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## **Examining Different Variables of TPACK level of Teachers Attending the FATIH Project Interactive Classroom Management Course**

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### **Abstract**

“Pedagogical Content Knowledge” term came out by combining “content knowledge” dimension that teachers need to have and pedagogical knowledge dimension. Nowadays “technological pedagogical content knowledge” term is created by adding “technology” dimension to “pedagogical content knowledge”. Within the scope of this study, it is aimed to determine TPACK level of teachers from different branches attending the FATIH Project Interactive Classroom Management course and examine TPACK level of them in terms of different variables. Study group of the research in which experimental design is used consists of 25 teachers from different branches who attended the FATIH Project Interactive Classroom Management course and work in a secondary school in Ankara where the FATIH Project is conducted during 2015-2016 school year. According to findings, it is concluded that training has an effect on improvement of “Pedagogical Knowledge” and “Technological Pedagogical Knowledge”. Despite the effect occurring on these two sub-dimensions, it is determined that there is no significant effect of the training on TPACK improvement of the teachers.

**Key words:**TPACK level; FATIH project; technology integration.

### **Introduction**

Nowadays the need of contemporary age is raising qualified individuals who have the qualifications of 21st century. First of all, for fulfilling this need, it is needed to examine the teachers and their qualifications. Point of view to qualifications of teachers has changed as needs of society, theoretic studies and technology have developed. As a result of these changes, it comes out that teachers need to have new qualifications besides the knowledge that teachers have as experts of their fields. Especially need for using information technologies on every level of education is increasing each passing day (Ersoy, 2005). For

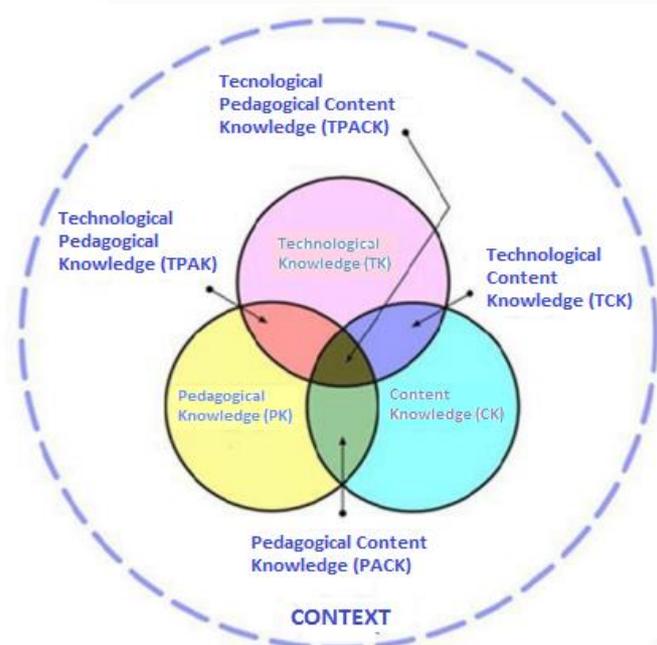
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integrating new technologies to the education, it is considered significant that teachers should use technology efficiently (Turan, Küçük&Gündoğdu, 2013).

Technological Pedagogical Content Knowledge term is derived from the importance of teaching-learning process in which teachers use educational technology. TPACK is defined as a term (area where technological knowledge, pedagogical knowledge and content knowledge intersect) created by adding technological knowledge to pedagogical content knowledge which was introduced to the literature by Shulman (1986) (Koehler, Mishra &Yahya, 2007; Mishra & Koehler, 2006; Niess, 2005). Briefly teachers' qualifications regarding content, pedagogical and technological knowledge are referred as Technological Pedagogical Content Knowledge (TPACK). Thus, TPACK can be defined as one of the basic qualifications that a teacher should have in our age.

**Figure 1.** TPACK and Types of Knowledge (Koehler & Mishra, 2009:p.63)



There are various factors that affect achievement of technological integration efficiently in learning environment. Two of these factors are access to technology and sufficient technological literacy of teachers. According to this, it can be stated that only providing sufficient technological equipment to the teaching-learning environment does not bring success for education. In the first place, usage of provided technologies by teachers should be examined. Studies related to this issue in literature show that teachers are not qualified enough to use technology in their daily lives, academic lives and classrooms effectively. This study examines technological pedagogical content knowledge level of teachers who attend “FATİH Project Interactive Classroom Management Course” carried out under the FATİH Project and whose aim is to increase the technological qualifications of teachers and improve knowledge and skills for technological integration in teaching. Research of pedagogical content knowledge level of teachers who attend this study which was carried out with the aim of improving knowledge and skills for technological integration and providing technological literacy is regarded as significant.

## **Objectives**

By year 2012, within the scope of FATİH Project, “Using Technology while Teaching” course has started to be given to increase technological literacy of teachers and to improve their knowledge and skills for technological integration in education. This course has been conducted as distance education under the name of “FATİH Project Interactive Classroom Management Course” since 2016. Within the scope of this study, it is aimed to determine and examine TPACK level of teachers from different branches attending the FATİH Project Interactive Classroom Management course in terms of different variables.

- Research questions below are determined in line with this purpose:
  - Does interactive classroom management course have significant effect on TPACK levels of teachers?
- Is there any difference on TPACK level of teachers on post-test after FATİH Project interactive classroom management in service training in terms of their;
  - gender,
  - period of service,
  - level of education

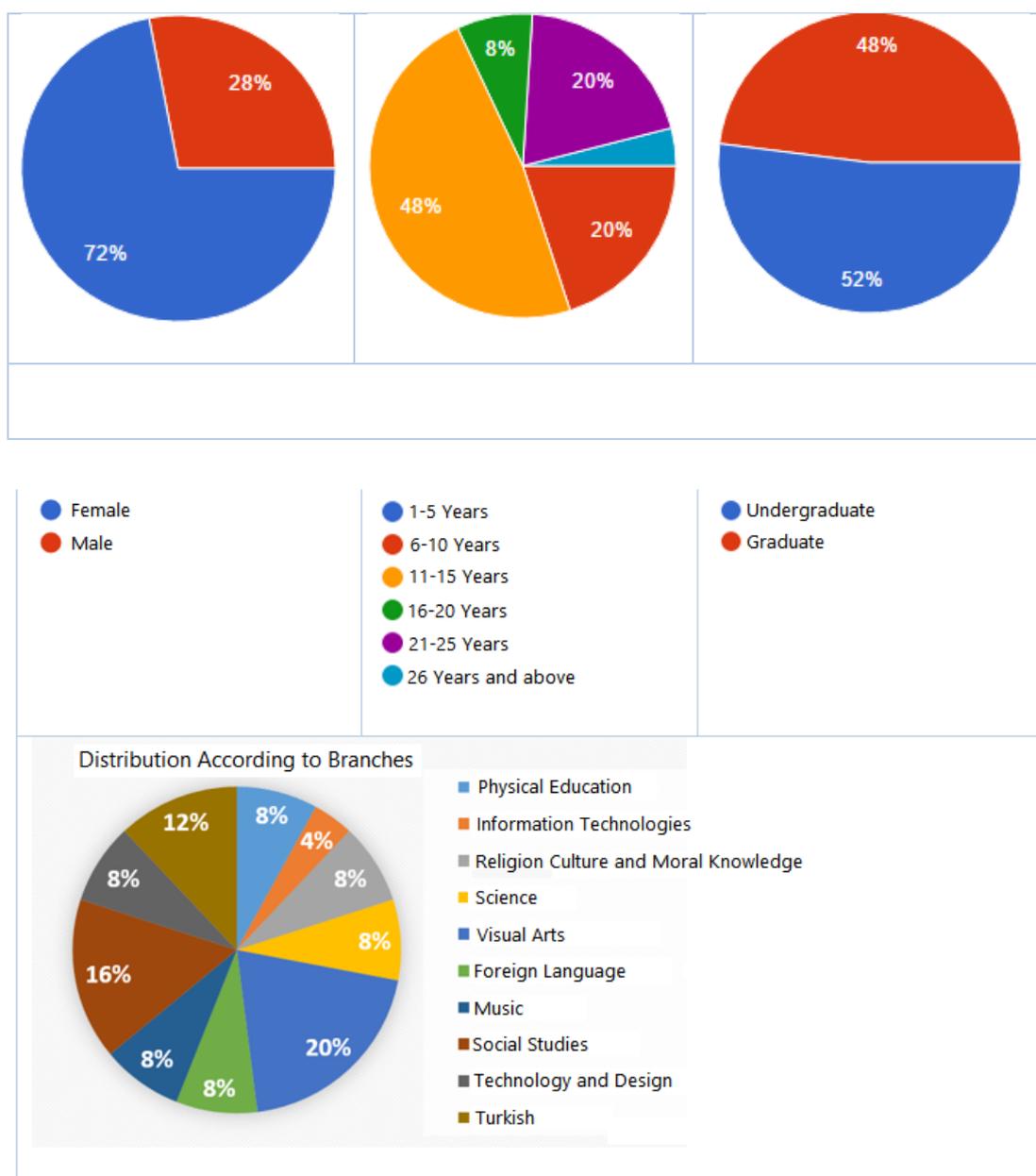
## **Method**

In this study, pre-test post-test single group half experimental design is used. In this design evaluating the effect of experimental process is tested according to data obtained from only one group. Differences between pre-test and post-test assessments are analyzed to determine and evaluate the effect of the process (Büyüköztürk, KılıçÇakmak, Akgün, Karadeniz and Demirel, 2014). In this design being able to determine the initial state with the pre-test gives opportunity to observe if there are any changes after process (Karasar, 2005).

## **Study Group and Its Characteristics**

Study group of the research consists of 25 teachers from different branches who attended the FATİH Project Interactive Classroom Management course and work in a secondary school in Ankara in which FATİH Project is conducted during 2015-2016 school year. Distribution of demographic characteristics of teachers is presented in Figure 2.

**Figure 2.** Distribution of Demographic Characteristics of Teachers



72% of teachers are female and 28% are male. As the highest rate, 52% of participants are 40-49 years old. Rate of teachers who have 11-15 years work experience is 48%. When branch distribution is checked, visual art teachers are the majority.

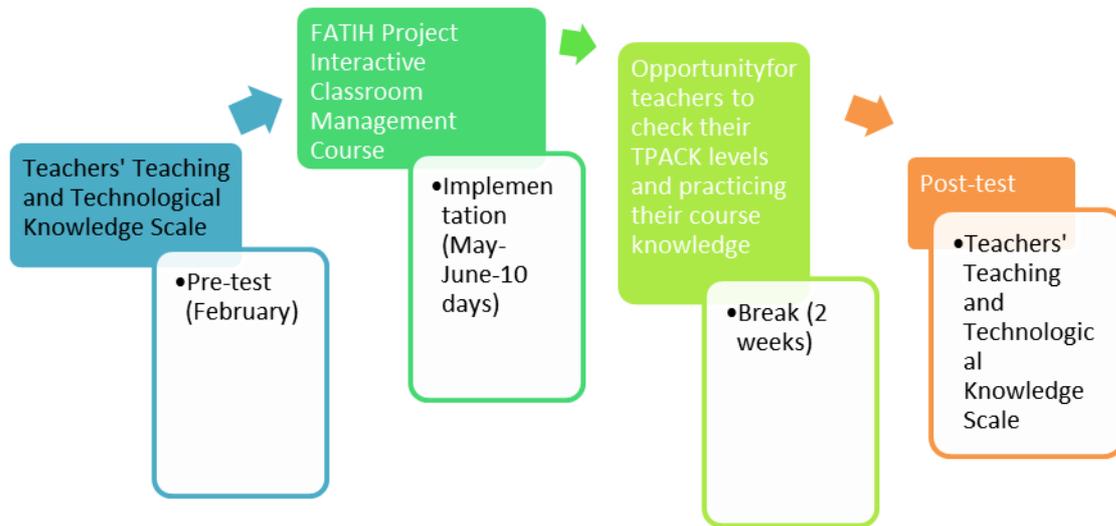
### Data Collection Tools

Within the scope of this study, “Teachers’ Teaching and Technological Knowledge scale” which was developed by Schmidt, Baran, Thompson, Koehler, Mishra and Shin (2009) and adopted to Turkish by Kaya, Kaya and Emre (2013) was used. That scale consists of 4 dimensions as pedagogical knowledge (PK), technological pedagogical knowledge (TPAK) and technological pedagogical content knowledge (TPACK) and 32 articles. Cronbach Alpha reliability co-efficient for TPACK scale is measured as 0.91.

## Data Collection

Study is done with all the teachers of a secondary school in Altındağ, Ankara. Before the study, “Teachers’ Teaching and Technological Knowledge Scale” was applied to the teachers at the beginning of the term (February). In June firstly teachers attended FATIH Project Interactive Classroom Management Course on Education Informatics Network for 10 days. After this course, teachers got opportunity to practice course subjects in their lessons during 2 weeks. The aim was to make them see their Technological Pedagogical Content Knowledge levels. After the study, “Teachers’ Teaching and Technological Knowledge Scale” was applied online to the teachers (See Figure 3 below).

**Figure 3.**Implementation Process



## Data Analysis

Data in this study conducted by using experimental design were analyzed by using frequency, percentage, t test and Kruskal Wallis test.

## Findings

In this part, findings related to research questions are presented respectively.

### *Findings Related to First Research Question*

First research question of the study is determined as “Does interactive classroom management course have significant effect on TPACK levels of teachers?”. Data related to this research question are presented in Table 1.

**Table 1.** T test Comparison of Teachers' TPACK Scale Pre-test and Post-test Score Averages

Sub-Dimensions	Test	N	Mean	S	sd	t	p
Pedagogical Knowledge	Pre-test	25	4.14	.83	24	3.11	.01
	Post-test	25	4.29	.91			
Technological Knowledge	Pre-test	25	4.03	.83	24	1.00	.33
	Post-test	25	4.02	.83			
Technological Knowledge Content	Pre-test	25	4.05	.84	24	1.18	.25
	Post-test	25	3.96	.90			
Technological Pedagogical Knowledge	Pre-test	25	3.97	1.04	24	2.75	.01
	Post-test	25	4.02	1.07			
Technological Pedagogical Knowledge Content	Pre-test	25	4.05	.80	24	.87	.39
	Post-test	25	4.07	.84			

When Table 1 is examined, it is seen that there is positive increase on behalf of post-test in the PK, TPAK sub-dimensions of the scale and according to total score obtained from the scale, the highest increase respectively is on PK, TPAK and TPACK sub-dimensions. On TK, TCK dimensions, there is decrease on behalf of post-test. It can be stated that that decrease is because teachers' awareness level about the topic increased and they answered the questions more consciously. Considering overall the scale, after in-service training, statistically there is no significant increase on TPACK levels of the teachers ( $t(24)=.87$ ,  $p>0,05$ ). When sub-dimensions of the scale are examined, after in-service training of the teachers, it is determined that increase on PK ( $t(24)=3,11$ ,  $p<0,05$ ) and TPK ( $t(24)=2,75$ ,  $p<0,05$ ) dimensions of the scale is significant; but increase on TK ( $t(24)=1,00$ ,  $p>0,05$ ) and TCK ( $t(24)=1,18$ ,  $p>0,05$ ) dimensions is not significant.

### *Findings Related to Second Research Question*

Second research question of the study is determined as "Is there any difference on TPACK level of teachers on post-test after FATİH Project interactive classroom management in service training in terms of their gender, period of service and level of education?". Data related to this research question are presented in Table 2, Table 3 and Table 4.

**Table 2.**Kruskal Wallis Test Result Related to Distribution of TPACK Level According to Gender

Sub-Dimensions	Gender	N	Mean Rank	Sd	X <sup>2</sup>	P
Pedagogical Knowledge	Female	18	12.17	1	.85	.36
	Male	7	15.14			
Technological Knowledge	Female	18	12.19	1	.78	.38
	Male	7	15.07			
Technological Content Knowledge	Female	18	12.03	1	1.14	.29
	Male	7	15.50			
Technological Pedagogical Knowledge	Female	18	12.56	1	.24	.62
	Male	7	14.14			
Technological Pedagogical Content Knowledge	Female	18	12.11	1	.94	.33
	Male	7	15.29			

When Table 2 is analyzed, it is found out that there is no significant difference statistically between perceptions of teachers related to their TPACK depending on their gender ( $X^2(1)=.94, p>0,05$ ). It is seen that perception of male teachers related to their TPACK level is more positive.

**Table 3.**Kruskal Wallis Test Result Related to Distribution of TPACK Level According to Level of Education TPAB

Sub-Dimensions	Level of Education	N	Mean Rank	Sd	X <sup>2</sup>	p
Pedagogical Knowledge	Undergraduate	13	12.85	1	.01	.91
	Graduate	12	13.17			
Technological Knowledge	Undergraduate	13	14.42	1	1.02	.31
	Graduate	12	11.46			
Technological Content Knowledge	Undergraduate	13	15.35	1	2.80	.09
	Graduate	12	10.46			
Technological Pedagogical Knowledge	Undergraduate	13	13.96	1	.48	.49
	Graduate	12	11.96			
Technological Pedagogical Content Knowledge	Undergraduate	13	14.69	1	1.43	.23
	Graduate	12	11.17			

According to Table 3, it is determined that there is no significant difference statistically on perceptions of teachers related to their TPACK depending on their level of education ( $x^2(1)= 1,43, p>0,05$ ). It is seen that perceptions of teachers at the undergraduate level related to their TPACK level is more positive. Expectation is that teachers at the graduate level would get higher score on technological pedagogical knowledge and sub-dimensions but there are some reasons why the result is vice versa. One of these can be stated as self-awareness of teachers at the graduate level related to this topic is higher. In other

words, perception related to TPACK levels of teachers at the graduate level is so close with the situation in real. However, perception of the teachers at the undergraduate level related to TPACK levels is higher than the reality. Another reason is teachers' field of education at the graduate level may not be on their own field or pedagogy.

**Table 4.** Kruskal Wallis Test Result Related to Distribution of TPACK Level According to Period of Service

Sub-Dimensions	Period of Service	N	Mean Rank	Sd	X <sup>2</sup>	p
Pedagogical Knowledge	6-10 years	5	12.90	4	1.84	.77
	11-15 years	12	13.50			
	16-20 years	2	7.75			
	21-25 years	5	14.90			
	26 years and above	1	8.50			
Technological Knowledge	6-10 years	5	11.20	4	.93	.92
	11-15 years	12	14.08			
	16-20 years	2	10.00			
	21-25 years	5	13.50			
	26 years and above	1	12.50			
Technological Content Knowledge	6-10 years	5	9.90	4	4.77	.31
	11-15 years	12	15.17			
	16-20 years	2	9.25			
	21-25 years	5	10.50			
	26 years and above	1	22.50			
Technological Pedagogical Knowledge	6-10 years	5	11.00	4	3.59	.46
	11-15 years	12	14.63			
	16-20 years	2	8.75			
	21-25 years	5	11.00			
	26 years and above	1	22.00			
Technological Pedagogical Content Knowledge	6-10 years	5	11.40	4	2.43	.66
	11-15 years	12	14.75			
	16-20 years	2	8.50			
	21-25 years	5	11.20			
	26 years and above	1	18.00			

Considering Table 4, it is determined that there is no significant difference statistically on perceptions of teachers related to their TPACK depending on their period of service ( $X^2(4) = 2,43, p > 0,05$ ). It is seen that rise on teachers' period of service partly affect their perception related to their TPACK positively.

## Results, Discussion And Suggestions

Improvement on TPACK levels of teachers who attend "Interactive Classroom Management" course started to be given as distant training within the scope of FATİH Project is examined. According to findings, it is concluded that training has an effect on improvement of "Pedagogical Knowledge" and "Technological Pedagogical Knowledge". Despite the effect occurring on these two sub-dimensions, it is determined that there is no significant effect of the training on TPACK improvement of the teachers. On the researches that were carried out, it is seen that technological knowledge of teachers improve as a result of trainings about technology, but they have lack of experience when it comes to integrate it with pedagogical knowledge (Timur and Taşar, 2011). Hence it is concluded that teachers who find themselves qualified about technological knowledge do not find themselves self-confident enough about technological pedagogical knowledge (Meriç, 2014; Kırılmazkaya

and KırbağZengin, 2015). With reference to this conclusion obtained from this research, it can be stated that only Pedagogical Knowledge and Technological Pedagogical Knowledge do not make significant contribution to general TPACK. As a whole because TPACK explains; determining a method according to nature of the topic, arranging the training process of the content, using technology while teaching, characteristics of learner, arranging teaching environment according to individual differences and pedagogical strategies in a wide range including knowledge that needs to be had related to the topic, it can be accepted as normal that dimensions of Pedagogical Knowledge and Technological Pedagogical Knowledge become ineffective alone. However, in literature there are some studies on the most powerful predictors of sub-dimensions of TRACK. In a study carried out by Şad, Açıkgül&Delican (2015) it is concluded that significant predictors of TRACK scale are respectively pedagogical content knowledge, technological pedagogical knowledge, technological content knowledge and pedagogical knowledge. Likewise, in a study carried out by Chai, Koh& Tsai (2010), similar results were obtained.

Within the scope of the second research question of the study, distribution of TPACK levels in terms of gender, level of education and period of service is analyzed. Although mean rank of male teachers on all sub-dimensions of TRACK scale is higher compared to female teachers, it is concluded that this difference is not significant. Similarly, it is determined that TPACK levels of teachers do not show significant difference in terms of level of education and period of service.

One of the basic principles for obtaining successful results from a project like FATİH Project which is one of the high-cost projects of the country is that teachers should reach efficient TPACK level. Due to not having necessary skills, teachers feel shy while using technology during lessons. According to this, it can be stated that “Interactive Classroom Management” course carried out with the aim of using technology efficiently in classrooms should be revised in a way that would help to improve TRACK levels of teachers to achieve this goal.

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