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Technological Pedagogical Content Knowledge Levels of Atatürk's Principles and History of Turkish Revolution Instructors

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Abstract
Twenty-five instructors were included in the current study, which aims to examine the levels of technological and pedagogical content of the instructors of Atatürk's Principles and the History of Turkish Revolution in different state universities in our country. The purpose of the study is to provide these participants with the Scale of Technological Pedagogical Content Knowledge (TPIB) developed by Basher and his friends (2016) and used by Saricoban and his friends (2019).Scale (a) consists of sub-components and 33 items as Technological Knowledge (TB) (Article 9), (b) Content Knowledge (PU) (Article 3), (c) Pedagogical Knowledge (PB) (Article 6), (d) Pedagogical Content Knowledge (PIB) (Article 2), (e) Technological Content Knowledge (TIB) (Article 3), (f) Technological Pedagogical Knowledge (TPB) (Article 7) and (g) Technological Pedagogical Content Knowledge (TPIB) (Article 3). The questionnaire is of type 5 Likert scale and includes the answers in the form of strongly disagree (1), disagree (2), neither agree nor disagree (3), agree (4), strongly agree (5).The reliability of the original questionnaire is 946 and the reliability of the version used in our study is 930. In the light of the data obtained in the study, it was found that the participants' perceptions of the technological and pedagogical content levels of knowledge were positive. Although there is no difference in gender and age between the levels of technological and pedagogical self-sufficiency of the instructors teaching Atatürk's Principles and the History of Turkish Revolution, it has been detected as a result of statistical analysis that there is positivity in those who are more advanced in terms of age.It is recommended for other researchers who consider working on the same topic to use both semi-configured interview techniques to study the subject from both a qualitative and quantitative perspective and increase the number of examples.
Keywords: History of Atatürk's principles and republic, technology, pedagogy, content

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Introduction

Technology integration has become inevitable in education as in all fields. The integration of technology in education emerges more effectively during the COVID 19 pandemic period, which affects the whole world. Thanks to the use of technology in all disciplines of education, it is aimed to continue education and training activities without interruption. In this context, Atatürk's Principles and History of Revolution (AİT), which is a common compulsory course in universities, is also carried out as distance education.

Technology, which is an indispensable element of our current life, has an important place in the lives of both instructors and students in the education process. However, it is known that some instructors, who suddenly have to give their courses in distance educational format, face difficulties in the use of technology due to the lack of technology knowledge. In this context, there is a lack of knowledge about how technology can be used in the best way to benefit students in various subjects.

The Technological Pedagogical Content Knowledge (TPACK) package developed by Mishra and Koehler (2006) consists of three main components: technological knowledge (TK), pedagogical knowledge (PK) and content knowledge (CK). TPACK brings a productive approach to most of the difficulties faced by teachers in applying educational technology (Kaya &Dağ, 2013; Güdek&Açıksöz, 2018; Polly, 2011; Niess, 2005).

Technological knowledge (TK) includes knowledge and ability to use various technologies, technological tools and related resources such as computers, internet, video, boards, books. This skill also requires having skills such as understanding educational technology, knowing the features that facilitate learning and making them available to students, recognizing possible difficulties in the learning process, and following new developments in technology and putting them to work. Pedagogical knowledge (PK) covers teaching methods, learning processes, learn and teaching styles and strategies, classroom management, preparing a lesson plan and making assessments about the lesson, aims, values and purposes of education. On the other hand, content knowledge (CK) covers the knowledge of the subject area to be learned in its most basic sense, knowledge about concepts, theories, evidence and

organizational frameworks on a particular subject, and the skills of transferring all these to the learner.

Of course, the integration of these knowledge and skills with each other makes education and training activities stronger and more effective. In this context, Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK) and Technological Pedagogical Content Knowledge (TPACK) and their use are of particular importance (Koehler & Mishra, 2009; Koh, Chai & Tsai, 2010; Lee & Tsai, 2010).

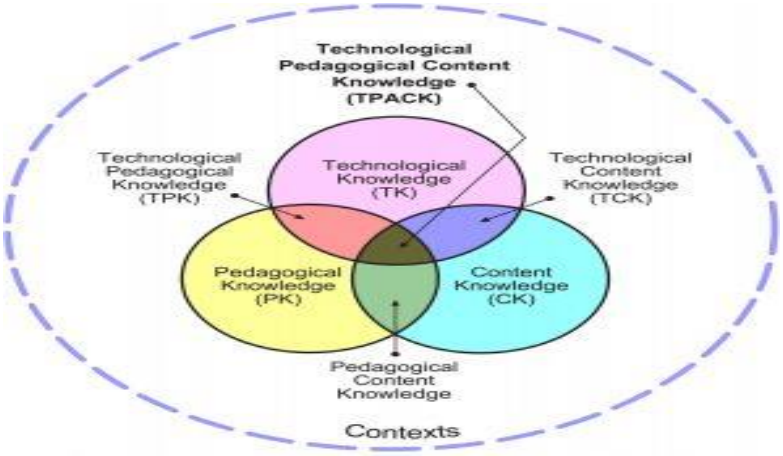

Figure 2:Technological Pedagogical Content Knowledge (TPACK) (Koehler&Mishra, 2009)

Pedagogical Content Knowledge (PCK) covers subjects such as the knowledge of instructors in their fields, curriculum development, syllabus preparation, and evaluation of educational activities. One of the main goals of PCK is to improve teaching practices. Technological Content Knowledge (TCK), on the other hand, consists of the skills of the instructors on the interaction of technology and content with each other. It also includes the ability to choose which special education technology tools are most suitable for the subjects followed and to put them to work. Technological Pedagogical Knowledge (TPK), where these two skills come together, covers the

experiences of the instructors in these two subjects and the skills on how they can change these experiences in a positive way. Finally, Technological Pedagogical Content Knowledge (TPACK), which includes the three features we have tried to explain, consists of different combinations and interests of content, pedagogy,and technology, which form an effective basis for teaching using educational technology. It requires instructors to employ the most appropriate pedagogical techniques for students' learning styles and learning strategies, such as concepts, theories, and content related to the subject studied in the context of TPACK, with technology. Considering these, it is predicted that educational activities will be carried out very effectively and efficiently in the technological environment.

Within the framework of these issues, the present study seeks answers to the following questions.

1. What are the technological pedagogical content knowledge self-efficacy levels of the instructors of Atatürk's Principles and Revolution History course?

2. Do the technological pedagogical content knowledge self-efficacy levels of Atatürk's Principles and Revolution History course instructors' perceptions differ in terms of

a. gender and

b. age?.

Method

Participants

In the 2019-2020 academic year, 25 instructors of the Atatürk's Principles and History of Revolution (APHR) course, which is compulsory in Turkey's universities, participated in this study. Twelve of the participants are females and 13 are males. 12 of the participants are in the age range of 23-30, 4 of them are in the age range of 31-40, and the remaining 9 are in the age range of 41 and over.

Data Collection

In this study, the Technological Pedagogical Content Knowledge (TPACK) Scale developed by Başer et al. (2016) and used by Sarıçoban et al. (2019) was given to the participants of the study.The scale consists of such sub-components as (a) technological knowledge (TK) (9 Items), (b) content knowledge (CK) (3 Items), (c) pedagogical knowledge (PK) (6 Items), (d) pedagogical content knowledge (PCK) (2 items), (e) technological content knowledge (TCK) (3 items), (f) technological pedagogical knowledge (TPK) (7 items) and (g) technological pedagogical content knowledge (TPCK) (3 items). dimension and a total of 33 items. The questionnaire is in 5-point Likert type and includes answers such as strongly disagree (1), disagree (2), undecided (3), agree (4), strongly agree (5). The reliability of the original questionnaire was found to be ,946. The reliability of its sub-dimensions is (a) technological knowledge ,843, (b) content knowledge ,836, (c) pedagogical knowledge ,853, (d) pedagogical content knowledge ,865, (e) technological content knowledge ,710, (f) technological pedagogical knowledge ,893 and (g) technological pedagogical content knowledge ,800. In the current study, instead of the 5 (five) questions in the content knowledge subcomponent in the original questionnaire, which did not create questions about the field. As a result, the scale took its final form consisting of 33 items by adding only 3 (three) questions about the field in this section. The reliability value of the present study was found to be .930. The reliability level of the sub-components are (a) technological knowledge,817, (b) content knowledge ,851, (c) pedagogical knowledge ,898, (d) pedagogical content knowledge ,909, (e) technological content knowledge ,538, (f) technological pedagogical knowledge ,871 and (g) technological pedagogical content knowledge ,699.

Data Analysis

The data obtained in the study were analyzed using SPSS.22.0 (Statistical Package for Social Sciences). First of all, it was checked whether the data showed a normal distribution. Although the distribution was normal in the current study, non-parametric tests were used because the number of

participants was less than 30. Mann-Whitney U Test was used for gender comparisons, and Kruskal Wallis Test was used for age comparisons.

Findings

The data obtained in the study were analyzed according to the research questions of the study.

Technological pedagogical content knowledge self-efficacy levels of Atatürk's Principles and Revolution History course instructors

When the average values given in Table 1 are examined, it is understood that the AIT instructors included in the study believe that their technological pedagogical content knowledge levels (M=4.00) are satisfactory. This result shows that the participants of the study have positive perceptions of their technological pedagogical content knowledge levels.

Table 1
Technological pedagogical content knowledge levels

	N	Minimum	Maximum	Mean	Std. Deviation
TK	25	2,22	4,67	3,7022	,65320
CK	25	2,33	5,00	4,2133	,76303
PK	25	3,00	5,00	4,2133	,53903
PCK	25	3,00	5,00	4,3800	,58238
TCK	25	3,00	5,00	4,0000	,57735
TPK	25	2,71	5,00	4,0629	,56406
TPCK	25	2,33	5,00	3,9467	,63596
TOTAL	25	3,06	4,91	**4,0085**	,46202

Technological knowledge

As for the analysis of the sub-components, the perceptions of the participants regarding the sub-component of technological knowledge are that they look at this subject in a positive way, although not completely (M=3.70). When Table 2 is examined carefully, the participants use computerparts such as printers, headphones and scanners (M=4.28), basic technological terms (e.g. operating system, wireless connection, virtual memory etc.) (M=4.04). They stated that they could use digital classroom equipment such as projector, smart board (M=4.00). In addition to these, they also stated that they can learn to use office programs (e.g. Word, PowerPoint, etc.) with a high level of competence and learn software that helps them complete various tasks more efficiently (M=3.84).

Table 2

Technological knowledge

I can	N	Min.	Max.	Mean	Std. D.
TK1 use key technological terms appropriately (eg operating system, wireless connection, virtual memory, etc.)	25	2,00	5,00	4,0400	1,09848
TK2 make computer settings such as software installation and internet connection.	25	2,00	5,00	3,6400	1,07548
TK3 use computer peripherals such as printer, headset and scanner.	25	1,00	5,00	4,2800	1,06145
TK4 independently solve common computer problems (eg printer problems, internet connection problems, etc.).	25	1,00	5,00	3,5200	1,12250
TK5 use digital classroom equipment such as projector, smart board.	25	2,00	5,00	4,0000	,86603
TK6 use office programs (eg Word, PowerPoint, etc.) with a high level of competence.	25	2,00	5,00	3,8400	,89815

TK7 create multimedia (eg video, web pages, etc.) using text, images, audio, video and animation.	25	1,00	5,00	3,4000	1,11803
TK8 use collaboration tools (wiki, edmodo, 3D virtual environments, etc.) in line with my goals.	25	1,00	4,00	2,7600	1,05198
TK9 learn software that helps me complete various tasks more efficiently.	25	2,00	5,00	3,8400	,89815
TOTAL	25			**3,7022**	

Content knowledge

Table 3 simply indicates that the instructors participating in the study were able to explain the concepts related to their fields (M=4.28), they considered themselves competent enough (M=4.20) and they prepared their lessons by scanning the literature on the subjects they would cover (M=4.16). It is understood that the employees exhibit positive attitudes about content knowledge (M=4.21).

Table 3

Content knowledge

	N	Min.	Max.	Mean	Std. D.
CK1 I think that I am competent enough in my field of study.	25	2,00	5,00	4,2000	,91287
CK2 I prepare my lessons by scanning the literature on the subjects they would cover.	25	2,00	5,00	4,1600	,89815
CK3 I can explain the concepts related to my field of study.	25	3,00	5,00	4,2800	,79162
TOTAL	25			**4,2133**	

Pedagogical knowledge

The pedagogical knowledge of the instructors is another factor that makes the learning and teaching environments the most effective. In this context, the instructors who constituted the participants of the study exhibited positive attitudes (M=4.21). They also stated that they could use teaching methods and techniques suitable for the learning environment and could design a learning experience suitable for the level of the students (M=4.32). In addition, the participant group reported that they were able to support their out-of-class work to facilitate their self-regulated learning (M=4.28), and that they could reflect the experiences they gained from professional development programs to their teaching processes (M=4.24), and that they could respond to students' physical, mental, emotional, social and cultural differences. They believed that they were able to support their learning (M=4.12) and that they could cooperate with school stakeholders (students, parents, teachers, etc.) to support students' learning (M=4.00).

Table 4

Pedagogical knowledge

I can	N	Min.	Max.	Mean	Std. D.
PK1 use teaching methods and techniques suitable for the learning environment.	25	3,00	5,00	4,3200	,55678
PK2 design a learning experience appropriate to the level of the students.	25	3,00	5,00	4,3200	,55678
PK3 support students' learning according to their physical, mental, emotional, social and cultural differences.	25	2,00	5,00	4,1200	,72572
PK4 collaborate with school stakeholders (students, parents, teachers, etc.) to support student learning.	25	2,00	5,00	4,0000	,81650
PK5 reflect the experiences I have gained from professional development programs to my teaching process.	25	2,00	5,00	4,2400	,72342

PK6 support students' work outside the classroom to facilitate their self-regulated learning.	25	3,00	5,00	4,2800	,54160
TOTAL	25			**4,2133**	

Pedagogical content knowledge

AIT instructors, who can blend pedagogy and content knowledge, which are indispensable elements of classroom management, together (M=4.38) stated that they consider themselves competent in managing the classroom learning environment (M=4.40) and evaluating students' learning processes (M=4.36).

Table 5

Pedagogical Content knowledge

I can	N	Min.	Max.	Mean	Std. D.
PB1 manage the classroom learning environment.	25	3,00	5,00	4,4000	,64550
PİB2 evaluate students' learning processes.	25	3,00	5,00	4,3600	,56862
TOTAL	25			**4,3800**	

Technological content knowledge

When Table 6 is examined, it can be said that the technological content knowledge of the AIT instructors is at a satisfactory level (M=4.00). In this regard, participants especially benefit from multimedia (eg video, slide show, etc.) to express their opinions on various topics (M=4.32) and they use technology (eg web conferencing and discussion forums) to contribute remotely to crowded classrooms (M=4.24) is understood.

Table 6

Technological Content knowledge

I can	N	Min	Max.	Mean	Std. D.
TCK1 use multimedia (eg video, slide show, etc.) to express their opinions on various topics.	25	3,00	5,00	4,3200	,74833
TCK2 use technology (eg web conferencing and discussion forums) to contribute remotely to crowded classrooms.	25	3,00	5,00	4,2400	,66332
TCK3 use collaboration tools (eg Second Life, wiki, etc.) to work collaboratively with strangers.	25	1,00	5,00	3,4400	,96090
TOTAL	25			**4,0000**	

Technological pedagogical knowledge

It can be said that the perceptions of the instructors, who constitute another sub-component of the study, regarding their technological pedagogical competencies are also positive (M=4.06). The participating instructors who contributed to our study by responding to the relevant part of the questionnaire were able to decide when technology would be beneficial to teach curriculum standards in the field (M=4.32), they could use multimedia such as videos and websites to support students' learning (M=4.20). They also reported that they were able to manage the learning environment in the online classroom while using technology (M=4.12) and that they could design learning materials using technology that supported students' learning (M=4.00) (Table 7).

Table 7

Technological Pedagogical Knowledge

I can	N	Min.	Max.	Mean	Std. D.
TPK1meet the individualized needs of students using knowledge technologies.	25	3,00	5,00	3,9200	,70238
TPK2 direct students to use knowledge technologies legally, ethically, safely and in accordance with copyrights.	25	2,00	5,00	3,9200	,75939
TPK3 support students in online teaching as they use technologies such as virtual discussion platforms to develop higher-order thinking skill.	25	2,00	5,00	3,9600	,84063
TPK4 manage the learning environment in the virtual classroom while using technology in online teaching.	25	2,00	5,00	4,1200	,66583
TPK5 decide when technology will benefit my online teaching curriculum standards in the field.	25	3,00	5,00	4,3200	,62716
TPK6 design learning materials using technology that supports students' learning.	25	2,00	5,00	4,0000	,91287
TPK7 use multimedia such as videos and websites to support student learning.	25	2,00	5,00	4,2000	,70711
TOTAL	25			**4,0629**	

Technological pedagogical content knowledge

In terms of the technological pedagogical content knowledge sub-component, the participants exhibited positive attitudes (M=4.06). Likewise, this participant group stated that they can support their professional development by using technological tools and resources in order to continuously improve the online teaching process (M=4.24) and they also support students in using technology to support students' development independently (M=4.08).

Table 8

Technological Pedagogical Content Knowledge

Technological Pedagogical Content Knowledge Levels of Atatürk's Principles and History of Turkish Revolution Instructors

I can	N	Min.	Max.	Mean	Std. D.
TPCK1 use collaboration tools (eg wiki, 3D virtual environments, etc.) to support student learning	25	1,00	5,00	3,5200	1,00499
TPCK2 support students in using technology to independently support student development.	25	2,00	5,00	4,0800	,75939
TPCK3 support my professional development by using technological tools and resources to continuously improve the online teaching process.	25	3,00	5,00	4,2400	,59722
TOTAL	25			**4,0629**	

The Difference of Technological pedagogical content knowledge self-efficacy levels of Atatürk's Principles and Revolution History course instructors in terms of gender and age.

Gender

As can be seen from Table 9 and Table 10, in order to find an answer to the second research question of our study, the technological pedagogical content knowledge self-efficacy levels of the instructors of Atatürk's Principles and Revolution History course were investigated using the Mann-Whitney Test to determine whether there is any statistical significance between gender. As a result of the statistical analysis, no difference was found (Sig. ,810).

Table 9
Technological pedagogical content knowledge self-efficacy levels difference:gender

	TOTAL
Mann-Whitney U	73,500

Wilcoxon W	151,500
Z	-,245
Asymp. Sig. (2-tailed)	**,807**
Exact Sig. [2*(1-tailed Sig.)]	**,810**

Table 10
Mann-Whitney Test: Technological pedagogical content knowledge

	TOTAL TK	TOTAL CK	TOTAL PK	TOTAL PCK	TOTAL TCK	TOTAL TPK	TOTAL TPCK
Mann-Whitney U	59,000	56,000	77,500	75,500	69,500	75,000	58,500
Wilcoxon W	137,000	134,000	168,500	166,500	160,500	153,000	149,500
Z	-1,036	-1,239	-,029	-,147	-,470	-,165	-1,083
Asymp. Sig. (2-tailed)	**,300**	**,215**	**,977**	**,883**	**,639**	**,869**	**,279**
Exact Sig. [2*(1-tailed Sig.)]	**,320**[b]	**,247**[b]	**,979**[b]	**,894**[b]	**,650**[b]	**,894**[b]	**,295**[b]

a. Grouping Variable: Gender

b. Not corrected for ties.

Age

In order to find an answer to the second research question of our study, whether there is any statistical significant difference between the age variable of the technological pedagogical content knowledge self-efficacy levels of the instructors of Atatürk's Principles and Revolution History course was investigated using the Kruskal-Wallis Test and no difference was found (Sig. ,105).

Table 11
Technological pedagogical content knowledge self-efficacy levels difference:gender

	TOTAL
Chi-Square	4,501
df	2
Asymp. Sig.	,105

a. Kruskal Wallis Test
b. Grouping Variable: Age

However, when further statistical analysis was made on the subject, such a difference was found only in the content knowledge variable (Sig. ,002).

Table 12
Kruskal Wallis Test:Technological pedagogical content knowledge

TOTAL TPCK	TK	CK	PK	PCK	TCK	TPK	TPCK
Chi-Square	4,583	12,060	2,123	2,281	,941	2,454	,146
df	2	2	2	2	2	2	2
Asymp. Sig.	,101	**,002**	,346	,320	,625	,293	,930

a. Kruskal Wallis Test
b. GroupingVariable: Age

The participants in the 31-40 and 41 and over age group were able to explain the concepts related to the field very easily by scanning the literature on the subjects they will cover compared to the 23-30 age group participants (M=5.00 for 31-40 Years; 41). and above, respectively, M=4.55 and 4.77), and therefore they found themselves competent in their fields (M=4.25 for 31-40 years old, and M=4.66 for 41 and above years old).

Table 13

Technological pedagogical content knowledge self-efficacy levels difference: age

Yaş		CK1 I think that I am competent enough in my field of study.	CK2I prepare my lessonsby scanning the literature on the subjects they will cover..	CK3 I can explain the concepts related to the field very easily
1,00 23-30	Ortalama	3,8333	3,5833	3,6667
	KS	12	12	12
	Std. Sapma	,83485	,90034	,65134
2,00 31-40	Ortalama	**4,2500**	**5,0000**	**5,0000**
	KS	4	4	4
	Std. Sapma	1,50000	,00000	,00000
3,00 41 ve üzeri	Ortalama	**4,6667**	**4,5556**	**4,7778**
	KS	9	9	9
	Std. Sapma	,50000	,52705	,44096
Toplam	Ortalama	4,2000	4,1600	4,2800
	KS	25	25	25
	Std. Sapma	,91287	,89815	,79162

Conclusion and Recommendations

The present study examines the self-efficacy levels of AIT instructors regarding technological pedagogical content knowledge. In the light of the data obtained in the study, it was determined that the perceptions of the participants regarding their technological pedagogical content knowledge levels were positive. Then, the researcher analyzed the sub-components of the technological pedagogical content knowledge levels separately, regarding the topic of the study. When the views of the participants on the sub-component of technological knowledge were examined, it was seen that they looked at this issue in a positive way, although not completely. It is understood that the instructors have positive attitudes towards content knowledge. The pedagogical knowledge of the instructors is another factor that makes the learning and teaching environments the most effective. In this context, the instructors exhibited positive attitudes. Participants feel competent in terms of pedagogical content knowledge. It can be said that the technological content knowledge of the instructors of the mentioned course are at a satisfactory level. It was seen that the perceptions of the instructors, who constitute another sub-component of the study, regarding their technological pedagogical competencies were also positive. Finally, the participants exhibited positive attitudes in terms of the technological pedagogical content knowledge sub-component, too.

In order to find an answer to the second research question of our study, it was examined whether there was any statistical significance between the technological pedagogical content knowledge self-efficacy levels and gender and age of the instructors of Atatürk's Principles and Revolution History course, and advanced statistical analyzes were only performed on the technological pedagogical content knowledge self-efficacy levels and age. It was observed that there was a difference in the content knowledge sub-component in this context. It is understood that the older age group is more competent in terms of content knowledge than the younger group.

In similar studies that will be considered in the future, it is recommended to investigate the subject both qualitatively and quantitatively

by using the semi-structured interview technique and to increase the number of samples.

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