tree was examined, it was determined that most of the prospective Social Studies teachers saw themselves in the lower part of the tree (f = 41; BLOB 1, 2, 3, 4, 5) before the implementation process. 11 prospective teachers saw themselves in the middle part of the tree (BLOB 6, 7, 8, 10), while 1 prospective teacher saw themself in the upper part of the tree (BLOB 16). After the implementation process, the majority of prospective teachers stated that they saw themselves in the upper part of the BLOB tree (f = 44; BLOB 11, 14, 17). 8 prospective teachers saw themselves in the middle part of the tree (BLOB 7, 9, 10), while 1 prospective teacher saw themself in the lower part of the tree (BLOB 4). On the BLOB tree self-assessment form, the tree represents instructional technology tools and BLOBs represent Social Studies prospective teachers. In this context, when the locations on the BLOB trees were evaluated together, and the prospective teachers saw their locations before and after implementation process, it can be said clearly that prospective teachers' levels of self-confidence in using instructional technology tools is weak before implementation process and their self-confidence increased considerably after the experimental process. Prospective Social Studies teachers' explanations about the locations where they saw themselves on the BLOB tree at the beginning and end of the implementation process support this interpretation. The prospective teachers' explanations are presented below. In order to provide a clearer understanding of the findings, prospective teachers' pre and post explanations were presented together.

"At the beginning of the semester, I saw myself as someone who was the bottom of the tree (BLOB 1). Because I didn't know anything about these tools, and when I was taught, I couldn't do it. Now I see myself at the top of the tree (BLOB 17). I believe I can learn and do somethings. We will never say we cannot do it, we say who wants to do it" (PT 46).

"At the beginning of the semester, I did not have the necessary training in the technology content, so I couldn't trust myself that I could do it alone. I never tried to learn instructional technologies because I didn't even know that there were programs and I saw myself at the bottom of the tree (BLOB 1). I'm aware that what I learned at the end of the semester would really serve me well as a teacher. But I need to improve myself, so I see myself in the middle of the tree (BLOB 11)" (PT 45).

"At the beginning of the semester, I was trying to climb the tree (BLOB 3) with the newly learned tools. At the end of the semester, I learned the instructional technologies tools, but I could not pass the application and although I fell down the tree, I kept the branch (BLOB 4). I have learned how concepts and practices will contribute to education" (PT 49).

As a result, when the quantitative and qualitative findings of the study are evaluated in general it was determined that prospective Social Studies teachers did not have sufficient knowledge and skills about instructional technologies before the implementation process and due to this deficiency, their TPACK self-confidence was weak. After the implementation process, it was determined that prospective teachers developed positive attitudes towards instructional technologies and their self-confidence in using these technologies increased. This finding was supported by both the metaphorical explanations of the prospective teachers and the explanations in the BLOB tree self-assessment form.

Conclusion and Discussion

The aim of this study is to determine the effect of a textbook preparation process which was supported by instructional technology tools on the levels of self-confidence about TPACK amongst prospective Social Studies teachers. The study was carried out using a mixed methods approach and the quantitative data were obtained by conducting a pre-test and post-test capture of responses on the TPACK self-confidence scale. It was determined that the levels of self-confidence about TPACK amongst prospective Social Studies teachers was low before the implementation process. This result is thought to be due to their lack of TPACK related knowledge and skills. Tondeur, et al. (2013) also stated in their study that prospective teachers don't feel as if they can adequately use instructional technologies. The reason why prospective teachers have low self-esteem about TPACK is thought to be caused by their lack of knowledge and skills related to the use of technology. Similar studies have revealed that Social Studies teachers and prospective teachers consider themselves as having an insufficient understanding about TPACK. Çetin, Çalışkan and Menzi (2012) conducted a study to determine the perceptions about competent use of technology amongst prospective teachers who were graduating from different departments. As a result of the study, it was found that prospective Social Studies teachers perceive themselves to be less insufficient compared to prospective primary and Science teachers. Bal and Kandemir (2013) have studied the self-assessment levels about TPACK amongst Social Studies teachers; and in the study, they found out that teachers considered themselves to be sufficient in terms of PCK and insufficient in terms of TPACK. Akman (2014) conducted a study to determine the perception of TPACK self-efficacy amongst Social Studies teachers and prospective teachers', and discovered a weak relationship existing between prospective teachers' technology knowledge and content knowledge. Yeh, et al. (2017) developed a questionnaire to determine the TPACK of Science teachers. In the questionnaire, it was found out that teachers had high levels of knowledge/understanding about TPACK but low levels of applying and analyzing this knowledge. Koh and Chai (2016) examined the teacher's usage of TPACK in the course. In the study, they stated that teachers used the Pedagogical Content Knowledge component most frequently. They stated that the TPACK component was weaker and they suggested that this problem could be solved by increasing the useage of technology.

In the current study, firstly prospective Social Studies teachers were taught the necessary knowledge and skills about TPACK in order to eliminate their inadequacies and deficiencies related with the use of instructional technology tools. Then, the prospective teachers were asked to prepare a sample Social

Studies textbook by using these tools. Last, the prospective teachers presented these books using their content knowledge. As a result of the study, the mean of TPACK self-confidence levels increased for the prospective Social Studies teachers' and a significant difference was found in favor of the post-test. In addition, when the effect of the implementation process on the development of the TPACK self-confidence levels of prospective teachers was examined, it was determined to be a large effect size *(r=1,21)*. This suggests that the implementation process has a positive effect on the levels of self-confidence about TPACK amongst prospective teachers. Similar studies have revealed that teaching technologies enrich education when used in the teaching process (Churchill, 2011; Dohn and Dohn, 2017; Açıkgül Fırat and Köksal, 2019). Gökdaş and Torun (2017) used instructional technologies in the instructional technology and material design course in order to improve levels of self-efficacy about TPACK amongst prospective teachers. At the end of the process, the level of TPACK self-efficacy was improved in the courses where ICT was used. Sancar and Yanpar (2015) carried out a study to determine levels of self-confidence about TPACK amongst prospective teachers, and the participating teachers prepared digital stories in the course. Sancar and Yanpar (2015) stated that the preparation of digital stories in the course has improved the levels of self-confidence about TPACK amongst prospective teachers.

In the current study, it was determined how prospective teachers evaluated themselves metaphorically in their use of instructional technologies. When examining the metaphors which were created before the implementation process, it was determined that prospective teachers created metaphors with more negative judgments about their use of instructional technologies. These metaphors are grouped under five themes: lack of knowledge and skills, backwardness, inadequacy, uselessness and fear. It can be said that prospective teachers have a prejudice about the use of instructional technology tools and they are afraid of using these tools because they didn't have sufficient knowledge and skills about instructional technology tools before the implementation process. When examining the metaphors created after the implementation process, it was determined that prospective teachers created more positive metaphors about themselves. These metaphors are grouped under five themes: equipped, advanced, usefulness, openness to innovation and guidance. The prospective teachers find the phenomena easier to understand, and they can embody the abstract concepts to more easily qualify such understanding. Thus, abstract concepts such as life, time and emotions are more easily understood by transforming them into concrete phenomena. Creating metaphors is one way of transforming abstract concepts into concrete phenomena (Forceville, 2006). Also, metaphors label the similarity between events, concepts and processes. This similarity affects our conceptual perception positively (Black, Downes, Field, Mozdzanowska and Steel, 2006). When examining the metaphors of prospective teachers', it was determined that they expressed their feelings about their usage of instructional technologies. While the pre-metaphors of prospective teachers contain negative judgments, their post-metaphors have more positive meanings. This result shows that the implementation process positively affects the self-confidence levels of prospective teachers' about TPACK. The implementation process has broken prospective teachers' prejudices about the instructional technologies and made

them create more positive metaphors. A similar result was found in the study by Yanpar, Çocuk, Yavuz, Konokman, (2015). As a result of their study, they stated that some of the prospective teachers' metaphors about the use of instructional technologies were collected under the guidance category. Korkmaz and Unsal's (2016) study determined the metaphorical opinions of pre-school teachers about the concept of technology. They conclude that pre-school teachers metaphorically explain their use of technology in the "advanced" category and explain that technology is an element that contributes to the continuous development of the individual. The results from metaphors reveal that the self-confidence levels about TPACK amongst prospective teachers increased at the end of the process.

In the current study, prospective Social Studies teachers were asked to indicate on the BLOB tree about how they saw themselves using instructional technologies. The prospective teachers were asked to explain the reason of their choice. According to the results of the BLOB tree self-assessment, the majority of prospective teachers stated that they saw themselves on the lower part of the tree before the implementation process. After the implementation process, the majority of prospective teachers stated that they saw themselves on the upper part of the tree. When the BLOB tree self -assessments and their explanations were examined, it was determined that the prospective teachers had low levels of self-confidence in using instructional technologies before the implementation process. After the implementation process, it was revealed that the prospective teachers' levels of self-confidence about TPACK increased considerably. However, the most remarkable result is that some prospective teachers saw themselves in the middle of the tree both before and after the implementation process. Some of the prospective teachers considered the pre-experimental knowledge about technology as sufficient in their use of these tools. Tally (2007) stated that teachers who use technology more intensively in their daily lives (such as virtual shopping, internet banking) are often more resistant to the use of technology during lessons.

As a result of the research, it was determined that the levels of self-confidence about TPACK amongst prospective teachers increased positively after the implementation process. Both quantitative and qualitative data in the research supported this result.

Suggestions

Based on research results from the current study, the following suggestions are made:

- Educators should create learning environments where prospective teachers can more frequently use instructional technology tools.
- Educators should design digital materials and activities that prospective teachers can actively use.
- The using of instructional technology tools should not be compressed into one or more courses; and use of these tools should be extended to all courses. Course content should be prepared in accordance with the use of instructional technology tools.
- Educators (including academics) who do not have sufficient knowledge and skills in using instructional technologies should be trained in this area and they

should be encouraged to apply their learning and integrate technology into their courses. Thus, prospective teachers will have the opportunity to encounter more opportunities to encounter and use instructional technologies.

- The technological physical infrastructure of Education faculties should be arranged in accordance with the use of prospective teachers.

In this research, the self-confidence of prospective teachers was examined by using ten instructional technology tools. It is suggested that in the future, researchers carry out similar studies on the attitudes, levels of academic achievement or perception of competence amongst teachers 'or prospective teachers' about the use of different instructional technology tools.

References

Akman, Ö. (2014). Analysis of Technological, Pedagogical and Content Knowledge Self-Efficacy Perception Levels of Social Science Teachers and Pre-Service Teachers with Different Variables, Unpublished Doctoral Dissertation. Necmettin Erbakan University, Konya.

Aksin, A. (2014). Competencies of Technological Pedagogical and Content Knowledge (TPACK) of Social Studies Teachers: A Case Study of Amasya Province, Unpublished Doctoral Dissertation. Atatürk University, Erzurum.

Azuma, R. T. (1997). A Survey of Augmented Reality. *Teleoperators and Virtual Environments 6*(4). pp. 355-385.

Bal, M. S. & Kandemir, N. (2013). Determining Social Science Teachers' Self-Assessment Levels with Regard to Their Technological Pedagogical Content Knowledge (TPCK), *Pamukkale University Journal of Education, 34,* pp.15-32.

Black, J., Downes, K., Field, F., Mozdzanowska, A. & Steel, K. (2006, June). The Metaphors of Emerging Technologies: Unpacking the Disconnects between the "What" and the "How" in the World of "Online Shopping". *9th International Conference on Technology Policy and Innovation, Santorini,* Greece.

Churchill, D. (2011). Web 2.0 in Education: A Study of The Explorative Use of Blogs with a Postgraduate Class. *Innovations in Education & Teaching International, 48*(2), 149–158. https://doi.org/10.1080/14703297.2011.564009.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences.* 2. Edition. New York: Lawrence Erlbaum Associates.

Cresswell, J. W. (2009). Research Design Qualitative, Quantitative and Mixed Methods Approaches, Third edition, US: SAGE Publications.

Cresswell, J. W. (2019). *Introduction to Mixed Method Research.* Trn. Ed.: Mustafa Sözbilir. 2nd. Edition, Ankara: Pegem Akademi.

Çetin, O., Çalışkan, E. & Menzi, N. (2012). The Relationship between Technological Competencies and Attitudes of Pre-Service Teachers towards Technology. *Elementary Education Online, 11*(2), pp. 273–291.

Dohn, N. B., & Dohn, N. B. (2017). Integrating Facebook in Upper Secondary Biology Instruction: A Case Study of Students' Situational Interest and Participation in Learning Communication. *Research in Science Education, 47*(6), pp. 1305–1329.

Ehman, L. H. (2002). Why Haven't Secondary Social Studies Teachers Adopted Information Technologies? *The International Social Studies Forum, 2*(2), pp. 175–178.

Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher Beliefs and Technology Integration Practices: A Critical Relationship. *Computers and Education, 59*, pp. 423-435.

Gokdas, I., & Torun, F. (2017). Examining the Impact of Instructional Technology and Material Design Courses on Techno pedagogical Education Competency Acquisition According to Different Variables. *Educational Sciences: Theory & Practice, 17,* pp. 1733–1758. http://dx.doi.org/10.12738/estp.2017.5.0322

Graham, C. R. (2011). Theoretical Considerations for Understanding Technological Pedagogical Content Knowledge (TPACK). *Computers & Education*, *57*, pp. 1953–1960.

Graham, C. R., Burgoyne, N., Cantrell, P., Smith, L., St. Clair, L., & Harris, R. (2009). TPACK Development in Science Teaching: Measuring the TPACK Confidence of Inservice Science Teachers, *TechTrends, Special Issue on TPACK, 53*(5), pp. 70-79.

Hart, C. (2010). Critical Discourse Analysis and Cognitive Science: New Perspectives on Immigration Discourse. Hertfordshire, UK: Palgrave Macmillan.

Hicks, D., Lee, J., Berson, M., Bolick, C., & Diem, R. (2014). Guidelines for Using Technology to Prepare Social Studies Teachers. *Contemporary Issues in Technology and Teacher Education*, *14*(4), pp. 433-450.

Kim, C., Kim, M. K., Lee, C., Spector, J. M., & DeMeester, K. (2013). Teacher Beliefs and Technology Integration. *Teaching and Teacher Education, 29*, pp. 76-85.

Koehler, M.J., Mishra, P., Kereluik, K., Shin T. S. & Graham, C. R. (2014). The Technological Pedagogical Content Knowledge Framework, *Handbook of Research on Educational Communications and Technology*, New York: Springer Science+Business Media.

Koehler, M. J., Mishra, P. M. & Cain, W. (2013). What is Technological Pedagogical Content Knowledge (TPACK)?. *Journal of Education. 193*(3), pp.13-19.

Koehler, M. J., & Mishra, P. (2009). What is Technological Pedagogical Content Knowledge? *Contemporary Issues in Technology and Teacher Education*, *9*(1), pp. 60-70.

Koehler, M. J., & Mishra, P. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record. 108* (6), pp. 1017-1054.

Koh, J. H. L. & Chai, C. S. (2016). Seven Design Frames That Teachers Use When Considering Technological Pedagogical Content Knowledge (TPACK). *Computers & Education, 102,* pp. 244-257.

Koh, J. H. L., Chai, C. S. & Lee, M. H. (2015). Technological Pedagogical Content Knowledge (TPACK) for Pedagogical Improvement: Editorial for Special Issue on TPACK. *Asia-Pacific Education Research, 24*(3), pp. 459–462.

Korkmaz, F., & Ünsal, S. (2016). An Investigation of Preschool Teachers' Perceptions on the Concept of "Technology. *Mustafa Kemal University Journal of Graduate School of Social Sciences, 13*(35), pp. 194-212.

Lissack, C. (1997). Mind Your Metaphors: Lessons from Complexity Science, *Long Range Planning, 30*(2), pp. 292-298.

Mason, C., Berson, M., Diem, R., Hicks, D., Lee, J., & Dralle, T. (2000). Guidelines for Using Technology to Prepare Social Studies Teachers. *Contemporary Issues in Technology Contemporary Issues in Technology and Teacher Education, 14*(4).

Martorella, P.H. (1997). Technology and the Social Studies – or: Which Way to the Sleeping Giant? *Theory and Research in Social Education*, *25*(4), pp. 511-514.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook*, Second Edition. Sage Publications.

Önal, N., (2018). Applications Supported by Technology That Can Be Used in Instruction, Ed.: Nezih Önal, *Applications in Education Enriched with Examples of Activities*, (in 2-13), Ankara: Pegem akademi.

Robson, C. (2015). *Scientific Research Methods Real World Research,* Trs. Ed.: Şakir Çankır and Nihan Demirkasımoğlu, Ankara: Anı Publication.

Rosenberg, J. M. & Koehler, M. J. (2015) Context and Technological Pedagogical Content Knowledge (TPACK): A Systematic Review, *Journal of Research on Technology in Education, 47*(3), pp. 186-210, DOI: 10.1080/15391523.2015.1052663

Russell, W. B., Waters, S. & Turner, T. N. (2014). *Essentials of Middle and Secondary Social Studies,* New york: Routledge.

Sancar-Tokmak, H. & Yanpar-Yelken, Tugba (2015) Effects of Creating Digital Stories on Foreign Language Education Pre-Service Teachers' TPACK Self-Confidence, *Educational Studies, 41*(4), pp. 444-461,

Sheffield, C. C. (2015). Struggling to Move Beyond Projection: A Case Study of Instructional Use of an Interactive White Board in Elementary Social Studies. *Contemporary Issues in Technology and Teacher Education*, *15*(4), pp. 541-567.

Shifflet, R. & Weilbacher, G. (2015). Teacher Beliefs and Their Influence on Technology Use: A Case Study. *Contemporary Issues in Technology and Teacher Education*, *15*(3), pp. 368-394.

Shulman, L. S. (1986). Those Who Understand: Knowledge Growth in Teaching. *Educational Researcher, Vol. 15,* No. 2, pp. 4-14.

Tally, B. (2007). Digital Technology and the End of Social Studies Education. *Theory and Research in Social Education. 35* (2), pp. 305-321.

Tanık Önal, N., (2018). Concept Map Tools Supported by Computer, Ed.: Nezih Önal, *Technology Applications in Education Enriched with Examples of Activities,* (in 44-65), Ankara: Pegem Akademi.

Tondeur, J., Pareja Roblin, N., Braak, J., van, Fisser, P., & Voogt, J. (2013). Technological Pedagogical Content Knowledge in Teacher Education: In Search of a New Curriculum. *Educational Studies, 39*(2), pp. 239–243.

Turgut, T., Aydın, F., Yigit, K. G. (2019). Technological Pedagogical Content Knowledge Competencies of Social Studies Teachers: The Case of the City of Karabuk, *International Online Journal of Educational Sciences, 11*(1), pp. 255-287.

Yanpar Yelken,T., Cocuk, H. E., Yavuz Konokman, G. & Pan, V. L. (2015) The Effect Of Digital Story Preparation On Technological Pedagogical Content Knowledge (TPCK) Self-Confidence, *The Anthropologist, 22*(2), pp. 185-195,

Yeh, Y., Hsu, Y., Wu, H. & Chien, S. (2017). Exploring the Structure of TPACK with Video-embedded and Discipline-focused Assessments. *Computers & Education, 104,* pp. 49-64.

Watson, G. (2006). Technology Professional Development: Long-Term Effects on Teacher Self-Efficacy. *Journal of Technology and Teacher Education, 14*(1), pp. 151-165.

What is CANVA?, retrieved at https://dijitalmaden.com/canva-nedir-nasil-kullanilir

What is a QR Code? (2019). *What is a QR Code?* Retrieved at https://www.the-qrcode-generator.com/whats-a-qr-code.

Wilson, P. & Long, I. (2018). *The big book of BLOBs,* Newyork: Routledge Publishing.

Wilson, P. & Long, I. (2015). *BLOB School,* Newyork: Speechmark Publishing Ltd.

Biographical Statements

Fatma TORUN is a Dr. Lecturer of Social Studies Education at Adıyaman University, Turkey. She received her bachelor's (2008) and master's (2011) degrees in social studies education from Adıyaman University. And she also completed her Ph.D. (2015) in social studies education from Gazi University by determining students' argument levels in argumentation-based social studies course and assessing the relationship between argumentation level and decision-making skills of secondary school students. Her current research interests include argumentation, decision making, social studies education, prospective teacher's education. Recently she is interested in teaching social studies with technology.