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The Investigation of the Relationship Between Classroom Teachers' Views on Distance Education and Beliefs about Computer Use in Mathematics Education

Gökçen BAKAN[1] Mehmet Akif BİRCAN[2] Emrah AKMAN[3]

[1] Sivas Cumhuriyet University, Faculty of Education, Department of Primary Education, Sivas, Turkey gokcen.arslan@hotmail.com
[2] Assistant Professor, Sivas Cumhuriyet University, Faculty of Education, Department of Primary Education, Sivas, Turkey bircanmehmetakif@gmail.com
[3] Assistant Professor, Ordu University, Faculty of Education, Department of Educational Sciences, Ordu, Turkey emrahakman@outlook.com.tr *(Sorumlu Yazar/Corresponding Author)*

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ABSTRACT

In this study, we sought to investigate the opinions of classroom teachers about distance education and their beliefs about the use of computers in mathematics education. We used a relational survey model, one of the quantitative research designs, to collect data from 163 classroom teachers. The Opinion Scale on Distance Education developed by Kurnaz, Kaynar, Şentürk Barışık, and Doğrukök (2020) and the Belief Scale on Computer Use in Mathematics Education developed by Çakıroğlu, Güven, and Akkan (2008) were used as data collection tools. We analysed the data using descriptive statistics, independent samples t-test, ANOVA, and Pearson correlation. A significant positive relationship was found between classroom teachers' views on distance education and their mean scores on computer use in mathematics education. The results of the study showed that the mean scores of classroom teachers' opinions about distance education and beliefs about the use of computers in mathematics education were both close to the middle level. Additionally, the mean scores of classroom teachers' opinions about distance education did not differ significantly by gender or education level, but they did differ significantly by professional seniority. Similarly, the mean scores of classroom teachers' beliefs about the use of computers in mathematics education did not differ significantly by gender or professional seniority, but they did differ significantly by education level.

Sınıf Öğretmenlerinin Uzaktan Eğitime İlişkin Görüşleri ve Matematik Eğitiminde Bilgisayar Kullanımına İlişkin İnançları arasındaki ilişkinin İncelenmesi

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ÖZ

Bu araştırmada sınıf öğretmenlerinin uzaktan eğitime ilişkin görüşleri ve matematik eğitiminde bilgisayar kullanımına ilişkin inançları ortaya çıkarılmaya çalışılmıştır. Araştırmada nicel araştırma desenlerinden ilişkisel tarama modeli kullanılmıştır. Araştırmanın çalışma grubunu 163 sınıf öğretmeni oluşturmaktadır. Araştırmada veri toplama aracı olarak Kurnaz, Kaynar, Şentürk Barışık ve Doğrukök (2020) geliştirilen Uzaktan eğitime ilişkin görüş ölçeği ve Çakıroğlu, Güven ve Akkan (2008) tarafından geliştirilen Matematik Eğitiminde Bilgisayar Kullanımına İlişkin İnanç ölçeği kullanılmıştır. Araştırma verileri betimsel istatistikler, bağımsız gruplar t-testi, Anova testi ve pearson korelasyon testi kullanılarak analiz edilmiştir. Araştırma sonuçlarına göre sınıf öğretmenlerinin uzaktan eğitime ilişkin görüşleri ile matematik eğitiminde bilgisayar kullanımına ilişkin ortalama puanları arasında pozitif yönde anlamlı bir ilişki vardır. Sınıf öğretmenlerinin uzaktan eğitime ilişkin görüş ve matematik eğitiminde bilgisayar kullanımına ilişkin inanç ortalama puanlarının orta düzeye yakın olduğu sonucu elde edilmiştir. Ayrıca sınıf öğretmenlerinin uzaktan eğitime ilişkin görüş ortalama puanları; cinsiyet ve eğitim düzeyi değişkenine göre anlamlı farklılık göstermezken mesleki kıdem değişkenine göre anlamlı farklılık göstermektedir. Bununla birlikte sınıf öğretmenlerinin matematik eğitiminde bilgisayar kullanımına ilişkin inanç ortalama puanları; cinsiyet ve mesleki kıdem değişkenine göre anlamlı farklılık göstermezken eğitim düzeyi değişkenine göre anlamlı farklılık göstermektedir.

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INTRODUCTION

The rapid pace of technological development and the easy availability of the internet have opened up new possibilities for people to access information (Bozkurt, 2016). In particular, improvements in infrastructure and technology services have led to major changes in education and training. As a result, the traditional concepts of education and school have been transformed, and accessing and producing information has become much faster and more convenient (Alptekin & Türkmen, 2023). This has led to the emergence of education methods that are not limited by time or space and that allow information to be accessed at any time. One such method is distance education (Buselic, 2012).

Distance education is a technology-mediated method that allows individuals to construct knowledge on their own (Kaya, 2002; Schlosser & Simonson, 2009). Moore and Kearsly (2011) define distance education as a flexible teaching method that is independent of time and place. In this teaching model, teachers and students are physically separated, but they are still able to interact and participate in the education process (Özer, 1990). Distance education offers education to people by eliminating factors such as time and place that can prevent them from continuing their education (Özbay, 2015).

Interest in distance education is growing and it is widely used in learning and teaching environments (Beese, 2014). Today, distance education is often carried out through computers and the internet. This has made the use of computers and the internet a valuable element in educational processes. In addition, another concept that has come to the forefront is computer-assisted education (CAE). CAE can be defined as a teaching method in which students interact with lessons programmed on the computer during the learning process, while the teacher plays the role of a guide and the computer plays the role of a medium (Hamafin & Peck, 1989). This education method provides benefits such as increasing learning motivation in students, supporting students to learn according to their own learning speed, and concretizing abstract concepts (Andiç, 2012).

The distance education process has become a necessity with the development of technology and the ease of access to technology. The COVID-19 pandemic period has especially brought distance education to the forefront. In the distance education process, it is important for teachers to have a positive perception of distance education in order to fulfill the tasks expected of them (Gündüzalp, 2021). Computers and the internet are at the center of the distance education process. For this reason, teachers' attitudes and beliefs towards CAE are very important in achieving the learning goals set in the distance education process. This is because teachers' attitudes (Arslan, 2006) and beliefs (Çakıroğlu, Güven, & Akkan, 2008) towards CAE can be listed among the factors affecting the quality of CAE.

Another factor affecting the quality of the distance education process is the digital competencies of teachers (Sezgin & Fuat, 2020). The factors affecting teachers' digital competencies can be listed as whether teachers receive adequate training in using computers, their attitudes towards using computers, their self-confidence (Akpınar, 2003), and their beliefs about using computers (Çakıroğlu, Güven, & Akkan, 2008). In this context, it can be stated that teachers' opinions, attitudes, and beliefs towards CAE are very important in the effective implementation of the distance education. In addition to the factors mentioned above, teachers' opinions, attitudes, and beliefs towards CAE can also affect the quality of the distance education process. One subject that students often struggle with is mathematics. Computers can make abstract mathematical operations more concrete, which can help students learn mathematics more effectively.

Mathematics is one of the subjects that students have the most difficulty with due to its abstract nature (Dursun & Dede, 2004). Baki (2022) states that computers can make students' mathematics learning experiences more meaningful by making abstract mathematical operations concrete. The use of computers in mathematics education has been shown to improve students' academic achievement (Önal & Demir, 2012), facilitate permanent learning by making difficult subjects easier to understand (Hangül & Üzel, 2010), and help students to make connections between abstract mathematical concepts and real-world applications (Dede & Argün, 2003). For these reasons, the use of computers in mathematics education can be a useful tool for effective mathematics education.

Primary school years are a critical period for students to develop positive attitudes towards mathematics and to acquire basic knowledge and skills. Students' attitudes towards mathematics and the knowledge and skills they acquire in this period are considered to be important for their future success (Toptaş & Öztop, 2021). Therefore, it is important to ensure that students receive high-quality mathematics education during their primary school years.

Today's developments have made distance education a necessity. For this reason, it is important to understand the opinions of classroom teachers on distance education in order to achieve the expected goals of elementary school mathematics education. In addition, the fact that computers are at the center of learning and teaching in this process makes it important to understand classroom teachers' beliefs about the use of computers in mathematics education. In the literature there are studies that have investigated classroom teachers' views on distance education (Kızıltaş & Özdemir, 2021; Yurtbakan & Ayyıldız, 2020; Sönmez, Yıldırım, & Çetinkaya, 2020), their attitudes towards distance education (Ülkü, 2018; Kandemir, Kurt, & Apaydın, 2022), their distance education experiences (Batdal-Karaduman, 2021; Akşak-Ertaş & Duran-Baytar, 2021), and their perceptions about distance education (Usta, 2022). However, there is no research that has examined classroom teachers' beliefs about computer-assisted mathematics teaching. This study will contribute to the field by revealing the opinions of classroom teachers about distance education and their beliefs about the use of computers in mathematics education. The problem statement of the study is as follows:

What are the opinions of classroom teachers about distance education and their beliefs about the use of computers in mathematics education?

The sub-problems of the research are as follows:

1- Is there a relationship between classroom teachers' perceptions of distance education and their beliefs about computer use in mathematics education?

2- Do classroom teachers' perceptions of distance education and their beliefs about computer use in mathematics education differ according to gender?

3- Do classroom teachers' perceptions of distance education and their beliefs about computer use in mathematics education differ according to professional seniority?

4- Do classroom teachers' perceptions of distance education and their beliefs about computer use in mathematics education differ according to education level?

METHOD

Research Design

This study was conducted using the relational survey model, which is one of the quantitative research methods. The relational survey model aims to determine the relationship between two or more variables and allows researchers to determine the relationship between variables and develop hypotheses to explain this relationship. (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2018).

Population and Sample

The sample for the study was determined using convenience sampling from the non-random sampling method. The population of the study consisted of all classroom teachers in Turkey. A total of 163 classroom teachers participated in the study. Demographic information about the teachers is presented in Table 1.

Table 1. *Teachers' Demographic Information*

Demographic information	Group	N	%
Gender	Male	58	35,6
	Female	105	64,4
Grade	1st Grade	32	19,6

	2nd Grade	42	25,8
	3rd Grade	51	31,3
	4th Grade	38	23,3
Total		163	100

A total of 58 male and 105 female classroom teachers participated in the study. In addition, 32 teachers taught first grade, 42 teachers taught second grade, 51 teachers taught third grade, and 38 teachers taught fourth grade.

Research Instruments

The data for the study were collected using three instruments: the Personal Information Form, the Teachers' Perceptions of Distance Education Scale, and the Teacher Belief Scale on Computer Use in Mathematics Education.

The Personal Information Form

The Personal Information Form was created by the researchers and asked about teachers' gender, professional seniority, grade level, and educational status.

The Teachers' Perceptions of Distance Education Scale

The Teachers' Perceptions of Distance Education Scale (UEA) was developed by Kurnaz, Kaynar, Şentürk Barışık, and Doğrukök in 2020. It consists of 37 items and 5 factors. The responses to the scale are on a 5-point Likert scale, ranging from "completely agree" to "completely disagree." The Cronbach alpha internal consistency coefficient for the scale in the development study was 0.90. The Cronbach alpha internal consistency coefficient for the data from this study was 0.72.

The Teacher Belief Scale on Computer Use in Mathematics Education

The Teacher Belief Scale on Computer Use in Mathematics Education (MEBİKİ) was developed by Çakıroğlu, Güven, and Akkan in 2008. It consists of 27 items and 3 factors. The responses to the scale are on a 5-point Likert scale, ranging from "completely agree" to "completely disagree." The Cronbach alpha internal consistency coefficient for the scale in the development study was 0.81. The Cronbach alpha internal consistency coefficient for the data from this study was also 0.81.

Data Analysis

The data were analyzed using the SPSS program. The data were tested for normality before they were analyzed to determine if they were normally distributed. Descriptive statistics, skewness, and kurtosis values for the scores from both scales and sub-dimensions are presented in Table 2.

Table 2. *Skewness and Kurtosis Values*

Dimensions	N	X	Sd	Skewness	Kurtosis
Thoughts on the Sustainability of Distance Education	163	2,7707	,56524	-,204	-,397
Their Perceptions of Themselves in Distance Education	163	2,7429	,37667	,402	,602
Thoughts on Teaching Practices in Distance Education	163	2,4492	,34576	-,139	,083
Attitudes towards Distance Education	163	3,4822	,54148	-,268	-,255
Thoughts on Assignments in Distance Education	163	2,6702	,55605	,586	,345
Opinions on Distance Education	163	2,8231	,29879	-,264	,391
Using the Computer for Learning Mathematics	163	2,7989	,42423	,355	-,469
Using the Computer for Teaching Mathematics	163	2,7546	,40387	,068	-,074
Compatibility of Computer Use with the Nature of Mathematics	163	3,1370	,55275	-,052	,202
Beliefs towards the Use of Computer in Mathematics Teaching	163	2,8968	,31744	-,254	,323

After determining that the data was normally distributed, parametric tests were applied. Independent samples t-tests and one-way analysis of variance (ANOVA) were conducted to test whether there is a difference between teachers' perceptions of distance education and their beliefs about computer use in mathematics education according to demographic variables. Pearson's product-moment correlation coefficient was examined to reveal whether there is a relationship between teachers' perceptions of distance education and their beliefs about computer use in mathematics education.

Ethic

The ethical committee approval required for this research was obtained on 28.11.2022 with decision number 34 from the Sivas Cumhuriyet University Scientific Research and Publication Ethics Social and Humanities Ethics Committee.

FINDINGS

This section presents the research findings analyzed within the framework of the research problems. Firstly Pearson product-moment correlation coefficients were examined to determine whether there was a relationship between classroom teachers' perceptions of distance education and their beliefs about computer use in mathematics education, and the direction of the relationship, if any. The Pearson correlation coefficients are given in Table 3.

Table 3. *Pearson Product Moment Correlation Coefficient Analysis Results*

	1	2	3	4	5	6	7	8	9	10
1. Thoughts on the Sustainability of Distance Education	1									
2 Their Perceptions of Themselves in Distance Education	0,453**	1								
3. Thoughts on Teaching Practices in Distance Education	0,221**	0,255**	1							
4. Attitudes towards Distance Education	0,330**	0,314**	0,026	1						
5. Thoughts on Assignments in Distance Education	0,118	0,256**	0,144	0,211**	1					
6. Opinions on Distance Education	0,707**	0,691**	0,442**	0,651**	0,591**	1				
7. Using the Computer for Learning Mathematics	0,274**	0,232**	0,089	0,393**	0,196*	0,398**	1			
8. Using the Computer for Teaching Mathematics	0,306**	0,320**	0,080	0,180*	0,154	0,337**	0,555**	1		
9. Compatibility of Computer Use with the Nature of Mathematics	-0,035	-0,073	0,174*	-0,030	0,069	0,023	0,019	0,132	1	
10. Beliefs towards the Use of Computer in Mathematics Teaching	0,231**	0,197*	0,175*	0,234**	0,192*	0,334**	0,692**	0,748**	0,645**	1

** $p<0.001$; * $p<0.05$

Table 3 shows that there is a positive relationship between classroom teachers' views on distance education and their beliefs about the use of computers in mathematics education ($r=0.334$, $p<0.001$). And the relationship is of moderate strength. This means that as classroom teachers' views on distance education become more positive, their beliefs about the use of computers in mathematics education are also likely to become more positive.

This finding is consistent with the results of previous studies, which have shown that there is a positive relationship between teachers' beliefs about technology and their use of technology in the classroom.

The positive relationship between teachers' views on distance education and their beliefs about the use of computers in mathematics education suggests that if classroom teachers are given more opportunities to learn about and experience distance education, they may be more likely to adopt the use of computers in their mathematics education.

Whether teachers' perceptions of distance education and their beliefs about computer use in mathematics education differed according to gender was analysed by independent samples t-tests and the findings are presented in Table 4.

Table 4. *Independent Samples T-Test Results Showing the Change According to Gender*

	Gender	N	X	Sd	t	df	p
Thoughts on the Sustainability of Distance Education	Male	58	2,7392	0,55818	-0,527	161	0,599
	Female	105	2,7881	0,57102			
Their Perceptions of Themselves in Distance Education	Male	58	2,7790	0,41262	0,909	161	0,365
	Female	105	2,7229	0,35577			

Thoughts on Teaching Practices in Distance Education	Male	58	2,4693	0,35016	0,551	161	0,582
	Female	105	2,4381	0,34448			
Attitudes towards Distance Education	Male	58	3,4103	0,59757	-1,262	161	0,209
	Female	105	3,5219	0,50649			
Thoughts on Assignments in Distance Education	Male	58	2,6724	0,55647	0,037	161	0,971
	Female	105	2,6690	0,55847			
Opinions on Distance Education	Male	58	2,8141	0,32266	-0,285	161	0,776
	Female	105	2,8280	0,28625			
Using the Computer for Learning Mathematics	Male	58	2,7537	0,42378	-1,010	161	0,314
	Female	105	2,8238	0,42444			
Using the Computer for Teaching Mathematics	Male	58	2,7672	0,40236	0,296	161	0,768
	Female	105	2,7476	0,40646			
Compatibility of Computer Use with the Nature of Mathematics	Male	58	3,0402	0,56568	-1,671	161	0,097
	Female	105	3,1905	0,54077			
Beliefs towards the Use of Computer in Mathematics Teaching	Male	58	2,8537	0,35197	-1,291	161	0,199
	Female	105	2,9206	0,29574			

Teachers' perceptions of distance education and their beliefs about computer use in mathematics education did not differ according to gender (p>0.05).

Whether teachers' perceptions of distance education and their beliefs about computer use in mathematics education differ according to their professional seniority was analysed by one-way analysis of variance (ANOVA) and the findings are shown in Table 5.

Table 5. *One-Way Analysis of Variance Results Showing the Change According to Professional Seniority*

	Source of Variation	Sum Sq	df	Mean Sq	F	p
Thoughts on the Sustainability of Distance Education	Between Groups	2,652	6	0,442	1,404	0,216
	Within Groups	49,107	156	0,315		
	Total	51,758	162			
Their Perceptions of Themselves in Distance Education	Between Groups	1,997	6	0,333	2,474	0,026*
	Within Groups	20,988	156	0,135		
	Total	22,985	162			
Thoughts on Teaching Practices in Distance Education	Between Groups	1,325	6	0,221	1,910	0,082
	Within Groups	18,041	156	0,116		
	Total	19,367	162			
Attitudes towards Distance Education	Between Groups	1,280	6	0,213	0,720	0,634
	Within Groups	46,218	156	0,296		
	Total	47,498	162			
Thoughts on Assignments in Distance Education	Between Groups	4,640	6	0,773	2,655	0,018*
	Within Groups	45,448	156	0,291		
	Total	50,088	162			
Opinions on Distance Education	Between Groups	1,519	6	0,253	3,051	0,008*
	Within Groups	12,944	156	0,083		
	Total	14,463	162			
Using the Computer for Learning Mathematics	Between Groups	3,204	6	0,534	3,210	0,005*
	Within Groups	25,951	156	0,166		
	Total	29,156	162			
Using the Computer for Teaching Mathematics	Between Groups	1,511	6	0,252	1,577	0,157
	Within Groups	24,913	156	0,160		
	Total	26,424	162			
Compatibility of Computer Use with the Nature of Mathematics	Between Groups	1,082	6	0,180	0,581	0,745
	Within Groups	48,413	156	0,310		
	Total	49,496	162			
Beliefs towards the Use of Computer in Mathematics Teaching	Between Groups	1,056	6	0,176	1,799	0,103
	Within Groups	15,268	156	0,098		
	Total	16,324	162			

* p<0,05

Teachers' perceptions of distance education and their beliefs about the use of computers in mathematics education were examined to determine if they differed according to professional seniority. Differences were found in the dimensions of perceptions about themselves in distance education (F=2,474), thoughts about assignments in distance education (F=2,655), perceptions of distance education (F=3,051), and the use of

computers for learning mathematics (F=3,210) (p<0.05).

The Scheffe test was conducted to determine which groups differed in the dimensions of perceptions about themselves in distance education, thoughts about assignments in distance education, perceptions of distance education, and the use of computers for learning mathematics. The results showed that teachers with 26-30 years of professional seniority had higher scores in the dimension of their perceptions of themselves in distance education than teachers with 0-5 years of professional seniority. Teachers with 21-25 years of professional seniority had higher scores on the dimension of thoughts about assignments in distance education than teachers with 0-5 years of professional seniority. Teachers with 26-30 years of professional seniority also had higher scores in the dimension of distance education perceptions than teachers with 0-5 years of professional seniority. Teachers with 16-20 years of professional seniority had higher scores in the dimension of using computers for learning mathematics than teachers with 0-5 years of professional seniority and teachers with 6-10 years of professional seniority (p<0.05).

One-way analysis of variance (ANOVA) was used to determine if teachers' perceptions of distance education and their beliefs about the use of computers in mathematics education differed according to grade level. The findings are presented in Table 6.

Table 6. *One-Way Analysis of Variance Results Showing the Change According to Education Level*

	Source of Variation	Sum Sq	df	Mean Sq	F	p
Thoughts on the Sustainability of Distance Education	Between Groups	2,005	2	1,003	3,224	0,042*
	Within Groups	49,753	160	0,311		
	Total	51,758	162			
Their Perceptions of Themselves in Distance Education	Between Groups	0,100	2	0,050	0,351	0,704
	Within Groups	22,885	160	0,143		
	Total	22,985	162			
Thoughts on Teaching Practices in Distance Education	Between Groups	0,005	2	0,003	0,022	0,979
	Within Groups	19,361	160	0,121		
	Total	19,367	162			
Attitudes towards Distance Education	Between Groups	0,877	2	0,438	1,504	0,225
	Within Groups	46,622	160	0,291		
	Total	47,498	162			
Thoughts on Assignments in Distance Education	Between Groups	0,282	2	0,141	0,452	0,637
	Within Groups	49,806	160	0,311		
	Total	50,088	162			
Opinions on Distance Education	Between Groups	0,226	2	0,113	1,271	0,283
	Within Groups	14,237	160	0,089		
	Total	14,463	162			
Using the Computer for Learning Mathematics	Between Groups	0,318	2	0,159	0,881	0,416
	Within Groups	28,838	160	0,180		
	Total	29,156	162			
Using the Computer for Teaching Mathematics	Between Groups	0,084	2	0,042	0,254	0,776
	Within Groups	26,341	160	0,165		
	Total	26,424	162			
Compatibility of Computer Use with the Nature of Mathematics	Between Groups	0,632	2	0,316	1,034	0,358
	Within Groups	48,864	160	0,305		
	Total	49,496	162			
Beliefs towards the Use of Computer in Mathematics Teaching	Between Groups	0,144	2	0,072	0,711	0,493
	Within Groups	16,181	160	0,101		
	Total	16,324	162			

* p<0,05

The study examined whether teachers' perceptions of distance education and their beliefs about the use of computers in mathematics education differed according to their educational status. The results showed that there was a difference in the dimension of teachers' thoughts about the continuation of distance education (F=3.224, p<0.05). The Scheffe test revealed that teachers with a master's degree had higher scores than teachers with a doctorate (p<0.05).

In addition, independent samples t-tests and one-way ANOVAs were conducted to determine whether the scores obtained from the scales of classroom teachers' perceptions of distance education and beliefs about

the use of computers in mathematics education differed according to their use of digital tools and their purposes of use, such as attracting attention, active participation, evaluation, and concretization. No statistically significant differences were found ($p>0.05$).

DISCUSSION, CONCLUSION, RECOMMENDATIONS

In this study, we investigated the opinions of classroom teachers about distance education and their beliefs about the use of computers in mathematics education. The research concluded that there is a positive relationship between classroom teachers' views on distance education and their beliefs about computer use in mathematics teaching. This finding suggests that these two factors are interrelated, and that classroom teachers' views on distance education may be influenced by their beliefs about computer use in mathematics education. Bütün and Karakuş (2021) support this finding, stating that secondary school teachers' beliefs about using computers in mathematics education affect their views about distance education.

The results showed that classroom teachers' average score for opinions about distance education was close to the middle level. When the data were analyzed by sub-dimension, the highest score was for attitude towards distance education and the lowest score was for thoughts about teaching practices in distance education.

Studies that have examined classroom teachers' attitudes towards distance education have found that teachers have a generally positive attitude towards it. For example, Balcı (2022) found that classroom teachers had a high level of positive attitude towards distance education. However, the literature review revealed that no quantitative studies have been conducted to investigate classroom teachers' opinions about distance education. Instead, qualitative studies have been conducted in which classroom teachers have expressed difficulties with the teaching process in distance education. For example, Ertan-Kantos (2021) found that distance education is not suitable for primary schools in a study conducted to determine the views of classroom teachers on the distance education process. These findings support the results obtained in the present study.

Bütün and Karakuş (2021) conducted a study to determine the views of secondary school mathematics teachers on distance education. In this study, they found that the average scores of mathematics teachers' views on distance education were close to the middle level. The fact that the average scores of teachers on distance education were not high in these two studies may be associated with their lack of technological pedagogical content knowledge and knowledge/skills to use the internet/computer in educational processes.

The results of the research showed that classroom teachers' beliefs about the use of computers in mathematics education were generally neutral. When the findings were analyzed by sub-dimensions, the highest score was found in the dimension of the suitability of computer use to the nature of mathematics, and the lowest score was found in the dimension of the use of computers for teaching mathematics. No research was found in the literature that specifically explored classroom teachers' beliefs about the use of computers in mathematics education. However, studies have been conducted with mathematics teachers, and these studies have found mixed results. For example, Çakıroğlu, Güven, and Akkan (2008) found that mathematics teachers had negative beliefs about the use of computers in mathematics education, while Bütün and Karakuş (2021) found that mathematics teachers had positive beliefs. These different results may be due to factors such as teachers' skills in using computers and the Internet, their digital literacy, and their experiences.

As a result of the research, there was no significant difference in the mean scores of classroom teachers' views on distance education according to the gender variable. This finding is consistent with the results of previous studies, such as those conducted by Bütün and Karakuş (2021) and Kurnaz et al. (2020). However, some studies have found that male teachers have more positive views towards distance education than female teachers (Markauskaite, 2006; Ong & Lai, 2006). This difference may be due to the different attitudes, knowledge, and skills of the teachers in the study groups towards using technology.

Similarly, there was no significant difference in the mean scores of classroom teachers' beliefs about computer use in mathematics education according to the gender variable. This finding is supported by the results of studies by Kaleli-Yılmaz and Koparan (2015) and Çakıroğlu, Güven and Akkan (2008), which found

that gender did not affect teachers' beliefs about computer use in mathematics education. This suggests that gender has no effect on belief.

The research found that classroom teachers' opinions about distance education differed significantly according to their professional seniority. Teachers with more professional seniority had more positive views towards distance education, especially in terms of their own perceptions of distance education, their thoughts about assignments in distance education, and their perceptions of the overall effectiveness of distance education. The research also found that classroom teachers' beliefs about the use of computers in mathematics education did not differ significantly according to their professional seniority. However, teachers with 16-20 years of professional seniority had higher scores in the dimension of using computers for learning mathematics than teachers with less professional seniority. These findings suggest that teachers' views on distance education and the use of computers in mathematics education are not entirely determined by their professional seniority. Other factors, such as teachers' personal experiences with distance education and computers, may also play a role in shaping these views.

The findings of this study are consistent with those of previous research on the relationship between professional seniority and teachers' views on technology. For example, a study by Kocayiğit and Uşun (2020) found that teachers from different disciplines and different levels of schools, with more professional seniority had more positive attitudes towards distance education. Similarly, a study by Çakıroğlu, Güven, and Akkan (2008) found that teachers with more professional seniority had more positive beliefs about the use of computers in mathematics education.

The findings of this study have implications for teacher education and professional development. It is important to help teachers develop positive views on distance education and the use of computers in mathematics education, regardless of their professional seniority. This can be done by providing teachers with opportunities to learn about and experience these technologies in a supportive environment.

As a result of the research, it was found that there was no significant difference in the mean scores of classroom teachers' opinions about distance education according to the education level variable. This finding suggests that education level does not have an effect on opinion towards distance education.

In the study conducted by Kocayiğit and Uşun (2020), it was also found that teachers' attitudes towards distance education did not differ significantly according to the education level variable. However, in the study conducted by Yahşi and Kırkıç (2020), it was found that teachers with postgraduate education level had higher attitude scores towards distance education than teachers with undergraduate education level. This finding suggests that teachers' attitudes towards distance education may be more positive as their education level increases.

Similarly, there was no significant difference in the mean scores of classroom teachers' beliefs about the use of computers in mathematics education according to the education level variable. This finding suggests that teachers' education level does not affect their knowledge and skills in computer or technology use.

In the study conducted by Karadeniz and Vatanartıran (2015), it was also found that the education level of classroom teachers did not affect their technological pedagogical content knowledge. TPACK is a complex construct that involves the integration of content knowledge, pedagogical knowledge, and technological knowledge. While education level can certainly play a role in the development of these knowledge domains, it is not the only factor. Other factors, such as experience, professional development, and personal interest, can also have a significant impact on TPACK. The findings of the Karadeniz and Vatanartıran (2015) study suggest that classroom teachers with different education levels can have similar levels of TPACK. This finding is consistent with the results of our study, which also found no significant difference in TPACK between teachers with different education levels. We interpret our findings in light of the TPACK framework to suggest that classroom teachers with different education levels can develop TPACK through a variety of means. These means may include formal education, professional development, and personal exploration of technology.

The research suggests that future studies should be conducted with a larger population of classroom

teachers. Additionally, the research process revealed that most studies on the use of computers in mathematics education have been conducted with mathematics teachers or pre-service teachers. Future studies should be conducted with classroom teachers in order to gain a more comprehensive understanding of how these factors influence each other.

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GENİŞLETİLMİŞ ÖZET

Giriş: Günümüzde yaşanan gelişmeler uzaktan eğitimi bir zorunluluk haline getirmiştir. Bu nedenle uzaktan eğitim ile verilecek ilkokul matematik eğitiminin beklenen hedeflere ulaşmasında sınıf öğretmenlerinin uzaktan eğitime ilişkin görüşleri önemlidir. Ayrıca bu süreçte bilgisayarların öğrenme ve öğretimin merkezinde olması da sınıf öğretmenlerinin matematik eğitiminde bilgisayar kullanımına ilişkin inançlarını önemli hale getirmektedir. Alan yazın incelendiğinde sınıf öğretmenlerinin uzaktan eğitime ilişkin görüşlerini (Kızıltaş ve Özdemir, 2021; Yurtbakan ve Ayyıldız, 2020; Sönmez vd., 2020), uzaktan eğitime yönelik tutumlarını (Ülkü, 2018; Kandemir vd., 2022), uzaktan eğitim deneyimlerini (Batdal-Karaduman, 2021; Akşak-Ertaş ve Duran-Baytar, 2021) ve uzaktan eğitime ilişkin algılarını (Usta, 2022) araştıran çalışmaların olduğu görülmektedir. Fakat sınıf öğretmenlerinin bilgisayar destekli matematik öğretimine yönelik inançlarını inceleyen bir araştırmaya rastlanılmamıştır. Bütün bu nedenlerle araştırmanın sınıf öğretmenlerinin uzaktan eğitime ilişkin görüşleri ile bilgisayar destekli matematik eğitimine ilişkin inançlarını ortaya çıkarması açısından alana katkı sağlayacağı düşünülmektedir. Bu doğrultuda araştırmanın problem cümlesi "Sınıf öğretmenlerinin uzaktan eğitime ilişkin görüşleri ve matematik eğitiminde bilgisayar kullanımına ilişkin inançları ne düzeydedir?" olarak belirlenmiştir.

Yöntem: Bu araştırma nicel araştırma yöntemlerinden biri olan ilişkisel tarama modeli ile yürütülmüştür. İlişkisel tarama modelinde iki veya daha fazla değişken arasındaki ilişkiyi belirlemek amaçlanmaktadır (Büyüköztürk, Çakmak, Akgün, Karadeniz ve Demirel, 2018). Araştırmanın örneklemi seçkisiz olmayan örnekleme yönteminden uygun örnekleme ile belirlenmiştir. Çalışmaya 58 erkek ve 105 kadın olmak üzere toplam 163 sınıf öğretmeni katılmıştır. Ayrıca 32 öğretmen birinci sınıfı, 42 öğretmen ikinci sınıfı, 51 öğretmen üçüncü sınıfı ve 38 öğretmen dördüncü sınıfı okutmaktadır. Araştırmanın verileri "Kişisel Bilgi Formu", "Öğretmenlerin Uzaktan Eğitim Algıları Ölçeği" ve "Matematik Eğitiminde Bilgisayar Kullanımına İlişkin Öğretmen İnanç Ölçeği" ile toplanmıştır. Verilerin analizi SPSS programı ile yapılmıştır. Verilerin normal dağılım sergilediği saptandıktan sonra parametrik testler uygulanmıştır.

Bulgular: Öğretmenlerin uzaktan eğitim algıları ile matematik eğitiminde bilgisayar kullanımına ilişkin inançlarının cinsiyete göre farklılık göstermediği bulunmuştur. Öğretmenlerin uzaktan eğitim algıları ile matematik eğitiminde bilgisayar kullanımına ilişkin inançlarının mesleki kıdeme göre farklılık gösterip göstermediği incelenmiş ve uzaktan eğitimde kendilerine ilişkin algılar ($F=2,474$), uzaktan eğitimde ödevlere ilişkin düşünceler ($F=2,655$), uzaktan eğitim algıları ($F=3,051$) ve bilgisayarın matematik öğrenme amaçlı kullanımı ($F=3,210$) boyutlarında farklılık gösterdiği saptanmıştır ($p<0,05$). Öğretmenlerin uzaktan eğitim algıları ile matematik eğitiminde bilgisayar kullanımına ilişkin inançlarının eğitim durumuna göre farklılık gösterip göstermediği incelenmiş ve uzaktan eğitimin sürdürülüşüne yönelik düşünceleri ($F=3,224$) boyutunda farklılık gösterdiği saptanmıştır ($p<0,05$). Bununla birlikte sınıf öğretmenlerinin uzaktan eğitim algıları ve matematik öğretiminde bilgisayar kullanımına yönelik inanç ölçeklerinden elde ettikleri puanların dijital araçları kullanma durumlarına ve ilgi çekme, aktif katılım, değerlendirme ve somutlaştırma gibi kullanım amaçlarına göre farklılık gösterip göstermediğine yönelik bağımsız gruplar t-testi ve tek yönlü varyans analizi (ANOVA) yapılmış, istatistiksel olarak anlamlı bir farklılığın oluşmadığı görülmüştür ($p>0,05$).

Tartışma ve Sonuç: Araştırmada sınıf öğretmenlerinin uzaktan eğitime ilişkin görüşleri ortalama puanının, orta düzeye yakın olduğu bulgusu elde edilmiştir. Uzaktan eğitim sürecine ilişkin sınıf öğretmenlerinin tutumlarını belirlemeye yönelik yapılan çalışmalarda öğretmenlerin yüksek düzeyde olumlu tutum sahibi olduğunu belirten çalışmalar mevcuttur: Örneğin Balcı (2022) tarafından gerçekleştirilen araştırmada sınıf öğretmenlerinin uzaktan eğitime yönelik tutumlarının yüksek düzeyde olduğu sonucuna ulaşılmıştır. Araştırmada sınıf öğretmenlerinin matematik eğitiminde bilgisayarların kullanımına ilişkin inançları ortalama puanlarının orta düzeye yakın olduğu bulgusu elde edilmiştir. Matematik öğretmenlerine yönelik gerçekleştirilen araştırmalarda Çakıroğlu, Güven ve Akkan (2008) matematik öğretmenlerinin matematik eğitiminde bilgisayar kullanımına yönelik olumsuz inançlara sahip olduğuna yönelik bulgular elde etmişlerdir. Bu araştırmada sınıf öğretmenlerinin uzaktan eğitime ilişkin görüşleri ortalama puanlarının cinsiyet değişkenine göre anlamlı farklılık göstermediği bulgusu elde edilmiştir. Bütün ve Karakuş (2021) ve Kurnaz vd. (2020) tarafından gerçekleştirilen çalışmalarda da öğretmenlerin uzaktan eğitime ilişkin görüşlerinin cinsiyet değişkenine göre farklılaşmadığı sonucuna ulaşılmıştır. Araştırma sonucunda sınıf öğretmenlerinin matematik eğitiminde bilgisayar kullanımına ilişkin inançları ortalama puanlarının cinsiyet değişkenine göre anlamlı farklılık göstermediği bulunmuştur. Kaleli-Yılmaz ve Koparan (2015) ve Çakıroğlu, Güven ve Akkan (2008) tarafından gerçekleştirilen araştırmada öğretmenlerin matematik eğitiminde bilgisayar kullanımına ilişkin inançlarını cinsiyet değişkeninin etkilemediği sonucuna ulaşılmıştır. Bu araştırmada sınıf öğretmenlerinin uzaktan eğitime ilişkin görüşleri ortalama puanlarının mesleki kıdem değişkenine göre anlamlı farklılık gösterdiği görülmüştür. Kocayiğit ve Uşun (2020) öğretmenlerin uzaktan eğitime yönelik tutumlarının mesleki kıdeme göre anlamlı farklılaştığı bu farkın da mesleki kıdemi daha fazla olan öğretmenler lehine olduğu sonucuna ulaşılmıştır. Bu araştırmada sınıf öğretmenlerinin uzaktan eğitime ilişkin görüşleri ile matematik öğretiminde bilgisayar kullanımına yönelik inançları arasında pozitif yönde ilişki olduğu sonucuna ulaşılmıştır. Araştırma sürecinde matematik eğitiminde bilgisayar kullanımına yönelik olarak gerçekleştirilen araştırmaların matematik öğretmenleri ya da öğretmen adayları ile sınırlı olduğu görülmüştür. Bu nedenle matematik eğitiminde bilgisayar kullanımına ilişkin sınıf öğretmenlerine yönelik araştırmalar yapılması önerilmektedir.