A Survey of Pre-Service Teachers' Perceived Technological Pedagogical Content Knowledge (TPACK)

Asena Tülay Canay

Submitted to the
Institute of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Master of Science
in
Information and Communication Technologies in Education

Eastern Mediterranean University
September 2018
Gazimağusa, North Cyprus

Approval of the Institute of Graduate Studies and Research

Assoc. Prof. Dr. Ali Hakan Ulusoy
Acting Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science in Information and Communication Technologies in Education.

Assoc. Prof. Dr. Ersun İşçioğlu
Chair, Department of Computer Education and Instructional Technologies

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Science in Information and Communication Technologies in Education.

Asst. Prof. Dr. İsmail Erkan Arkın
Supervisor

Examining Committee

1. Prof. Dr. Ülker Vancı Osam

2. Prof. Dr. Oğuz Serin

3. Asst. Prof. Dr. İsmail Erkan Arkın

ABSTRACT

This research set out to investigate a mixed group of pre-service teachers' perceived pre-course and post-course TPACK development in Faculty of Education in Eastern Mediterranean University located in Turkish Republic of Northern Cyprus, and find out about the pre-service teacher educators' views on TPACK. In this research, both qualitative and quantitative data were used. Quantitative data was collected at the beginning and at the end of the semester with a validated and reliable TPACK-SAS from 115 pre-service teachers taking the same material design and development course, BOTE218. Qualitative data was collected through interviews with eight pre-service teachers and four course instructors in order to support the results. The results revealed statistically significant differences in the participants' perceived Technological Knowledge (TK), Content Knowledge (CK) and Technological Pedagogical Knowledge (TPK) scores between the pre- and post-course surveys. However, no statistically significant difference was observed in the other four subdomains namely Pedagogical Knowledge (PK), Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK) and Technological Pedagogical and Content Knowledge (TPACK). The results suggest that although the designed course contributed to the development of pre-service teachers' general ICT knowledge and awareness of technology use for pedagogical purposes, more specific courses addressing a more comprehensive development of TPACK seem necessary for effective ICT integration into instruction.

Keywords: TPACK-SAS (Technological Pedagogical Content Knowledge Self-Assessment Survey), Technological Pedagogical Content Knowledge, pre-service

teacher education, technology integration, Information and Communication Technologies

ÖZ

Bu çalışma, Kuzey Kıbrıs Türk Cumhuriyeti'nde bulunan Doğu Akdeniz Üniversitesi, Eğitim Fakültesi'nde öğrenim görmekte olan öğretmen adaylarının ders öncesi ve sonrası edinilmiş Teknolojik Pedagojik Alan Bilgisi gelişimini ve dersi veren öğretim görevlilerinin Teknolojik Pedagojik Alan Bilgisi hakkında görüşlerini araştırmak amacıyla yürütülmüştür. Bu araştırmada, hem nicel hem de nitel veri kullanılmıştır. Nicel veri, BÖTE 218 materyal dizayn ve geliştirme dersini alan 115 hizmet öncesi adayından, 2017-2018 Bahar dönemi başında ve sonunda toplanmıştır. Nitel veri ise, nicel veri sonuçlarını desteklemek amacıyla, sekiz öğretmen adayı ve dört öğretim görevlisiyle yürütülen görüşmelerle toplanmıştır. Sonuçlar katılımcıların, dönem başı ve dönem sonu anket sonuçlarının arasında, Teknoloji Bilgisi (TB), Alan Bilgisi (AB) ve Teknolojik Pedagoji Bilgi (TPB) alt alanlarında istatistik olarak anlamlı farklılar olduğunu ortaya çıkarmıştır. Fakat diğer Pedagoji Bilgisi (PB), Teknolojik Alan Bilgisi (TAB), Pedagojik Alan Bilgisi (PAB) ve Teknolojik Pedagojik Alan Bilgisi (TPAB) dört alt alanda istatiksel olarak hiçbir anlamlı farklılık gözlenmemiştir. Sonuçlar, bu dersin, hizmet öncesi öğretmen adaylarına genel Bilgi ve İletişim Teknoloji gelişimi ve pedagojik amaçlı teknoloji farkındalığı bağlamında katkıda bulunmasına rağmen, daha kapsamlı TPAB gelişimine katkı sağlayan, özgül derslerin etkili bir BİT entegrasyonu için gerekli olduğunu ortaya koymuştur.

Anahtar Kelimeler: TPAB-ÖDÖ (Teknolojik Pedagojik Alan Bilgisi-Özdeğerlendirme Ölçeği), Teknolojik Pedagojik Alan Bilgisi, hizmet öncesi öğretmen adayı eğitimi, teknoloji entegrasyonu, Bilgi ve İletişim Teknolojileri

To my family… If you read this, and feel proud of me, you are a family regardless our bloodlines.

ACKNOWLEDGEMENT

I would like to record my gratitude to Asst. Prof. Dr. İsmail Erkan Arkın for his supervision, advice, support and constant encourangement from the very early stage of this thesis. He was truly an inspiration and a guide. His passions, experiences and ideas helped me widen my perspective and enriched my growth since I was a Bachelors student. I am honoured that he was my supervisor and I am indebted to him more than he knows.

I would also like to acknowledge the jury members Prof. Dr. Ülker Vancı Osam and Prof. Dr. Oğuz Serin for their advice and guidance. I am grateful that they spent their valuable time and effort. There are no possible ways to express how honoured I am.

Many thanks go to my friends, my other beloved lecturers and my family who helped me and encouraged me during the depressive times.

They all made me go on and reach my goal. I am thankful in every possible way. I would not have succeeded without their continuous love and faith in me.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CK	Content Knowledge
CS	Computer Science
ELT	English Language Teaching
ICT	Information and Communication Technologies
ICTE	Information and Communication Technologies in Education
ISTE	International Soceity for Technology in Education
MEB	Ministry of Education
NETS	National Educational Technology Standards
PCK	Pedagogical Content Knowledge
PK	Pedagogical Knowledge
SPSS	the Statistical Package for the Social Sciences
TCK	Techonological Content Knowledge
TELs	Technology Enhanced Lessons
TK	Technological Knowledge
TPACK	Technological Pedagogical Content Knowledge
TPACK-SAS	Technological Pedagogical Content Knowledge-Self Assesstment Survey
TPK	Technological Pedagogical Knowledge
YOK	the Council of Higher Education of Turkey

Chapter 1

INTRODUCTION

Technology is fast becoming a part of our daily lives thanks to its unparalleled advance since the start of the new millennium. Educational institutions have become aware of the emerging need for investing more in technology in schools considering the fact that students use technology in their daily lives. Within this new context, some teachers are able to adapt and feel comfortable with using technology in their classroom practices, while others still feel nervous about it. In fact, although technology is very much a part of everyday life, for many teachers it is "still an area that they need to learn" (Walker & White, 2013, p. 2).

The need for teachers to able to use technology effectively in order to help their students learn brings us to the issue of pre-service teacher education. Teachers of this new era of technology must have the necessary skills for effective technology use in the classrooms. Therefore, the education of prospective teachers must include focus on using technology for teaching and learning practices. Indeed, universities have started including technology courses as part of their pre-service teacher education programmes with the awareness that a teacher of this new age must have not only content and pedagogical knowledge, but also knowledge of technology enhanced teaching and learning methods and practices. Pre-service teacher education on the use of ICT is argued to have potential to influence teachers' future use of ICT in

instructional practices (Hammond, Fragkouli, Suandi, Crosson, Ingram, Johnston-Wilder, Johnston-Wilder, Kingston, Pope & Wray, 2009).

Teachers who want to use technology for and with their students must understand what it means to be competent in using technology for education. This is especially important in the context of teacher education and it is a particular concern for teacher educators to offer the right knowledge and skills set for pre-service teachers (Fisher, 2000; Thieman, 2008). This need for fostering and development of pre-service teachers' knowledge and abilities to integrate technology into teaching has led to the construction of a framework, known as TPACK (Baser, Kopcha & Ozden, 2016; Koehler & Mishra, 2005). As a result of their efforts for understanding what it means effective teaching with technology, Koehler and Mishra (2005) highlighted three major knowledge areas an effective teacher must have. These are:

- content knowledge (CK): knowledge about the subject matter to be taught;
- technology knowledge (TK): knowledge of technology tools used in everyday life and are available for education;
- pedagogical knowledge (PK): knowledge of strategies, procedures and methods for teaching.

In their approach to an effective framework for teacher education, the researchers have also emphasised "the connections and interactions between these three elements." (p. 133), coming up with new areas of intersection, namely

- pedagogical content knowledge (PCK),
- technological pedagogical knowledge (TPK), and
- technological content knowledge (TCK).

Finally, considering all the three elements of knowledge jointly, Koehler and Mishra (2005) constructed the idea of *technological pedagogical content knowledge* (TPCK; also known as TPACK), arguing that an effective technology integration into classroom teaching requires "understanding and negotiating the relationships between these three components of knowledge" (p. 134).

1.1 Problem Statement

Since the technology is everywhere, the fact that education is influenced by it is inevitable. The use of technology in education has a lot of advantages. For instance, recently developed software enables teachers to create a better learning environment, helps students develop a better attitude regarding the attention to the lesson or offers teachers unlimited creative ways for class activities, assignments or spread sheets (Bishop & Verleger, 2013). Accordingly, within all those advantages, the research on this field got very popular. After its introduction, TPACK has received a wide interest and soon researchers constructed surveys for assessing pre-service teachers' TPACK (Koehler, Shin & Mishra, 2012). The reason for TPACK surveys' popularity is that they offer "teacher educators a quick and cost-effective method for assessing knowledge and skills" of pre-service teachers and the results can be used in planning the aims and content of technology education as part of pre-service teacher education (Baser et al., 2016).

The Faculty of Education of Eastern Mediterranean University is the best place to conduct such a study since the quality of the students, its lecturers and their knowledge is priceless. Moreover, the mission of Eastern Mediterranean University is becoming a university acting in line with universal values, guided by internationally recognised

academic educational criteria, and the vision is to provide high quality education. (Eastern Mediterranean University, 2018)

This study was conducted at the Faculty of Education in Eastern Mediterranean University in Turkish Republic of Northern Cyprus. It was aimed to inspect pre-service teachers' perceived knowledge of TPACK, taking the same course called BOTE218 (CITE218), which is Instructional Technologies and Material design course provided by the Department of Computer Education and Instructional Technology to the students of all teaching programs in Eastern Mediterranean University. The research design included analysis of pre and post-course TPACK self-inventory survey results and interviews with students, as well as interviews with course lecturers. The results would provide the university feedback in an effort to contribute to the faculty's vision of quality teacher education.

1.2 Purpose of the Study

A review of the literature reveals that there has been a tremendous interest from the community of teacher educators in the TPACK framework since its popularization by Mishra and Koehler (Baser et al., 2016), as it offers a structured way of conceptualizing and assessing teachers' knowledge and abilities to integrate technology into their instruction (Mishra & Koehler, 2006). Baser et al. (2016) argue that this is especially necessary in the context of teacher education because with such a rapid increase of technology in today's educational contexts, there is a need for a framework like TPACK to support teachers' ICT development.

As has already been mentioned, one of the most popular forms of assessing preservice teachers' TPACK is with surveys, for an effective TPACK survey can provide a good

mechanism for measuring and assessing level of teachers' TPACK (Koehler, Shin & Mishra, 2012); it could also help improve effectiveness of teacher educators in their training of teachers' ICT skills (Baser et al., 2016).

In the light of the above arguments, this research aims to find out the TPACK of pre-service teachers studying at the Education Faculty of Eastern Mediterranean University before and after they complete the educational technology courses they take as part of their educational programme and to examine how the course lecturers handle the needs of the complexity of integration of technology in the educational field.

1.3 Research Questions

In this research, it is intended to achieve to investigate the research questions below:

1. To what extent does an introductory educational technology course affect pre-service teachers' perception of their TPACK?
2. How do course instructors perceive TPACK as a concept/framework for designing and evaluating their course content?

1.4 Significance of the Study

Within the developments in the educational field and the integration of the technology into the classrooms in the world, Ministry of Education (MEB) in Turkey had also a vision about Information and Communication Technologies in Education (ICTE). In the strategy plan of MEB, 2010-2014, it is clearly emphasised that ICT should be integrated into the instructional system and developments in the system should be benefitted. Moreover, the improvements should be followed up and developed regularly so that student-centred and project based learning by using technology can be provided to the students. Cuban (2000) and Wachira and Keengwe (2011) stated that there is a need for a policy to integrate technology beneficially. The barriers due

to absence of teacher training (Anthony & Clark, 2011) and deficiency of teachers' familiarity (Becker & Riel, 2010) and teachers' lack of information about the effective usage of technology and instructional technological tools (Wachira & Keengwe, 2011) cannot be overcome without educating pre-service teachers. It is, without a doubt, responsibility of the educational departments in terms of training pre-service teachers respectfully as well-developed 21st century teachers knowing how to integrate technology into their classes and to be self-confident and creative using interactive white boards, tablets and other software and applications in their classes. Despite all the progress done in this area all over the world, such a study for a mixed group of pre-service teachers from different departments and their perceived knowledge regarding their technological pedagogical content knowledge was not conducted in North Cyprus. In this regard, this research is hoped to contribute to the relevant literature on the use of I.C.T. in Pre-service Teacher Education

1.5 Limitation

The amount of data collected was limited only to pre-service teachers taking the course called BOTE218 in the Faculty of Education at Eastern Mediterranean University in 2017-2018 Spring semester. Besides, the data for this research was collected by self-assessment survey of TPACK. As a result, the findings from this research might not be interpreted for a wider generalisation for pre-service teacher education.

Chapter 2

LITERATURE REVIEW

2.1 Information and Communication Technologies (ICT) in Teacher Education

It is significant for the educational institutes to train teachers qualified to serve the needs of students to be able to teach them effectively; especially in the 21st century since the students anymore are techno-natives and their needs are different depending on that. Jadhav (2011) stated that "The quality of education depends upon the quality of teachers, which in turn depends upon the quality of teacher education" (p.64). Goel and Gupta (2013) supported this by pointing out "there is a need to facilitate training on ICTs for teacher both at the preservice level and in service level" (p.199). This also shows the importance of enabling pre-service teachers' technological self-development. According to Dhingra and Rahman (2014), "The revolution of ICT is a major challenge for teachers' professional development" (p.2). The reason for that is the fact that they are not only supposed to use technological tools to grab the attention of the students but also expected to use them with the correct pedagogical expertise (Loveless, Burton & Turvey, 2006). According to Goel and Gupta (2013) the main aim of pre-service teacher training is to develop techno-pedagogues rather than preparing technocrats. The teachers should be able to integrate technology into teaching. Moreover, they should be self-developed in terms of making use of technology, exploring, creating, etc. According to Mishra and Koehler (2006), instead of limited technology programs in teacher education, the approaches supporting

technological knowledge, content knowledge and pedagogical content knowledge are suggested. According to Canbazoglu Bilici, Yamak and Kavak (2012), the courses on instructional technologies and material developments and special teaching methods I and II are insufficient regarding the duration and content of the courses for pre-service teachers. Uluyol (2013) supported this by mentioning within the investigation of course content of pre-service teachers, it is found out that the needs of pre-service teachers in terms of instructional technologies are ignored.

2.2 What is TPACK?

The term TPCK, also known as TPACK (Technological Pedagogical Content Knowledge), which is a framework about the teachers' knowledge base regarding technology and how to use it effectively in the classroom, was first introduced by Koehler and Mishra in 2005. It can also be said that TPACK is the extended and expanded version of Shulman's idea of Pedagogical Content Knowledge (1986, as cited in Koehler & Mishra, 2005), which claimed that the content knowledge of the teachers and their pedagogical level should be treated equally exclusive and they need to be trained regarding this matter. In other words, TPACK is a term used increasingly to describe what teachers need to know to effectively integrate technology into their teaching practices (Schmidt, Baran, Thompson, Mishra, Koehler & Shin, 2009).

There are seven components of TPACK in Koehler and Mishra's (2005) work. Three of them are the primary forms of knowledge: Content Knowledge (CK), Pedagogical Knowledge (PK) and Technological Knowledge (TK). Nevertheless, those three primary forms are not enough to create the best teaching/learning environment on their own. Therefore, there are also three intersections of the combinations of those; Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK)

and Technological Pedagogical Knowledge (TPK). They altogether form one intersection which is called “TPACK”.

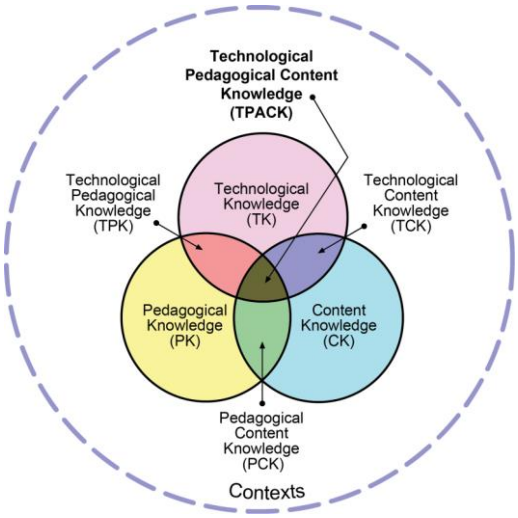

Figure 1: TPACK Framework and Its Knowledge Components (Koehler & Mishra, 2009)

As is observed in Figure 1, Koehler and Mishra (2009) argue that the relation among those components should be in a transactional and dynamic relationship since each teaching environment is unique. Definitions of each individual unit, as well as the intersections, are given below.

- CK: It is the knowledge of the teachers on subject matter. Schmidt et al. (2009) emphasize that teachers must know about the content they are going to teach and that the nature of knowledge is different for various content areas. For instance, depending on the specific subject matter, the terms, applications, formulas and theories may differ in each subject area. Koehler, Mishra and Cain (2013) give the example of the fact that the content to be covered in middle school science or history is different from the content to be covered in an undergraduate course in art appreciation or a graduate seminar in astrophysics.

- PK: It is the knowledge of the teachers regarding the teaching methods, theories, classroom management skills or analysing students' needs and ways of learning, which has a direct contact with aims and objectives of the lesson. Koehler et al. (2013) said that this generic form of knowledge applies to understanding how students learn, as well as to general management skills, lesson planning and assessing students. Within pedagogical knowledge, the teachers are supposed to know all the theories and approaches regarding cognitive and interactive development of the learners.
- TK: It is the knowledge on any technological tools, resources and applications.
- TCK: In order to be able to teach any subject or subtopic, knowing what kind of technological tools or resources to use has a great deal of importance since there are specific ways of teaching any topic.
- TPK: It is the direct relationship between the instructional, technological tools and their constraints, and the ambience of the classroom regarding the students, aims and objectives of the lesson and classroom itself.
- PCK: It is the combination of the way of teaching in the classroom and subject matter knowledge, using and changing different teaching tools in order to enhance learning and teaching in the classroom (Koh , Chai & Tsai, 2013).
- TPACK: This component focuses on teachers' knowledge and use of technology, content and pedagogy interactively, that is, meaningful uses of technology to support instructional practices. Koehler and Mishra (2009) state that TPACK is

> …different from knowledge of all three concepts individually. Instead, TPACK is the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how

> technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old one.

According to the definition of TPACK above, a teacher is not obligated to be good at only her content, the method she uses and the instructional tools. There are also intersections, therefore, special solutions for specific problems during the integration of technology into the classroom. The components of TPACK should be specialized independently and combined. Koehler and Mishra (2008) supported this by saying "The TPACK framework suggests that content, pedagogy and technology have roles to play individually and together. Teaching successfully with technology requires continually creating, maintaining, and re-establishing a dynamic equilibrium between each component" (p.10). It is also stated by them that teaching with technology is a wicked problem (Koehler & Mishra, 2008). Therefore, it is essential to train teachers who can not only deal with the technology but also integrate it to their subject areas with a correct pedagogical method for each and every classroom since they are all unique.

2.3 Previous studies on TPACK

Since it was first introduced, TPACK has been very popular among the researchers and teachers in the world because it claims that content on its own cannot be efficient enough to teach the subject; the way of using the technology and regarding the pedagogical needs in the classroom should be taken into consideration critically. Researchers all over the world have taken TPACK into consideration on different manners and fields after Shulman's (1986) expression about the necessity of the combination of content knowledge and pedagogical knowledge of the teachers. Shulman (1986) basically supported the interaction between those areas and

encouraged the blend of CK and PK in terms of creating a better teaching environment. Jang and Tsai (2013) also supported this idea in their research by saying "Before teachers are able to integrate technology, they must prioritize their development of pedagogical content knowledge from their teaching experiences" (p.568). After Mishra and Koehler (2006, 2009) went further on Shulman's (1986) expression, a number of researchers studied on TPACK considering it in different points of views. Some of them investigated TPACK scales and developed new ones or improved the previous ones (Baser et al,. 2016; Bostancıoğlu & Handley, 2018; Schmidt et al., 2009), some of them focused on measuring pre-service teachers' pre and post survey results using either qualitative or quantitative or mixed methods (Erdogan, 2017; Niess, Ronau, Shafer Driskell, Harper, Johnston, Browning, Özgün-Koca & Kersaint, 2009) and some other researchers concentrated on working with the teachers and their TPACK in the real classrooms (Polly, 2011; Jang & Tsai,2013; Wah, 2018).

2.4 Turkish Context

Even though TPACK has gained a lot of attention all around the world since it was first introduced, it can be seen that the number of research studies done in the Turkish context is not even close to the conducted ones especially in Europe. When the database of the Council of Higher Education of Turkey (YOK) is searched, 29 PhD studies and 78 Master studies have been found. Most of the research was done on the subjects such as Mathematics Teacher Education (22), Science Teacher Education (30) and Social Sciences Teacher Education (6) from 2009 to 2018.

YOK stated that "In our country, the courses for "Instructional Technology and Material Design" in the curriculum of Pre-service teachers' education aim to inform the pre-service teachers about the instructional technology, material and instructional

design.” (The Council of Higher Education of Turkey, 2007) However, it is clearly seen that the curriculum itself is not sufficient enough when pre-service teachers’ improvement throughout and after the course is checked. International Society for Technology in Education (ISTE) is a community supporting the power of technology in the classroom and created National Educational Technology Standards (NETS) for students, educators, education leaders, coaches and Computer Science (CS) educators. According to ISTE NETS for educators, there are seven standards in the Figure 2 below.

Figure 2: ISTE Standards for Educators

The indicators of each standard as it follows below;

1. Learner

1a: Set professional learning goals to explore and apply pedagogical approaches made possible by technology and reflect on their effectiveness.

1b: Pursue professional interests by creating and actively participating in local and global learning networks.

1c: Stay current with research that supports improved student learning outcomes, including findings from the learning sciences.

2. Leader

   2a: Shape, advance and accelerate a shared vision for empowered learning with technology by engaging with education stakeholders.

   2b: Advocate for equitable access to educational technology, digital content and learning opportunities to meet the diverse needs of all students.

   2c: Model for colleagues the identification, exploration, evaluation, curation and adoption of new digital resources and tools for learning.

3. Citizen

   3a: Create experiences for learners to make positive, socially responsible contributions and exhibit empathetic behaviour online that build relationships and community.

   3b: Establish a learning culture that promotes curiosity and critical examination of online resources and fosters digital literacy and media fluency.

   3c: Mentor students in safe, legal and ethical practices with digital tools and the protection of intellectual rights and property.

   3d: Model and promote management of personal data and digital identity and protect student data privacy.

4. Collaborator

   4a: Dedicate planning time to collaborate with colleagues to create authentic learning experiences that leverage technology.

   4b: Collaborate and co-learn with students to discover and use new digital resources and diagnose and troubleshoot technology issues.

4c: Use collaborative tools to expand students' authentic, real-world learning experiences by engaging virtually with experts, teams and students, locally and globally.

4d: Demonstrate cultural competency when communicating with students, parents and colleagues and interact with them as co-collaborators in student learning.

5. Designer

5a: Use technology to create, adapt and personalize learning experiences that foster independent learning and accommodate learner differences and needs.

5b: Design authentic learning activities that align with content area standards and use digital tools and resources to maximize active, deep learning.

5c: Explore and apply instructional design principles to create innovative digital learning environments that engage and support learning.

6. Facilitator

6a: Foster a culture where students take ownership of their learning goals and outcomes in both independent and group settings.

6b: Manage the use of technology and student learning strategies in digital platforms, virtual environments, hands-on makerspaces or in the field.

6c: Create learning opportunities that challenge students to use a design process and computational thinking to innovate and solve problems.

6d: Model and nurture creativity and creative expression to communicate ideas, knowledge or connections.

7. Analyst

7a: Provide alternative ways for students to demonstrate competency and reflect on their learning using technology.

7b: Use technology to design and implement a variety of formative and summative assessments that accommodate learner needs, provide timely feedback to students and inform instruction.

7c: Use assessment data to guide progress and communicate with students, parents and education stakeholders to build student self-direction. (Retrieved from https://www.iste.org/standards/for-educators)

As the indicators of the standards are observed, it can be clearly seen that each and every standard, except for Standard 3, serves TPACK and encourages the usage of technology in the classroom and widening the creativity, self-confidence, self-awareness and development of educators of the new era.

Moreover, compared to a more balanced distribution of qualitative and quantitative studies in the European context, the research carried out in the Turkish context has been largely quantitative (Baran & Bilici, 2015). Therefore, the analyses and synthesis of the qualitative data are ignored within its benefits for the research quality in Social Studies. Most of the data was collected by questionnaires and surveys due to their applicability. However, those could not satisfy the needs of the field. For example; Chai, Koh and Tsai (2013) stated that qualitative data collection and applied studies are more frequently used. Additionally, according to Abbitt (2011) it is necessary to use both qualitative and quantitative data collection tools and to conduct more studies on improvements of Pre-service teachers from different departments. Baran and Bilici (2015) pointed out that those suggestions should be taken into consideration in the studies conducted in Turkey.

Chapter 3

METHODOLOGY

3.1 Research Design

This research study utilized a mixed method research design, the rationale behind and details of which are explained in detailed in the other parts of the chapter. Using both qualitative method and quantitative method at the same time in a study is called a mixed methods design. Both positive and negative effects of merely qualitative or quantitative research exist. Therefore, the combination of two help the researcher overcome those weaknesses and strengthen the outcomes of the research (Schoonenboom & Johnson, 2017). According to Johnson and Onwuegbuzie (2004), using mix data collection technique enables the researcher to minimize the weaknesses and maximize the strengths to get better answers.

According to Creswell and Clark (2007), there are four major mixed methods designs. There are also some important factors such as timing, key points, aims and expected outcomes to be considered while choosing the most suitable design Those designs are as follows;

1. Sequential Explanatory Design: First quantitative data collection and analysis is done; then, it is trailed by qualitative data collection and analysis.

2. Sequential Exploratory Design: First qualitative data collection and analysis is done; then, it is trailed by quantitative data collection and analysis.
3. Triangulation Design: Both quantitative and qualitative data collection and analysis are done together in order to reach an outcome.
4. Embedded Design: Quantitative and qualitative data are collected and analysed at the same time within a quantitative design.

Bishop and Holmes (2013) illustrated those method designs on Figure 3.

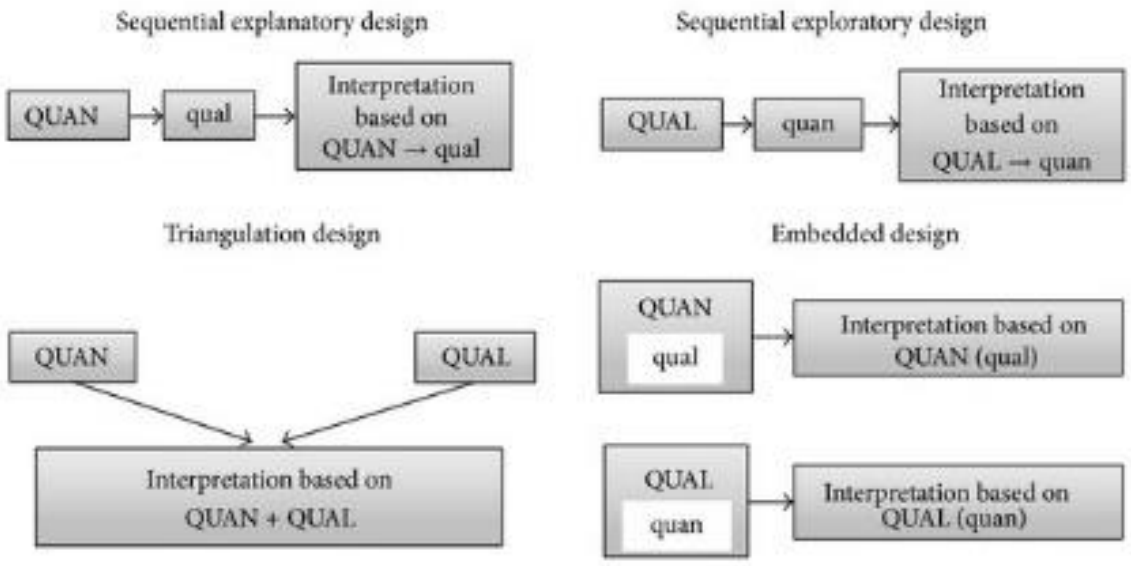

Figure 3: Bishop and Holmes' (2013) Illustration of Creswell and Clark's (2007) Research Method Designs

In this study, both qualitative and quantitative data were collected using "Embedded design". The details about the data collection regarding participants and data collection instruments are to be presented further.

3.2 Participants

In the selection of research participants, convenience sampling was used. Participants were all pre-service teachers, studying at the Faculty of Education in Eastern Mediterranean University and taking the same course coded BOTE218 in their 2nd year, from different fields such as Mathematics, Elementary and Pre-school, Turkish Language and Music. There were a total of 186 students who were targeted for the survey. One hundred and fifteen of them are chosen after comparing the pre and post surveys. The rest was not included in data analysis since they did not respond to either the pre- or the post-test. Details and statistics of the participants' demographic information are shown in Table 1 and 2 below. As can be seen in Table 1, most of the participants were female, young and studying in Pre-School Teacher Education. Moreover in Table 2, it can be seen that the sample was quite homogeneous in terms of access to and use of computers and Internet.

Table 1: Demographic Information about the Participants

		N (115)	Percentage
Gender	Male	25	21.7%
	Female	90	78.3%
Age	18-20	55	48.2%
	21-25	58	50.9%
	26-30	1	0.9%
	31+	0	0%
Departments	Turkish Language Teaching	17	14.8%
	Elementary School Teacher Education	20	17.4%
	Music Teaching	2	1.7%
	Pre-School Teacher Education	66	57.4%

	Elementary School Mathematics Teacher Education	10	8.7%

Table 2: Usage of Technological Tools

		N (115)	Percentage
Ownership of a PC	Yes	97	84.3%
	No	18	15.7%
Internet Access	Yes	111	96.5%
	No	4	3.5%
Hours spent on PC per week	Less than 1 hour	40	34.8%
	2-5 hours	51	44.3%
	6-10 hours	17	14.8%
	More than 11 hours	7	6.1%

3.3 Course Description

BOTE 218 is a compulsory course for the pre-service teachers in Eastern Mediterranean University. It has three credits consisting of two hours of lectures and two hours of laboratory work. The course was offered by four lecturers in four groups during the 2017-2018 Academic Year Spring Semester.

The description of the course is given as follows: concepts related to instructional technology, features of various instructional technologies, location and use in the teaching process, determination of the technology needs of the school or class, the planning and execution of technology planning, two and three dimensional materials development, development of teaching materials (worksheets, activity planning, overhead transparencies, slides, visual media (VCD, DVD) equipment, computer-based equipment), education, examination of the software, evaluation of instructional materials in various qualities, and the use of instructional technologies in Turkey and in the world.

The aim of the course was

- to develop the teaching techniques and material development of the students, to be carried out depending on the practical work.
- to investigate and evaluate the effects of design and application of developed teaching materials on teaching process.

The learning outcomes, based on the general aim, was to help students achieve the following benefits:

- recognizing and exemplifying the teaching technologies and materials used in the education and training process,
- describing the factors that influence the design process of instructional material.
- designing appropriate teaching materials aimed at the intended purpose.
- evaluating the effectiveness of the designed teaching material.

The course was conducted for 11 weeks except for the exam and presentation weeks. A Turkish course book by Yalin (2006) was used with some more additional reading resources. It is important to stress that this course is the only course that the pre-service teachers take during their Bachelor's education. There is no additional technological material design course specifically designed for their field, except for the English Language Teaching program, which offers an additional technology in ELT course after the students take the initial BOTE course, called CITE 336. Further details about the original version of course outline, which is Turkish, can be found in Appendix F

3.4 Data Collection Tools and Procedure

The TPACK-SAS (self-assessment scale) which was developed by Kartal, Kartal and Uluay (2016) was used in this study as a quantitative data collection instrument. Semi-structured interviews with randomly selected eight students and four course lecturers were conducted as a qualitative data collection instrument.

3.4.1 Quantitative Data Collection Tool

A Turkish version of the TPACK-SAS scale was used in this study, which was developed by Kartal et al. (2016) using DeVellis' (2003) eight-step scale development framework. Analysis of this scale by the researchers revealed that it can be used as a valid and reliable tool for data collection after observing evidence with the following details. After gaining confirmation of appropriateness for factor analysis with the results of Kaiser-Meyer-Olkin (KMO) test (.972) and Bartlet's test of spherity (BTS) values (46057,977; df= 2211; p<.001), the internal consistency reliability coefficients (Cronbach's alphas) were calculated within each construct and all were found to be satisfactory (with values above .70, which is regarded as acceptable in the literature): PK (.96), TK (.93), CK (.92), TCK (.96), TPK (.93), PCK (.94), TPACK (.92). Kartal et al. (2016) carried out the research with 754 participants who were in their third and fourth year in the Pre-service teacher program from different departments in a university in Turkey. The reason why the participants were not in their first and second years was explained by the researchers as;

> The participants are juniors and seniors in a teacher education program. In the teacher preparation programs in Turkey, the participants are equipped with more proficiency about teaching profession. It is more likely for juniors and seniors to distinguish subdomains than freshmen and sophomores. Also in the last two years, the participants take technology courses related with both using different technologies and using them in their content areas. (Kartal et al., 2016)

According to the researchers, experienced pre-service teachers tend to be more capable of differentiating subdomains of TPACK since they take courses related the technological tools, methods and techniques of using them in the classroom,which increases awareness of their particular subject area.

The TPACK-SAS survey uses a 7- point Likert-scale and contains 67 items. Options on the 7-point scale are; "1=Strongly Disagree, 2=Disagree, 3=Somewhat Disagree, 4=Neither Agree nor Disagree, 5= Somewhat Agree, 6=Agree, 7= Strongly Agree"

There are seven subdomains in the TPACK-SAS survey in table 3, each of which contains the following number of items:

Table 3: Subdomains of TPACK-SAS survey

Subdomain	Number of items
PK	15
TK	11
CK	8
TCK	5
TPK	10
PCK	11
TPACK	7

The complete TPACK-SAS survey is given in Appendix A with the permission of the researchers who developed it. Some of the items in the survey are:

- I think I can teach using a great variety of effective teaching approaches (e.g. constructivist, multiple intelligence) to guide student learning. (PK)
- I think I have enough knowledge about different technologies (e.g. computers, interactive whiteboard, tablet.) (TK)

- I think I follow contemporary resources (e.g. books, journals..) and activities in my content area. (CK)
- I think I can use technology to help abstract concepts to be learned. (TCK)
- I think I know how to integrate technology to teaching and learning. (TPK)
- I think I can develop and use different representations (e.g. visual, audial..) related with my content area. (PCK)
- I think I can use technology in determining the reasons of student difficulties when learning specific conceptions. (Kartal et al., 2016)

3.4.2 Qualitative Data Collection Tool

According to Merriam (2009), a person-to-person interaction between the participants and the researcher is called as "interview". There are three sorts of interviewing structures in the literature. These are unstructured, semi-structured and highly structured (Merriam, 2009). In this study, the researcher used semi-structured interviews. In those kind of interviews, the questions do not have to be in an order, or additional questions may be asked by the interviewer, which definitely broadens the perspective or brings up new ideas. The main aim of the interviews were follow-up the questionnaires In Appendix B, six questions which were used in the interviews with the students can be found. The interviewees are named as Student1, Student2, Student3, Student4, Student5, Student6, Student7 and Student 8. Interviews were analysed as qualitative data since it is the most commonly used technique (Creswell, 2012; Merriam, 2009).

In addition to interviews with the students, interviews with four course lecturers were also conducted by the researcher. The interviewees are named as Lecturer 1, Lecturer

2, Lecturer 3 and Lecturer 4. In Appendix C, the interview questions for the instructors of the course can be found.

3.4.3. Data Collection Procedure

For quantitative data, pre-surveys were distributed to approximately 190 students and collected by the researcher at the beginning of March, 2018 during a course hour with the permission of the course lecturers. Post-surveys were also distributed to 150 students and collected by the researchers at the beginning of June, 2018 during a course hour with the permission of the course lecturers.

For qualitative data, at the end of the course in June, 2018, interviews were conducted with eight randomly selected pre-service teachers taking the course. After their class hour, they were invited to an empty classroom. They were asked six questions about their pre and post opinions on technology and its usage in education, the benefits of the course, the information they gained from the course particularly about their profession, the comfort zone of themselves regarding using and integrating technology, their possible improvements. All the interviews were audio recorded and was later transcribed by the researcher for analysis. The names are kept anonymous. The transcripts can be seen in Appendix D.

In addition to interviews with the students, interviews with four course lecturers were conducted in their offices at a time which is suitable for them. They were visited in their offices and asked seven questions about the process of planning the course, the problems or obstacles they came across, precautions they took to avoid the problems, the feedback they got from the students and the usage of those feedback, and the extent of their knowledge on the use of TPACK scales for assessing student teachers'

knowledge and skills regarding use of educational technologies. The names are kept anonymous. The transciprs can be found in Appendix E.

3.5 Analysis of the Data

For the analysis of the quantitative data, the Statistical Package for the Social Sciences (SPSS, version 18) was used. First, cronbach's alpha tests were run for each subscale of the survey to observe the level of internal consistency for each. Similar to what the developers of the original scale (Kartal, et al., 2016) have argued, a high level of internal consistency was observed for each sub-scale both in the pre- and post-course survey responses, confirming the survey is a reliable tool to use considering the internal consistency of its items grouped under each sub-scale (for the pre-course survey, the alpha scores for each sub-scale was as follows: PK (.93), TK (.90), CK (.93), TCK (.87), TPK (.91), PCK (.94), TPACK (.92); and for the post-course survey: PK (.96), TK (.94), CK (.95), TCK (.93), TPK (.95), PCK (.95), TPACK (.90)). Second, a Kolmogorov-Smirnov test was run as a test of normality, which helped the researcher to find out if parametric or non-parametric analysis should be chosen for data analysis. Even though the number of the participants were 115, the Kolmogorov Smirnov test of normality showed that the distribution of values was not normal, with significance scores smaller than 0.05 for each item. Thus, a non-parametric test, Wilcoxon Signed-Rank, was used instead of a parametric independent samples t-test for analysis of the quantitative data gathered from the pre- and post-test surveys.

As for the qualitative data, the transcriptions of the audio-recorded interviews, which can be found in Appendix D and Appendix E, were read carefully. Afterwards, they were sorted and categorized according to the interview questions asked and a closer reading was carried out again to find any emerging codes and themes out of each

category (Merriam, 2009). The interviews with the pre-service teachers and course lecturers were used to triangulate the findings of the quantitative data, following the same anaylsis pattern as it was done for the student interviews.

Chapter 4

DATA ANALYSIS

In this chapter, the analysis of the data is presented. The findings are presented addressing the research questions, with sub-headings where specific quantitative and/or qualitative findings are provided.

4.1 Analysis and Findings related to the First Research Question

A Wilcoxon Signed-Rank test was run to compare the mean scores of the responses given to pre- and post-course TPACK-SAS survey. Also, the same test was run for a comparison of each of the seven sub-scales and for all the items in each sub-scale.

Table 4: The Difference between Pre and Post Scores in Total Scores of TPACK Survey Analysed by Wilcoxon Signed Ranks Test

		N	**M (SD)**	**Min**	**Max**	**Median**
TOTAL	**Pre**	115	365.21 (48.409)	202	469	367*
	Post	115	375.30 (50.779)	121	469	377*
*TPACK survey: 67 items x 7 scale = 469						

Table 5: The Difference between Pre and Post Test Scores in...

	N	**M**	**∑**	***Z***	***p***
Negative Ranks	38	55.95	2126		
Positive Ranks	76	58.28	4429	-3.256	.001
Ties	1				
Total	115				

In Table 5, it can be seen that seventy-six of the participants scored higher in the post-course survey, while thirty-eight of them scored lower. There was only one participant whose pre- and post-survey scores were equal. Overall, according to the findings in

tables 4 and 5, the mean difference between the pre and post survey scores was statistically significant (Z= -3.256, p< .05), indicating that the course might have a positive effect on the participants' perception of their overall TPACK. The suggestion for non parametric test analysis to look at medians rather than mean scores. There seems to be an improvement between pre and post scores.

A further investigation into the subscales of TPACK-SAS, which is presented in Table 6 below, revealed more details about the findings.

Table 6: The Difference between Pre and Post Scores of Subscales of TPACK

		N	M(SD)	*Z*	*p*	*r*
PK	**Pre**	115	85.75 (12.821)	-0.592	.554	.03904
	Post	115	86.62 (12.486)			
TK	**Pre**	115	54.94 (12.024)	-3.439	.001**	.22676
	Post	115	58.47 (11.996)			
CK	**Pre**	115	39.16 (9.833)	-4.636	.000***	.30569
	Post	115	43.39 (8.705)			
TCK	**Pre**	115	27.69 (5.058)	-1.351	.177	.08915
	Post	115	27.90 (5.338)			
TPK	**Pre**	115	55.90 (8.506)	-2.277	.023*	.15014
	Post	115	56.78 (8.783)			
PCK	**Pre**	115	62.93 (9.509)	-0.437	.662	.02881
	Post	115	62.62 (9.223)			
TPACK	**Pre**	115	38.84 (6.801)	-1.103	.270	.07273
	Post	115	39.52 (5.864)			

* <.05
** <.01
*** <.001

Although there is evidence for increase in total mean scores of the responses of the Pre-service teachers indicating a probable perceived development, when the subscales

of the survey is analysed in detail, a Wilcoxon Signed Rank Test revealed a statistically significant increase in the course participants' perceptions of three subscales out of seven only, which are; TK ($Z= -3.439$, $p <.05$), CK ($Z= -4.636$, $p<.01$) and TPK ($Z=-2.277$, $p<.05$).

Although varying degrees of statistical significance were observed in these three sub-scales (very highly significant for CK, highly significant for TK, and significant for TPK), an effect size measure was necessary to observe the size of possible effect of the course on the participants' perceptions. Therefore, a follow up effect size measure was calculated for each of these three components. The findings suggest that although there were statistically significant differences, the effect size of these seemingly positive perceived improvement was small for TK (.23) and TPK (.15) and only moderate for CK (.31) (.1= small; .3= moderate; .5=large) (Cohen, 1988).

In the following sections, discussion of the findings from each of the three components which had a statistically significant mean score difference will be presented. Then discussion of findings for the remaining four components which did not yield any statistically significant difference will be presented.

4.1.1 Technological Knowledge

An increase on TK was already expected since one of the objectives of the course is to improve pre-service teachers' abilities regarding recognizing and exemplifying the educational technologies. Table 7 presents the mean differences for each of the items in this component.

Table 7: Technological Knowledge: Pre and Post Course Survey Differences

				Wilcoxon Signed Rank Test	
Technological Knowledge	N	Mean (SD)	Median	Z	Sig (2-tailed)
16a	115	4.44 (1.723)	5		
16b	115	4.91 (1.565)	5	-2.996	.003*
17a	115	4.83 (1.616)	5		
17b	115	5.11 (1.468)	5	-1.797	.072
18a	115	4.35 (1.702)	5		
18b	115	4.98 (1.481)	5	-3.349	.001*
19a	115	4.92 (1.964)	6		
19b	115	5.39 (1.599)	6	-1.801	.072
20a	115	5.52 (1.402)	5		
20b	115	5.50 (1.173)	6	-0.183	.855
21a	115	5.43 (1.457)	6		
21b	115	2.60 (1.234)	6	-0.937	.349
22a	115	4.75 (1.595)	5		
22b	115	5.28 (1.386)	5.5	-3.287	.001*
23a	115	4.83 (1.602)	5		
23b	115	5.30 (1.304)	5	-3.445	.001*
24a	115	5.17 (1.512)	5		
24b	115	5.35 (1.351)	6	-1.406	.160
25a	115	5.22 (1.560)	6		
25b	115	5.43 (1.332)	6	-1.610	.107
26a	115	5.89 (1.260)	6		
26b	115	5.70 (1.256)	6	-1.012	.312

(16) I think I can solve technical problems (e.g. network connection, Windows system file error…) related with hardware.
(17) I think I can solve problem related with software (e.g. downloading proper adds-on, program loading…).
(18) I can help people around me solve their technical problems about computers.
(19) I think I do not have trouble in using technology.
(20) I think I have knowledge and skills required for using technology in daily life.
(21) I think I have enough knowledge about different technologies (e.g. computers, interactive whiteboard, tablet…).
(22) I think I have enough knowledge about main computer hardware (e.g CD-Rom, mainboard, RAM) and their functions.
(23) I think I have enough knowledge about main computer softwares (e.g Windows Media Player, Abode Reader, Foxit,…) and their features.
(24) I can use word processor program(s) (e.g Microsoft Word, LibreOffice, Apache OpenOffice, Calligra…).
(25) I can use spreadsheets (e.g Microsoft Excel…).
(26) I can communicate via internet tools such as e-mail, Skype, Hangouts etc.

When the items are measured independently in pairs, the results show that four out of eleven items' pre and post scores significance (2-tailed) is less than .05. Those items are directly about the basic software and hardware of the computer and regarding the fact that the students are techno-natives, most of them are expected to have the basic skills on I.C.T.

4.1.2 Content Knowledge

On the other hand, a perceived increase in the CK of the pre-service teachers with a very high significance was surprising since the course did not explicitly place emphasis on development of the content knowledge since pre-service teachers from different departments were taking the same course. Table 8 below gives the mean scores for pre- and post-course survey responses.

Table 8: Content Knowledge: Pre and Post Course Survey Differences

				Wilcoxon Signed Rank Test	
Content Knowledge	N	Mean (SD)	Median	Z	Sig (2-tailed)
27a	113	5.43 (1.224)	6		
27b	115	5.62 (1.268)	6	-1.856	.064
28a	113	4.55 (1.647)	5		
28b	114	5.22 (1.362)	5	-3.974	.000*
29a	113	4.96 (1.566)	5		
29b	115	5.50 (1.314)	6	-3.103	.002*
30a	114	5.05 (1.533)	5		
30b	114	5.51 (1.228)	6	-2.871	.004*
31a	114	4.68 (1.620)	5		
31b	114	5.31 (1.298)	6	-3.608	.000*
32a	115	4.84 (1.642)	5		
32b	115	5.44 (1.272)	6	-3.638	.000*
33a	115	5.00 (1.510)	5		
33b	115	5.49 (1.187)	6	-3.074	.002*
34a	115	4.98 (1.457)	5		
34b	115	5.45 (1.172)	6	-3.066	.002*

(27) I think I have enough knowledge in my content area.
(28) I think I am expert in my content area.
(29) I think I know topic I will teach extensively.
(30) I think I follow the current developments in my content area.
(31) I think I know famous people in my content area.

(32) I think I follow contemporary resources (e.g books, journals…) and activities in my content area.
(33) I think I have enough knowledge about outcomes in the curriculum.
(34) I think I know conceptions, rules, and generalizations in my content area.

As it is known, the course BOTE218 is given to a mixed group of pre-service teachers from different departments with different contents. However, when the items are independently inspected, the highest significance among all other areas was found out. Seven out of eight items of the subdomain had statistically significant improvement when compared to the pre-course survey scores.

The reason for that might be the precautions that the course lecturers might have taken while pairing pre-service teachers from the same or similar departments for course assignments and projects. In the interviews with the lecturers they stated that teaching this course to pre-service teachers from different departments is not easy and this is one of the obstacles they come across.

‘The point when we have difficulties is the fact that we have heterogeneous groups and while developing the group projects, pre-service teachers should prepare a material regarding the mutual curriculum and aims.’ (Lecturer 2)

‘We are trying to ensure that everybody prepares projects on their specific area in implementation parts of the course.’ (Lecturer 3)

As the findings from the items might imply, there might be a possible positive effect of such group work activities in terms of an improvement of awareness on the content knowledge of the subject areas of the student teachers.

4.1.3 Technological Pedagogical Knowledge

Lastly, the final component which showed a statistically significant improvement in the post-course survey scores was the TPK. Technological Pedagogical Knowledge subdomain is meant to see the improvements or changes on the methods that teachers use while also using technology in the classroom. The details can be found in Table 9 below.

Table 9: Technological Pedagogical Knowledge: Pre and Post Course Survey Differences

				Wilcoxon Signed Rank Test	
Technological Pedagogical Knowledge	N	Mean (SD)	Median	Z	Sig (2-tailed)
40a	115	5.60 (1.310)	6		
40b	115	5.83 (1.102)	6	-1.822	.068
41a	115	5.63 (1.058)	6		
41b	115	5.75 (1.069)	6	-1.513	.130
42a	115	5.66 (1.050)	6		
42b	115	5.65 (1.076)	6	-0.425	.671
43a	115	5.54 (1.082)	6		
43b	115	5.58 (1.100)	6	-0.929	.353
44a	115	5.54 (1.115)	6		
44b	115	5.65 (1.101)	6	-1.149	.251
45a	115	5.65 (1.132)	6		
45b	115	5.63 (1.004)	6	-0.269	.788
46a	115	5.60 (1.019)	6		
46b	115	5.67 (1.057)	6	-0.847	.397
47a	115	5.61 (.980)	6		
47b	115	5.67 (.975)	6	-0.755	.450
48a	115	5.63 (1.072)	6		
48b	115	5.74 (1.093)	6	-1.252	.211
49a	115	5.65 (1.124)	6		
49b	115	5.71 (1.024)	6	-0.377	.706

(40) I think I can design an online environment (e.g. blogs, Google groups, Facebook groups…) to develop students' knowledge and skills, using different teaching methods.
(41) I think I can guide students to interact with each other in an online environment.
(42) I think I know how technology affects teaching and learning.
(43) I think I know how to integrate technology to teaching and learning.
(44) I think I can use technology effectively to meet students' learning needs.
(45) I think I can decide which technology can be used to enhance learning.
(46) I think I know how to use specified technologies to enhance learning.
(47) I think I know how to use technology in different teaching activities.

(48) I think I can use computer applications that support learning.
(49) I think I can decide whether a new technology is appropriate or not for teaching and learning.

Although the subscale presented a statistically significant improvement in terms of differences in overall means score, the mean score differences in individual items were not statistically significant. The reason for that might be the fact that although the participants showed improvement in TK but this was not specifically reflected in combining that knowledge from a pedagogical perspective; which might be plausible considering the fact that the students were only in their second year of undergraduate study and have not yet fully started developing their pedagogic awareness and strategies.

Still, the overall significant difference in the TPK might be attributed to some evidence of learning from the course, in terms of incorporating technology into pedagogical practices. This interpretation seems to be supported with findings from the student interviews. In the interviews, it can be seen that pre-service teacher's awareness regarding addressing students' motivation and attention in the class, which is a pedagogical strategy, somewhat increased.

'Even in pre-school education, the teachers follow up a traditional teaching method, they do not include technology.' (Student 3)

'Without technology, the courses are more difficult and we cannot grab attention of the kids. However, when technology is used in the classroom, it is easier to grab attention and teach while having fun.' (Student 4)

‘With a specific application, we can create more colourful presentations with animations, which I think it will be more effective on kids.’ (Student 1)

Pre-service teachers were also aware of the fact that the mental, cognitive and physical development of the kids affect the way they teach.

‘We learnt how to technology appropriately for the kids and the characteristics of their growth.’ (Student 2)

The following are the four components of the TPACK-SAS scale which yield no statistically significant differences in the mean scores between the pre- and post-course survey responses.

4.1.4 Pedagogical Knowledge

Table 10: Pedagogical Knowledge: Pre and Post Course Survey Differences

				Wilcoxon Signed Rank Test	
Pedagogical Knowledge	N	Mean (SD)	Median	Z	Sig (2-tailed)
1a	115	5.48 (1.203)	6		
1b	115	5.57 (1.243)	6	-0.921	.357
2a	115	5.63 (1.199)	6		
2b	115	5.86 (1.016)	6	-1.964	.050
3a	115	5.74 (.987)	6		
3b	115	5.83 (1.034)	6	-1.021	.307
4a	115	5.82 (1.133)	6		
4b	115	5.75 (1.077)	6	-0.619	.536
5a	115	5.72 (1.120)	6		
5b	115	5.60 (1.122)	6	-0.829	.407
6a	115	5.75 (1.085)	6		
6b	115	5.75 (.999)	6	-0.164	.869
7a	115	5.89 (1.108)	6		
7b	115	5.90 (1.054)	6	-0.073	.941
8a	115	5.97 (1.127)	6		
8b	115	6.00 (1.026)	6	-0.395	.693
9a	115	5.70 (1.222)	6		
9b	115	5.79 (1.096)	6	-0.706	.480

10a	115	5.64 (1.234)	6		
10b	115	5.79 (1.017)	6	-1.041	.298
11a	115	5.70 (1.100)	6		
11b	115	5.67 (1.098)	6	-0.251	.802
12a	115	5.84 (1.141)	6		
12b	115	5.75 (1.035)	6	-0.836	.403
13a	115	5.95 (1.071)	6		
13b	115	5.90 (.986)	6	-0.483	.629
14a	115	5.73 (1.111)	6		
14b	115	5.80 (1.028)	6	-0.886	.375
15a	115	5.98 (1.009)	6		
15b	115	5.80 (1.094)	6	-1.734	.083

(1) I think I can use various instructional strategies that will help students associating different conception.
(2) I think I can determine teaching methods according to students' level.
(3) I think I can assess student learning.
(4) I think I can make change(s) in my teaching due to students' different learning styles.
(5) I think I can teach using a great variety of effective teaching approaches (e.g. constructivist, multiple intelligence) to guide student learning.
(6) I think I can use teaching practices, strategies and methods effectively.
(7) I think I can motivate students.
(8) I think I can communicate with students in an effective way.
(9) I think I can make classroom suitable for learning and teaching activities.
(10) I think I can use the time well.
(11) I think I can plan my teaching due to student outcomes.
(12) I think I can teach based on students' individual differences.
(13) I think I can call students' attention to lesson.
(14) I think I can remind students' prior knowledge.
(15) I think I can meet the requests, expectations and needs of students.

As it is mentioned before, PK stands for the pedagogical knowledge of the pre-service teachers, which includes the classroom management skills, the psychological, physical and mental development of a child, approaches and methods of teaching, and so on. As is mentioned earlier, it is important to point out that the participants are on their second year in the university, which is the time they newly start having pedagogical courses of their department specifically. Therefore, it might seem also quite normal for the participants not to have fully developed their pedagogical knowledge at this stage. Nevertheless, they are expected to develop some skills within the courses because in the course outline, it is written that they are supposed to decide on the

factors affecting the duration of material design and pedadogical strategies are a part of it.

4.1.5 Technological Content Knowledge

Table 11: Technological Content Knowledge: Pre and Post Course Survey Differences

				Wilcoxon Signed Rank Test	
Technological Content Knowledge	N	Mean (SD)	Median	Z	Sig (2-tailed)
35a	115	5.49 (1.300)	6		
35b	115	5.52 (1.300)	6	-0.650	.515
36a	115	5.70 (1.139)	6		
36b	115	5.59 (1.206)	6	-0.365	.715
37a	115	5.46 (1.259)	6		
37b	115	5.54 (1.198)	6	-0.821	.412
38a	115	5.50 (1.029)	6		
38b	115	5.53 (1.194)	6	-0.745	.456
39a	115	5.69 (1.216)	6		
39b	115	5.77 (1.126)	6	-0.940	.347

(35) I think I know technologies which can be used in my content area (e.g lecturing video, materials and models, interactive softwares…).
(36) I think I can use technology to help abstract concepts to be learned.
(37) I think I can decide which topics in my content area technology support.
(38) I think I can decide which topics in my content area technology constrain.
(39) I can reach online resources related with subject matter.

When the items are checked as pairs independently, their positions in the Likert scale are not very different. Means are very close to each other and the medians are all 6.

4.1.6 Pedagogical Content Knowledge

PCK mainly focuses on the knowledge both about particular areas and the methods and techniques used in the classroom by the pre-service teachers. The little decrease is extremely normal regarding that their expertise on their field is not very high because they are still in their second year and did not take most of the pedagogical courses of the program.

Table 12: Pedagogical Content Knowledge: Pre and Post Course Survey Differences

				Wilcoxon Signed Rank Test	
Pedagogical Content Knowledge	N	Mean (SD)	Median	Z	Sig (2-tailed)
50a	115	5.63 (1.143)	6		
50b	115	5.62 (1.189)	6	-0.130	.896
51a	115	5.96 (1.012)	6		
51b	115	5.76 (1.039)	6	-1.681	.093
52a	113	5.57 (1.068)	6		
52b	115	5.55 (1.028)	6	-0.465	.642
53a	115	5.60 (1.168)	6		
53b	115	5.73 (1.103)	6	-0.910	.363
54a	115	5.60 (1.033)	6		
54b	115	5.54 (1.003)	6	-0.698	.485
55a	115	5.62 (1.084)	6		
55b	115	5.63 (1.004)	6	-0.056	.955
56a	115	5.82 (.970)	6		
56b	115	5.69 (1.063)	6	-1.022	.307
57a	115	5.89 (1.015)	6		
57b	115	5.72 (1.089)	6	-1.491	.136
58a	115	5.76 (1.159)	6		
58b	115	5.73 (1.029)	6	-0.148	.883
59a	115	5.81 (1.050)	6		
59b	115	5.77 (.902)	6	-0.414	.679
60a	115	5.83 (.991)	6		
60b	115	5.90 (.931)	6	-0.516	.606

(50) I think I can use teaching methods (e.g. collaborative learning, problem solving, demonstration, inquiry-based learning, discussion, lecturing, case study…) specific to my content area.
(51) I think I can develop and use different representations (e.g. visual, audial…) related with my content area.
(52) I think I am familiar with students' misconceptions about a specific topic.
(53) I think I can adopt a material due to students learning (e.g. students' abilities, prior knowledge, misconceptions, bias…).
(54) I think I am aware of difficulties particular to a topic that students may encounter.
(55) I think I can use essential and effective approaches (e.g. constructivism, multiple intelligence…) to guide students' thinking and learning.
(56) I think I can develop traditional measurement tools (e.g multiple choice, true-false question, open-ended questions) related with my content area.
(57) I think I can develop alternative measurement tools (e.g. portfolio, performance, project…) related with my content area.
(58) I think I can prepare a comprehensive lesson plan that includes attractive activities, different materials.
(59) I think I can reach gains identified in the lesson plan.
(60) I think I can link interrelated topics in my content area.

As it is mentioned after the previous table (Table 12) earlier, this is particularly only subdomain where some of the post-tests' values are less than Pre –tests' values even when the pairs are tested in pairs. The reason for that could be the fact that the Pre-service teachers did not even start to do their micro-teachings and also did not complete the pedagogical courses. They are inexperienced regarding course desing, lesson planning and teaching in real classroom. Therefore, even though they know their subject areas well and gain awareness of some pedagogical strategies such as students' motivation, they cannot fully develop.a detailed lesson. It is quite normal for the pre-service teachers in their second year not to be familiar with students' misconceptions or to use essential approaches.

As it was mentioned before, the pre-service teachers were on their second year and the group was heterogeneous regarding their subject areas. They may have developed some skills regarding CK and PK independently but the course may not have affected the subdomain PCK because it was not addressed directly.

4.1.7 Technological Pedagogical and Content Knowledge

The combination of the three main subdomains (CK, PK and TK) are expected to be understood and used by the Pre-service teachers while teaching a specific subject on a special method with the right integration of the technology.

Table 13: Technological Pedagogical Content Knowledge: Pre and Post Course Survey Differences

				Wilcoxon Signed Rank Test	
Technological Pedagogical Content Knowledge	N	Mean (SD)	Median	Z	Sig (2-tailed)
61a	115	5.63 (1.293)	6		
61b	115	5.58 (1.108)	6	-0.620	.535
62a	115	5.50 (1.273)	6		

62b	115	5.65 (.908)	6	-0.853	.394
63a	115	5.62 (1.136)	6		
63b	115	5.74 (1.001)	6	-0.682	.495
64a	115	5.57 (1.133)	6		
64b	115	5.69 (1.003)	6	-0.860	.390
65a	115	5.59 (1.120)	6		
65b	115	5.60 (1.099)	6	-0.074	.941
66a	115	5.47 (1.134)	6		
66b	115	5.59 (1.199)	6	-1.010	.313
67a	115	5.61 (1.190)	6		
67b	115	5.67 (1.057)	6	-0.624	.533

(61) I think I can use technology in determining the reasons of student difficulties when learning specific conceptions.
(62) I think I can use technology in removing students' difficulties when teaching specific conceptions.
(63) I think I can use technology to help students build new knowledge on the existing ones.
(64) I think I can decide which technologies affect positively teaching and learning.
(65) I think I can make leadership for my colleagues to help them use their content, pedagogy (e.g. teaching methods, misconceptions, classroom management…) and technology knowledge together.
(66) I think I am aware of the relationships between knowledge of content, pedagogy (e.g. teaching methods, misconceptions, classroom management…) and technology.
(67) I think I can use technology effectively to meet the pedagogical needs (teaching methods, instructional materials, classroom management, student learning…) when teaching a particular topic.

From the beginning till the end of the survey, it can clearly be seen that the median of the items are either 5 or 6 regarding the Likert Scale of the survey and the differences between the means of each paired items have a little increase and sometimes even decrease, which means that there is no highly measurable difference between the time when pre-service teachers started the course and the time they completed the course. This might be an expected result when considering the findings from PK especially, which yielded no significant difference. As one of the main key components of TPACK, lack of improvement in PK might have been reflected in the students' TPACK. As is already stated, the pre-service teachers who took this course may not be confident enough in their pedagogical knowledge, or their awareness regarding their professions is not developed yet.

4.2 Analysis and Findings related to the Second Research Question

With regards to the interviews with four educators (i.e. the course instructors), at the end of the semester they were asked some questions about the course, the obstacles they came across or the difficulties they faced, the researcher asked them if they had ever heard about the TPACK framework and if so, whether they believed that it was a beneficial framework for conceptualization and evaluation of the course content. In their responses, they reported,

‘ I have never applied such a thing.’ (Lecturer 4)
‘I have heard, but I do not have much information about its content.’ (Lecturer 3)
‘I have not heard before, but I would like to get some information from you.’(Lecturer 2)
‘I have heard about TPACK and even thought I did not search much about it, I saw a survey on TPACK.’ (Lecturer 1)

Most of the researchers in this field supported new surveys to be developed in details for specific purposes. And one of the lecturers supported this point of view with the following words:

‘I think the pedagogy in the classroom and the pedagogy of using technology in the classroom is a quite different… it is something that we should discuss through the items of TPACK surveys.” (Lecturer 1)

The findings from interviews with the course instructors suggest that TPACK as a model for conceptualizing and evaluating course content for education of preservice teachers in educational technologies may not necessarily be a preferred model;

however, the course instructors stated that they would like to find out more about the TPACK framework and welcome discussing its possible applications into teacher education.

Chapter 5

CONCLUSION

The aim of this thesis was to investigate to what extent an introductory educational technologies course would contribute to pre-service teachers' perceptions about their TPACK development. The study used Mishra and Koehler's (2006) TPACK framework as a basis for analysis of development of a group of pre-service teachers studying at different subject teacher education programs at the Faculty of Education of Eastern Mediterranean university, particularly investigating whether the aforementioned course had any impact on the participating students' technological, pedagogical and content knowledge, as well as their TPACK as a whole. This study also investigated the teacher educators' perspective on TPACK and its usage for the course design, evaluation and redesign. The research literature has already emphasised the importance of the TPACK framework regarding the planning of teacher education for effective integration of technology into the classroom and development of 21st century teachers (Baran & Bilici, 2015; Chai et al.2018; Chai et al., 2010; Kartal et al., 2016; Mishra & Kohler, 2006; Koehler and Mishra, 2009; Ozgun-Koca et al. 2010; Schmidt et al. 2009; Solak & Çakır, 2014;).

5.1. Discussion of Findings

This study addressed two major research questions. Regarding the first research question, "To what extent does an introductory educational technology course affect pre-service teachers' perception of their TPACK?", the findings suggest that the course moderately contributed to an increase in preservice teachers' perceived development

in their content knowledge (CK), and also had a small contribution to development of their technological knowledge (TK) and technological pedagogical knowledge (TPK). The improvement in the CK was surprising that even though developing pre-service teachers' content knowledge was not one of the course objectives, CK was one of the subdomains showing a noteworthy escalation. A similar result was obtained in the study of Chai, Koh and Tsai (2010). In their study, the researchers examined the effects of pre-service teacher education ICT course. They found that although CK was not particularly taught in the course, it had a moderately large effect size of 0.69 and according the researchers the reason for that was the fact that "pre-service teachers were challenged to make references to the content of their teaching subject through brainstorming lesson ideas in the Technology Enhanced Lessons (TELs) and their final projects" (p.69). Therefore, the case in this research might be the course lecturers' precautions regarding pre-service teachers' department and their harmony during the class projects. Another reason for that could be the fact that pre-service teachers keeps having courses specifically designed for their areas as a part of their educational program in the university. Thus, it may be said that development on this particular area could be the result of their personal development with the other courses in the semester.

On the other hand, an improvement in the TK and TPK was something expected as the major aim of the course is to equip participants with the basic knowledge of how to utilize educational technology for instructional purposes. And this interpretation was supported by student interviews in which most of the participating students expressed how they improved their awareness of the use of technology for pedagogical purposes.

While this was the case, the course seems to have failed to contribute to a statistically significant development in the four other domains of the students' TPACK development, namely pedagogical knowledge (PK), pedagogical content knowledge (PCK), technological content knowledge (TCK), and technological pedagogical content knowledge (TPACK). One of the possible explanations for this would be because the participating students in this course were only in their second year of undergraduate study, that is meaning they just started their methodology and pedagogy focused courses, and thus they may have not yet developed their content specific knowledge and awareness of pedagogical skills and strategies, yet alone planning technology integration into pedagogical practices. This interpretation is also supported in the literature. Pierson (2001) and Chai et al. (2010) argue that teachers who have low levels of PK may not be able to make a link between technology and pedagogy even if they have high TK.

Considering the second research question, "How do course instructors perceive TPACK as a concept/framework for designing and evaluating their course content?" the findings show that TPACK as a planning and evaluation framework was not a preferred model for the course instructors, although they said they would like to find out more about it and possible implications for planning of their course content. This study and results might help contribute to an increased awareness of the TPACK framework as a possible alternative to conceptualizing and assessing pre-service teachers' development of knowledge and skills for effective integration of technology into instruction.

The TPACK framework proposes a comprehensive addressing of specific knowledge and mastery of skills for an effective technology integration to educational practices,

which are solid content-specific and pedagogical knowledge, as well as knowledge of various educational technologies. Within the scope of this framework, it may not be enough to address all those knowledge and skill areas through a one- or two-semester ICT courses. When its aims and objectives are considered (see Appendix F), BOTE 218 served well to its purpose, addressed basic technological needs and possible educational implications. Therefore, this course by itself cannot be expected to address all the specific domains of TPACK. Following a similar argument, Chai et al. (2010) proposed "a model for developing pre-service teachers' TPACK through ICT courses", which is illustrated in the figure below.

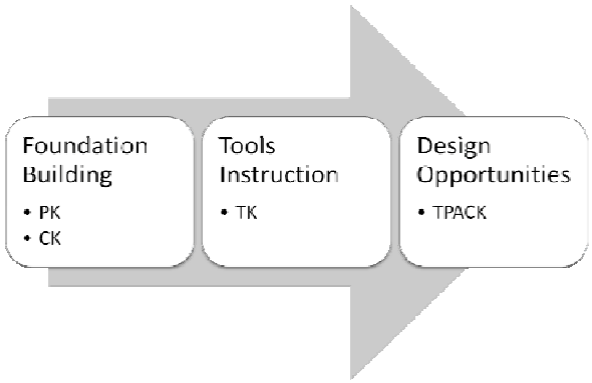

Figure 4: Model for developing pre-service teachers' TPACK through ICT courses (Chai et al., 2010)

According to their model, Chai et al. (2010) suggest that in their first and second year, pre-service teachers should be given a foundation building on their PK and CK. Then in the following years, their TK can be addressed by offering technological courses, in which they can discuss and practice possible ways of PK, CK and TK integration. And finally, after completing the foundation building, they should be offered a design course in which they plan and execute technology integrated lesson plans within their micro-teaching and practicum courses, when they have become more aware of the

real classroom settings, needs of the students, and more self-confident and knowledgeable in terms of their PK and CK.

When planning further courses in the latest stages of teacher education, subject-related ICT integration courses should be offered, rather than offering general ICT courses for all the programs, such as opening an technology-enhanced teaching course for Mathematics teacher education program students, and a subject-specific ICT integration course for music teacher education program students, and so on.

5.2 Suggestions for Further Research

Regarding the last point given above, that is the need for subject-specific ICT teacher education, Baser et al. (2016) argue that although several surveys developed as valid and reliable measures of TPACK, there is now need for discipline specific TPACK surveys, because each content area values different pedagogical strategies when integrating technology (Graham et al., 2009; as cited in Baser et al., 2016). They further argue that items written to apply to multiple content areas fail to address content-specific pedagogical and technological practices associated within a given subject matter, stating that there is a current interest in developing surveys that are content specific. Therefore, Baser et al. (2016) developed a subject-specific TPACK survey, designed specifically to measure TPACK of pre-service EFL teachers, proposing that this survey can be used by foreign language teacher educators to identify and improve the way we teach pre-service teachers to integrate technology as well as assess the quality of our technology integration coursework in EFL. Thus, further research should be on assessing different subject pre-service teachers' TPACK using specially developed survey instruments (Cetin-Dindar, Boz, Sonmez & Celep, 2018; Mei, Brown & Teo, 2018).

In the research of Baran and Bilici (2015), it is found that in 21 studies quantitative data collection techniques and in 7 studies qualitative data collection techniques are used. It is suggested to use more qualitative data collection techniques such as designing and applying a course, or mixed data collection techniques in which the qualitative data collection is applied to support the findings of the quantitative data collection.

Technology and the changes in technology is an ongoing process, which is the same for the Faculty of Education since it is aimed to train pre-service teachers who are capable of using technology, creating and teaching with technology. Therefore, there was a rapid interest on the teacher training programs and research on the benefits of the programs. Courses aiming a development on pre-service teachers' TPACK is necessary and the courses should also be related to pre-service teachers' content areas. In other words, technological courses given to the pre-service teachers are supposed to be content-specific. Chai et al. (2018) pointed out that "As content specializations may pose different challenges to the implementations of 21st century learning, further research is definitely needed" (p.21). Therefore, the first recommendation of this research is to develop courses considering TPACK, its components and the specific contents of the pre-service teachers.

5.3 Conclusion

This research study investigated whether an introductory educational technology course has any positive impact on pre-service teachers' perceived TPACK development and to what extent course instructors refer to TPACK as a framework in developing and evaluating their course content. The results suggest that while the designed introductory ICT course serves its purpose and helps equip the pre-service

teachers with basic ICT skills and helps improve their awareness about the pedagogical potential and applications of technology tools in their instructional practices, it fails to fully address the complex needs which would enable pre-service teachers to combine their technological skills with effective pedagogical and content specific skills as highlighted in the TPACK framework. This is something expected because an introductory course cannot adreess all these within the given time and scope in one or two semesters. That is why the findings from this research, supported with suggestions from the literature, highlights the importance of follow up ICT courses which would particulary focus on how to integrate technology tools into course and materials design effectively, taking both the content specific and pedagogic considerations into account. This also highlights the importance of using theoretical frameworks such as TPACK or internationally recognized standards like ISTE as guiding principles in the design and evaluation of educational technology courses, suggesting that program teacher educators should be made aware of and encouraged to refer to such standards in developing their course content so as to help contribute education of teachers wo are equipped with the knowedge and skills required as part of twenty-first century skills.

REFERENCES

Anthony, A. B., & Clark, L. M. (2011). Examining dilemmas of practice associated with the integration of technology into mathematics classrooms serving urban students. *Urban Education, 46(6),* 1300-1331.

Archambault, L., & Crippen, K. (2009). Examining TPACK among K-12 online distance educators in the United States. *Contemporary issues in technology and teacher education, 9(1),* 71-88.

Baran, E., & Canbazoğlu Bilici, S. (2015). Teknolojik pedagojik alan bilgisi (TPAB) üzerine alanyazın incelemesi: Türkiye örneği. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *30(1),* 15-32.

Baser, D., Kopcha, T. J., & Ozden, M. Y. (2016). Developing a technological pedagogical content knowledge (TPACK) assessment for preservice teachers learning to teach English as a foreign language. *Computer Assisted Language Learning*, *29(4),* 749-764.

Bishop, F. L., & Holmes, M. M. (2013). Mixed methods in CAM research: A systematic review of studies published in 2012. *Evidence-Based Complementary and Alternative Medicine*, *13,* 1-24.

Bostancıoğlu, A., & Handley, Z. (2018). Developing and validating a questionnaire for evaluating the EFL 'Total PACKage': Technological Pedagogical

Content Knowledge (TPACK) for English as a Foreign Language (EFL). *Computer Assisted Language Learning*, 1-27.

Becker, H. J., & Riel, M. M. (2000). *Teacher Professional Engagement and Constructivist-Compatible Computer Use. Teaching, Learning, and Computing*: *1998 National Survey*. (Report No. 7) Retrieved from http://www.crito.uci.edu/tlc/findings.html

Bishop, J. L., & Verleger, M. A. (2013). The flipped classroom: A survey of the research. In *ASEE National Conference Proceedings, Atlanta, GA*. 30(9), 1-18.

Canbazoğlu Bilici, S., Yamak, H., Kavak, N. S., & Guzey, S. (2013) Technological pedagogical content knowledge self-efficacy scale (TPACK-SeS) for preservice science teachers: Construction, validation and reliability. *Eurasian Journal of Education Research*, *52*, 37-60.

Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2010). Facilitating preservice teachers' development of technological, pedagogical, and content knowledge (TPACK). *Educational Technology & Society*, *13*(4), 63-73.

Chai, C. S., Hwee Ling Koh, J., & Tsai, C. C. (2013). A review of technological pedagogical content knowledge. *Journal of Educational Technology & Society, 16*(2), 31-51.

Chai, C. S., Hwee Ling Koh, J., & Teo, Y. H. (2018). Enhancing and Modeling Teachers' Design Beliefs and Efficacy of Technological Pedagogical Content Knowledge for 21st Century Quality Learning. *Journal of Educational Computing Research*, DOI: 0735633117752453.

Creswell, J. W., & Clark, V. L. P. (2007). *Designing and conducting mixed methods research (2nd ed.)*. Thousand Oaks, CA: Sage.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches (4th ed.).* Thousand Oaks, CA: Sage.

Cuban, L. (2000). So much high-tech money invested, so little use and change in practice: How come? Paper prepared for *the Council of Chief State School Officers' annual Technology Leadership Conference*, February 20–22. *Washington, DC*.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences. *(2nd ed.).* NY:Lawrance Erbaum

Çetin, Ibrahim. (2017). *Ortaöğretim Matematik Öğretmeni Adaylarinin Teknolojik Pedagojik Alan Bilgisi (Tpab) Yeterliklerindeki Ve Düzeylerindeki Değişimin İncelenmesi* (Doctoral dissertation). Retrieved from https://tez.yok.gov.tr

Cetin-Dindar, A., Boz, Y., Sonmez, D. Y., & Celep, N. D. (2018). Development of pre-service chemistry teachers' technological pedagogical content knowledge. *Chemistry Education Research and Practice*, *19*(1), 167-183.

Deville, R. F. (2003). *Scale development: Theory and applications*. London: Sage Publications.

Dhingra, K., & Rahman, A. Integrating ICT in Teacher Education: Suggesting Approaches. Retrieved September 10, 2018 from https://www.researchgate.net/publication/264275254/download

Fisher, M. (2000). Computer skills of initial teacher education students. *Journal of Information Techology for Teacher Education*, *9*(1), 109-123.

Ersanli, C. Y. (2016). Improving technological pedagogical content knowledge (TPACK) of pre-service English language teachers. *International Education Studies*, *9*(5), 18.

Eastern Mediterranean University. (2018). Mission and Vision. Retrieved September 12, 2018, from https://www.emu.edu.tr/en/about-emu/mission-and-vision/594

Goel, D. A., & Gupta, M. (2012). ICT and teacher education. *Asian Journal of Multidimensional Research*, *1*(3).

Hammond, M., Fragkouli, E., Suandi, I., Crosson, S., Ingram, J., Johnston-Wilder, P., Johnston-Wilder, S., Kingston, Y., Pope, M. & Wray, D. (2009). What happens as student teachers who made very good use of ICT during pre-service training enter their first year of teaching? *Teacher Development*, *13*(2), 93-106.

International Society for Technology in Education (2018). National Educational Technology Standards for Educators. Retrieved from https://www.iste.org/standards/for-educators

Jadhav, V. (2011). ICT and teacher education. *International Educational E-Journal, {Quarterly}, Volume-I, Issue-I, Oct-Nov-Dec 2011*, 64-69.

Jang, S. J., & Tsai, M. F. (2013). Exploring the TPACK of Taiwanese secondary school science teachers using a new contextualized TPACK model. *Australasian Journal of Educational Technology*, *29(4)*, 566-580.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, *33*(7), 14-26.

Koehler M.J., & Mishra P. (2005). What happens when teachers design educational technology? The development of technological pedagogical content knowledge. *Journal of Educational Computing Research*, *32*, 131–152.

Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge*? Contemporary Issues in Technology and Teacher Education*, *9(1)*, 60-70.

Koehler, M., Mishra, P., & Cain, W. (2013). What is technological pedagogical content knowledge (TPACK)? *The Journal of Education*, *193*(3), 13-19. Retrieved from http://www.jstor.org/stable/24636917

Koehler, M. J., Shin, T. S., & Mishra, P. (2012). How do we measure TPACK? Let me count the ways. In *Educational technology, teacher knowledge, and classroom impact: A research handbook on frameworks and approaches* (pp. 16-31). IGI Global.

Kartal, T., Kartal, B., & Uluay, G. (2016). Technological pedagocical content knowledge self-assessment scale (TPACK-SAS) for preservice teachers: Development, validity and reliability. *International Journal of Eurasia Social Sciences, 7 (23)*, 1-36.

Koh, J. H. L., Chai, C. S., & Tsai, C. C. (2013). Examining practicing teachers' perceptions of technological pedagogical content knowledge (TPACK) pathways: A structural equation modeling approach. *Instructional Science*, *41*(4), 793-809.

Loveless, A., Burton, J., & Turvey, K. (2006). Developing conceptual frameworks for creativity, ICT and teacher education. *Thinking Skills and Creativity*, *1*(1), 3-13.

Merriam, S. B. (2009). *Qualitative Research: a guide to design and interpretation*. San Francisco: Jossey-Bass.

Milli Eğitim Bakanlığı 2010-2014 Stratejik Planı. Retrieved August 15, 2018 from http://abdigm.meb.gov.tr/dokumanlar/stratejikplan.pdf

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*, 1017–1054.

Mei, B., Brown, G. T., & Teo, T. (2018). Toward an understanding of preservice English as a Foreign Language teachers' acceptance of computer-assisted language learning 2.0 in the People's Republic of China. *Journal of Educational Computing Research*, *56*(1), 74-104.

Niess, M. L., Ronau, R. N., Shafer, K. G., Driskell, S. O., Harper S. R., Johnston, C., Browning, C., Özgün-Koca, S. A., & Kersaint, G. (2009). Mathematics teacher TPACK standards and development model. *Contemporary Issues in Technology and Teacher Education, 9(1)*, 4-24.

Özgün-Koca, S. A., Meagher, M., & Edwards, M. T. (2010). Preservice teachers' emerging TPACK in a technology-rich methods class. *The Mathematics Educator*, *19*(2), 10-20.

Polly, D. (2011). Examining teachers' enactment of technological pedagogical and content knowledge (TPACK) in their mathematics teaching after technology integration professional development. *Journal of Computers in Mathematics and Science Teaching*, *30*(1), 37-59.

Pierson, M. E. (2001). Technology integration practice as a function of pedagogical expertise. *Journal of Research on Computing In Education*, *33*(4), 413-430.

Schoonenboom, J., & Johnson, R. B. (2017). How to Construct a Mixed Methods Research Design-Wie man ein Mixed Methods-Forschungs-Design konstruiert. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, *69*(2), 107-131.

Shulman, L.S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15(2),* 4-14.

Solak, E., & Çakır, R. (2014). Examining preservice EFL teachers' TPACK competencies in Turkey. *The Journal of Educators Online, 11(2),* 1-22.

Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, T. S. (2009). Technological pedagogical content knowledge (TPACK) the development and validation of an assessment instrument for preservice teachers. *Journal of Research on Technology in Education*, *42*(2), 123-149.

The Council of Higher Education of Turkey (YOK) *The Thesis Database* checked 10th September 2018 on http://tez.yok.gov.tr/UlusalTezMerkezi

Thieman, G. (2008). Using technology as a tool for learning and developing 21st century skills: An examination of technology use by pre-service teachers with their K-12 students. *Contemporary Issues in Technology and Teacher Education*, *8*(4), 342-366.

Uluyol, Ç. (2013). ICT integration in Turkish schools: Recall where you are coming from to recognise where you are going to. *British Journal of Educational Technology*, *44*(1), E10-E13.

Walker, A., & White, G. (2013). *Technology enhanced language learning: Connecting theory and practice*. London: Oxford University Press.

Wachira, P., & Keengwe, J. (2011). Technology integration barriers: Urban school mathematics teachers perspectives. *Journal of Science Education and Technology*, *20*(1), 17-25.

Wah, L. K. (2018). Developing In-Service ESL Teachers' TPACK to Teach in the 21st Century. *Advanced Science Letters*, *24*(1), 230-232.

Yalın, H. İ. (2006). *Öğretim teknolojileri ve materyal geliştirme*. Ankara: Nobel.

APPENDICES

Appendix A: TPACK Self-Assessment Survey

Technological Pedagogical Content Knowledge Self-Assessment Scale

(TPACK-SAS) for Pre-Service Teachers

Dear Teacher Candidate;

- The data which will be obtained from this scale will only be used to identify your Technological Pedagogical Content Knowledge Self-Assessment Scale (TPACK-SAS) and will absolutely not be used in another research.
- The sincere answers and your attention for not leaving any blank item are extremely important for the sake of the research.

PART 1:

1- Gender: □ Female □ Male

2- Age : □ 18-20 □ 21-25 □ 26-30 □ 31+

3- Department : □Turkish Language Teaching

□ Elementary School Teacher Education

□ Turkish Language and Literature Teacher Education

□ Social Sciences Teacher Education

□ Secondary School Mathematics Teacher Education

□ Music Teaching

□ Pre-School Teacher Education

□ Elementary School Mathematics Teacher Education

□ Computer Education and Instructional Technology

□ English Language Teaching

□ Guidance and Psychological Counseling

□ Special Education Teaching

□ Other : .....

4- Do you own a personal computer or a laptop? □ Yes □ No

5- Do you have internet access? □ Yes □ No

6- How many hours do you spend on the computer per week?

□ Less than 1 hour □ 2-5 hours □ 6-10 hours □11+ hours

7- What is the course code? □ BÖTE218 □ CITE33

PART 2:

1	2	3	4	5	6	7
Never	Hardly Ever	Rarely	Sometimes	Often	Usually	Always

Please indicate why and the extent to which you use your computer	**1**	**2**	**3**	**4**	**5**	**6**	**7**
(1) I use computer for social media.							
(2) I use computer to watch films or videos and listen to music.							
(3) I use computer to research about my content area.							
(4) I use computer to play game.							
(5) I use computer as an information storage tool.							
(6) I use computer to do my homework.							
(7) I use computer to follow current developments about daily life (e.g. news, games, programs…)							
(8) I use computer to follow developments related with my content area (e.g. up and coming books, articles, computer applications…)							
(9) I use computer to communicate (e.g send or receive e-mail, chat…)							
(10) I use computer for online shopping.							
(11) I use computer to improve my foreign language.							
(12) I use computer for distance education.							

PART 3:

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Neither Agree nor Disagre	Agree Somewhat	Agree	Strongly Agree

		1	2	3	4	5	6	7
Pedagogical Knowledge	(1)I think I can use various instructional strategies that will help students associating different conception							
	(2) I think I can determine teaching methods according to students' level.							
	(3) I think I can assess student learning.							
	(4) I think I can make change(s) in my teaching due to students' different learning styles.							
	(5) I think I can teach using a great variety of effective teaching approaches (e.g. constructivist, multiple intelligence) to guide student learning.							
	(6) I think I can use teaching practices, strategies and methods effectively.							
	(7) I think I can motivate students.							
	(8) I think I can communicate with students in an effective way.							
	(9) I think I can make classroom suitable for learning and teaching activities.							
	(10) I think I can use the time well.							
	(11) I think I can plan my teaching due to student outcomes.							
	(12) I think I can teach based on students' individual differences.							
	(13) I think I can call students' attention to lesson.							
	(14) I think I can remind students' prior knowledge.							
	(15) I think I can meet the requests, expectations and needs of students..							

		1	2	3	4	5	6	7
Technological Knowledge	(16) I think I can solve technical problems (e.g. network connection, Windows system file error…) related with hardware.							
	(17) I think I can solve problem related with software (e.g. downloading proper adds-on, program loading…).							
	(18) I can help people around me solve their technical problems about computers.							
	(19) I think I do not have trouble in using technology.							
	(20) I think I have knowledge and skills required for using technology in daily life.							
	(21) I think I have enough knowledge about different technologies (e.g. computers, interactive whiteboard, tablet…).							
	(22) I think I have enough knowledge about main computer hardwares (e.g CD-Rom, mainboard, RAM) and their functions.							
	(23) I think I have enough knowledge about main computer softwares (e.g Windows Media Player, Abode Reader, Foxit,…) and their features. .							
	(24) I can use word processor program(s) (e.g Microsoft Word, LibreOffice, Apache OpenOffice, Calligra…).							
	(25) I can use spreadsheets (e.g Microsoft Excel…).							
	(26) I can communicate via internet tools such as e-mail, Skype, Hangouts etc.							
Content Knowledge	(27) I think I have enough knowledge in my content area.							
	(28) I think I am expert in my content area.							
	(29) I think I know topic I will teach extensively.							
	(30) I think I follow the current developments in my content area.							
	(31) I think I know famous people in my content area.							
	(32) I think I follow contemporary resources (e.g books, journals…) and activities in my content area.							
	(33) I think I have enough knowledge about outcomes in the curriculum.							
	(34) I think I know conceptions, rules, and generalizations in my content area.							

		1	2	3	4	5	6	7
Technological Content Knowledge	(35) I think I know technologies which can be used in my content area (e.g lecturing video, materials and models, interactive softwares…).							
	(36) I think I can use technology to help abstract concepts to be learned.							
	(37) I think I can decide which topics in my content area technology support.							
	(38) I think I can decide which topics in my content area technology constrain.							
	(39) I can reach online resources related with subject matter.							
Technological Pedagogical Knowledge	(40) I think I can design an online environment (e.g. blogs, Google groups, Facebook groups…) to develop students' knowledge and skills, using different teaching methods							
	(41) I think I can guide students to interact with each other in an online environment.							
	(42) I think I know how technology affects teaching and learning.							
	(43) I think I know how to integrate technology to teaching and learning.							
	(44) I think I can use technology effectively to meet students' learning needs.							
	(45) I think I can decide which technology can be used to enhance learning.							
	(46) I think I know how to use specified technologies to enhance learning.							
	(47) I think I know how to use technology in different teaching activities.							
	(48) I think I can use computer applications that support learning.							
	(49) I think I can use computer applications that support learning.							

		1	2	3	4	5	6	7
Pedagogical Content Knowledge	(50) I think I can use teaching methods (e.g. collaborative learning, problem solving, demonstration, inquiry-based learning, discussion, lecturing, case study…) specific to my content area.							
	(51) I think I can develop and use different representations (e.g. visual, audial…) related with my content area.							
	(52) I think I am familiar with students' misconceptions about a specific topic.							
	(53) I think I can adopt a material due to students learning (e.g. students' abilities, prior knowledge, misconceptions, bias…).							
	(54) I think I am aware of difficulties particular to a topic that students may encounter.							
	(55) I think I can use essential and effective approaches (e.g. constructivism, multiple intelligence…) to guide students' thinking and learning.							
	(56) I think I can develop traditional measurement tools (e.g. multiple choice, true-false question, open-ended questions) related with my content area.							
	(57) I think I can develop alternative measurement tools (e.g. portfolio, performance, project…) related with my content area.							
	(58) I think I can prepare a comprehensive lesson plan that includes attractive activities, different materials.							
	(59) I think I can reach gains identified in the lesson plan.							
	(60) I think I can link interrelated topics in my content area.							

		1	2	3	4	5	6	7
Technological Pedagogical Content Knowledge	(61) I think I can use technology in determining the reasons of student difficulties when learning specific conceptions.							
	(62) I think I can use technology in removing students' difficulties when teaching specific conceptions.							
	(63) I think I can use technology to help students build new knowledge on the existing ones.							
	(64) I think I can decide which technologies affect teaching and learning positively.							
	(65) I think I can make leadership for my colleagues to help them use their content, pedagogy (e.g. teaching methods, misconceptions, classroom management…) and technology knowledge together.							
	(66) I think I am aware of the relationships between knowledge of content, pedagogy (e.g. teaching methods, misconceptions, classroom management…) and technology.							
	(67) I think I can use technology effectively to meet the pedagogical needs (teaching methods, instructional materials, classroom management, student learning…) when teaching a particular topic.							

Appendix B: The Interview Questions for the Students

1-How different are your opinions on the technology and its usage in education regarding pre-course and after course?

2- What kind of benefits do you think you will have as a result of this course during your teaching career in the future?

3- Regarding the content you are going to teach, what did you learn in this course in terms of designing and improving materials specifically for your teaching area?

4- A- If you could give me a number from 1 to 10, how comfortable are you on the subjects of using technology and integrating technology into teaching?

B- Why did you pick that number?

5- Thinking about integrating technology into your own teaching area, in which parts do you think you still need some improvements?

6- Is there anything you would like to add?

Appendix C: The Interview Questions for the Instructors of the Course

1- What did you consider while planning the content of the course?

2- You are teaching this course to the pre-service teachers of different departments. Are there any problems or obstacles you come across? If so, could you describe them?

3- What kinds of precautions do you take in order to avoid those problems or obstacles?

4- What kind of feedback do you receive from the students regarding the content of the course?

5- Do you use that feedback in order to improve the content? What are your methods?

6- Have you ever heard TPACK or TPAB scale? If so, do you believe that the scale is beneficial to the revisions of the content of the course?

7- Would you like to add something?

Appendix D: The Transcript of the Student Interviews

Just the little part of the beginning of the transcript is translated into English.

Each number stands for a student.

Question 1

1. Goruslerim cok degisti. Oncelikle yapmam gereken uygulamalari ogrendim. Suan mesela derste ogrendigim programlari yasantimda veya diger derslerde kullanarak daha etkin bir sekilde sunum yapmalari ogrendim.

(My opinions have changed a lot. First of all, I learnt about the application I shoud design. I learnt how to do more effective presentations in my life and in other lessons.)

2. Simdi bu dersi almadan once gercekten bir bilgim yoktu. Bilgisayari tamam aciyorum, sadece internete girmek icin aciyorum. Sonrasinda gecen yil Bote112 olsun, Bote dallarini alana kadar, bu ikinci donemin dersini, gercekten inanilmaz bir sekilde bilgisayarla ilgili bilgilerim gelisti. O da Ildeniz hocanin sayesinde. Bunu bilgisayari ogrenerek neler yapman gerektigini, o uygulamayi girdikten sonra artik beyinsel olarak bir isleme geciyorum, bilgisayar gibi aynen. Bu sekilde aldigim icin karsima cikacak herhangi bir sorunu, gidip o programa girerek cozebiliyorum.

3. Degisti, benim bayagi degisti. Mesela ana siniflarinda bile olsa, ogretmenler gelenekselci yaklasimi kullaniyor. Hani teknolojiyi dahil etmiyorlar. Etselerde mesela tek yaptiklari sey film acip cocuklara izletmek oluyor. Ama aslinda en kucuk bir bilgisayardan bile, cocuklara ogretebilecegimiz cok sey var, oyle dusunmeye basladim.

4. Mesela teknoloji olmadiginda dersler daha sıkıcı oluyor ve cocuklarin dikkatlerini toparlayamiyoruz boyle herkesin dagiliyor. Ama teknoloji oldugunda ise cocuklarin dikkatlerini daha cabuk cekebilliyoruz ve eglenceli bir sekilde dersler ogretebiliyoruz.

5. İlk basta bu dersle alakali hic bir fikrim yoktu, programlari kullanmayla alakali. Baslamadan once cok yabanci geliyordu ama dersin sonunda ogrendigimi anladim. Bunlarinda bana katkisi oldugunu dusunuyorum.

6. Calisma yapraklari yapmada kolaylik sagladi. Yani bu kadar.

7. Aslinda cok fazla degismedi cunku daha onceden de bilgisayara merakli oldugum icin pek fazla zorlanmadim. Bir cok uygulama bildigim konulardi. Bir tek 2 tanesini yeni ogrendim. O da zor adapte olmadim. Yani kolay geldi.

8. Ben aslinda bilgisayar kullanimi teknoloji kullanimi yonunden iyiydim ama bilmedigim o kadar uygulamalar varmis, Damla hoacanin sayesinde bunlari gelistirdim.

Question 2

1. Ogretmenlik yaparken cok etkili olacagini dusunuyorum. Cunku mesela Prezi olan bir uygulamayi ogrendim. O uygulamada videolar ekleyerek, diger uygulamalarda da ekliyoruz bunlari ama, Prezi de daha canli, daha etkin ve TV programlarinda olan

gecisli animasyolari falan ogrendigimiz icin cocuklarda cok etkili olacagini dusunuyorum.

2. O kadar da yeterli degil bilgilerim. Daha da soylicem. Bu mesela meslek dalimda, inanilmaz bir sekil de faydasi olacak. Cocuklarin uzerinde tabiki de kullanacam. Sonuc ta Ildeniz hocanin soyledigi gibi, meslek alaninda da size yardimci olacak diye soyluyordu surekli. Buna gercektende arkadaslarin Prezi de yapmis olduklari etkinlikleri oraya aktararak, benim mesela ulasmak istedigim bir etkinligi ben orada bulabilirim, videolar olsun, etkinlikler olsun. Bir de ailelere ulasmak icin Pinterest diye bir program var. O programdan mesela cocuklarin ailelerine ulasmam daha kolay olabilir diye dusunuyorum.

3. Mesela gorsellerden yararlanabiliriz. Slaytlarla, bu da cocuklarin dikkatini o yone vermelerini saglar. Kavramlari falan daha kolay ogrenirler bence.

4. Yani mesela derste goruyoruz. En kucuk birsey mesela slayti hazirlarken, goreselleri nereye koymaniz gerektigini yada yaziyi nereye koymamiz gerektigini aslinda bu bule bakis acisini, cocougun dikkatini ceken birsey oldugunu gorduk mesela. Bunlari kullanicaz. Iste yani yazi stillerini, nasil olmasi gerektigini, yani bu tarz. Isimize yarayacagini dusunuyorum ben.

5. Ogretmenlik yaparken ozellikle kodlamada yardimci olacagini dusunuyorum. Cunku sunumlarimizda falan , slayt gosterileri oluyor. Onlar bize yardimci olabiliyor.

6. Bir cok etkinligi yaparken guzel olacaktir. Yani.

7. Sunumlarda yada teknoloji ile birlikte cocuklara aktarabilecegim bazi bilgileri aktarabilecegim, projeksiyon gibi, onlari kullanmakta bana faydasi olacagini dusunuyorum.

8. Mesela biz calisma kagidini, ben baska universitede okumustum, kendi elimizle ciziyorduk ama bunlari bilgisayarda yapmayi falan ogrendik, posterdir falan. Bunlari ogrendim yani kullabilecegim acisindan cok iyi oldu.

Question 3

1. Okul oncesinde mesela cocuklara asama asama gidilecek bir program ogrendik. Adi kodlamaydi. Kodlamayi ogrendik. Hatta gecen hafta Matematik dersimizde de bundan bahsedildi. Bu kodlamada cocuklara adim adim yonergeler verilerek, oyunu oynayacaklarindan bahsediliyordu. Bu cocuklar icin hem zihin gelisiminde hemde bilincsel gelisimde bir cok alanda etkili olacagini dusunuyorum.

2. Simdi, neler ogrendim? Mesela dedigim gibi Pinterest olsun, bu programda aile ile daha aktif bir sekilde ulasabilecegim haberlesebilecegim bir program, kendi alanima uygulayarak daha sistemli ve cocuklarin gelisimine yonelik etkinlikler yapabilecegime daha da inandigim icin bu sekilde programlari ogrendim.

3. Cocuklarin gelisim ozelliklerine uygun olmasi, zaten hep bunu butun derslerde goruyoruz ama hani burda daha cok, teknolojiyi cocuklara, onlarin gelisim ozelliklerine uygun nasil kullanabilirizi gorduk. Hani onlarin boyutunda olmali

materyaller, hani yonergeleri dogru ve acik bir sekilde vermeliyiz. Bu saydiklarim.

4. Teknolojiyi boyle eglence haline getirerek degilde, yani cok oyun adi kullanilmamali derslerde, sadece derse yonelik olmali.

5. 3 boyutlu etkinlik yapmayi ogrendik. Poster yapimini ogrendik ve slatylardan sunumun duzenini ogrendik.

6. Daha cok kavramlari ogrendik. Pratikten cok teorik yani.

7. Uygulamalarda bir cok sunum yada materyal gelistirme tasarladik. Bunlarla da bayagi bir etkinlik yapmayi ogrendik.

8. Ben aslinda materyal konusunda iyiydim. O kadar artisi oldu mu. Hayir. Cunku ben biliyordum, sadece yaptim o kadar. Yani benim icin bir gelistirmesi olmadi.

Question 4

1. Teknoloji de rahat hissediyorum kendimi ama suan ki nesile bakildiginda, cocuklar bizden daha iyi teknolojiyi ogrendiklerinden dolayi, bazen cocuklarin bildikleri seyleri biz bilemedigimiz icin, yani orta derecede 5 puan veriyorum kendime.

2. Valla 1 den 10 a kadar verirsem, 10 veriyorum. Yani cunku gercekten bu verilen bilgisayar etkinliginde, cocuklara yonelik tam anlamiyla gelismis programlar

ogreniyoruz. Tabi ki de ben cocuklara muhakkak uygularim ve yeterli de bulurum cunku cocuklara, tamam teknoloji zarar veriyor ama, 3 boyutlu gorselligide mesela bir etkinligi anlatacaksin, hemen şıp sinevizyondan gosterebiliyorsun, Iletisimi o cocuklara teknnoloji sayesinde ulastirabiliyorsun mesela.

3. 7 yapabilecegimi dusunuyorum. Kullandirabilecegimi dusunuyorum cocuklara. O teknolojiyle egitimi butunlestirebilecegimi dusunuyorum ki derste falanda yapiyoruz zaten. Sunumumuz vardi mesela, yaptik ve basarili oldugumuzu dusunuyorum. 3 puani da mezun oldugumda tamamlicam.

4. 7 Kendimi daha fazla birazcik daha gelistirmem lazim. Eksikliklerim var mesela, hatalari duzeltemiyorum bilgisayarda cikan onume. Onlari biraz daha duzeltmem lazim.

5. Bu konudan konuya degisebilir, Eger teknoloji ile yakindan ilgiliyse 10 puan verebilirim. Ama teknoloji ile uzaktan ilgisi varsa, pek rahat hissetmeyebilirim o konuda.

6. 4 Zorlandigim bir ders oldugu icin.

7. 9 cok rahat geliyor yani bilgisayari aldigimda bir cok seyi yapabiliyorum. 1 puan da konuya bagli. Ya konu bilgisayarla alakali degilse.

8. 7 falandir. Hani cok iyi miyim, eksikliklerim vardir. Ama cok kotumuyum. Hayir, biliyorum.

Question 5

1. Bilgisayarda bir ariza ciktiginda yapabiliyorum ama mesela kablolarla ilgili bir sorun oldugunda sinif ortamindaysam cok fazla telaslaniyorum. Yapamayacak duruma geliyorum. Bildigim halde unutuyorum.

2. Aslinda gelismeye ihtiyac duymuyorum. Bir bilgi gelmiyor aklima soyleyecek.

3. Mesela lab derslerimzde yapiyoruz. Bazi programlar 2 saatimizi aliyor gercekten, gozlerimiz mahfoluyor falan. Ama bazilarinda 15 dakikada bitiyorum, kaliyorum boyle bekliyorum falan. Hani mesela Powtoon ugrastiracak seylerden. Birazda hani yapip deneyip ondan sonra tecrube edinip, daha hizli bir sekilde yapabilecegimiz uygulamalar ama. Ama atiyorum Kavram haritasi hazirladik, nerden hazirladigimizi unuttum suan. O da ‘’P’’ ile basliyordu,mesela o daha basit. Pinterest i gecen yilda kulanmistim, BOTE almadan once, onda biraz daha iyiydim mesela derste falanda yaptim.

4. Pinteresti gelistirebilirim,birde Kavram haritasi hazirlama programi, adini hatirlayamiyorum. Onda iyi oldugumu dusunmuyorum. Onu da iyilestirmem lazim. Baska?? Yani bu kadar.

5. Program ve cihaz bazinda gelismeye ihtiyac duyuyorum.

6. Sosyal gelisime daha cok ihtiyac duyuyorum. Cihaz, uygulama, hardware software olarak da.

7. Programlama, programcilik. Arkadasimdan heveslendim.

8. Ogrencilerin oynadiklari oyunlari tasarim yapmak, uygulamak isterdim. Dolayisiyla tasarim ve dizayn konusunda.

Question 6

1. Teknoloji guzel ama pek onermiyorum suan ki cocuklar acisindan. Kucuk yasta cocuklar da bile anne ve babalarin cocuklari el ayak altindan kaldirmak icin sessiz sakin oturmalari icin, verdikleri aletler olarak, cocuklarin gelisiminde zararli oldugunu dusunuyorum. Neden cocugun onune bir resim kagidi yada boyama vermiyorsunda, gidiyorsun eline teknolojik bir alet veriyorsun. Bu acidan sevmiyorum.

Appendix E: The Transcript of the Lecturer Interviews

Just the little part of the beginning of the transcript is translated into English.

Each number stands for a lecturer.

Question 1

1. Ogrencilerin, ahh, once seyden baslayalim. Turkiye de ki biz Fatih projesi biz cok goz onunde bulunduruyoruz. Turkiye de ki Fatih projesinde egitim teknolojilerinin entegre edilmesi vardir. Ve orda ogrencilerin yani ogretmen olacak ogretmen adaylarinin ne gibi becerilere sahip olmasi gerektigini dusunuyoruz ve ona yonelik teknolojik bilgi vermeye calisiyoruz kendilerine, egitim teknolojileri uzerinde bilgi vermeye calisiyoruz.

(Students, Oh Let's start with the Fatih Project in Turkey. We really consider it. There is integration of instructional technologies in Fatih Project. And we consider what kinds of skills the students , the future teachers , should have, and we are trying to provide technological knowledge to them regarding that. We are trying to give information about educational technologies.)

2. Dersin icerigini planlarken ilk olarak hedefimiz, burda bizim dersimiz Materyal tasarim. Ogretim teknolojileri ve materyal gelistirme. Burda bir ogrencinin kendini ogretmen olarak ileriki hayatinda ogretmenlik meslegine adapte olabilmesi icin bir sinifta kullanabilecegi, Web tabanli olsun, 3 boyutlu materyal olsun, Office uygulamalarindan olusturabilecegi alternatif materyalleri olusturmasi icin plan ve

programlar cikariyoruz. Onculugumuz bu. Kullandigimiz ana kaynagimiz var Halit'in kitabi. Onun onderliginde onun esliginde ders notlarimizi haziriyoruz. Arti derleme notlarimiz var bizim. Bunlari hazirlarken ozellikle materyal gelistirmelerine kendi bolumlerine uygun olarak, ilk hedefimiz bu. Bu sekilde plan ve programimizi yapmaya calisiyoruz. Her donem, donem basinda yenilikleri takip ederek, ozellikle Lab notlarimiz degismekte.

3. Ders icerigini planlarken aslinda genel mufredati gozonunde bulunduruyoruz. Sonucta programimiz YOK'ten onayli bir proram ve YOK'un bu kapsamda Egitim Fakultesindeki bolumlere vermis oldugu bir program var ve bizim dersimizde de ayni sekilde kitaba bagli kalarak, kitabin unitelerini baz alarak tum YOK'ten onaylı egitim fakultelerinde islendigi gibi islenmektedir.

4. Dersin icerigini planlarken gecmis yillarda yapilanlari gozardi edemeyiz. Gecmis yillarda yapilan uygulamalar ve icerikleri kesinlikle bir onumuze koyariz. Sonra yeni olarak neler katabiliriz, bunlara bakariz. Bir onceki yildan bu yila literature eklenen yeni materyaller var midir? Yeni kitaplar var midir? Bunlara bakariz. Birde diger universitelerin yaptigi uygulamalara bakariz, bizden farkli olarak ne gibi uygulamalar yapiyorlar derste. Cunku bu ders her universitede verilen bir ders egitim fakultelerinde. Bu 3 konuyu muhakkak goz onunde bulundurarak icerik hazirlariz.

Question 2

1. Var dogrudur, Ozellikle PDRcilerde ve okul oncesi ogretmenligi bolumunde okuyan ogrencilerde bir direnc vardir. Ogrenmeye karsi bir direnc vardir, biz bunlari nerde

kullanacagiz diyor. Yani mesela, PDRciler ben sinifa girmeyecem bana niye bu teknolojiyi ogretiyorsunuz diyorlar. Bunlarla ilgili bir sıkıntı, zorluk yasiyoruz.

2. Zorluk yasadigimiz nokta, cok heterojen gruplarimiz var suanda. Gruplarin birlesmesi sonucunda elimizde, atiyorum, sinif ogretmenliginden okul oncesi, ilk ogretim matematikten muzik ogremenliginden turkce ogretmenliginden tutunda tum ogretmenlik alaninda ki tum, bolumler, programlar bu dersi almak zorunda. Heterojen bir grup oldugunu soylemistim. Bunun bize dezavantaji ne? Grup projelerini olustururken en sona kalan atiyorum tek gruplu ogrencilerin bir arada ortak bir ders mufredatina uygun, onlarin hedeflerine uygun bir ders secip onun uzerinden materyal olusturmali yasadiigimiz tek sikinti budur benim acimdan.

3. Aslinda, yani ben bu donem Lab dersi vermiyorum ama daha ince bir donemdeki tecrubelerime dayanarak kullaniyorum. Biz uygulamali bolumlerde herkesin kendi alani ile ilgili projeler ortaya cikarmasini sagliyoruz.

4. Evet karsilasiyoruz. Ornegin en kolay calistigimiz yada en kisa sure de materyal uretebildigimiz bolum, okul oncesi ogretmenligidir.Cunku bizim dersimizi alana kadar okul oncesi ogretmenliginde ki ogrenciler daha farkli materyal gelistirme dersleri aliyorlar kendi alanlarina ozgu. O yuzden bizim dersimize adapte olmalari hicte zor degil. Ama ornegin bir Turkce Ogretmneligi yada daha farkli bolumler egitsel materyal gelistirmeyle ilgili ilk kez tanistiklari icin biraz daha fazla zorlaniyorlar ve bizim daha fazla zaman ayirmamiz gerekiyor bu ogrencilere.

Question 3

1. Genelde PDR cilere de cok soyleyebilecek birsey bulamiyoruz ama genel olarak, bunlara, bu tip egitimcilere soyledigimiz nokta su, bugun bir hukuk okuyan ogrencinin ingilizce bilmesi gerekmez mi? Gerekir.buda bir genel kulturdur. Bir okulda ogretmen olacak bir kisinin, egitim teknolojilerinin ne oldugunu, nasil calistigini bilmesi gerekir diiye dusunuyorum. Ve okul oncecilere ayrica, kendi alanlarina uygun farkli seylerde gostermeye calisiyoruz ki mesela bu mobil uygulamalarda olsun. Bilmem nelerde olsun, onlarinda kullanabilecekleri seyler olmasi acisindan, bu sekilde cozmeye calisiyoruz.

2. Gidermek icin aslinda alabilecegimiz tedbir yok cunku otomatik olarak kendilerine uygun olan ders programlari seciliyor, ders saatleri belli, bolumlerin turkce olusundan dil acisindan aldiklari ders sayisi cok fazla. 8-9 tane ders alan ogrenci var. Baska bir gruba aktarma sansimiz yok. Alabildigimiz onlemler, ortak temel basic dersler olan Turkce matematik derslerini ortak alarak hem muzikle okul oncesi birleserek ortak bir ders secip onun uzerinden materyal olusturmalarini istiyoruz. Onlemimiz bu olabilir en cok.

3. Ozellikle materyal gelistirilen bolumlerde ve derslerde ayni bolumde ki ogencileri birbirleriyle eslestiriyor, onlarin arasinda ki bolum farkliliklarini aradan kaldirmis oluyoruz.

4. Ne gibi tedbirler aliyoruz? Donem basinda aslinda bu ogrencilerin karisik siniflara konulmamasi talebinde bulunuyoruz bolumlerden. Cunku ayni seviyede ki ogrencilerle daha rahat ilerleyebiliriz. Yani mesela Turkce Ogretmenligindeki bir ogrenci ile Okul Oncesi Ogretmenliginde ki bir ogrenci ayni seviyede olmadigi icin her ikiside zorlaniyor sinifta. Biz bunlarin farkli siniflara yada farkli gruplara

yerlestirilmesi talebinde bulunuyoruz ki, en azindan o farki yada sorunu ortadan kaldiralim.

Question 4

1. Genelde ogrencilere seyi soruyorum, bu yaptigimiz aktiviteleri gercek hayatta kullanabilecek misiniz diye soruyorum. Onlardan aldigimiz donute gore bir sonraki senede ekleme yada cikarma, degisiklik yapiyoruz. Genelde yaptigimiz budur. Gercek hayatta bunlari kullanabilecekmisiniz, nasil kullanabileceksiniz tarzinda ve genelde geri donutler alarak devam ediyoruz.

2. İlk basta materyal tasarim diyince gozlerinde cok buyuyor. Ozellikle lab etkinliklerine geldigimizde hocam ben bunu nasil yapacam yada en buyuk karsilastigimiz sorun kullandigimiz tum programlarin web tabanlilarinin ozellikle Ingilizce olmasi. Onlar icin dezaavantaj oluyor ve olumsuz geriye donutleri oluyor.

3. Yani aslinda bu bolumden bolume gore degisiklik gosteriyor. Mesela okul oncesi ogretmenleri dersle ilgili 3 boyutlu materyalleden ve diger gelistirilien materyallerden cok memnun kaldiklari da oluyor ama teknolojinin kullanildigi noktalarda, bizim mesela ogrenim yonetim sistemlerimiz var yada icinde metin gecmesi gereken sunum dosyalari vb. Materyalleri uretirken onlar, biz bunu nasil kullanacagiz gibi tepki de bulunabiliyorlar ama 3 boyutlu bir materyal gelistirdigimizde onlar icin bir avantaj oldugunu soyluyorlar.

4. Yani aslinda her hafta muhakkak uygulamalari derslerimiz oldugu icin, muhakkak zaten geri donutlerle birlikte ilerleyen bir ders oluyor. Yani sadece bizim anlattigimiz tek yonlu bir ders degil. Ogrencilerle birlikte goturdugumuz bir ders oluyor. Geri donutler genelde olumlu yonde. Cunku ilk kez tanistiklari sistemleri yada materyal hazirlayabilecekleri ortamlari ogrencilere sunmaya calisiyoruz. Genelde olumlu geri donutler aliyoruz. Hani ilerleyen zamanlarda kullanabileceklerini, gerek staj bir sonraki yilda staja basliyorlar- birer egitmen olarak- staj yaparken kullanabileceklerini soyluyorlar. Bu sekilde yani olumsuz donut aldigimi hatirlamiyorum BOTE 218 deki icerigimizle alakali.

Question 5

1. -

2. Tabi zaman gectikten sonra sadece bir dille degil, dile bagli kalmamalarini ozellikle ben soyluyorum. Hersey zaten elimizde ki olan programlar, ikonlar uzerinde kurulmus. Hic birsey bilmeseniz bile, orda ki gorselle herseyi ifade edebiliyor.

3. Yani biz aslinda ders icerigini gelisen teknolojiler dogrultusunda degistiriyoruz. Yani ogrencilerden gelen bu donutler dogrultusunda, farkli gruplara da verdigimiz icin cok fazla fark etmiyor aslinda bolumler icin ama gelisen teknoloji dogrultusunda, yeni cikan platformlari yada yeni cikan ogretim yonetim sistemleri dogrultusunda, biz dersin icerigini ozellikle uygulama bolumune, guncelliyouz ve degistiriyoruz.

4. Muhakkak katki sagliyor, evet , yani ornegin bir sonraki yili planlarken bir onceki yilda ogrenciler bunu sevmistir o yuzden bunun uzerine bunu da koyabilir. Hani bu

yone daha fazla agirlik verebilirz. Hani ogrenciler icin daha eglenceli hem daha ilgi cekici oldugunu dusunerek. Ee tabiki etkiliyor bizim planlarimizi

Question 6

1. TPACK i duydum. Cok asiri bir arastirma yapmamis olmama ragmen, TPACK da mesela bir anket gordum. Bu anketin dogru oldugunu, dogru hazirlandigini ben sahsen dusunmuyorum. Ozellikle orda bir pedagojik kisim vardir. Pedagoji kisminda, orda sinif icinde ogretmenligin kullanacak pedagoji ile teknolojinin pedagojisinin cok farkli oldugunu dusunuyorum. Ve bu TPACK in hazirladigi anketlerin bunu direk olarak test ettigini dusunmuyorum. Yani bir ogretmenin sinifta ki videonun nasil kullanacaginin pedagojisinin soruldugu bir soru yoktur mesela ornegin. Orda ki anketlerin icersinde sey der, dersini nasil verecegini biliyor musun. Sinifta verebilirim. Bu benim teknoloji ile gercekten uygun bir sekilde verebilecegim anlamina geliyor mu? O teknolojiyi iyi biliyor muyum, soru isaretidir. Yani bu ozellikle uzerinde tartismamiz gerekli birseydir. Belki de TPACK in anketlerini acip uzerinden tek tek giderek konusmamiz gereken birseydir. Ama mesela bilirsin bizde ingilizce ogretmenliginde videolar nasil kullanilir. Mesela durdurursun ortasinda videoyu, ondan sonra ogrenciye dersin geri kalanini yaz, mesela. Bu normal sinif egitimdeki pedagoji ile uyan birsey degildir. Sinifta ingilizceyi vermenin pedagojisi baskadir, teknolojiyi kullanarak vermenin pedagojisi baskadir. Dolayisi ile o TPACK in tam olarak duzgun ayarlanmis oldugunu degil, zaman icersinde yerine oturacagini dusunuyorum.

2. Duymadim, bu konu hakkinda bilgi alabilirim sizden.

3. Duydum ama aslinda icerigi hakkinda cok bir bilgim yok.

4. Hic uygulamadim boyle birsey.

Question 7

1. Genellikle TPACK konusunda cikacak olan seyler, sonuclar, TPACK' in benim bugune kadar gordugum anketlerinde, ogretmenlerin teknolojiyi bilmedigidir. Butun ogretmenler nerdeyse ben pedagojiyi bilirim diyorlar. Ama teknolojinin pedagojisi ile sinifin icinde ki pedagoji farkli seylerdir.

Teknolojiden teknolojiye de degisir. Akilli tahtanin teknolojisi baskadir. Bir LMS in kullanilmasinin pedagojisi baskadir. Yani bunlar icin ayri spesifik sorular olmasi lazimdir. Yani mesela bir LMS i sinif icerisinde nasil entegre edersin, ve dersin bir parcasi olarak kullanirsin dedigin zaman onun pedagojisi baskadir. Sinif icerisinde akilli tahtayi kullanmanin baskadir. Akilli tahtayi kullanirken de atiyorum, oyunlari o akilli tahtanin uzerinde mesela mobil oyunlar olurya adam asmaca bilmem nedir. Bunlari kullanmanin pedagojisi baskadir. Akilli tahtanin uzerinde farkli seyler yaptirmak baskadir yani mesela, bir video kullandirmak pedagojisi baskadir. Onlar o kadar cok spesifik noktalara giderki yani tek bir anketle hepsini birden cozebilecegini her derde deva olan bir pedagoji ve teknoloji yoktur. Dolayisiyla bunlari context spesifik arastirarak bunlarin nasil uygulacaginin bulunmasi lazimdir. Designed based research vardir, bilirsin. Bunu kullandigin zaman zaten teknolojiye odaklanip, teknolojinin pedagojisine odaklaniyorsun design based researchte. Onun uygulanarak o sekilde teorilerin bulunmasi o pedagojinin ortaya cikarilmasi bence onumuzde ki zamanda da cok guncel olacak olan, cok populer olacak olan birseydir bence.

2. -

3. Her ogretmen adayinin almasi gereken bir ders olarak dusunuyorum. Ogrenciler aslinda eskiden geleneksel olan ogretmenleri gordukleri zaman biz bu platformlari nerde kullanacaz, bunlar okullarda kullaniliyor mu, ne isimize yarayacak gibi tepkilerle bize geliyorlar. Bazi durumlarda ama bilincli olanlar ozel bir okulda staj yapmis olanlar yada ozel bir okul hakkinda bir tanidigi olanlar bu bilgileri gerek akilli uygulanan uygulamalarin yada internet tabanli materyal gelistirme platformarinin cok kullanildigini ve cok islerine yarayacaginin farkindalar.

4. Yok, daha spesifik sorarsan ekleyebilirm ama?

--EK soru (Degistirilmesini istediginiz. / Dusundugunuz , boyle olsa daha iyi olurdu dediginiz birsey var mi?

Yani aslinda o kadar icerigi dinamik bir derski bu ders, her yil gercekten koklu degisiklikler yapiyoruz icerik anlaminda. O yuzden hani keske suda olsa, bu da boyle olsa diyemiyorum. Cunku zaten her yil ciddi anlamda calismalar yapiyoruz dersin yenilenmesi icin.

-teknolojik oldugu icin , surekli degistiginden mi?

Aynen oyle oldugu icin. Hic bir yil birbirinin tekrari degil bu derste. O yuzden dinamik bir ders, surekli yenilenen bir ders. Yani bu halinden de memnunuz.

Appendix F: Course Outline BOTE 218 (CITE218)

BOTE218 Öğretim Teknolojileri ve Materyal Geliştirme

Ders Tanıtım Formu

DERSİN SAATİ, KREDİSİ VE TÜRÜ	4 (2+2) saat, 3 kredi, zorunlu		
DERS YILI VE DÖNEMİ	2017 – 2018 Bahar Dönemi		
GRUP(LAR)	**DERSİN ZAMANI VE YERİ**		
	Gün	**Saat**	**Sınıf**
01	Çarşamba/Cuma	14.30-16.20/12.30-14.20	CTL222/CL204
02	Salı/Cuma	16.30-18.20/12.30-14.20	CTL003/CL204
03	Pazartesi/Cuma	16.30-18.20/12.30-14.20	CTL220/CL202
04	Salı/Cuma	16.30-18.20/12.30-14.20	CTL006/CL202
05	Pazartesi/Perşembe	10.30-12.20/16.30-18.20	CL204/CTL220
06	Pazartesi/Çarşamba	10.30-12.20/16.30-18.20	CL204/CTL013
07	Pazartesi/Cuma	10.30-12.20/16.30-18.20	CL213/CTL220
08	Pazartesi/Çarşamba	10.30-12.20/16.30-18.20	CL213/CTL224
DERSİN ÖNKOŞULU	–		

ÖĞRETİM ELEMANI	**E-POSTA**	**TELEFON NUMARASI**	**OFİS**
Asst. Prof. Dr. İldeniz ÖZVERİR	ildeniz.ozverir@emu.edu.tr	630 32 88	PrepB 04
Dr. Damla KARAGÖZLÜ	damla.karagozlu@emu.edu.tr	630 3098	YB 306
Dr. Rahme UYGARER	rahme.uygarer@emu.edu.tr	630 10 69	YB 306
Öğrt. Gör. Ömer Sami KAYA	omer.kaya@emu.edu.tr	630 31 22	YB 306
WEB ADRESİ	http://fedumoodle.emu.edu.tr/		

DERSİN TANIMI

Öğretim teknolojisi ile ilgili kavramlar, çeşitli öğretim teknolojilerinin özellikleri, öğretim teknolojilerinin öğretim sürecindeki yeri ve kullanımı, okulun ya da sınıfın teknoloji ihtiyaçlarının belirlenmesi, uygun teknoloji planlamasının yapılması ve yürütülmesi, öğretim teknolojileri yoluyla iki ve üç boyutlu materyaller geliştirilmesi, öğretim gereçlerinin geliştirilmesi (çalışma yaprakları, etkinlik tasarlama, tepegöz saydamları, slaytlar, görsel medya (VCD, DVD) gereçleri, bilgisayar temelli gereçler), eğitim yazılımlarının incelenmesi, çeşitli nitelikteki öğretim gereçlerinin değerlendirilmesi, Türkiye'de ve dünyada öğretim teknolojilerinin kullanım durumu.

DERSIN AMACI VE ÖĞRENME ÇIKTILARI

Bu dersin amacı öğrencilerin öğretim teknolojileri ve materyal geliştirilmesi öğrenimini, kuramsal ve uygulamaya dönük çalışmalara bağlı olarak gerçekleştirmelerini sağlamak. Geliştirilen öğretim materyallerinin tasarım ve uygulamalarının öğretim sürecine olan etkisini araştırmak ve değerlendirmek. Bu derste, genel amaca dayalı olarak, öğrencilerin öğretim sonunda aşağıdaki kazanımları edinmeleri beklenmektedir.

- Eğitim ve öğretim sürecinde kullanılan öğretim teknolojilerini ve materyallerini tanır, örneklendirir.
- Öğretim materyalinin tasarım sürecine etki eden faktörleri belirtir.
- Hedeflenen amaca yönelik uygun öğretim materyalleri tasarlar.
- Tasarlanan öğretim materyalinin etkinliğini değerlendirir.

TAKVİM, İÇERİK VE ETKİNLİKLER

Sayfa 1/4

1. Hafta: 12 - 16 Şubat	Tanışma ve dersin tanıtılması, Temel Kavramlar
2. Hafta: 19 - 23 Şubat	Temel Kavramlar (Eğitim, öğrenme, öğrenme teknolojisi, öğretim tasarımı)
3. Hafta: 26 Şubat - 02 Mart	Öğretim Teknolojisi ve İletişim
4. Hafta: 05 - 09 Mart	Öğretim Analizi
5. Hafta: 12 – 16 Mart	Öğretim Durumlarını Planlama
6. Hafta: 19 - 23 Mart	Araç-Gereçlerin Öğretimdeki Yeri ve Önemi Öğretim Araç gereçlerinin seçimi
7. Hafta: 26 - 30 Mart	Görsel Materyaller Tasarımı
8. Hafta: 02 - 06 Nisan	Öğretim Araçları ve Etkili Kullanımı (mesaj tasarımı)
9.-10. Hafta: 12 - 21 Nisan	**Ara Sınavlar**
11. Hafta: 24 - 27 Nisan	Öğretim Araçları ve Etkili Kullanımı
12. Hafta: 30 Nisan - 04 Mayıs	Eğitimde Bilgisayar Kullanımı (Web 2.0 tools)
13. Hafta: 07 - 11 Mayıs	Uzaktan Eğitim
14. Hafta: 14 - 18 Mayıs	Değerlendirme
15. Hafta: 21 - 25 Mayıs	Proje Sunumu
16. Hafta: 28 Mayıs – 09 Haziran	**Dönem Sonu Sınavları**

ÖĞRETME-ÖĞRENME YAKLAŞIMI

Ders, etkin öğrenme yaklaşımı izlenerek yürütülecektir. Konuların işlenmesinde kimi zaman öğretim elemanın öğretimi yanı sıra, konulara ilişkin öğrenci çalıştay ve laboratuvar uygulamalarına yer verilecektir. Ayrıca gerek hedeflenen öğrenmelerin sağlanması, gerekse öğretme-öğrenme yöntemlerinin örnek uygulamalarının görülmesi için öğretme-öğrenme sürecinde **video durumlara dayalı tartışma**, işbirlikli öğrenme teknikleri ile soru-yanıt, sorun çözme gibi yöntemleri ve teknikler işe koşulacaktır. Dersin her aşamasında öğrencinin aktif katılımı esastır.

DERS KİTABI

Yalın, H. İ.(2006). *Öğretim Teknolojileri ve Materyal Geliştirme*. Ankara: Nobel.

OKUMA KAYNAKLARI

Demirel, Ö., & Seferoğlu, S. (2001). *Öğretim Teknolojileri ve Materyal Geliştirme*. Ankara: Pegam A.
İşman, A. (2008). *Öğretim Teknolojileri ve Materyal Geliştirme*. Ankara: Pegem A..
Seferoğlu S. S. (2014). *Öğretim Teknolojileri ve Materyal Tasarımı*. Ankara: Pegem A.
Uşun, S. (2006). *Öğretim Teknolojileri ve Materyal Tasarımı*. Ankara: Nobel.
Yıldırım, S. (2002). *Öğretim Teknolojileri ve Materyal Geliştirme*. İstanbul: Anı.

BAŞARI KOŞULLARI
Öğrencilerin dersle ilgili öğrenmeleri gerçekleştirebilmeleri ve dersten başarılı sayılmaları için şu koşulları yerine getirmeleri gereklidir:

- Derslere en az %80 oranında devam etme.
- Derslere işlenecek konuyu okuyarak hazırlıklı gelme.
- Ders içi öğrenme ve uygulama etkinliklerine yoğunlukla katılma.
- Yazılı ve sunuma dayalı ödevleri istenilen nitelikte ve zamanında yapma.
- Yazılı çalışmalarda yapılan alıntıları, alıntıların kaynaklarını ve yazarlarını belirtme.
- Çalışmalarını kimseden almama, kimseye vermeme.
- Sınavlarda yeterli puanları alma.

DEĞERLENDİRME
Öğrencilerin dersle ilgili başarı değerlendirmesinde temel alınacak ölçütler ve yüzdelik ağırlıkları şöyledir:

Ara Sınav : % 30
Uygulama Etkinlikleri: % 15
Proje : % 20
Dönem sonu sınavı : % 35

Öğrencilerin değerlendirmeye katılan ölçütlerden elde ettikleri puanlar aşağıdaki çizelgeye göre nota çevrilecektir:

A = % 90 – 100	C+ = % 65 – 69	D– = % 45 – 49 %
A– = % 85 – 89	C = % 60 – 64	F = % 00 – 44 %
B+ = % 80 – 84	C– = % 56 – 59	NG = % 80 altında devamsızlık veya eksik ölçüt
B = % 75 – 79	D+ = % 53 – 55	
B– = % 70 – 74	D = % 50 – 52	

MATERYAL GELİŞTİRME PLANI

Adı soyadı:	
Bölüm:	
Materyali hazırlanan Ders:	
Materyali hazırlanan Unite:	
Materyalin hazırlandığı sınıf düzeyi:	
Materyalin Amacı:	
Öğrenme Hedefleri (Talim Terbiye Kurulu sitesinde yer alan ve ilgili derse ilişkin öğretim programından yazılacaktır.) Adres: http://ttkb.meb.gov.tr/www/ogretim-programlari/icerik/72	Örnek : • Öğrenciler iki basamaklı sayılarda toplama işleminin nasıl yapıldığını açıklayabileceklerdir. • Öğrenciler iki basamaklı sayılarda verilen iki sayıyı toplayıp doğru sonucu bulabileceklerdir.
Hedef kitlenin özellikleri	Materyalin hazırlandığı öğrenci grubunun (yaşlarına göre) gelişim özellikleri açıklanmalıdır. Öğrencilerin zihinsel, psikolojik ve bedensel gelişimlerinin açıklanması beklenmektedir.
Kısa Ozet:	Materyali hazırlanan ünitenin kısaca tanıtılması beklenmektedir.
I. Basılı Materyal	Bir kitapçık, poster A1, bröşür, çalışma yağrağı vb biçiminde olabilir. Görseller (şekil, resim, fotoğraf, şema, tablo), yazı ve renklerden yararlanılabilir.
II. Sunu Materyali	Sunu materyalinin, Power-point ile ve içeriği öz bir biçimde sunmak amacıyla hazırlanması beklenmektedir. Sunu hazırlanırken mesaj tasarımı ve görsel tasarım ilkelerinin dikkate alınması beklenmektedir.
III. Uç boyutlu Materyal	Dersin amaçları ve hedef kitlenin özelliklerine uygun olmak koşulu ile üç boyutlu bir materyalin hazırlanması beklenmektedir. (karton, tahta, plastik, metal vb. Materyaller kullanılabilir.)
Rapor	Materyallerin hangi görsel tasarım ilkelerini esas aldığı, hedef kitlenin hangi özelliklerini gözönünde bulundurarak hazırladığını içeren kısa bir raporun yazılması beklenmektedir.