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ORIGINAL ARTICLE

The Effect of Physical Education and Sports Teachers' Web-Technological Pedagogy Content Knowledge on Online Learning Readiness

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ABSTRACT

Aim: The aim of this study was to examine whether the Web-Technological Pedagogy Content Knowledge of Physical Education and Sports Teachers had an Effect on Online Learning Readiness in terms of various demographic variables such as gender, school level and tenure.

Methods: In line with this purpose, 180 Physical Education and Sports Teachers voluntarily participated in the research. In the research, Web-Technological Pedagogy Content Knowledge and Online Learning Readiness Scales were used as a data collection tool besides the personal information form prepared by the researcher. In the analysis of the data, descriptive statistics and Pearson Moments Multiplication Correlation Coefficient (r), Linear Regression Analysis, T-Test and One-Way ANOVA were used. It was determined that the participants had a high level of Web-Technological Pedagogy Content Knowledge and Online Learning Readiness.

Results: While the results of the analysis showed that the level of web-technological pedagogy content knowledge did not differ according to gender and service time variables, it was determined that the level of online learning readiness was higher in women. In addition, it was determined that there was a positive and moderate relationship between Online Learning Readiness and Web-Technological Pedagogy Content Knowledge.

Conclusion: As a result, it was determined that 38% of online learning readiness was explained by web-technological pedagogy content knowledge.

Keywords: Readiness, Web-technological pedagogy content knowledge, Physical education and sports, Online learning

INTRODUCTION

Distance education, which is normally a common form, has become more widespread due to the Covid-19 epidemic that affected the whole world with our country Turkey (1). The distance education that provided an opportunity for individuals who could not participate in face-to-face education for various reasons or obstacles to benefit from education-activities in the past, has now become a reason for preference for all education levels and individuals and started to be used more.

Today, one of the most important factors that increase the use of distance education, which has been used much more due to the epidemic, is the intensity of technology and internet use. Studies show that almost every student in the USA takes distance education lessons at least once during their education life (2), and after 2000, almost all of the world's population used the internet (3). The most important advantage of online learning, which is defined as learning experiences that can be provided in synchronous or asynchronous environments using different devices with internet access (eg mobile phones, laptops, etc.), is that it provides easy access and use of information and documents from anywhere (4). In addition, it provides students a learning environment suitable for their own learning style and speed and offers as many repetitions as they needed (5). Morover, it provides the opportunity for those who do not have the opportunity to participate in face-to-face trainings to receive training on the subjects they need (6). On the other hand, online learning is as much disadvantageous as it is advantageous. Considering that it is not different from face-to-face training, trying to provide training in the same way may lead to inefficiency and learning difficulties. Not everyone may have the same access possibilities. There may be a lack of interaction and communication. Students may quit the course more easily, and there may be a situation of dropping out of education here (7,8,6).

Readiness for online learning refers to the state of having the knowledge, skills and experiences regarding the use of technological tools required for online learning before starting education (9). Readiness is one of the basic requirements for effective and efficient online learning (10). Online learning readiness comprised the sub-dimensions of self-directed learning, which involves identifying and applying appropriate learning methods, either alone or with the help of others, by taking the initiative (11); the motivation to have to fulfill the requirements of distance education since there will be no face-to-face education; student control, which will determine the responsibilities he will take in the education process and It consists of self-efficacy for online communication, which includes self-efficacy in internet use and the individual's ability to use technologies that can be used in online learning (12).

Teachers are the representatives who will best prepare students for the future thanks to their knowledge, skills and experience (13). Physical education and sports teachers, on the other hand, are people who help individuals to gain awareness about exercise and sports activities from an early age, and who strive to make sports an important part of their lives throughout their lives (14)

and transferring the positive outcomes of sports and recreational activities to the individual (15). To achieve this goal, a quality education is essential and the prerequisite for quality education is qualified and expert teachers. While it was thought that pedagogical field knowledge was sufficient before, nowadays technology has become an indispensable part of the education and training environment, and the knowledge and ability to use technology has also gained importance.

Web-Technological content knowledge refers to a type of knowledge that includes the interaction of technology, pedagogy, and content knowledge or competence (16). With the increasing use of distance education applications, the importance of technological field knowledge, which requires the integration of three types of information in order to provide an effective, efficient and quality online education, has increased.

In the literature, generally there are studies on examining the relationship between online readiness and student success (17), student attitudes towards online learning (18), and the expectations and satisfaction levels of online students (19), the relationship between online learning and motivation and perceived learning (20), self-learning readiness and the online learning effectiveness of technology literacy (21), the relationship between online readiness level and perceived structure and interaction level (22). Although the concept of online readiness has been studied with different variables as above, no study has been found in which it is discussed together with web-technological pedagogy content knowledge. In addition, studies on web-technological pedagogy content knowledge are mostly related to mathematics (23, 24, 25, 26, 27) and science (28, 29, 30, 31). A study selected a sample of teachers in the branches of Mathematics, Turkish Language and Literature, English, History, Religious Culture and Moral Knowledge, Geography, Philosophy, Guidance, Painting, Biology, Information Technologies, Chemistry, Physics, Physical Education, and Music (32). When it is examined specifically in terms of physical education and sports, there is a study by Çar and Aydos (2020), who examined the proficiency perceptions of physical education and sports teachers regarding technological pedagogical content knowledge in terms of gender, technology use and district variables, and found a significant difference.

When the studies in the literature are examined, this study is important in terms of contributing to the literature in terms of theory. When examined in terms of practice, it is also important in terms of measuring the web-technological pedagogy content knowledge of physical education and sports teachers who give practical training and how this knowledge affects the readiness for online learning, raising awareness among practitioners and guiding practitioners. In addition, it is possible to say that the study is up-to-date in terms of measuring readiness for online learning, which has become essential at every level today. In this context, the aim of the study is; Web-technological pedagogy content knowledge, which Kolb (2007) states, enables individuals with different learning characteristics such as learning by doing, feeling, watching and thinking, and facilitating lifelong learning (5) is to examine whether there is an effect on online learning in terms of various demographic variables such as gender, school level and tenure.

MATERIAL AND METHODS

Research Model: In this study, the effect of web-technological pedagogy content knowledge of physical education and sports teachers on online learning readiness was investigated using the relational scanning model. This model aims to determine the existence or degree of change that may occur between more than one variable (35).

Study Group: The participants of this study comprised of a total of 180 physical education and sports teachers, 84 (46.7%) of whom are females and 96 (53.3%) males, working in public schools in the 2020-2021 academic year, in Ankara. 114 of the participants (63.3%) are working at the secondary school level and 66 (36.7%) of them are working at the high school level. 44 (24.4%) of the participants have a service period of 1-5 years, 47 (26.1%) of them 6-10 years, 32 (17.8%) 11-15 years, 24 (13.3%) 16-20 years and 33 (18.3%) of them have a service period of 21 years or more. The average age of the participants was calculated as 36.78 ± 7.33 (22-55 age range).

Data Collection Tools: Web-Technological Pedagogy Content Knowledge and Online Learning Readiness Scales and a personal information form were used in the study.

Web-Technological Pedagogy Content Knowledge Scale: Web-Technological Pedagogy Content Knowledge Scale developed by Lee & Tsai (2010) was adapted to Turkish by Horzum (2011). Although the scale has a 5-points Llikert structure, it consists of 30 items in total. The sub-dimensions of the scale; are named as general web, communicative web, web content knowledge, web pedagogical content knowledge and attitude towards web-based teaching. Cronbach's Alpha Coefficients of the original form of the scale for the sub-dimensions, respectively was calculated as .88, .91, .95, .90, .92 and .94 for the whole scale (37). Cronbach's Alpha Coefficients obtained from the data set used within the scope of the research are respectively .90, .92, .96, .90, .93 for the sub-dimensions and .97 for the whole scale.

Online Learning Readiness Scale: The Online Learning Readiness Scale developed by Hung, Chou, Chen & Own (2010) and brought to the Turkish literature by Yurdugül & Alsancak Sırakaya (2013) after completing the validity and reliability analysis, consists of 18 items and 5 sub-dimensions. The names of the sub-dimensions are computer / internet self-efficacy, self-directed learning, learner control, motivation for learning and online communication self-efficacy. Cronbach's Alpha Coefficients belonging to the original form of the scale for sub-dimensions, was calculated respectively as .92, .84, .85, .80, .91. Cronbach's Alpha Coefficients obtained from the data set used within the scope of the research are respectively .88, .86, .84, .82, .90 for the sub-dimensions and .89 for the whole scale.

Data Analysis: The data obtained within the scope of the research were examined and firstly 11 forms with extreme values were removed from the data set. Then, Shapiro-Wilk Test was applied in order to control the data distribution and in line with the result, it was determined that the Skewness and Kurtosis values were between -1.5 and +1.5. This result can be accepted as a proof of the normal

distribution of the data (40). The tests to be used in the research on determining the normal distribution of the data were determined. In these tests, in accordance with the purpose of the study, analyzes were carried out on the total score, since the scales were usable over the total score and could explain the feature. Pearson's Moments Multiplication Correlation Coefficient (r) was used to determine the level of correlation between the variables used in the study. Linear Regression Analysis was used to determine the effect of web-technological pedagogy content knowledge of physical education and sports teachers on online learning readiness. In addition, the comparison of the variables used in the study by gender and school level was achieved by using the T-Test, and the comparison with the variable of service time was achieved using One-Way ANOVA. Descriptive statistics were also used in the process of data analysis. In addition, analyzes were carried out using SPSS 22 Package Program and Excel Database programs.

RESULTS

The findings obtained as a result of the analysis of the data obtained from the participants are presented below.

Table 1. Average Scores of the Participants on the Web-Technological Pedagogy Content Knowledge Scale

Scale	N	Min	Max	x̄	S
General Web	180	1.14	5.00	4.34	.58
Communicative Web	180	1.00	5.00	4.05	.81
Web Content Knowledge	180	1.00	5.00	4.20	.68
Web Pedagogical Content Information Attitude Towards Web Based Teaching	180	1.00	5.00	4.15	.66
	180	1.00	5.00	4.11	.64
Web-Technological Pedagogy Content Knowledge Scale	180	1.03	5.00	4.18	.57

Table 2. Average Scores of the Participants on the Online Learning Readiness Scale

Scale	N	Min	Max	x̄	S
Computer / Internet Self-Efficacy	180	1.00	5.00	3.85	.68
Self-Guided Learning	180	1.00	5.00	4.04	.54
Learner Control	180	1.33	5.00	3.87	.57
Motivation for Learning	180	1.00	5.00	4.42	.54
Online Communication Self-Efficacy	180	1.00	5.00	3.91	.71
Online Learning Readiness Scale	180	1.06	5.00	4.04	.46

The average score of the participants from the Web-Technological Pedagogy Content Knowledge Scale was determined as (x̄= 4.18), from the "general web" sub-dimension (x̄= 4.34), from the "communicative web" sub-dimension (x̄= 4.05), from the "web content knowledge" sub-dimension (x̄= 4.20), "web pedagogical content knowledge" sub-dimension (x̄= 4.15) and "attitude towards web-based teaching" (x̄= 4.11).

The average score obtained by the participants from the Online Learning Readiness Scale was (x̄= 4.04) from the "computer / internet self-efficacy" sub-dimension was (x̄= 3.85), from the "self-directed learning" sub-dimension was (x̄= 4.04), and from the "learner control" sub-dimension was (x̄= 3.87), from the "motivation for learning" sub-dimension (x̄= 4.42) and from the "online communication self-efficacy" sub-dimension was (x̄= 3.91).

Table 3. T-Test Results of the Average Score Obtained from the Web-Technological Pedagogy Content Knowledge Scale and Online Learning Readiness Scales According to the Gender Variable

Scales	Gender	N	x̄	S	sd	t	P
Online Learning Readiness Scale	Kadın	84	4.12	.40	178	2.05	.04
	Erkek	96	3.98	.49			
Web-Techno Peda Content Knowledge Scale	Kadın	84	4.17	.53	178	-.21	.83
	Erkek	96	4.19	.61			

The average score obtained by female participants from the Online Learning Readiness Scale was determined as (x̄= 4.12) and (x̄= 3.98) by male participants. Considering the analysis results, it can be said that female participants' readiness for online learning is higher, t (178) =. 04, p <.05. On the other hand, the average score obtained by the female participants from the Web-Technological Pedagogy Content Knowledge Scale was determined as (x̄= 4.17) and by the male participants (x̄= 4.19). The results of the analysis show that the level of web-technological pedagogy content knowledge of the participants does not differ according to the gender variable, t (178) =. 83, p> .05.

Table 4. t-Test Results of the Average Score Obtained from the Online Learning Readiness and Web-Technological Pedagogy Content Knowledge Scales According to the Variable of the School Level.

Scales	Edu. Level	N	x̄	S	sd	t	P
Online Learning Readiness Scale	Secondary School	114	3.94	.50	178	-4.05	.00
	High School	66	4.22	.30			
Web-Technological Pedagogy Content Knowledge Scale	Secondary School	114	4.06	.61	178	-.3.69	.00
	High School	66	4.38	.45			

The average score obtained by the participants working in secondary school from the Online Learning Readiness Scale was determined as (x̄= 3.94), by the high school participants (x̄= 4.22). The results of the analysis showed that the online learning readiness level of the high school participants was significantly higher than the participants working in secondary school, t (178) = - 4.05, p <.05. From the Web-Technological Pedagogy Content Knowledge Scale, the average score obtained by the participants working at the secondary school level was determined as (x̄= 4.06), and the participants working at the high school level (x̄= 4.38). When the analysis results were examined, it can be stated that the level of web-technological pedagogy content knowledge of the participants working at the high school level was significantly higher than the participants working in the secondary school, t (178) = - 3.69, p <.05.

Table 5. One-Way Anova Results of Average Scores from Online Learning Readiness and Web-Technological Pedagogy Content Knowledge Scales According to the Service Time Variable

Scales	Tenure	N	x̄	SS	F	P
Online Learning Readiness Scale	1-5 years	44	4.06	.45	.96	.42
	6-10 years	47	4.04	.56		
	11-15 years	32	3.94	.40		
	16-20 years	24	3.99	.44		
	21 and above	33	4.16	.35		
	Total	180	4.04	.46		
Web-Technological Pedagogy Content Knowledge Scale	1-5 years	44	4.26	.56	.93	.44
	6-10 years	47	4.20	.66		
	11-15 years	32	4.21	.57		
	16-20 years	24	4.19	.57		
	21 and above	33	4.01	.47		
	Total	180	4.18	.57		

In Table 5, Anova results can be seen regarding whether there is a statistical difference according to the service period. It was concluded that there was no statistically significant difference between the average scores obtained from the Online Learning Readiness and Web-Technological Pedagogy Content Information Scales and the duration of service, F1 (4, 175) =. 96, p> .05; F2 (4, 175) =. 93, p> .05).

Table 6. Investigation of the Relationship Between Variables with the Pearson Product Moment Correlation

	Web-Technological Pedagogy Content Knowledge
Online Learning Readiness	.62**

**p<.01

Considering Table 6, it is seen that there is a positive and moderate relationship between Online Learning Readiness and Web-Technological Pedagogy Content Knowledge (r = .62, p <.01).

Table 7. Regression Analysis Results Related to Predicting Online Learning Readiness

Variables		Standardize β	Standard Error	Critical Rate	p	R^2
WTPCK	OLRS	.61	.04	10.39	.00	.38

p<.05,

WTPCK: Web-Technological Pedagogy Content Knowledge, OLRS: Online Learning Readiness

Analysis results show that there is a statistically significant effect on the relationship between web-technological pedagogy content knowledge and online learning readiness, (β = .61; p <.05). Considering the value of the model, it can be stated that 38% of online learning readiness is explained by web-technological pedagogy content knowledge.

DISCUSSION

When the findings of this study, which was conducted to examine whether the Web-Technological content knowledge of physical education and sports teachers has an effect on the level of online learning readiness in terms of various demographic variables such as gender, school level and tenure, are examined in line with the literature, web-technological pedagogy content knowledge is defined as one of the most important models for providing a successful teaching process with the use of technology (41). According to the average score obtained from this scale, it can be stated that the participants have a high level of web-technological pedagogy content knowledge. In particular, it can be said that their motivation level for learning is quite high. It has been stated that the use of technology in physical education and sports classes increases material diversity and learning motivation (42). In addition, it has been determined that technological pedagogical content knowledge affects professional anxiety by 62% (43). Therefore, it can be said that web-technological pedagogy content knowledge is quite necessary for carefree teaching. In parallel with the results of this study, Çar and Aydos (2020) determined that physical education and sports teachers', Özbek, (2014); Bakaç and Özen, (2018) and Harvey and Caro, (2017) prospective teachers'; Çekerol and Özen (2020) teachers' Technological Pedagogical content knowledge levels are quite high. Farikah and Al Firdaus (2020) also concluded that teachers' Technological Pedagogical content knowledge skills are at a sufficient level.

When looking at the average score the participants obtained from the Online Learning Readiness Scale, it can be stated that they have a high level of readiness. Kaymak and Horzum (2013) state that a high level of readiness also increases the level of interaction in the learning

environment. Therefore, it is important to have a high level of readiness in order to be able to perform active teaching in a highly interactive environment.

The average score obtained by the female participants from the Online Learning Readiness Scale is higher than the male participants. Considering the results of the analysis, it shows that the readiness level of female participants for online learning is statistically significantly higher than male participants. On the other hand, the average score of the female participants from the Web-Technological Pedagogy Content Knowledge Scale is lower than the male participants, although they are close to each other. The results of the analysis show that the level of web-technological pedagogy content knowledge of the participants does not differ according to the gender variable. Karakaya, (2013); Mutluoglu, (2012); Car and Aydos, (2020); Bakar et al. (2020) obtained similar results in their studies. There are also studies in the literature in which male participants scored higher than female participants (51, 52, 53, 54).

It has been concluded that there is no statistically significant difference between the average scores obtained from the Online Learning Readiness and Web-Technological Pedagogy Content Knowledge Scales and tenure. In parallel with the results of the study, similar results were obtained in the studies of Bal and Karademir (2013); Karakaya (2013); Karatas, (2014); Çar and Aydos (2020). In the study of Akman, (2014) and Yarar (2019), it was concluded that there is a negative significant difference between the year of seniority and the Technological Pedagogy Content Knowledge.

When the results of the analysis were examined, it was determined that the online learning readiness and web-technological pedagogy content knowledge levels of the participants working in high school were significantly higher than the participants working in secondary school. According to this result, it can be stated that as the level of education increases, the use of technology and field knowledge also increase. When the relevant literature was examined, a study was found that evaluated web-technological pedagogy content knowledge in terms of school level variable. Çekerol and Özen (2020) concluded that secondary school teachers think that they are more competent in web-technological pedagogy content knowledge than primary and high school teachers. This result does not show parallelism with the findings of this study. It is thought that the reason for this is that the difficulty levels of physical education and sports classes become more difficult as age and level increase, and different needs arise as the grade level progresses.

It is seen that there is a positive and moderate relationship between physical education and sports teachers' readiness for online learning and web-technological pedagogy content knowledge. In other words, it has been observed that as web-technological pedagogy content knowledge increases, the level of readiness for online learning also increases. It is thought that this result is due to the fact that teachers who have been integrated into online environments and who have increased their readiness by using online platforms effectively due to their frequency of use are open and suitable for development in terms of web-technological pedagogy content knowledge.

The results of the analysis show that there is a statistically significant effect on the relationship between web-technological pedagogy content knowledge and readiness for online learning. Considering the value of the model, it can be stated that 38% of readiness for online learning is explained by web-technological pedagogy content knowledge. The effect of the web-technological pedagogy content knowledge of the teachers on the level of online readiness, which includes the active use of online platforms (9), is due to the fact that the existing knowledge of physical education and sports teachers. This knowledge can be effectively transformed into both theory and practice. It can be stated that it is thanks to the knowledge and experience they have gained from the courses they have taken both theoretically and practically throughout their education. In this context, it is possible to say that web-technological pedagogy content knowledge and the transfer of this knowledge to practice positively affect online readiness. The results of the analysis also support this information.

As a result; in this study, conducted to examine whether the Web-Technological content knowledge of physical education and sports teachers has an effect on the level of online learning readiness, in terms of various demographic variables such as gender, school level and tenure, it is possible to say that physical education and sports teachers have technology usage at a level to provide online education and a sufficient level of field knowledge. When the results of the analysis are examined, the averages obtained from the participants support this situation. In addition, it can be said that there is a positive relationship between technological pedagogy content knowledge and readiness for online learning. The readiness of teachers is one of the most fundamental factors in creating a healthy learning environment for students. Therefore, teachers' first use of technology and their ability to combine their field knowledge will make a positive contribution to an effective online learning process. Since the field of physical education and sports is an application-based field, it is thought that adapting and transferring web-technological-based pedagogy and field information to online platforms is more difficult than other theoretical fields. In this context, it is even more important to integrate web-technological content knowledge into online platforms, and to ensure online readiness for this, in order to realize the effective learning process in the best way. Considering the results of this study, it was concluded that web-technological content knowledge is effective in online learning readiness level. Physical education and sports teachers receive training both theoretically and practically in the learning and teaching stages of physical education and sports, both during their sports background and undergraduate education. In these trainings, technological products, web-based software, measuring devices and programs in which these devices are integrated are used. In this context, it is possible to say that web-technological pedagogy and content knowledge are effective in online readiness, and that the physical education and sports teachers included in this study have sufficient level of content knowledge and use of technology to provide online education.

CONCLUSION

In line with the results of the study, it can be recommended to expand the theoretical sample for further studies, to conduct studies in larger groups, and to conduct studies on the competence perceptions of teachers who use online platforms used in the field of physical education and sports. In terms of practice, in line with the results of the study, it can be recommended to organize training programs for teachers who do not have sufficient content knowledge and online readiness, and to create a guide that will suggest curriculum for undergraduate universities to include in their curricula.

REFERENCES

1. Dhawan, Shivangi. "Online learning: A panacea in the time of COVID-19 crisis." Journal of Educational Technology Systems 49.1 (2020): 5-22.
2. Allen, I. Elaine, and Jeff Seaman. "Digital Compass Learning: Distance Education Enrollment Report." Babson survey research group (2017).
3. Internet World Stats, Internet Users in The Worlds. (2017). http://www.internetworldstats.com/stats.htm last access 2.12.2020
4. Horton, William Kendall. Designing web-based training: How to teach anyone anything anywhere anytime. Vol. 1. New York, NY: Wiley, 2000.
5. Horzum, Mehmet Barış, Zeliha Demir Kaymak, and Özlem CANAN GÜNGÖREN. " Adaptation of the scale of student barriers in online learning into Turkish: validity and reliability study." Journal of Open Education Practices and Research 3.2 (2017): 61-84.
6. Moore, Michael G., and Greg Kearsley. Distance education: A systems view of online learning. Cengage Learning, 2011.
7. Verduin, J. R. & Clark, T. A (1994). Uzaktan Eğitim: Etkin Uygulama Esasları (Çev.: İlknur Maviş), 1.Baskı, Eskişehir: Anadolu Üniversitesi Basımevi. Zhang, L. F.& Sternberg, R. abilitiesandacademicachievement amog Hong Kong Universitystudents, EducationalResearchJournal, 13, 41-62. J. (1998). Thinkingstyles,
8. Lynch, Maggie McVay. The online educator: A guide to creating the virtual classroom. Routledge, 2002.
9. Smith*, Peter J. "Learning preferences and readiness for online learning." Educational psychology 25.1 (2005): 3-12.
10. Xiong, Yao, Hyo-Jeong So, and Yancy Toh. "Assessing learners' perceived readiness for computer-supported collaborative learning (CSCL): A study on initial development and validation." Journal of Computing in Higher Education 27.3 (2015): 215-239.
11. Loyens, Sofie MM, Joshua Magda, and Remy MJP Rikers. "Self-directed learning in problem-based learning and its relationships with self-regulated learning." Educational psychology review 20.4 (2008): 411-427.
12. Horzum, Fatma. Examining the relationship between readiness for online learning and perceived barriers: Sakarya University pedagogical formation example. MS thesis. Sakarya University, 2019.
13. Kaçay, Zülbiye, Fikret Soyer, and Ersin Eskiler. "Analysis of the ethical leadership behaviors' effect on life satisfaction and mediation effect of organizational commitment." (2020).
14. Güngör, N. B. "The mediating role of cognitive flexibility in the effect of physical education and sports teachers' individual innovativeness level on teacher professionalism." Gazi University, Institute of Educational Sciences, Ankara (2019).
15. Özen, Güçlü, Ahmet Özsoy, and Nuh Osman Yıldız."The impact of artificial wall climbing as a recreational activity on children's locus of control." Journal of Human Sciences 15.4 (2018): 2462-2467.
16. Mishra, Punya, and Matthew J. Koehler. "Technological pedagogical content knowledge: A framework for teacher knowledge." Teachers college record 108.6 (2006): 1017-1054.
17. Cigdem, Harun, and Mustafa Ozturk. "Critical components of online learning readiness and their relationships with learner achievement." Turkish Online Journal of Distance Education 17.2 (2016).
18. Ibrahim, Daing Zaidah, Abu Daud Silong, and Bahaman Abu Samah. "Readiness and attitude towards online learning among virtual students." 15th Annual Conference of the Asian Association of Open Universities, Nueva Delhi, India. 2002.
19. Ilgaz, Hale, and Yasemin Gülbahar. "A snapshot of online learners: e-Readiness, e-Satisfaction and expectations." International Review of Research in Open and Distributed Learning 16.2 (2015): 171-187.
20. Horzum, Mehmet Baris, Zeliha Demir Kaymak, and Ozlem Canan Gungoren. "Structural equation modeling towards online learning readiness, academic motivations, and perceived learning." Educational Sciences: Theory and Practice 15.3 (2015): 759-770.
21. Lai, Horng-Ji. "The influence of adult learners' self-directed learning readiness and network literacy on online learning effectiveness: A study of civil servants in Taiwan." Journal of Educational Technology & Society 14.2 (2011): 98-106.
22. Demir, Zeliha Kaymak, and Mehmet Barış Horzum. "The relationship between online learning students' online learning readiness levels, their perceived structure and interaction." Educational Sciences in Theory and Practice, vol.13, no.3, 2013, ss.1783 - 1797.
23. Akkaya, Esra. Examination of pre-service mathematics teachers' technological pedagogical content knowledge regarding the concept of derivative in the context of student difficulties. Diss. Marmara University (Turkey), 2009.
24. Avcı, Turgay. "Determination of technological pedagogical content knowledge and self-confidence levels of science teachers." Unpublished master's thesis, Celal Bayar University,Manisa (2014).
25. Canbolat, Nuran. Examining the relationship between pre-service mathematics teachers' technological pedagogical content knowledge and their thinking styles. MS thesis. Selcuk University Institute of Educational Sciences, 2011.
26. Ergene, Berna. Examining the Technological Padagogical Content Knowledge of Mathematics Teacher Candidates on the Concept of Derivative in the Component of Multiple Representations. Diss. Marmara University (Turkey), 2011.
27. Niess, Margaret L. "Preparing teachers to teach science and mathematics with technology: Developing a technology pedagogical content knowledge." Teaching and teacher education 21.5 (2005): 509-523.
28. Canbazoğlu Bilici, S. "Technological pedagogical content knowledge and self-efficacy of prospective science teachers" (Unpublished doctoral dissertation). Gazi University, Institute of Educational Sciences, Ankara. (2012).
29. Graham, R. C., et al. "Measuring the TPACK confidence of inservice science teachers." TechTrends 53.5 (2009): 70-79.
30. Kiliç, Aygün. "Investigation of pre-service science and technology teacher candidates' technological pedagogical content knowledge and classroom practices on electric current" (Unpublished master's thesis). Firat University, Institute of Science and Technology,Elazığ. (2011).
31. Timur, Betül, and Mehmet Fatih Taşar. "Adaptation of the Technological Pedagogical Content Knowledge Self-Confidence Scale (TPABÖG) into Turkish." Gaziantep University Journal of Social Sciences 10.2 (2011).
32. Karatas, Abuzer, and Özcan Erkan Akgün. "Examination of the Technological Pedagogical Content Knowledge competencies of high school teachers for applying the FATIH Project." Journal of Civilization Educational Research

1.4 (2014): 10-30.
33. ÇAR, Bekir, and Latif AYDOS. "Examination of Physical Education and Sports Teachers' Competencies Related to Technological Pedagogical Content Knowledge." Gazi Journal of Physical Education and Sports Sciences 25.4 (2020): 441-454.
34. Kolb, David A. The Kolb learning style inventory. Boston, MA: Hay Resources Direct, 2007.
35. Karasar, Niyazi. Scientific research method. Ankara: Nobel Publisher. (2013).
36. Lee, Min-Hsien, and Chin-Chung Tsai. "Exploring teachers' perceived self efficacy and technological pedagogical content knowledge with respect to educational use of the World Wide Web." Instructional Science 38.1 (2010): 1-21.
37. Horzum, Mehmet Barış. "The Turkish Adaptation of the Web Pedagogical Content Knowledge Scale." Primary Education Online 10.1 (2011).
38. Hung, Min-Ling, et al. "Learner readiness for online learning: Scale development and student perceptions." Computers & Education 55.3 (2010): 1080-1090.
39. Yurdugül, Halil, and Didem Alsancak Sırakaya. "Online learning readiness scale: A study of validity and reliability." Education and Science 38.169 (2013).
40. Tabachnick, B. G., and L. S. Fidell. "Using Multivariate Statistics, 6th Edn. Northridge." CA: California State University.[Google Scholar] (2013).
41. Schmid, M., Brianza, E., & Petko, D. Efficient self-report measures for technological pedagogical content knowledge (TPACK): Constructing a reliable and valid short-scale among pre-service teachers. Computers & Education, 103967. doi:10.1016/j.compedu.2020.103967
42. Thornburg, Roland, and Kory Hill. "Using internet assessment tools for health and physical education instruction." TechTrends 48.6 (2004): 53-55.
43. Gulden, Kaya-Uyanik, Gur-Erdogan Duygu, and Ozlem Canan-Gungoren. "Examination of the Relationship between Prospective Teachers' Occupational Anxiety and Technological Pedagogical Content Knowledge by Canonical Correlation." International Journal of Educational Methodology 5.3: (2019). 407-420.
44. Özbek, Ayşe. Investigation of the effect of teachers' innovativeness levels on TPAB competencies. MS thesis. Necmettin Erbakan University, Institute of Educational Sciences, 2014.
45. Bakaç, ebru, and Özen. Raşit. "The relationship between pre-service teachers' self-directed learning readiness levels and technological pedagogical content knowledge (TPAB) competencies."Education Sciences 13.2 (2018): 90-105.
46. Harvey, Douglas M., and Ronald Caro. "Building TPACK in preservice teachers through explicit course design." TechTrends 61.2 (2017): 106-114.
47. Farikah, Farikah, and Moch Malik Al Firdaus. "Technological Pedagogical and Content Knowledge (TPACK): The Students' Perspective on Writing Class." Jurnal Studi Guru dan Pembelajaran 3.2 (2020): 190-199.
48. Karakaya, Ç. "Technological pedagogical content knowledge competencies of chemistry teachers working in secondary education institutions determined as pilot schools within the scope of FATIH project." Gazi University, Ankara (2013).
49. Mutluoğlu, Ahmet, and Ahmet Erdoğan. "Examination of primary school mathematics teachers' technological pedagogical content knowledge (TPACK) levels according to their teaching style preferences." OPUS International Journal of Society Studies 6.10 (2016): 102-126.
50. Bakar, Nurul Shahhida Abu, Siti Mistima Maat, and Roslinda Rosli. "Mathematics Teacher's Self-Efficacy of Technology Integration and Technological Pedagogical Content Knowledge." Journal on Mathematics Education 11.2 (2020): 259-276.
51. Ünlü, H. ve Erbaş, M. K. Investigation of Techno-Pedagogical Education Competencies of Physical Education Teacher Candidates. 26th International Educational Sciences Congress, National Education Associations Platform and Pegem Academy/Karadeniz Technical University,Antalya. (2017).
52. Karadeniz, Şirin, and Sinem Vatanartiran. "Examination of Technological Pedagogical Content Knowledge of Classroom Teachers." Primary Education Online 14.3 (2015).
53. 53. Akyıldız, Salih, and Taner Altun. "Examination of pre-service classroom teachers' technological pedagogical content knowledge (tpab) according to some variables." Trakya Journal of Education (2018).
54. Çekerol, Kamil, Emin Özen. Evaluation of teachers' technological pedagogical content knowledge within the framework of educational information network and other variables. Turkish online journal of distance education-TOJDE. ISSN 1302-6488 IODL-Special Issue Article 5. (2020).
55. Bal, Mehmet Suat, and Nadire Karademir. "Determination of self-evaluation levels of social studies teachers on technological pedagogical content knowledge (TPACK)." Pamukkale University Faculty of Education Journal 34.2 (2013): 15-32.
56. Akman, Özkan. "A versatile examination of social studies teachers' and prospective teachers' technological, pedagogical and content knowledge self-efficacy perception levels." (Unpublished PhD Thesis). Necmettin Erbakan University, Institute of Educational Sciences, Konya. (2014).
57. Yarar, G. "Examination of Technological Pedagogical Content Knowledge Competencies of English Instructors in Terms of Classroom Management Profiles." Gazi University Institute of Educational Sciences, Ankara (2019).