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THE RELATIONSHIP BETWEEN PRESCHOOL TEACHERS' TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE SELF-CONFIDENCE AND THEIR ATTITUDE TOWARDS TECHNOLOGY

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ABSTRACT

This study aims to examine the relationship between preschool teachers' technological pedagogical content knowledge (TPACK) confidence and their attitude towards technology. In addition, it was aimed to determine whether preschool teachers' technological pedagogical content knowledge and its sub-dimensions predict teachers' attitudes towards technology. The study group consists of 200 preschool teachers who teach 36-72-month-old preschool children in the 2020-2021 academic year. This quantitative study is designed in the single and relational screening model, one of the general screening models. The data were collected using the "Technological Pedagogical Content Knowledge Self-Confidence Scale (TPACKACKS)", "Attitude Towards Technology Scale" and "Personal Information Form". The data obtained were analyzed with SPSS 26.0 and JASP 0.16 programs and the normality test, Pearson Correlation test, and multiple linear regression analysis methods were used. As a result of the study, a significant positive relationship was found when the relationship between preschool teachers' attitudes towards technology and technological pedagogical content knowledge and sub-factors of it was examined. When the other findings obtained from the research were discussed, it was concluded that the relationship between preschool teachers' attitude towards technology scores and technological content knowledge sub-dimension scores was relatively low compared to other sub-dimensions.

Keywords: Technological Pedagogical Content Knowledge (TPACK); attitude towards technology; preschool teachers

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OKUL ÖNCESİ ÖĞRETMENLERİNİN TEKNOLOJİK PEDAGOJİK ALAN BİLGİSİ ÖZGÜVENİ İLE TEKNOLOJİYE YÖNELİK TUTUMU ARASINDAKİ İLİŞKİNİN İNCELENMESİ

ÖZET

Bu çalışmanın amacı okul öncesi öğretmenlerinin teknolojik pedagojik alan bilgisi (TPAB) özgüveni ile teknolojiye yönelik tutumu arasındaki ilişkinin incelenmesidir. Bunun yanı sıra okul öncesi öğretmenlerinin teknolojik pedagojik alan bilgisi ile alt boyutlarının öğretmenlerin teknolojiye yönelik tutumunu yordayıp yordamadığını incelemek amaçlanmıştır. Çalışma grubunu 2020-2021 eğitim ve öğretim yılı 36-72 aylık okul öncesi dönem çocuklarına eğitim veren 200 okul öncesi öğretmeni oluşturmaktadır. Bu çalışma, genel tarama modellerinden tekil ve ilişkisel tarama modelinde tasarlanmış nicel bir çalışma niteliğindedir. Araştırmanın verileri, "Teknolojik Pedagojik Alan Bilgisi Öz Güven Ölçeği (TPABÖGÖ)", "Teknolojiye Yönelik Tutum Ölçeği" ve "Kişisel Bilgi Formu" kullanılarak toplanmıştır. Elde edilen veriler SPSS 26.0 ve JASP 0.16 programları ile analiz edilerek normallik testi, Pearson Correlation testi ve çoklu doğrusal regresyon analizi yöntemleri kullanılmıştır. Araştırmanın sonucunda okul öncesi öğretmenlerinin teknolojiye yönelik tutumu ile teknolojik pedagojik alan bilgisi ve teknolojik pedagojik alan bilgisi alt boyutları arasındaki ilişki incelendiğinde pozitif yönde anlamlı bir ilişki bulunmuştur. Araştırmadan elde edilen diğer bulgular incelendiğinde okul öncesi öğretmenlerinin teknolojiye yönelik tutum puanları ile teknolojik alan bilgisi alt boyutu puanları arasındaki ilişkinin diğer alt boyutlara göre nispeten düşük seviyede olduğu sonucuna ulaşılmıştır.

Anahtar Kelimeler: Teknolojik Pedagojik Alan Bilgisi (TPAB); teknolojiye yönelik tutum; okul öncesi öğretmenleri

1. INTRODUCTION

Educational reforms for the net generation emphasize the inclusion of information and communication technologies in teaching (Hsu, 2015). Interest in technology applications to improve teachers' pedagogical content knowledge (PCK) has increased in recent years (Campbell & Abd-Hamid 2013; National Research Council [NRC], 2012). Qualified teachers should structure learning opportunities for their students to access information most understandably and easily. In the structuring process, the teacher needs to know the subject he/she will teach and the methods, techniques, practices and methods he/she will use while transferring this knowledge (Ekici & Dereli, 2022). The concept of pedagogical content knowledge emerged from the intersection of the teacher's pedagogical knowledge and subject content knowledge (Yolcu, Kaya Durna, Akan, & Uluçınar Sağır, 2022).

The concept of pedagogical content knowledge was developed by Shulman (1986) and conceptualized by Pierson (2001) (Gökçearslan, Karademir, & Korucu, 2017). The concept of pedagogical content knowledge integrated with information communication technologies was named Technological Pedagogical Content Knowledge (TPACK) by Mishra and Koehler (2006). Technological Pedagogical Content Knowledge is an understanding of the technology, pedagogy and content components that underlie teaching with technology and the interactions between these components (Koehler & Mishra, 2009). The intersection and combination of these essential components

constitute the other components of the TPACK Model (Kabakçı Yurdakul, 2011). TPACK is a set of integrative knowledge such as technological knowledge (TK), pedagogical knowledge (PK), content knowledge (CK), technological pedagogical knowledge (TPK), technological content knowledge (TCK) and pedagogical content knowledge (PCK) (Angeli & Valanides, 2009; Doğru & Aydın, 2017; Koehler & Mishra, 2009).

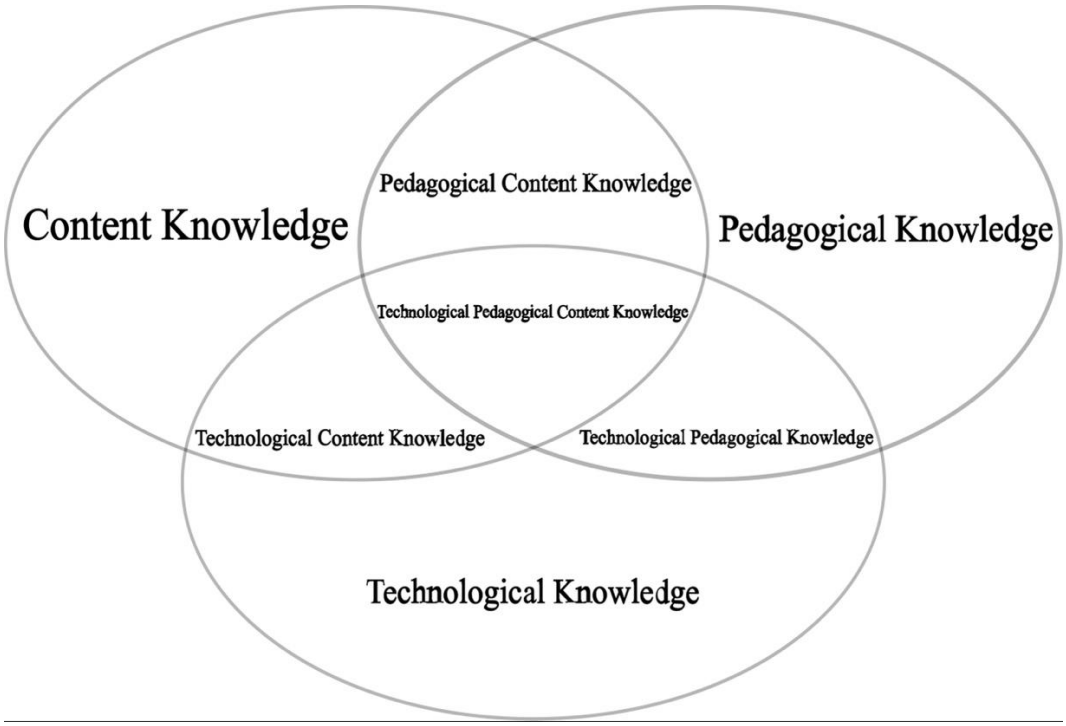

Figure 1. TPACK is focused on the complex, multifaceted nature of teacher knowledge (Mishra and Koehler 2006).

Mishra and Koehler (2005, 2007) explain the components of the TPACK Model in Table 1 below:

Table 1. Description Of TPACK And İts Sub-Factors

Pedagogical Knowledge (PK)	Teachers' deep knowledge of teaching and learning processes, practices or methods.
Content Knowledge (CK)	Teachers' knowledge of the subject to be learned or taught.
Technological Knowledge (TK)	Teachers' knowledge of standard technologies (blackboard, books, etc.) and digital technologies (video, storytelling, smartboard, educational software, etc.).
Pedagogical Content Knowledge (PCK)	Teachers' knowledge of the teaching approach for teaching the subject area.
Technological Pedagogical Knowledge (TPK)	Teachers' understanding of how technology can transform learning and teaching when used in specific ways.
Technological Content Knowledge (TCK)	The knowledge of teachers that emerges from the combination of technology and content knowledge.
Technological Pedagogical Content Knowledge (TPACK)	Teachers' knowledge of the technologies and instructional approaches they can use in the teaching process consists of the basic components of technology, pedagogy, and content area.

It is essential for the construction of the future of society that teachers, who have the role of raising qualified individuals who can keep up with the information society, are trained as individuals who can adapt to innovations, think critically, think creatively, and learn to learn. In today's information and technology age, where innovations are rapidly advancing, for a developed society and a successful education, teachers should follow technological developments and use technology in a meaningful way to contribute to their student's learning, that is, they should have sufficient TPACK and continuously improve their TPACK throughout their professional lives (Kaya & Yılayaz, 2013; Siddiq, Scherer, & Tondeur, 2016). The "2023 Education Vision" document was published by the Ministry of National Education in 2018, under the title of digital content and skill-supported transformation in learning processes, it is aimed for children to use information communication technologies in the context of production, developing solutions to problems and realize their dreams. In addition, teacher competence is also examined in this document, and it is stated that for teachers to use digital content in the classroom, environments suitable for questioning, design thinking, and conceptual learning should be established (Milli Eğitim Bakanlığı [MEB][Turkish Ministry of National Education], 2018). In order to help teachers learn the content, pedagogy, and technology skills they will need throughout their careers and to develop curricula, the International Society for Technology in Education (ISTE®) has determined the ISTE® Standards for Teachers (ISTE-ST) (DeSantis, 2016). In this context, preschool teachers use methods such as STEAM education, algorithmic thinking skills, coding with or without computers,

robotics, 3D printers, digital games, and augmented reality to integrate technology into the educational environment (Canbeldek, 2020; Başaran, Nacar, Aksay, Tüfekçi, & Vural, 2022; Küçükkara & Aksüt, 2021; Uğraş, 2017). It is considered necessary to utilize technology in the preschool education period as children are introduced to technology at an earlier age, and their knowledge and skills in the use of technology increase (Öner, 2020). Teachers, whose guidance is needed to benefit from technology in preschool education, should have sufficient knowledge, skills, and positive attitudes towards using technology (Aksoy, 2021). Although it is known that the teaching process integrated with technology is more effective, it is thought that the number of teachers with the necessary skills is low (Judson, 2006; Kuzgun & Özdinç, 2017; Usta & Korkmaz, 2010). In this context, gaining values such as knowledge, skills, positive attitudes, and perceptions towards effective and correct use of technology has become increasingly important (Öner, 2020). If teachers are trained on the effective use of information and communication technologies and adequate technological facilities are provided, technology will be a material that enables efficient use of time and realizes effective learning (Kuzgun & Özdinç, 2017).

Since 2005, TPACK has been an emerging research focus, especially among teacher educators who want to work in or be interested in educational technology (Chai, Koh, Tsai, 2013). Despite the potential to integrate technology into education, research has shown that teachers rarely adopt technology in many educational systems (Fraillon, Ainley, Schulz, Friedman & Duckworth, 2020; Judson, 2006; Kuzgun & Özdinç, 2017; Usta & Korkmaz, 2010). Teachers' lack of self-confidence, negative attitudes, and opinions about the use of technology were among the reasons for this situation (Ardıç, 2021). In this context, it has become increasingly important to gain values such as knowledge, skills, positive attitudes, and perceptions towards the effective and correct use of technology (Öner, 2020). In light of this information, it is essential to determine preschool teachers' technological pedagogical content knowledge, confidence, and attitudes towards technology. This study aims to determine preschool teachers' technological pedagogical content knowledge confidence and their attitude towards technology and to examine whether these variables predict each other. In line with this purpose, answers to the following questions were sought:

1. At what level is the relationship between preschool teachers' technological pedagogical content knowledge self-confidence, its sub-dimensions, and their attitudes towards technology?
2. To what extent do preschool teachers' technological pedagogical content knowledge, self-confidence, and its sub-dimensions predict attitudes towards technology?

2. METHOD

2.1. Research Design

This study is a quantitative study designed in the single and relational survey model, one of the general survey models. Research models that aim to determine the occurrence of variables individually, in terms of type or quantity, are called single survey models (Karasar, 2020: 111). Research that

examines relationships and connections is often referred to as relational research (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, Demirel, 2021: 25). In this context, a single survey model was used to determine preschool teachers' technological pedagogical content knowledge confidence and attitudes towards technology. A relational survey model was used to determine the relationship between preschool teachers' technological pedagogical content knowledge confidence and attitudes towards technology.

2.2. Working Group

The study group of this research consists of 200 preschool teachers who teach 36-72-month-old preschool children in the 2020-2021 academic year. The study group was formed according to the simple random sampling method. All units in this sampling method have an equal and independent chance to be selected for the sample (Büyüköztürk et al., 2021: 88).

The characteristics of the teachers in the study group are presented in Table 2.

Table 2. Demographic Characteristics Of The Teachers İn The Study Group

Gender	**Female**		**Male**		**Total**	
	f	%	f	%	f	%
	188	94	12	6	200	100
Experiment of years	f	%	f	%	f	%
0-4 years	65	32,5	8	4	73	36,5
5-9 years	46	23,0	2	1,0	48	24,0
10+years	77	38,5	2	1,0	79	39,5
Total	188	94,0	12	6,0	200	100

When Table 2 is analyzed in terms of gender, it is seen that 6% of the teachers are male and 94% are female; in terms of years of experience, 39.5% of the teachers have ten years or more, 36.5% have 0-4 years, and 24% have 5-9 years of experience.

2.3. Data Collection Tools

The data were collected using the "Technological Pedagogical Content Knowledge Self-Confidence Scale (TPCACKACKS)", "Attitude Toward Technology Scale," and "Personal Information Form". Technological Pedagogical Content Knowledge Self-Confidence Scale (TPACKACKS): "Technological Pedagogical Content Knowledge Self-Confidence Scale" (TPACKACKS) developed by Graham, Burgoyne, Cantrell, Smith, and Harris (2009) was adapted into Turkish by Timur and Taşar (2011) and designed as a 5-category Likert-type scale. As a result of the confirmatory factor analysis of the scale consisting of 31 items, it was concluded that the scale has four sub-dimensions: Technological

Pedagogical Content Knowledge (TPACK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), and Technological Knowledge (TK). While the Cronbach's Alpha reliability coefficient for the whole scale was .92, it was calculated as .89 in the TPACK dimension, .87 in the TPK dimension, .89 in the TAB dimension, and .86 in the TB dimension.

Personal Information Form: The "Personal Information Form" created by the researchers includes the variables of gender and seniority year, which are thought to affect preschool teachers' perceptions of TPACK self-confidence.

Attitude Toward Technology Scale: The scale developed by Aydın and Karaa (2013) consists of 17 items, 15 of which are positive and 2 of which are negative. The negative items of the 5- point Likert-type scale are calculated in reverse. The scale's Cronbach Alpha internal consistency coefficient consisting of one dimension was calculated as 0.87.

2.4. Data Analysis

Data collection tools were delivered to the teachers who agreed to participate in the study via "Google Forms". The data used in the study were analyzed with SPSS 26.0 and JASP 0.16 programs. In the data analysis process, a normality test was performed in the first stage. Normality test results are given in Table 3.

Table 3. Normality Test Results Of Scale Scores

SCALES	Median	$\bar{X}$	Skewness	Kurtosis
Technological Pedagogical Content Knowledge	29.00	29.22	-.182	.833
Technological Pedagogical Knowledge	27.00	26.75	-.282	-.030
Technological Domain Knowledge	15.00	14.27	-.619	-.680
Technological Knowledge	41.50	41.53	-.003	-.529
ATT	65.00	66.09	-.212	.459

The fact that the arithmetic mean and median values of the data are close to each other and the skewness and kurtosis coefficients are close to 0 within ±1 limits shows that the data have a normal distribution (Büyüköztürk, Şekercioğlu, & Çokluk, 2014; McKillup, 2012). Accordingly, when the kurtosis, skewness coefficients, and descriptive statistics of the distribution are examined in Table 3, it is concluded that the data are normally distributed because the mode, median, and arithmetic mean values of the scale scores are close to each other, and the skewness and kurtosis values are within ±1. Since the data showed normal distribution as a result of the tests, parametric tests were utilized. Pearson Correlation test was used in the analyses comparing two normally distributed variables. Multiple linear

regression analysis was used to examine the prediction of the independent variable on the dependent variable.

3. FINDINGS

The data obtained were analyzed and explained in line with the sub-problems of the study. The findings are given in Table 4 and Table 5.

Table 4. Pearson Correlation Test Results For The Relationship Between ATT And TPACK

Relationship	N	R	p
Attitude Towards Technology-Technological Pedagogical Content Knowledge	200	0.46**	0.00
Attitude Towards Technology-Technological Pedagogical Knowledge	200	0.46**	0.00
Attitude Towards Technology-Technological Content Knowledge	200	0,20**	0.00
Attitude Towards Technology-Technological Knowledge	200	0,45**	0.00

**R>0.20, p<0.05 Significant Correlation

Table 4 shows that there is a significant positive correlation between teachers' attitudes towards technology and technological pedagogical content knowledge (r (n=200) =0,46; p<,05), technological pedagogical knowledge (r (n=200) =0,46; p<,05), technological content knowledge (r (n=200) =0,20 p<,05), technological knowledge (r (n=200) =0,45; p<,05).

Table 5. Multiple Regression Analysis Results For The Prediction Of ATT And TPACK Levels

Variable	B	SH ß	ß	T	p	Binary r	Partial r
Fixed	33.826	3.87	-	9.173	.00*	-	-
Technological Pedagogical Content Knowledge	352	.153	.202	2.291	.02*	.460	.162
Technological Pedagogical Knowledge	.324	.166	.172	1.957	.05*	.457	.139
Technological Domain Knowledge	.156	.073	.131	2.134	.03*	.197	.151
Technological Knowledge	.267	.106	.206	2.516	.01*	.449	.177
R=.538		A.R2= .275**					
$F^{(4)}$ = 19,887		p=.000					

As indicated in Table 5, technological pedagogical content knowledge (β=-0.202; t=-2.291; p=0.00), technological pedagogical knowledge (β=-0.172; t=-1.957; p=0.00), technological content knowledge (β=-0.131; t=-2.134; p=0.00), technological knowledge (β=-0.206; t=-2,516; p=0.00) variables contributed significantly to the variance. However, a significant relationship was found with the level of attitude towards technology (R= ,538; A. R^2 = ,275; p=,000). When Table 5 is examined, the variables of technological pedagogical content knowledge, technological pedagogical knowledge, technological content knowledge, and technological knowledge explain 27.5% of the total variance in attitude towards technology levels. When this variance and its contribution to the analysis were examined; it was determined that preschool teachers' attitudes towards technology positively predicted their technological pedagogical content knowledge, self-confidence at the level of 27.5%.

4. DISCUSSION AND CONCLUSION

This study aims to determine the relationship between preschool teachers' technological pedagogical content knowledge self-confidence and their attitudes towards technology and to examine whether preschool teachers' attitudes towards technology predict their technological pedagogical content knowledge self-confidence. In light of the research findings, preschool teachers' attitude towards technology indicates their technological pedagogical content knowledge confidence. In addition, it was concluded that preschool teachers' attitude towards technology predicts TPACK sub-factors of technological pedagogical content knowledge, technological pedagogical knowledge, technological knowledge, and technological content knowledge self-confidence. When the relationship between

preschool teachers' attitudes towards technology and technological pedagogical content knowledge and its sub-dimensions was examined, a significant positive relationship was found.

Blackwell, Lauricella, and Wartella (2016) aimed to examine the effect of TPACK contextual factors on early childhood educators' use of technology. As a result of the study, they found that preschool teachers' technological pedagogical content knowledge levels had positive attitudes towards technology. The results obtained from this study support Porras-Hernandez and Salinas-Amescua's (2013) view that TPACK emerges in certain contexts. According to the results obtained, teachers' self-efficacy and attitude towards technology affected whether and how they integrated technological materials into activities. There was also a relationship between professional development performance and the frequency of teachers' use of technological materials.

In a similar study by Cheng and Xie (2018) examining the relationships between teachers' personal characteristics, values, and beliefs, and TPACK, teachers working in different schools from primary to high school took part. In this study, it was concluded that the variable that significantly predicted TPACK in both environments where the technological integration program was and was not implemented was teachers' values and beliefs. In this context, in another study conducted by Chai, Koh, and Teo (2019), teachers' technological design beliefs were examined with technological pedagogical content knowledge (TPACK), and it was concluded that teachers' technological design beliefs are essential predictors of technological pedagogical content knowledge.

Yang, Chan, and Gunn (2022) found that preschool teachers' pedagogical knowledge is an essential factor in shaping their attitudes towards technology. Yeh, Lin, Hsu, Wu, and Hwang (2014) examined science teachers' use of information and communication technologies in education and their technopedagogical content knowledge. Dong, Xu, Chai, and Zhai (2020) found that colleague support and teachers' TPACK levels predicted technology self-efficacy. Özgür (2020) stated that TPACK plays a vital role in coping with technology-induced psychological stress (technostress) caused by the technologies used by teachers in educational processes. It also reveals that teachers' competencies in the context of TPACK should be developed through administration, colleagues, parents and society or through in-service training. In addition, the decrease in TPACK levels indicates that teachers are inadequate in the education process**.**

When the other findings obtained from the research were examined, it was concluded that the relationship between preschool teachers' attitude towards technology scores and technological content knowledge sub-dimension scores was relatively low compared to other sub-dimensions. Teachers' negative views, attitudes, and lack of self-confidence towards technology use and innovations may be the reason for this result (Ardıç, 2021). In addition, the high number of preschool teachers with professional seniority of 10 years or more in the study group and the inadequacy of these teachers in terms of integrating technology and technology materials into education in the undergraduate education

they received during their undergraduate education can be shown as inadequate. Considering the new generation of teachers and prospective teachers, it can be said that their technological knowledge (TK) and technological content knowledge (TCK) are gradually improving (Masoumi, 2021). However, based on past studies, Enoschsson (2010) underlines that being familiar with and using digital technologies does not automatically ensure the utilization of these technologies in the preschool education environment (Masoumi, 2021). Preservice teachers' knowledge of technology and technology use does not guarantee that they have technological pedagogical content knowledge (Sancar-Tokmak, Yavuz Konokman, Yanpar Yelken, 2013). For this reason, TPACK-based activities should be planned to integrate technology and the educational process (Soong & Tan, 2010); a positive perception of the usefulness of digital technologies and past experiences should be created (Nikolopoulou & Gialamas, 2015). In another study, in parallel with the results obtained from this study, Koh and Chai (2016) examined the technological pedagogical content knowledge of primary school teachers by examining their views on the integration of information and communication technologies into education. According to the results obtained, they concluded that teachers know about seven sub-dimensions as TK, PCK, CK, TPK, PCK, TCK and TPACK and mainly use PCK and TPACK dimensions. In a similar study Boschman, McKenney, and Voogt (2015) focused on using teachers' TPACK domains in a collaborative education design enriched with technology in early literacy activities. According to the findings of the study, it was concluded that teachers' current technology-enriched orientations towards early literacy were transferred into the classroom. When the teachers' views on using TPACK were analyzed according to the sub-dimensions, the number of explanations reflecting the TK, PCK, and CK domains was quite low. In contrast, the teachers frequently included the PCK and TPCK domains. As a result, in this study conducted with preschool teachers, the relationship between their technological pedagogical content knowledge, self-confidence and their attitudes towards technology is in line with the literature.

RECOMMENDATIONS

The fact that preschool teachers' attitudes towards technology predict their technological pedagogical content knowledge self-confidence contributes to the literature. In the future, the complex relationship between TPACK and self-efficacy, self-regulation, beliefs, or attitudes towards educational technology should be examined in more detail as it is an essential factor for the discrimination of related constructs (Schmid, Brianza & Petko, 2020).

According to the research findings, different plans should be made to improve preschool teachers' TPACK self-confidence and attitudes towards technology. Teachers should be supported through in-service trainings and professional communities to follow new technologies and incorporate them into the learning process. According to Dong et al. (2020), school administrative staff should support teachers in their TPACK levels and technology self-efficacy and create professional learning communities. The relatively low level of the relationship between teachers' attitudes towards technology

and technological content knowledge sub-dimension compared to other sub-dimensions should be examined in depth.

In today's world of rapid technological developments, preschool teachers are expected to integrate current and new technologies in educational environments, activity plans and programs. Based on this necessity, an in-service training program should be prepared for preschool teachers to integrate technology into the early childhood education environment. There is also a need for online resources, forum platforms and communities of practice where teachers can discuss with each other (Sıngın & Gökbulut, 2020). New studies are needed to determine how preschool children learn with the integration of technology and technology materials and to determine the roles of teachers in this process. In addition, considering that quantitative data were collected and analyzed in this study, it can be stated that the literature can be supported by studies in different research designs where qualitative data are collected.

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GENİŞLETİLMİŞ TÜRKÇE ÖZET

OKUL ÖNCESİ ÖĞRETMENLERİNİN TEKNOLOJİK PEDAGOJİK ALAN BİLGİSİ ÖZGÜVENİ İLE TEKNOLOJİYE YÖNELİK TUTUMU ARASINDAKİ İLİŞKİNİN İNCELENMESİ

GİRİŞ

Nitelikli öğretmen, öğrencisinin bilgiye en anlaşılır ve kolay yolla ulaşması için öğrenme fırsatları yapılandırmalıdır. Yapılandırma sürecinde öğretmenin öğreteceği konu hakkındaki bilgisi ile bu bilgiyi aktarırken kullanacağı yöntem, teknik ve uygulama bilgisine sahip olması gerekmektedir (Taşkın Ekici ve Dereli, 2022). Öğretmenin pedagojik bilgisi ile konu içerik bilgisinin kesişiminden pedagojik alan bilgisi kavramı doğmuştur (Yolcu vd, 2022). Bilgi iletişim teknolojileri ile bütünleşmiş pedagojik alan bilgisi kavramı Mishra ve Koehler (2006) tarafından Teknolojik Pedagojik Alan Bilgisi (TPAB, [TPACK]) olarak adlandırılmıştır.

TPAB, teknoloji ile öğretimin temelinde yer alan teknoloji, pedagoji ve alan (içerik) bileşenleri ve bu bileşenler arasındaki etkileşimlerin ortaya çıktığı bir anlayıştır (Mishra ve Koehler, 2009). Bu temel bileşenlerin kesişim ve birleşimi ise TPAB modelinin diğer bileşenlerini oluşturur (Kabakçı Yurdakul, 2013). TPAB, teknolojik bilgi (TB), pedagojik bilgi (PB), alan (içerik) bilgisi (AB), teknolojik pedagojik bilgi (TPB), teknolojik alan bilgisi (TAB) ve pedagojik alan bilgisi (PAB) gibi bir dizi bütünleştirici bilgi kümesidir (Angeli ve Valanides, 2009; Doğru ve Aydın, 2017; Mishra ve Koehler, 2009).

2005'ten beri, TPAB eğitim teknolojisi konusunda öğretmenler ve eğitimciler arasında popüler bir araştırma alanı haline gelmiştir (Chai, Koh, Tsai, 2013). Bu alandaki çalışmalar, pek çok eğitim sisteminde öğretmenlerin teknoloji kullanımını yeterince benimsemediklerini ortaya koymaktadır (Kuzgun ve Özdinç, 2017; Fraillon vd., 2020). Öğretmenlerin teknoloji kullanımına ilişkin özgüven eksikliği ve olumsuz düşünceleri (Ardıç, 2021) bağlamında, etkili ve doğru teknoloji kullanımı için bilgi, beceri, olumlu tutum ve algılarını geliştirmeleri önem kazanmaktadır (Öner, 2020). Bu noktada, okul öncesi öğretmenlerinin teknolojik pedagojik alan bilgisi özgüveni ve teknolojiye yönelik tutumlarını belirlemek büyük önem taşımaktadır.

Araştırmada, okul öncesi öğretmenlerinin TPAB özgüveni ve teknoloji tutumlarına dair ulusal ve uluslararası çalışmalar ele alınmıştır. Çeşitli veri tabanları ve dijital kütüphaneler (ör. ERIC, ScienceDirect, Google Scholar) kullanarak "okul öncesi öğretmenleri", "teknolojik pedagojik alan bilgisi", "özgüven" ve "teknolojiye yönelik tutumlar" anahtar kelimeleriyle yapılan tarama, okul öncesi öğretmenlerinin teknolojik pedagojik alan bilgisi ve teknoloji tutumlarıyla ilgili çalışmaları kapsamaktadır. Bu süreçte, öğretmenlerin özgüven ve tutumlarına ilişkin eğilimleri incelenmiştir.

Okul öncesi öğretmenlerinin teknolojiye yönelik tutumu ile TPAB ve alt boyutları arasında pozitif yönde anlamlı bir ilişki bulunması ile ilgili alanyazındaki çalışmalar incelendiğinde, TPAB bağlamsal faktörlerinin erken çocukluk eğitimcilerinin teknoloji kullanımı üzerindeki etkisini inceleyerek okul öncesi öğretmenlerinin TPAB düzeylerini yüksek ve teknolojiye yönelik tutumlarının olumlu olduğunu tespit edilmiştir (Blackwell, Lauricella ve Wartella, 2016; Porras-Hernandez ve Salinas-Amescua, 2013; Yang, Chan ve Gunn, 2022). Cheng ve Xie (2018) çalışmasında, öğretmenlerin değer ve inançlarının teknolojik pedagojik alan bilgisi (TPAB) üzerinde önemli bir etkiye sahip olduğunu belirtmektedir. Benzer şekilde, Chai, Koh ve Teo (2019) tarafından yapılan bir çalışmada da öğretmenlerin teknolojik tasarım inançlarının TPAB üzerinde önemli yordayıcılar olduğunu ortaya koymaktadır.

Bu çalışmanın amacı okul öncesi öğretmenlerinin teknolojik pedagojik alan bilgisi özgüvenleri ile teknolojiye yönelik tutumlarını belirlemek ve bu değişkenlerin birbirini yordayıp yordamadığını incelemektir. Bu amaç doğrultusunda aşağıdaki sorulara cevap aranmıştır:

1. Okul öncesi öğretmenlerinin teknolojik pedagojik alan bilgisi özgüvenleri ve alt boyutları ile teknolojiye yönelik tutumları arasındaki ilişki hangi düzeydedir?
2. Okul öncesi öğretmenlerinin teknolojik pedagojik alan bilgisi özgüvenleri ve alt boyutları, teknolojiye yönelik tutumu ne düzeyde yordamaktadır?

YÖNTEM

Araştırmanın Deseni

Bu çalışma, genel tarama modelleri içerisinde tekil ve ilişkisel tarama modeline dayalı, değişkenlerin bireysel olarak, tür veya miktar açısından belirlenmesi amacıyla tasarlanan nicel bir araştırmadır (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, Demirel, 2021; Karasar, 2020). Bu kapsamda, okul öncesi öğretmenlerinin teknolojik pedagojik alan bilgisi öz güveni ve teknolojiye yönelik tutumlarını belirlemek amacı ile tekil tarama modeli; bu değişkenlerin arasındaki ilişkiyi belirlemek için ise ilişkisel tarama modeli kullanılmıştır.

Çalışma Grubu

Bu araştırmanın çalışma grubunu 2020-2021 eğitim ve öğretim yılı 36-72 aylık okul öncesi dönem çocuklarına eğitim veren 200 okul öncesi öğretmeni oluşturmaktadır. Çalışma grubu basit seçkisiz örnekleme yöntemine göre oluşturulmuştur (Büyüköztürk vd., 2021).

Veri Toplama Araçları

Araştırmanın verileri, "Teknolojik Pedagojik Alan Bilgisi Öz Güven Ölçeği (TPABÖGÖ)", "Teknolojiye Yönelik Tutum Ölçeği" ve "Kişisel Bilgi Formu" kullanılarak toplanmıştır. TPABÖGÖ: Graham, Burgoyne, Cantrell, Smith ve Harris (2009) tarafından geliştirilen bu ölçme aracı Timur ve Taşar (2011) tarafından Türkçe'ye uyarlanarak 5 kategorili Likert tipi ölçek olarak tasarlanmıştır. Ölçek,

Teknolojik Pedagojik Alan Bilgisi (TPAB), Teknolojik Pedagojik Bilgi (TPB), Teknolojik Alan Bilgisi (TAB), Teknolojik Bilgi (TB) olmak üzere 31 maddeden oluşmaktadır. Ölçeğin tümü için Cronbach Alfa güvenirlik katsayısı .92 iken alt faktörlerden TPAB boyutunda .89, TPB boyutunda .87, TAB boyutunda .89 ve TB boyutunda .86 olarak hesaplanmıştır.

Teknolojiye Yönelik Tutum Ölçeği: Aydın ve Karaa (2013) tarafından geliştirilen 5'li likert tipi ölçek 17 maddeden oluşmaktadır. Tek boyuttan oluşan ölçeğin Cronbach Alpha iç tutarlık katsayısı 0.87 olarak hesaplanmıştır. Kişisel Bilgi Formu: Araştırmacılar tarafından oluşturulan form okul öncesi öğretmenlerinin cinsiyet ve kıdem yılını içermektedir.

Verilerin Analizi

Veri toplama araçları çevrimiçi anket aracılığı ile toplanmıştır. Araştırmada kullanılan veriler uygun istatistik programıyla analiz edilmiştir.

TARTIŞMA, SONUÇ ve ÖNERİLER

Araştırma bulgularına bakıldığında, okul öncesi öğretmenlerinin teknolojiye yönelik tutumları, hem teknolojik pedagojik alan bilgisi özgüvenini hem de TPAB alt faktörlerindeki özgüvenlerini yordamaktadır. Öğretmenlerin teknolojiye yönelik tutumu ile TPAB ve alt boyutları arasındaki ilişki incelendiğinde pozitif yönde anlamlı bir ilişki bulunmuştur. Araştırmanın diğer bulgularına göre okul öncesi öğretmenlerinin teknolojiye yönelik tutum puanları ile TAB alt boyutu puanları arasındaki ilişkinin diğer alt boyutlara göre nispeten düşük seviyede olduğu sonucuna ulaşılmıştır. Öğretmenlerin teknoloji kullanımına yönelik tutum ve özgüven yetersizliğine sahip olmalarından kaynaklandığı söylenebilir (Ardıç, 2021). Ayrıca mesleki kıdemi 10 yıl ve üzeri olan öğretmenlerin sayısı fazla olduğu için, bu öğretmenlerin lisans eğitimi teknoloji entegrasyonu konusunda yetersiz kaldığı söylenebilir. Okul öncesi öğretmenlerinin teknolojiye yönelik tutumlarının TPAB özgüvenlerini yordama durumu alanyazına katkı sağlamaktadır. Gelecekte TPAB ile öz yeterlilik, öz düzenleme, inançlar veya eğitim teknolojisine ilişkin tutumlar arasındaki karmaşık ilişki ilgili yapıların ayırt ediciliği için önemli bir faktör olması nedeniyle daha ayrıntılı olarak incelenmelidir (Schmid, Brianza & Petko, 2020). Öğretmenlerin teknolojiye yönelik tutumları ile teknolojik alan bilgisi alt boyutu arasındaki ilişkinin diğer alt boyutlara göre nispeten düşük seviyede olması derinlemesine incelenmelidir.Teknolojik gelişmelerin hızla yaşandığı günümüzde okul öncesi öğretmenlerinden eğitim ortamlarında, etkinlik planlarında, programlarda güncel ve yeni teknolojileri entegre etmeleri beklenmektedir. Bu gereklilikten hareketle okul öncesi öğretmenlerine yönelik teknolojiyi erken çocukluk eğitimi ortamına entegre etmeleri amacıyla hizmet içi eğitim programı hazırlanmalı ve mesleki topluluklar aracılığıyla öğretmenlerin deneyimlerin deneyimlerini birbirine aktarmaları sağlanmalıdır. Ayrıca bu çalışmada nicel verilerin toplandığı göz önünde bulundurularak, nitel verilerin toplandığı çalışmalarla alanyazına destek sağlanabilir.