



The History of Turkish Education Course Based on Technopedagogical Education: An Action Research

Şefika Sümeyye Çam*

Department of Educational Sciences, Muş Alparslan University, Muş, Turkey

ORCID: 0000-0001-9360-0758

Article history

Received:
16.09.2020

Received in revised form:
25.11.2020

Accepted:
13.01.2021

Key words:

Technopedagogical education,
Quality of teaching in higher
education,
Action research

This study aimed to (a) determine how The History of Turkish Education course was taught under the current conditions, (b) identify the current status of the second-year student teachers (hereafter student) of preschool education regarding the technopedagogical education, (c) design history of Turkish education course activities based on technopedagogical education and specify its effect on the learning-teaching process, and (d) specify the opinions of students on the subject. Action research was applied to achieve this purpose. The researcher designed an action plan and implemented it into a two-hour history of Turkish education course that lasted 12 weeks in the 2018-2019 spring term. The study was conducted with 30 students. Content analysis was used to analyze the data obtained through semi-structured interviews and open-ended questionnaire forms. Findings displayed that traditional methods were used to teach the history of the Turkish education course. Besides, students were passive and had no training based on technopedagogical education. The course designed based on these findings positively affected the learning environment. The students became active, collaborated with their classmates, and communicated constantly with their friends and lecturers even outside the class through social media. However, those who were familiar with traditional teaching methods had difficulty in adopting technopedagogical methods at the first stage; they were adapted to these innovations over time. It was suggested that a course with emphasis on theoretical knowledge (e.g., the history of Turkish education) should be taught based on technopedagogical education in such a way that students could be active.

Introduction

The History of Turkish Education course was introduced in 2018 and is a two-credit compulsory professional teaching knowledge course. It is taught in all departments of faculties of education (The Council of Higher Education [YÖK], 2018). This course aims to examine the understanding of education of the Turkish society from past to present. Thus, it investigates the differences between the periods to understand the educational problems of today and to make future education plans. Knowing the history of Turkish education is crucial in terms of contributing to the development of education and its practices, understanding

* Correspondency: s.subay@alparslan.edu.tr

current educational issues and suggesting solutions to these problems, and having a strong professional awareness (Akyüz, 2015). However, students do not adequately internalize the history of Turkish education course; instead, they have negative attitudes towards this course (Arıkan, Ünver, & Süzer, 2007; Şahin & Güvercin Çetinoğlu, 2016). Besides, students find the course less effective (Alabaş, 2016).

The rote learning habit in the education system may be the reason for the low effectiveness of this course. Arıkan et al. (2007) advocate that students emphasize the use of visual elements and student-centred approach while teaching the history of Turkish education. They found rote learning and teacher-centred teaching ineffective. However, no research has examined the teaching methods and techniques used in the history of Turkish education course or students' opinions about these methods and techniques. Being a history course, lessons are usually based on memorization and conducted monotonously, and students are passive listeners. These problems negatively affect the perceptions of students towards the course (Aslan, 2005).

Active learning methods should be used to increase the interest of students towards the history of Turkish education and develop their perception as well as knowledge. Using technology increases students' active participation in lessons (Harris & Hofer, 2011). Technology with appropriate pedagogical methods can create an effective learning environment, increase academic success, and make the lesson more enjoyable. Technopedagogical education is one of the most effective methods to achieve this aim (Mishra & Koehler, 2006).

Technopedagogical Education

Mishra and Koehler (2006) developed the Technological Pedagogical Content Knowledge (TPCK) by adding "Instructional Technologies" into the Pedagogical Content Knowledge (PCK) model of Lee Shulman in 1986. PCK is the basis of this technology integration model, which emphasizes the importance of pedagogical knowledge (Harris & Hofer, 2011). PCK includes teaching the subject with the most effective forms of presentation, having the knowledge of teaching methods suitable for students with individual differences, and organizing learning environments to help students be active. TPCK refers to the use of all these features together with the "Instructional Technologies". In other words, it is the ability of a teacher to choose appropriate method and technologies to teach a topic (Mishra & Koehler, 2008). Figure 1 presents a diagram explaining TPACK.

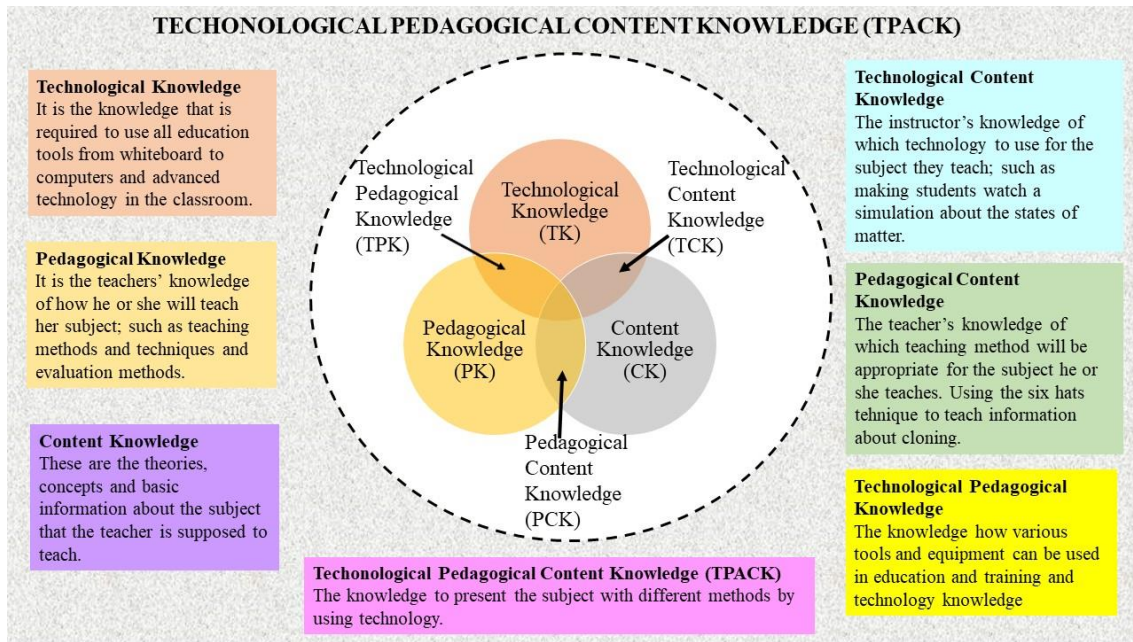


Figure 1. The Scope of Technological Pedagogical Content Knowledge, Mishra and Koehler (2008)

TPACK has various expressions such as technopedagogical knowledge, technological pedagogical content knowledge, pedagogical technology knowledge, and pedagogical content knowledge related to information and communication technologies. In this research, TPACK refers to technopedagogical knowledge. Technopedagogical education is the planning, performing, and evaluating stages of teaching based on technopedagogical knowledge to increase the effectiveness of the teaching process (Kabakçı Yurdakul, 2011).

Technopedagogical education has been mostly examined by survey studies that aim to identify the knowledge levels of students (Archambault & Crippen, 2009; Chai, Koh, & Tsai, 2010; Doğru & Aydın, 2017; Ünlü, Kaşkaya, & Coşkun, 2017). Process-oriented studies on technopedagogical education are less common. Positive results were found in research conducted to improve the technopedagogical knowledge of students, such as teaching becomes more effective, students develop a positive attitude towards the lesson, learning becomes easier and enjoyable (Brinkley-Etzkorn, 2018; Jaipal-Jamani et al., 2018; Koh & Chai, 2014; Mouza, Karchmer-Klein, Nandakumar, Yilmaz Ozden, & Hu, 2014; Uerz, Volman, & Kral, 2018). Similarly, national research have underlined the positive effects of practices based on technopedagogical education in Turkey (Canbazoğlu Bilici, Sedef; Yamak, Havva; Kavak, 2013; Ersoy, Kabakçı Yurdakul, & Ceylan, 2016; Kabakçı Yurdakul, 2013). However, there is a dearth of studies with concrete practices regarding the practices related to technopedagogical education. Thus, this study is important as it presented the examples of technopedagogical education practices, and served as a model to the researchers who are interested in technopedagogical education and want to use it in their lessons.

Aim of the Study

This study aimed to determine the current practices in the history of Turkish education course, to design action plans for the development of the course activities based on technopedagogical education, and to implement and evaluate these plans. To achieve this goal, the following research questions were:

- (1) How are the implementation in The History of Turkish Education course performed under the current conditions?
 - What are the perceptions of students about The History of Turkish Education course?
 - What kind of implementation are done in The History of Turkish Education course?
- (2) How can the implementation process of The History of Turkish Education course based on technopedagogical education be carried out?
- (3) What are the opinions of students about the process of The History of Turkish Education course based on technopedagogical education?
 - What are the prior knowledge and opinions of students regarding technopedagogical education?
 - What are the opinions of the students regarding technopedagogical education practices?

Method

Research Design

Action research was applied because the aim was to implement a new approach in the history of Turkish education course. Action research is a systematic process that requires pre-planned regular observations with the aim of solving the problems experienced in teaching processes and eliminating the gap between theory and practice (Schoen & Nolen, 2004). The goal is to develop an implementation to solve a particular problem. Johnson (2014) asserts three purposes for action research: analysing a teaching method, a problem, or an area of interest. In this study, a new method was carried out with students, and the implementation and performance processes were analysed in depth. The researcher received support from a field expert while preparing the action plan. The research process was designed in four stages (*planning, acting, observing, reflecting*) and was carried out by the researcher.

Planning

At the planning stage, the research problem was identified. Identifying a problem or a situation is very important in action research. The identified problem should be intervenable and replaceable (Mills, 2013). Considering the low interest in courses with a theoretical background such as the history of Turkish education (Arıkan et al., 2007; Şahin & Güvercin Çetinoğlu, 2016), the researcher took the opinions of students who had taken this course before to identify the research problem and to support it with concrete data. According to findings, this course was performed with traditional methods, and it did not attract students' attention.

Then, research questions were created, and the study group was determined. Action plans were designed to identify the prior knowledge of students who studied the history of Turkish education course before. Following the action plans, a 12-week implementation period was foreseen. Due to its cyclic nature, action research allows reviewing the literature during the data collection and analysis phases. Therefore, the researcher investigated the technopedagogical practices that can be applied in course throughout the entire process.



Acting

To design the action plans, topics were examined. The researcher reviewed the literature and determined outcomes as well as content of the course. Therefore, she designed lesson plans based on technopedagogical education. While applying the lesson plans, necessary changes were made according to the occurring situations during the process. While preparing lesson plans, students' computer skills, their interests, whether they had smart cell phones and internet packages were taken into consideration. The syllabus prepared was shared with two field experts who previously taught this course and used technology applications. According to their opinions, the action plans were finalized.

To carry out the teaching process effectively, non-traditional methods were preferred while preparing the lesson activities. In this regard, studies on technopedagogical education were examined (Graziano, Foulger, Schmidt-Crawford, & Slykhuis, 2017; İlter, 2014; Jang & Chen, 2010; Martin, 2015) and implementations were designed with a focus on the five main objectives of technopedagogical education. The following table shows the methods-objectives and technology applications used in the course based on technopedagogical education for these main objectives:

Table 1. Method-Objectives and Technologies Used in the Action Research Process

Method-Objective	Technologies
Active participation-Collaboration	Padlet, Video montage
Out-of-class tasks	Include all applications
Interactive evaluation	Kahoot, Poll Everywhere, Google Forms
Effective presentation	PowerPoint, Digital Concept maps, Video-documentary
Extending the class outside the classroom environment- strong communication	Instagram, WhatsApp

Action plans were applied for 12 weeks. After each implementation, the plan of the next week was prepared by taking the opinions of the students. The researcher implemented the plans. The researcher, also a participant action researcher, was the lecturer of the course.

Observing

The researcher examined each action plan, took students' opinions and made new arrangements (if necessary) for the following week. Data collection tools and the process were explained in detail under a separate heading.

Reflecting

Analysing and interpreting data is one of the most important steps in action research. While collecting data, the researcher also started to analyse data and create categories and subcategories, following the inductive approach (Johnson, 2014). The opinions received after the implementation performed every week were analysed. Besides, the interview transcripts were analysed. Figure 2 shows the planning scheme for the action research process:

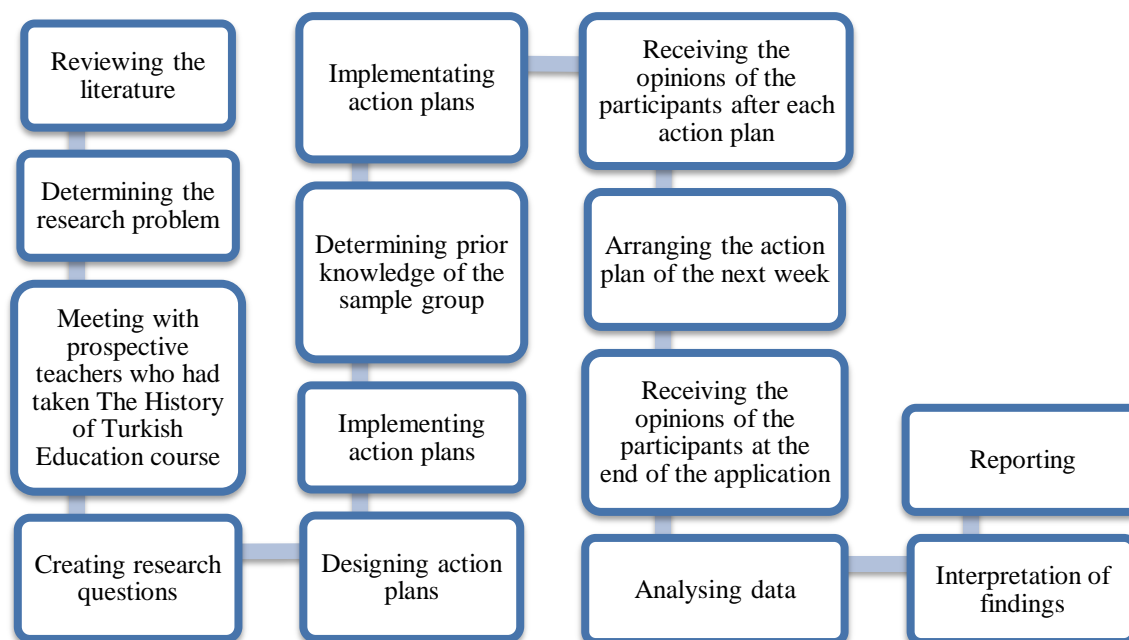


Figure 2. Research Process

Study Group

Convenient sampling was used so that the researcher could contact or reach the study group easily (Yıldırım & Şimşek, 2008). First, in order to determine the problem situation, data were collected from 10 students who took the history of Turkish education course at the faculty of education of a public university before. The study was conducted with 30 volunteer second-year students (out of 36 participants) of Pre-School Teaching, who took the history of Turkish education course in the spring semester of 2018-2019 academic year. Six students did not want to participate in the study, but they followed the course. However, they did not demonstrate an active participation during the implementation process (They did not participate in the data collection process or in the activities). Thirty students joined the whole implementation stage. At the end of the implementation, their opinions students were taken to obtain more detailed information about the action research process.

The Role of the Researcher

In action research, the researcher participates directly in the research environment and conducts the whole process (Johnson, 2014). The research consisted of two stages. In the first stage, the problem statement was determined. At this stage, the researcher acted as a non-participant observer in the research environment, did not interfere with the participant's opinions, and only examined the current situation and the problem in depth. On the other hand, at the implementation stage, plans for the implementation process were prepared according to the result determined in problem statement and according to the result of the pre-assessment of the group where the action research was conducted. During the implementation, the researcher was an active participant observer in the teaching environment since she conducted the applications. The researcher was responsible for preparing and implementing action plans based on the data collected during the research period to determine the systematic and in-depth situation of the research environment. The researcher also kept the identity of the participants confidential, keeping all raw data in terms of ethical principles. To increase the

credibility of the research, she reflected different views and quotations on the same theme during the analysis of the data.

Data Collection Tools and Data Collection

Data were collected through semi-structured interviews and open-ended questionnaire forms. Data collection tools used are as follows:

Semi-structured interviews

Semi-structured interviews were conducted with the students who had taken the history of Turkish education course to determine the research problem. In these interviews, the researcher examined the methods applied in course and took the opinions of students about these methods.

Open-ended questionnaire forms

Before the implementation of the action plans, prior knowledge of students about the technopedagogical education was determined. The researcher benefitted from Graham et al. (2009) while identifying the prior knowledge of the participants. Thus, three dimensions were considered while determining their prior knowledge: technology knowledge (TK) planned to be used throughout the implementation process, technology literacy levels (TCK), educational activity planned to be carried out by integrating technology and pedagogy (TPCK).

Weekly lesson evaluation form with Google Forms

Throughout the action research process, every week the opinions of the students about the course were taken with an open-ended questionnaire prepared via Google Forms. The lesson of the next week was shaped after examining the opinions of the participants under four themes: "Difficulties encountered", "Learning the lesson", "Attitude towards the method used" and "Recommendations for the next lesson".

Mid-term evaluation form of the history of Turkish education course based on technopedagogical education: Open-ended questionnaire forms were used in order for the opinions of the students to be gathered and evaluated, which are about the implementation process, until the midterm exam date. Participants were asked about the design of the course, technology integration, difficulties encountered, and suggestions. Through this form, students' opinions about the methods applied for five weeks and suggestions for the courses after the midterm exam were collected.

Semi-structured interviews with students at the end of the implementation

After the implementation process, volunteers were interviewed in the classroom. In parallel with the pre-interviews, their opinions were examined under four themes: technology applications used during the implementation process, technology literacy levels, the activities they plan to do by integrating technology and pedagogy, and the pedagogical methods applied. They were also asked to compare the methods applied before and after the midterm exam.

Lesson plans

An action plan was carried out with a 12-week lesson plan prepared under the content of the history of Turkish education course. The lesson plans were designed with a joint decision from two field experts. According to the weekly evaluation results, the plan of the next week has been shaped.

Data Analysis

Data were analysed with content analysis. The data were coded, divided into sub-themes, and interpreted by establishing relations between the sub-themes (Patton, 1990). While presenting the data, each of the research questions was considered as a dimension, and each research question was coded in itself with content analysis (Yıldırım & Şimşek, 2008). Thus, the interviews were transcribed and transferred to the computer. Irrelevant statements were eliminated, and only the answers to the interview questions were focused. The analyses were supported with direct quotations. To ensure participant privacy, those who were recruited to determine the problem were labelled as P1, P2, P3...; those who participated in the implementation were coded as S1, S2, S3...

Reliability - Validity

In action research, validity refers to a detailed explanation of the research process; reliability is the credibility of the data (Merriam & Tisdell, 2015). Validity and reliability studies in research significantly increase the quality of the research (Silverman, 2013). Therefore, various issues were taken into consideration, and the necessary precautions were taken to ensure the validity and reliability of this research.

In well-designed qualitative research, bias should be minimized, and the collected data should be reported in full detail (Silverman, 2013). Based on this information, all interviews were recorded, and all documents were kept ensuring the credibility of the research. Another researcher also analysed data and the results were discussed. Besides, the process was explained in detail from the design stage to the evaluation stage, and data analysis was supported with direct quotations for the credibility of the results.

Concerning reliability, data triangulation was applied. Thus, the data obtained in different ways were supported by each other. To ensure dependability, expert opinion was consulted at every stage. While preparing the course activities, in order to determine the appropriate technology applications for the course content, two field experts with technology knowledge were consulted. During the data analysis process, two field experts working in qualitative research were requested to reflect on the suitability of the emerging themes to the research questions. Data were constantly checked by the researcher so that they could be used and reached by another researcher. Besides, analyses were also reviewed by another researcher. Two researchers worked in collaboration and carried out the coding process simultaneously. Then, the codes of both researchers were compared. Code agreement percentage was found as .89 by using the formula of Miles and Huberman (1994). To ensure the reliability of coding, the data were coded at different times, and the attention was given to whether the same category included the same sentences in both coding. The different codes were excluded.

Findings and Interpretations

Findings Related to Implementations of the History of Turkish Education Course Under Current Conditions

To determine the research statement, the following research question was asked: “How are the implementation in the history of Turkish education course performed under the current conditions? The data collected under this main question were analysed under two themes: “Methods applied in the history of Turkish education course” and “Opinions of students about the history of Turkish education course”.



Methods applied in the History of Turkish Education Course

Two themes, namely “Traditional methods” and “Technology-supported methods”, were found (Table 2).

Table 2. Methods applied in The History of Turkish Education Course

Theme	Sub-theme	Participants
Traditional methods	Giving students topics-Asking students to present the topics	P1, P2, P3, P4, P5, P6, P7, P8, P9
	Narrative method	P1,P2,P3,P4,P5,P6,P7,P10
	Question-answer	P1, P2, P3,P4
Technology-supported methods	PowerPoint-Slide Share presentation	P1,P2, P3,P4,P5, P6,P7,P10
	Make student watch videos on YouTube	P2, P4

As is seen in Table 2, “Traditional methods” were most preferred in the course. Traditional methods consisted of three sub-themes: “Giving students topics- Asking students to present the topic”, “Narrative method”, and “Question-answer”. Generally, students were given topics and they were asked to present topics individually or as a group. Another method preferred by faculty members was the narrative method. The lecturer either lectured using her method or completed the missing parts verbally while students were presenting the topic through narration. This finding shows that the role of the lecturer in the course was mainly to complete the missing issues, to keep the attention alive by directing questions or most often through solely being a listener. Here are some opinions:

P2 “At the beginning of the lesson, our lecturer provided us with comprehensive content that includes all topics of the lesson. Then, she asked us to create groups of 2 or 3. Each group chose a topic and presented it.”

P6 “The lecturer was just listening and uttering a few sentences to support the slide. Slides were full of text, no video or visuals. Friends copied and pasted the whole paragraph from the book and just read it. Our teacher was saying: Don’t read, move onto the other pages. We were skipping that topic”

Technology-supported methods were limited to PowerPoint and YouTube videos in this course. The lecturer or prospective teacher used narration and question-answer methods mainly through the PowerPoint slides. These findings show that subject-based and teacher-centred approaches were used rather than student-centred; contemporary practices. Also, practices requiring students’ active participation and interaction were not used.

Opinions of Students about the History of Turkish Education Course

Considering students’ opinions about the history of Turkish education course, three themes were found: “Positive opinions”, “Negative opinions” and “Suggestions” (Table 3).

Table 3. Opinions of Students about The History of Turkish Education Course

Theme	Sub-theme	Participants
Negative opinions	Boring course	P1,P2,P3,P4,P5,P6,P7,P8,P9
	Inefficient course	P1,P2,P3,P5, P6,P7,P10
	Lecturer’s not teaching the topic	P1,P2,P4,P6,P7,P10
	Dealing with things irrelevant to course in class	P1,P2,P4,P5,P6,P7
	Not extending the class outside the classroom environment	P1,P2,P3,P5, P6,P7
	Not remembering the content of the course	P4,P5,P9,P10
Positive opinions	Low responsibility	P4, P6, P7
	Gaining public speaking skills	P5
Suggestions	Lecturer’s teaching the topic	P1,P2,P3,P4,P5,P6,P7,P8,P9
	Activating students	P1,P2,P3,P4,P5,P6,P7,P10
	Making the lesson fun	P3,P5,P7,P9

Students had negative opinions about the history of Turkish education course. Their negative opinions were “The course is boring”, “The course is inefficient”, “The lecturer does not explain the course”, “Dealing with things irrelevant to course in class”, “Not extending the class outside the classroom environment”, and “Not remembering the content of the course”. These findings show that students mostly taught monotonously, that listeners were passive and bored, what is more, were interested in other things. Lesson became less effective when taught by students. Their teaching did not attract the attention of other students. Besides, this situation caused the students to focus only on the subjects whose presentations they delivered instead of the whole course. Each student stated that they only learned their subjects and never remembered the others. Below are some opinions:

P9 “Such a lesson was boring and monotonous. There was always the same order, the same mode. As we were not as good as a teacher, we could not teach or listen to those who taught. We couldn’t focus on the lesson.”

P5 “We presented the topic once. We just studied our subject. I don't remember other issues. Maybe we should have worked on all subjects, but we-students-are like that, we just work for our subject.”

Students also expressed positive opinions owing to the ease of passing the course and the low responsibility. Students recommended that the lecturer make students active and use different practices that would make the lesson fun. They listed suggestions such as ensuring that students are prepared for the lesson, using drama and animation methods so that students attend the lesson, and keeping their attention alive with film and documentary sections.

P1 “If I were the lecturer, I would ask the students to use their role-playing abilities. Let them feel! It is history. It will be more memorable if one says: I am Farabi, this is my educational view...”

P7 “If I were the lecturer, I would never leave the whole lesson to the student. I would teach it myself, I would help them attend the lesson. If it was a boring and theoretical lesson, I would get them to watch videos that would keep their attention alive.”

Findings Related to the Implementation Process of the History of Turkish Education Course Based on Technopedagogical Education

After identifying the research problem, course activities based on technopedagogical education were prepared and the second research question (How can the implementation process of the history of Turkish education course based on technopedagogical education be carried out?) was examined. The implementation process of this design was explained in detail in the method section. In this section, the draft of the “History of Turkish Education Based on Technopedagogical Education” was presented. In this context, the researcher selected and presented the processes in which the implementation process was reflected best and the activities that could answer the research questions appropriately.

Action Plans

To arrange the implementation process by technopedagogical education, the following steps were realized. The researcher:

- (1) Explained technopedagogical education, which is the approach to be used directly at the beginning of the lesson,
- (2) Determined students' prior knowledge on technopedagogical education through an open-ended questionnaire form,



- (3) Determined students' technology use knowledge through verbal communication in the first lesson and identified whether they had smart mobile phones-internet access and so on.,
- (4) Determined hardware such as computer, internet, smart board that are planned to be used in the classroom and solved the problems (if any) pertinent to these tools,
- (5) Established a WhatsApp group that would enable all students to be together and communicate with each other as well as the lecturer throughout the course,
- (6) Created a Google Classroom class ensuring the attendance of the whole class in order to extend the class outside the classroom environment, share course-related information and documents, and announce weekly tasks,
- (7) Introduced technology applications to be used throughout the course,
- (8) Informed that there would be a task each week and that weekly tasks would form performance scores.

Before the implementation, the researcher identified the opinions and competencies of the students about technopedagogical education. All students (except two) were found to have smart phones and actively use the technology. However, their prior knowledge showed that they did not use applications other than Office programs such as PowerPoint. Besides, they were found to use narrative methods more and want to get out of this monotony. This was an important factor in determining the points that the researcher would focus on during the implementation of the action research. Firstly, action plans were designed considering that students had problems in actively participating in the course. For each week, a separate action plan was prepared. Below is a sample action plan.

Table 4. An Action Plan sample of The History of Turkish Education Course Based on Technopedagogical Education

1.Week
<p>1. Lesson: Scope and purpose of The History of Turkish Education</p> <p>Technology-Pedagogy Used: PowerPoint → narration Poll Everywhere → question-answer-brainstorming → ensuring the student's active participation Video-visual elements → Drawing attention Google Classroom → extending the class outside the classroom environment</p> <p>Brief introduction of technopedagogical education to be watched in the course with a PowerPoint presentation on visuals Determining students' prior knowledge about The History of Turkish Education by using brainstorming technique through Poll Everywhere application embedded in the presentation: Each student answers the questions on the mobile phone, answers are projected upon the board, and the answers are scrutinized by the whole class after the lecturer asks the following questions respectively: "What comes to mind when we say the history of Turkish education?" "What are the objectives of the history of Turkish education?" "Who are the important names you remember from The History of Turkish Education course?". Then, the lecturer shares the concept map prepared beforehand for the answers and the students make comparisons.</p>
<p>2. Lesson: Education and its features in Turks before Islam</p> <p>Sharing the main features of education and its characteristics before Islam with visual elements through PowerPoint, providing videos on the topic. Having students watch movie sections related to specific features such as war education, love of child, determination to live independently. In order not to distract students from the subject, asking questions with Poll Everywhere and the whole class' answering questions, sharing a short documentary film on the invention of the printing press. Assigning the task of the week: Watching the ORDU movie and answering questions posted after lesson through Google Classroom. Ensuring that all students answer the following questions: "How do you establish the connection between the Turks' experiences and education in this movie?" "How are the Turks represented?" "What are the examples from the history of education?" Thus, extending the class outside the classroom environment. At the end of the course, a questionnaire form prepared with the data matrix application was given to the students and their opinions about the course were taken.</p>

In the first week, the course was introduced and the Poll Everywhere application was used in company with brainstorming through narration to enable students to express what they know

without fear. Students were observed to participate in such an activity for the first time and want the next lessons to continue like this. There was progress on the active participation of students. Each student could express his/her opinion clearly. However, for this situation to continue as desired, these practices were continued in the following weeks.

The course was carried out as above until the midterm exam. After the midterm exams, before the classes started, a mid-term evaluation was made and the way the course was taught was changed according to the opinions of the students. They became tired due to their intensive participation in the lesson for five weeks and had difficulty in performing weekly tasks. Therefore, weekly tasks that would continue after the midterm exam were abolished and it was decided to give a single wide-ranging task. Some opinions related to this finding are as follows:

S3 “We are not accustomed to these applications. We have been shocked and ruined. We have been tired. We want less burden until the final exam. Let's not do homework anymore”

S9 “Homework is useful, but we are very busy, we cannot catch up with other classes. We are university students; why do we prepare homework? You teach, we listen...”

Activities of the course based on technopedagogical education were gathered under five themes: “Presentation of theoretical knowledge”, “Active participation of students in the lesson”, “Collaboration”, “Communication”, and “Extending the class outside the classroom environment”. The type of activity suitable for each theme, the description of the activity and the technology knowledge used were determined.

Table 5. Activities of The History of Turkish Education Course Based on Technopedagogical Education

	Type of activity	Description	Technology used
Activities for the Presentation of Theoretical Information	Reading text	Reading documents about the subject before coming to class, reading information from the Internet via applications used in the lesson	Web pages, Office programs
	Presentation tools	Presentation of theoretical information, verbal presentation	PowerPoint
	Visual elements	Supporting theoretical knowledge with mobile-immobile visual elements, Embodying information	XMind, iMindMap, Tagul, Poll Everywhere
	Videos	Attracting attention and embodying information with documentaries and various video elements relate to events in the history of education	YouTube, PowToon, Movie Maker
	Researching	Instructing students to study outside and inside the classroom, giving research tasks on the subject	Google, Web pages
	Visualizing the text	Creating concept maps providing an easy understanding of the complex and intensive topics in the history of Turkish education	XMind, iMindMap,
Activities for Active Participation	Evaluation activity	Testing what is learned in the lesson, polling their prior knowledge, making the lesson fun, and drawing attention	Kahoot, Poll Everywhere
	Taking student opinions	Taking the opinions of students about the events in the history of education, taking opinions about the way the lesson is taught	Poll Everywhere, Google Forms, Padlet
	Weekly tasks	Giving weekly tasks for students to come to class prepared	Google Classroom, Web pages, Office programs, Padlet, PowToon, Movie Maker, XMind,
	Question-answer	Drawing attention, adding questions to the theoretical flow of information to gather distracted attention, giving feedback to responses	Poll Everywhere
Activities for Collaboration	Station technique	Determining station points in the classroom, students' researching or presenting their views on each station topic	Google Drive-Google document, Padlet
	Creating common	Students' creating a common content on a subject related	Padlet



	content	to Turkish education history	
	Teamwork	Giving weekly tasks such as video montage-documentary preparation-animation video preparation to students to do teamwork	YouTube, PowToon, Movie Maker
Activities for Communication	Social network platform for the course	Extending the class outside the classroom environment, Sharing documents about the lesson, publishing quizzes after lesson, Assigning tasks, making announcements	Google Classroom
	Communication of all stakeholders	Making announcements about the lesson, presenting instant information	WhatsApp

During the 12-week implementation, combinations of activities in Table 5 were used and their applicability was tested. Methods that are not efficient in practice are not included in the table.

Findings Related to the Students' Opinions Regarding the Process of the History of Turkish Education Course Based on Technopedagogical Education

To determine the effect of action plans and students' opinions about the implementation, the third research question was asked: "What are the opinions of students about the process of The History of Turkish Education course based on technopedagogical education?" Under this main question, "prior knowledge and opinions", "mid-term evaluation opinions", and "opinions on implementation" of students on technopedagogical education were examined.

Prior Knowledge and Opinions of Students on Technopedagogical Education

Before implementing the action plans designed based on technopedagogical education, prior knowledge and opinions of students on "Technology applications planned to be used during the implementation process", "Technology literacy levels", and "Activities they plan to do by integrating technology and pedagogy in the future" were determined.

Table 6. Prior Knowledge of Students on Technology Applications

	I know about it	I just encountered it (once)	I don't know about it
Technology Applications	n	n	n
Google Classroom social networking environment		1	29
Google Forms survey preparation tools	3	10	18
Windows Movie Maker video montage programs	3	9	18
iMind Map - Gliffy digital concept map applications			30
Kahoot, Poll Everywhere interactive assessment tools		1	29
PowToon animation applications		1	29
Padlet digital board applications			30

Table displays that the majority did not use these applications before. Only three students were found to use video editing programs such as Google Forms and Windows Movie Maker. Based on these findings, it can be said that students need to improve their technology knowledge. To determine whether students perceived the situation in the same way, they were asked: "What is the score over 5 when you evaluate yourself as a technology literate?" Table 7 exhibits the findings.

Table 7. Personal Scores of Students Regarding Technology Literacy Levels

Score	Prospective teacher
5	--
4	S21, S24, S29
3	S2, S7, S10, S12, S14, S16, S17, S27
2	S1, S5, S13, S15, S19, S22, S23, S25
1	S3, S4, S6, S8, S9, S11, S18, S20, S26, S28, S30

Table 7 supports Table 6. The majority described themselves as technology literate in the field with 3 points or less. Only three students scored themselves as 4 or above. This finding shows that the participants did not see themselves as technology literate.

They were asked “Imagine you are recruited as a preschool teacher. What are the pedagogical methods you should have? With which technology applications, and how, do you integrate these pedagogical methods?”. The answers were summarized in Table 8.

Table 8. Students' Plans for Integrating Technology and Pedagogy

I do not know	S1, S2, S5, S7, S8, S9, S10, S11, S14, S16, S17, S19, S25, S26
Using simulation or videos to show events that cannot be shown or displayed in the classroom	S7, S10, S15, S18, S20, S21 S23, S26, S27, S28, S30, S29
Playing intelligence games on smartboard to reveal the creativity of children and make them have fun	S8, S12, S18, S22, S24, S30
Drawing attention through videos, cartoons, and animations	S3, S4, S15, S23, S30, S29
Following technological innovations from the internet and social media to be up-to-date in the field	S13, S22, S25, S27

Considering Table 8, almost half of the participants do not know how to design activities for the course by combining technology and pedagogical methods. They provided examples of using mainly simulation videos, intelligence games and animation videos for various purposes. This finding shows that students need to carry out lesson activities by combining technology and pedagogical methods.

Mid-Term Evaluations of Students' Opinions about Technopedagogical Education

A mid-term evaluation was done by taking the opinions after a 5-week implementation period designed based on technopedagogical education in the history of Turkish education course. Their suggestions underlined three sub-themes: “Reducing/eliminating out-of-class tasks”, “Reducing teamwork in the classroom” and “Solving technical problems”. Table 9 displays sub-themes related to opinions of participants.

Table 9. Suggestions According to Mid-Term Evaluations of Students' Opinions

Reducing/eliminating in- and out-of-class tasks	S1, S3, S5, S6, S7, S9, S10, S11, S12, S15, S18, S19, S20, S23, S24, S25, S26, S27, S29, S30
Reducing teamwork in the classroom	S1, S3, S6, S7, S10, S11, S12, S15, S19, S23
Solving technical problems	S1, S2, S3, S12, S15
Making class tasks obligatory	S4, S21, S22, S27
Emphasis on direct instruction method	S5, S9, S28
Ensuring classroom management	S13

According to mid-term evaluations of students' opinions, the majority were active in the lesson, fulfilled out-of-class tasks, were in touch with each other outside the class, and collaborated in the classroom. Although most of them claimed to be active in and out of the class, they demanded reduction/elimination of their workload in and outside the classroom in



the following weeks. This finding shows that they did not want to take responsibility and had difficulty in adapting to technopedagogical education which is unlike usual methods. Here are some representative excerpts:

S6 “Having a task in each lesson was difficult for us. Because we have other burdens and we cannot manage all of them together. Obviously, you do these things so that the lesson can be interesting and we enjoy it, but we are alienated from the lesson. Mondays have been a nightmare ...”

S29 “We are not accustomed to these methods... Yes, we did not do any homework but we were nervous It was indeed possible to come here to listen to the teacher and take notes...”

It was observed that students had difficulties in performing weekly tasks given in technopedagogical education after a five-week implementation period and this caused them to display negative attitudes towards the course. Thus, considering their opinions while planning the lessons, in- and out-of-class tasks were eliminated after the five-week period.

Opinions of Students About Technopedagogical Education Implementation

Opinions of students were examined under four themes: (1) “Technology applications”, (2) “Technology literacy levels”, (3) “Activities they plan to do by integrating technology and pedagogy”, and (4) “Pedagogical methods”. Three themes (TK, TCK, TPACK) determined to identify the priory knowledge were also used to examine the development of the participants in the implementation process.

Table 10. Opinions of Students About Technology Applications

Making a boring lesson (such as history) fun	S1, S4, S9, S10, S11, S13, S18, S20, S25, A26, S27, S28, S29
Being able to express their ideas clearly, feel valuable	S2, S4, S6, S7, S10, S15, S21, S26, S29
Developing technology knowledge	S5, S9, S11, S12, S16, S23, S27
Increasing participation in the lesson	S6, S7, S10, S15, S17, S21
To be able to see history, teaching principles-methods and technology elements as a whole, to use these three elements by combining them	S1, S4, S7, S9, S20
Making the class enjoyable, being different from the others	S9, S19, S25, S27

Regarding Table 10, the majority believe that the technology applications used were successful in “Making a boring lesson (such as history) fun”. That is, the participants' interest in the lessons increased and they developed a positive attitude towards the lesson. These findings, obtained through opinion forms as a result of implementation, were also supported by semi-structured interviews at the end of the implementation. Some opinions are as follows:

S2 “I normally don't like history. I was thinking that I would get bored in a history lesson. However, my thought changed in the process. Our ideas were considered. We thought that nobody would ask for our opinions, but we appreciated that you got feedback from us and acted on it relating it to the lesson.”

S6 “I have not heard some of our friends' voices in our class for two years, but they have started to participate in lessons thanks to these implementation. Actually, some of our teachers use the question-answer technique a lot. Verbally, of course. However, they don't give feedback on whether we are wrong or right. Then, individuals start to not raise their fingers. However, in your application, we were given feedback. We write and see our writing on the screen. You checked our prior knowledge, then corrected us.”

The technology knowledge of the participants, who were not experienced and knowledgeable, improved positively. To determine whether the situation is the same for the students, the pre-application question (What is the score over 5 when you evaluate yourself as a technology literate?) was asked again after application. Table 11 was created based on the data.

Table 11. Students’ Self-Evaluation of Post-Application Technology Literacy Levels

Score	Students
5	S1, S4, S5, S8, S9, S17, S19, S23, S28
4	S2, S3, S7, S10, S12, S21, S22, S27, S30
3	S6, S11, S14, S16, S18, S24
2	S13, S19, S20,
1	S15, S25, S26

Table 11 shows that the majority of students evaluated themselves as technology literate with three or more points as a result of the implementation. This finding shows that participants had positive opinions on technology literacy developments at the end of the action research. The opinions of students were gathered under three sub-themes: “Considering themselves as a technology-literate a step further”, “Increasing self-confidence in learning technology applications” and “Realizing the need for developing more about technology”. Some of the opinions supporting this finding are as follows:

S8 “I have learned that using PowerPoint only in the classroom is not real use of technology. Now, I can design a lesson on my own using technology and learn new things easily.”

S17 “First of all, our confidence levels have increased. I think that I can make a lesson fun by using an unfamiliar technology application in an ordinary lesson.”

Together with technology knowledge, participants’ knowledge of technopedagogical education were also examined. To determine the change in their development regarding technological education knowledge, they were asked “Consider a topic you learned in the history of Turkish education course. If you were a lecturer conducting this course, which pedagogical method and which technology application would you refer to?” in addition to the following question: “Imagine you are recruited as a preschool teacher. If you were the lecturer conducting this course, which pedagogical method and technology application would you use to teach?” Table 12 presents the answers to these questions.

Table 12. The History of Turkish Education Course Activities Designed by Prospective Teacher at the End of the Implementation

Using Kahoot and Poll Everywhere to reinforce the topics covered in the lesson and make the lesson fun	S1, S3, S4, S6, S10, S11, S12, S14, S15, S18, S19, S23, S24, S25, S27, S28, S30
Using digital concept maps to help students better follow and summarize topics	S2, S3, S5, S7, S8, S9, S10, S11, S13, S14, S15, S24, S27, S28, S29
Using videos to gather students' attention	S1, S2, S4, S6, S7, S9, S10, S11, S16, S17, S18,
Considering the opinions of each student and getting their opinions with Google Forms to make them feel valuable	S6, S9, S10, S14, S15, S16, S25
Establishing a Google Classroom, providing out-of-class communication and sharing course documents	S3, S9, S10, S12, S13, S14

The lesson plans of students focused on the sub-themes such as “Using Kahoot-Poll Everywhere to reinforce the topics covered in the lesson” and “Using digital concept maps to help students better follow and summarize topics”. They also expressed their opinions on other technologies and methods used in the course. There was a positive development in their opinions on technopedagogical education when these findings were compared with the



findings obtained in the pre-test. When participants' prior knowledge was examined (Table 8), the technologies mentioned in Table 13 and the methods related to the active participation of students in the lesson were not encountered. The technologies that the participants planned to use were diverse and there were opinions about the active participation of students in their teaching methods. The findings related to participants' opinions on the pedagogical methods (active participation, interaction, collaboration, and out-of-class tasks) applied during the action plans were shown in Table 13.

Table 13. Students' Opinions on Pedagogical Methods Applied in Technopedagogical Education

Out-of-class tasks	Positive opinions	Increasing awareness of responsibility Facilitating learning Helping be prepared for the lesson Increasing the general culture Increasing research skills	S2, S10, S14, S19, S22, S24, S29 S3, S4, S13, S14, S20, S23 S11, S14, S24 S11, S15 S19, S18
	Negative opinions	Difficulty in allocating time Sense of obligation, being alienated from lesson	S1, S2, S6, S7, S9, S8, S12, S15, S18, S20, S21 S25, S29, S30 S1, S5, S25, S26, S27, S28
Interaction	Positive opinions	Each student's ability to express his/her view Being able to communicate with the instructor in and out of the class That all students can communicate with each other, work in collaboration	S4, S6, S8, S12, S13, S14, S15, A17, S20, S21, S23, S24, S25, S26, S27, S29, S28, S29 S1, S2, S3, S6, S9, S11, S13, S17, S19, S23, S26, S27, S30 S2, S3, S7, S9, S10, S13, S14, S15, S22, S24
	Negative opinions	Boredom of extending the class outside the classroom environment	S7, S28
Active participation	Positive opinions	Getting involved in the process by actively participating in the lesson Ensuring the attendance of those who have never attended the class	S1, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, S18, S20, A22, S23, S24, S25, S27 S7, S9, S15, S17, S19, S21, S25, S29
	Negative opinions	Failure to participate actively due to technical reasons	S2
Collaboration	Positive opinions	Implementing innovative practices in the class Making the lesson more effective Getting involved in the learning process Making the lesson fun	S1, S2, S18, S9, S11, S15, S17, S18, S19, S23, A24, S27 S3, S4, S5, S6, S7, S9, S11, S28, S23, S17, S27, S28, S29 S1, S5, S6, S8, S9, S10
	Negative opinions	Failure to ensure class discipline Difficulty in active participation	S6, S7, S8, S9, S10, S11, S12, S13, S22, S23, S25 S2, S7, S9, S19, S21, S28

Table 13 underlines that students had positive opinions on methods used. However, some expressed negative opinions about out-of-class tasks. This supports mid-term evaluation findings. However, this result contradicts with the answers given to the question “Were the methods before or after the midterm effective?” that was asked at the end of the implementation. Because the answers to this question were mostly as follows: “*The methods before the midterm exam were more effective, but it was difficult and time was needed. For this reason, we wanted these tasks to be eliminated.*” Here are some opinions:

S12 “The previous methods were better. We were more active, we were prepared for lesson, but we asked the lecturer to eliminate these as we were having trouble. I wish they

were not eliminated because I entered the mid-term exam with less work and got a high score.”

S20 “We were not familiar with it at first; instead, we had trouble. We were grouching as “Aaaa, teacher shared something again...I prefer the post-midterm but pre-midterm was the effective one. Although we were tired of your notifications, in fact we were more pleased in the lesson.”

The methods applied before the midterm exam were found to be more effective in learning the topics and active participation in the lesson. However, they had difficulty adopting these methods because they had trouble getting out of the usual methods and they asked the lecturer to reduce their course load. This shows that students want to experiment with different applications and participate actively in the course, but they do not have the responsibility to do so.

Discussion and Conclusion

The history of Turkish education is an important course taught as a two-credit professional teaching knowledge course in all departments of education faculties; it contributes to the development of students, supports the understanding of current educational problems, and provides suggestions for the solutions to these problems. Thus, in line with the purpose of the research, the first sub-problem aimed to identify the methods used to teach the history of Turkish education under the current conditions and students' opinions about this course. According to findings, the course was being taught with traditional methods, students were passive, lessons were taught with narrative methods; and accordingly, the interest in the course was quite low and the negative opinions were intense. This confirms various studies (Arıkan et al., 2007; Şahin & Güvercin Çetinoğlu, 2016), which advocate that the history of Turkish education course was not internalized or effective and that there was a negative attitude towards this course. One of the reasons is the fact that the students were passive listeners in the course. This is because being only a listener distracts students and directs their interest to other things (Harris & Hofer, 2011). The rote learning nature of this course might cause it to be less effective. Like this research, Arıkan et al. (2007) suggested that the history of Turkish education course be taught with a student-centered approach rather than a teacher-centered memorization approach. Aslan (2005) concluded that the history of Turkish education was taught based on memorization with a uniform narrative method and that students' being a passive listener was one of the most important problems which negatively affect students' perceptions towards the course.

Based on the finding that the history of Turkish education course was conducted with traditional methods with a teacher-centered approach, course activities (or a course of activities) was designed by using the TPACK model to ensure the active participation of students and make the class interesting (Mishra & Koehler, 2006). The methods and technologies used in the designed course were found to contribute to the development of students positively. The main findings of the research are ensuring the effectiveness of this course, enabling students to be active through technology support despite having a theoretical structure, and internalization of students with a positive attitude. Students could gain outcomes of the history of Turkish education course, which was designed based on technopedagogical education, and they had positive opinions towards this course. Students actively participated in this course, collaborated, constantly communicated with the instructor and the classmates, shared course-related things out of the class, and their interactions increased. According to Mishra and Koehler (2006), lessons with a theoretical background



can become more fun with technology support and student-centered active teaching methods, so a more effective learning environment can be created. From this point, the finding obtained overlaps with the literature. Harris and Hofer (2011) emphasize that active learning environments offered to students with technology support increase their interest in the lesson. The results of this research confirm the results of Graziano et al. (2017) and Uerz et al. (2018). In these studies, instead of using direct instruction methods in higher education institutions, researchers used applications to make students active and make the lesson fun. Thanks to these applications, the content of the course was enriched with technology, and students learned how to teach in the future. Even in higher education, the success of the students increases remarkably and fun element comes into play. This is crucial in qualified teacher education (Koehler & Mishra, 2005). Students feel valuable when they actively participate in such applications. Unlike traditional methods, they are not passive listeners in lessons, and they are considered important with activities in which they can express their opinions and thoughts clearly. Other studies show similar results (Harris & Hofer, 2009; Kalem & Fer, 2003; Kösterelioğlu, Bayar, & Kösterelioğlu, 2014). The fact that this process increased students' communication with their classmates and made them be active may be considered as an indicator of their socialization.

It was found out that students actively participated in lessons and were able to express their ideas instead of just listening thanks to the implementation used in the history of Turkish education course based on technopedagogical education. Active learning is provided since students are at the centre of learning in technopedagogical education (Harris & Hofer, 2009). The important thing is not the technology used by the lecturers and students, but how they do it. Individuals can even start with familiar basic technology applications (Mishra & Koehler, 2008). Similarly, in the current research, students were included in the learning process by using basic technology applications. As İltter (2014) stated, it is not possible to enable students to participate in the class as active listeners by traditional methods. However, as found in this research, many universities still focus on narrative methods and students get bored after a certain period (Keengwe & Georgina, 2012). This situation also indicates that the presentation tools should not be used for more than five minutes to ensure the active participation of students in learning processes in higher education.

Students were observed to have difficulty in adapting to the methods based on technopedagogical education, no matter how actively they participated in the lesson with these methods. Especially, they had problems in fulfilling their responsibilities for out-of-class tasks. They emphasized the usefulness of out-of-class tasks in preparing for the lesson and learning the subject. However, they had difficulty in spending additional time, and they did not want to take this responsibility by claiming they had different course loads. Two-thirds of students were not happy with doing out-of-class tasks. This finding demonstrates that students have a negative attitude towards this course due to out-of-class tasks, which they initially found enjoyable. This confirms Yar Yıldırım (2018) who found that students were prejudiced against homework for various reasons such as homework was not controlled by instructors in higher education, students' course load, and homework was difficult for students. Şahin and İnce (2019) also found that students were not satisfied with their homework, although they found it effective. Unlike them, Keane and Heinz (2019) revealed that students' attitudes towards out-of-class tasks developed throughout the process. Liberatore (2011) and Liberatore, Marr, Herring, and Way, (2013) also argue that online assignments / out-of-class tasks positively affect students' learning in higher education and are very beneficial for them to be prepared for the lesson and for doing practice. That is, homework is effective in higher education but considered negative by students.

One of the important results of this paper is the development of students' opinions about technology knowledge, technology literacy levels, and integrating technology and pedagogy considering the outcomes of the history of Turkish education course, which is designed based on technopedagogical education. In this course, along with the course's theoretical background, the technology knowledge and technology literacy levels of students, who were mostly trained in accordance with traditional methods, developed. This finding coincides with the results of research stating that students' technology knowledge and technology literacy levels develop with the help of implementation based on technopedagogical education in courses with the theoretical background (Brinkley-Etzkorn, 2018; Jaipal-Jamani et al., 2018; Jang & Chen, 2010; Koh & Chai, 2014). According to these studies, technology knowledge of the students developed with the technopedagogical education, and they showed positive attitudes towards this method.

Suggestions

Based on the results of this study, the following suggestions were made:

- (1) The results indicated that the history of Turkish education course based on technopedagogical education increased the interest of students in the course, contributed to their learning, ensured active participation, increased their interaction and communication in the class, and made the lesson effective. It is recommended that lecturers of theoretical lessons (such as the history of Turkish education) use course designs applied to make students more active, help students develop positive attitudes towards the course, and internalize the course. Technopedagogical education-based activities can be adopted to break the monotony of lessons and to adapt the lessons to contemporary methods.
- (2) It was found that students' technology knowledge, technology literacy levels and their opinions towards technopedagogical education developed positively. There is a dearth of studies examining the use of this method in the fields of social sciences in higher education. Further studies can be designed to increase the use of this method in social sciences as it is used in the science in primary and secondary education.
- (3) According to the results of the research, the students were bored with the lessons taught with traditional methods. Therefore, they suggested active participation, remarkably entertaining activities. The methods used in the implementation process of the research gained the appreciation of the students and active participation was achieved in the lessons. For this reason, it may be suggested to increase such practices in education faculties. For the implementation of instruction based on technopedagogical education in higher education, lecturers can be provided with professional development activities that are organized especially by faculty of education deanship. Higher education programs can be reorganized based on technopedagogical education.
- (4) Students were observed to have difficulty in performing out-of-class tasks. Longitudinal studies can be carried out to increase students' out-of-class tasks and responsibilities. Instructors can collaborate on this issue, and joint decisions can be taken.

References

- Akyüz, A. (2015). *Türk eğitim tarihi M.Ö. 1000-M.S.2015 [History of Turkish education B. C. 1000-A. C. 2015]*. Ankara: Pegem.



- Alabaş, R. (2016). Prospective teachers' perceptions about the importance of history of turkish education. *Cumhuriyet International Journal of Education*, 5(4), 89–102. <https://doi.org/10.30703/cije.321417>
- 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. Retrieved from <https://www.learntechlib.org/p/29332>
- Arıkan, A., Ünver, Ş., & Süzer, H. S. S. (2007). Students' views on the importance and content of “Turkish history of education” course in german and english language teaching curricula. *H. U. Journal of Education*, 33, 24–32.
- Aslan, E. (2005). Problems of history education in Turkey. *Buca Faculty of Education Journal*, 18, 106–114.
- Brinkley-Etzkorn, K. E. (2018). Learning to teach online: Measuring the influence of faculty development training on teaching effectiveness through a TPACK lens. *The Internet and Higher Education*, 38, 28–35. <https://doi.org/10.1016/j.iheduc.2018.04.004>
- Canbazoğlu Bilici, Sedef; Yamak, Havva; Kavak, N. G. S. S. (2013). Technological pedagogical content knowledge self-efficacy scale (TPACK-SeS) for pre-service science teachers: Construction, validation, and reliability. *Eurasian Journal of Educational 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). *Journal of Educational Technology & Society*, 13(4), 63–73. Retrieved from <https://www.learntechlib.org/p/52307>
- Doğru, E., & Aydın, F. (2017). Examining the skills of geography teachers' technological pedagogical content knowledge. *Journal of History Culture and Art Research*, 6(2), 485. <https://doi.org/10.7596/taksad.v6i2.686>
- Ersoy, M., Kabakçı Yurdakul, I., & Ceylan, B. (2016). Investigating preservice teachers' TPACK competencies through the lenses of ICT skills: An experimental study. *TED Education and Science*. <https://doi.org/10.15390/EB.2016.6345>
- Graham, C. R., Nicolette;, B., Cantrell, P., Smith, L., Clair, L. S. ., & Harris, R. (2009). TPACK development in science teaching: Measuring the TPACK confidence of inservice science teachers. *TechTrends*, 53(5), 70–79. <https://doi.org/10.1007/s11528-009-0328-0>
- Graziano, K. J., Foulger, T. S., Schmidt-Crawford, D. A., & Slykhuis, D. (2017). Technology integration and teacher preparation: The development of teacher educator technology competencies. In P. Resta & S. Smith (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2017* (pp. 2336–2346). Austin, TX, United States: Association for the Advancement of Computing in Education (AACE). Retrieved from <https://www.learntechlib.org/p/177528>
- Harris, J. B., & Hofer, M. J. (2009). Instructional planning activity types as vehicles for curriculum-based TPACK development. Retrieved from <https://activitytypes.wm.edu/HarrisHoferTPACKDevelopment.pdf>
- Harris, J. B., & Hofer, M. J. (2011). Technological pedagogical content knowledge (TPACK) in action. *Journal of Research on Technology in Education*, 43(3), 211–229. <https://doi.org/10.1080/15391523.2011.10782570>
- İlter, İ. (2014). Teacher candidates' opinions related to methods and techniques used by the instructors. *The Journal of International Social Research*, 7(35), 532–575.
- Jaipal-Jamani, K., Figg, C., Collier, D., Gallagher, T., Winters, K.-L., & Ciampa, K. (2018).

- Developing TPACK of university faculty through technology leadership roles. *Italian Journal of Educational Technology*, 26(1), 39–55. Retrieved from <https://www.learnlib.org/p/184086>
- Jang, S.-J., & Chen, K.-C. (2010). From PCK to TPACK: Developing a transformative model for pre-service science teachers. *Journal of Science Education and Technology*, 19(6), 553–564. <https://doi.org/10.1007/s10956-010-9222-y>
- Johnson, A. P. (2014). *Eylem araştırması el kitabı [A short guide to action research]*. (M. Anay Özten & Y. Uzuner, Eds.). Ankara: Anı.
- Kabakçı Yurdakul, I. (2011). Examining technopedagogical knowledge competencies of preservice teachers based on ICT usage. *H. U. Journal of Education*, 40, 397–408.
- Kabakçı Yurdakul, I. (2013). *Teknopedagojik eğitime dayalı öğretim teknolojileri ve materyal tasarımı [Instructional technologies and material design based on technopedagogical education]*. Ankara: Anı.
- Kalem, S., & Fer, S. (2003). The effects of active learning model on the learning, teaching and communication process of students. *Educational Sciences Theory & Practice*, 3(2), 433–461.
- Keane, G., & Heinz, M. (2019). Differentiated homework: Impact on student engagement. *Journal of Practitioner Research*, 4(2). <https://doi.org/10.5038/2379-9951.4.2.1111>
- Keengwe, J., & Georgina, D. (2012). The digital course training workshop for online learning and teaching. *Education and Information Technologies*, 17(4), 365–379. <https://doi.org/10.1007/s10639-011-9164-x>
- Koehler, M. J., & Mishra, P. (2005). What happens when teachers designed educational technology? The development of technological pedagogical content knowledge. *Journal of Educational Computing Research*, 32(2), 131–152. <https://doi.org/10.2190/0EW7-01WB-BKHL-QDYV>
- Koh, J. H. L., & Chai, C. S. (2014). Teacher clusters and their perceptions of technological pedagogical content knowledge (TPACK) development through ICT lesson design. *Computers & Education*, 70, 222–232. <https://doi.org/10.1016/j.compedu.2013.08.017>
- Kösterelioğlu, İ., Bayar, A., & Kösterelioğlu, M. (2014). Activity-based learning process on teacher education: A case study. *Turkish Studies - International Periodical For The Languages, Literature and History of Turkish or Turkic*, 9(2), 1035–1035. <https://doi.org/10.7827/TurkishStudies.6406>
- Liberatore, M. W. (2011). Improved student achievement using personalized online homework for a course in material and energy balances. *Chemical Engineering Education (CEE)*, 45, 184–190.
- Liberatore, M. W., Marr, D. W. M., Herring, A. M., & Way, J. D. (2013). Student-created homework problems based on YouTube videos. *Chemical Engineering Education (CEE)*, 47(2), 122–132.
- Martin, B. (2015). Successful implementation of TPACK in teacher preparation programs. *International Journal on Integrating Technology in Education*, 4(1), 17–26. <https://doi.org/10.5121/ijite.2015.4102>
- Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation*. John Wiley & Sons.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. SAGE.
- Mills, G. E. (2013). *Action research: A guide for the teacher researcher*. Pearson.



- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017–1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- Mishra, P., & Koehler, M. J. (2008). Introducing technological pedagogical content knowledge. In *Annual Meeting of the American Educational Research Association* (pp. 1–16). New York. Retrieved from <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.605.9082&rep=rep1&type=pdf>
- Mouza, C., Karchmer-Klein, R., Nandakumar, R., Yilmaz Ozden, S., & Hu, L. (2014). Investigating the impact of an integrated approach to the development of preservice teachers' technological pedagogical content knowledge (TPACK). *Computers & Education*, 71, 206–221. <https://doi.org/10.1016/j.compedu.2013.09.020>
- Patton, M. Q. (1990). *Qualitative evaluation and research methods*. SAGE.
- Şahin, M., & Güvercin Çetinoğlu, A. (2016). Perceptions of social studies prospective teachers related to courses and implementations in their departments. *E-International Journal of Educational Research*, 7(1), 50–69. <https://doi.org/10.19160/e-ijer.43780>
- Şahin, V., & İnce, Z. (2019). Opinions of students of geography department on homework-assisted education. *Trakya Journal of Education*, 9(4), 696–707. <https://doi.org/10.24315/tred.518571>
- Schoen, S. F., & Nolen, J. (2004). Action research: Decreasing acting-out behavior and increasing learning. *TEACHING Exceptional Children*, 37(1), 26–29. <https://doi.org/10.1177/004005990403700103>
- Silverman, D. (2013). *Doing qualitative research: A practical handbook*. SAGE.
- The Council of Higher Education [YÖK]. (2018). *Teacher training undergraduate programs [Öğretmen yetiştirme lisans programları]*. Retrieved from https://www.yok.gov.tr/Documents/Kurumsal/egitim_ogretim_dairesi/Yeni-Ogretmen-Yetistirme-Lisans-Programlari/AA_Sunus_%20Onsoz_Uygulama_Yonergesi.pdf
- Uerz, D., Volman, M., & Kral, M. (2018). Teacher educators' competences in fostering student teachers' proficiency in teaching and learning with technology: An overview of relevant research literature. *Teaching and Teacher Education*, 70, 12–23. <https://doi.org/10.1016/j.tate.2017.11.005>
- Ünlü, I., Kaşkaya, A., & Coşkun, M. K. (2017). Examining the technological pedagogical field knowledge competencies of social sciences teacher candidates according to some variables. *Erzincan University Journal of Education Faculty*, 19(1), 214–228. <https://doi.org/10.17556/erziefd.295611>
- Yar Yıldırım, V. (2018). The opinions of the students, teachers and parents about the daily assignments given at secondary school level. *National Education Journal*, 47(220), 201–224.
- Yıldırım, A., & Şimşek, H. (2008). *Nitel araştırma yöntemleri [Qualitative research methods]*. Ankara: Seçkin.