Challenges Faced by Teachers during the Covid-19 Pandemic: A Scale Development Study[1]

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Article Info	ABSTRACT
	This research aims to develop a perception scale for the challenges faced by teachers in distance education applied during the Covid-19 pandemic. In addition, using the scale developed within the scope of the research, teachers' perceptions of the difficulties they encountered in this process were revealed. A descriptive survey, one of the quantitative research designs, was used in the research. First, a semi-structured interview form was applied to 40 teachers from different branches and age groups, who were determined voluntarily to create an item pool. The draft measurement form thus obtained was applied to 955 teachers who were working in public schools in Turkey, giving live lessons from all levels and branches, and selected by the convenience sampling method. The data were collected over the internet with the "Perceptions Scale towards the Challenges Faced by Teachers in Distance Education (DE)" prepared by the researcher, and validity and reliability analyzes of the scale were made. The scale was examined in terms of suitability and content validity by three field experts who have a Ph.D. in Computer Education and Instructional Technologies and a Turkish Language expert. According to the results of the pilot scheme, the scale has a two-factor and valid structure. According to the results of the research, it was determined that teachers' perceptions towards the challenges they faced in distance education applied during the pandemic period were at a high level. This study is important in that it will open the door to research on the challenges faced by teachers in distance education in the future.

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[1] This study was produced in the first author's non-thesis master's graduation project with the same title.

1. INTRODUCTION

The COVID-19 virus was first seen in Wuhan, Hubei Province, China at the end of December 2020, and spread to the whole world in a short time. The disease caused by this virus, which affects all countries economically, psychologically, sociologically, and in many other ways, was declared a "pandemic" by the World Health Organization (WHO) on March 11, 2020 (WHO, 2020a). Education has also been one of the areas most affected by this global pandemic. In this process, many educational institutions all over the world were partially or completely closed and more than one and a half billion students at all levels faced various challenges (UNESCO, 2020a; UNESCO, 2020b). Distance education, which is an alternative method in the pandemic process, has been included in education systems as a practical solution method by governments (Demir and Özdaş, 2020). In distance education, the learner and the teacher are provided with the opportunity to learn in different places and periods by using technologies synchronously and asynchronously. Technologies used for instruction may include the following: One-way and two-way transmitters through internet, open broadcasts, closed circuits, cable, microwave, broadband lines, fiber optics, satellite or wireless communication devices (Allen and Seaman, 2017). Distance education is a system that offers space and time options within a certain program and plan, supports existing education, increases the efficiency and quality of education with the effective use of technology, and requires countries themselves to reveal the most appropriate original content in this sense also in the digital age (Anderson ve Rivera-Vargas, 2020). The COVID-19 global pandemic caused some disruptions in education, making it compulsory to include almost all students in the distance education system instead of face-to-face education (Kurnaz, Kaynar, Şentürk Barışık, & Doğrukök, 2020). In Turkey, the first case was seen on 10 March 2020 (WHO, 2020a). During the pandemic period, the education calendar in Turkey was re-planned, and the Education Information Network (EBA) platform, which constitutes the content component of the FATIH Project launched in 2011, was combined with the national channel TRT, and various studies for distance education were initiated (Gençoğlu and Çiftçi, 2020). On March 23, 2020, distance education was started at all levels within the Ministry of National Education (Koç, 2021).

While distance education has undeniable benefits (Rice, Lowenthal, & Woodley, 2020), it also has problems to consider (Hongmei, 2002), and this is also true for the pandemic period. Turkey has made and continues to make necessary updates and improvements in distance education in the process. However, there is a need for longer-term plans, including distance education, and both current and past positive and negative experiences are of great importance to make these plans (OECD, 2020). According to Hodges, Moore, Lockee, Trust, and Bond (2020): A well-planned distance education process is not synonymous with planned live lessons in a crisis. Effective and efficient online teaching and learning, which has been studied for decades, results from carefully planned instructional design. However, emergency distance education (EDE) is a temporary intervention that is usually applied in a crisis. There are differences between the concepts of distance education and emergency distance education (Canpolat and Yıldırım, 2021). While Emergency Distance Education is a concept that is used to find an emergency solution for education or to meet the need, especially in a crisis such as an pandemic or natural disaster, without the limitation of space; distance education, on the other hand, is a planned and systematic education system that aims to produce permanent solutions for lifelong learning by considering physical, interactional and psychological factors (Bozkurt & Sharma, 2020). According to Zan and N. Zan (2020): In Turkey, in line with the measures and decisions taken during the pandemic process, students of all ages and levels, from pre-school to higher education, have to continue their education from home, within the scope of emergency education and emergency distance education. In this process, public schools have carried out DE with applications such as EBA, EBA TV, and ZOOM; private schools also have carried out DE, which is an immediate and sudden transition, from their systems. Universities, on the other hand, have planned distance education in different ways, taking into account institutional systems, students, and academicians. In summary, distance education, which is compulsory and suddenly preferred due to the

pandemic, has affected the entire education community. In other words, each step of education has been evaluated within itself and different solutions have been tried to be put forward.

While the COVID-19 pandemic affects all humanity in various ways (Mbunge, Akinnuwesi, Fashoto, Meftule, and Mashwama, 2020); educational institutions, experts, teachers, students, and parents were also unprepared for education in terms of managerial, technological, pedagogical, and psychological aspects (Hidayat, Suswanto, Kristanto, Wardhani, Hamdan, & Sari, 2020). Distance education was applied only as a live lesson out of necessity, without enriching the content and neglecting the preparations for transition to the process (Altunçekiç, 2021). Directing education to technology urgently during the pandemic process; it can also cause a digital divide in various aspects such as equality of opportunity, access, socio-economic differences (Sezgin and Fırat, 2020). In addition, a different teaching plan is required for each teaching level. Because in also distance education, as in face-to-face education, teaching methods and techniques suitable for all levels should be applied (Marek, Wu, & Chew, 2021). In addition, it is recommended by experts to adjust the lesson durations (Kalelioğlu, Atan, & Çetin, 2016) and hours appropriate for the levels in distance education. From another point of view; students' place of residence, family structure, socioeconomic status, class, and age are related to digital use; migrations from rural to urban areas, increasing age, and the transition to the upper-class increase digital use, but do not provide digital equalization (Nerse, 2020).

Distance education, which had to be preferred as a temporary solution to education during the pandemic period, is evaluated by many countries in terms of its advantages and disadvantages, and it is tried to be adapted, developed, or updated to their own education-training systems. Because it will not be possible to return to the "old normal life" in many respects (Schleicher, 2020). The main reason why most countries make longer-term plans for distance education, taking into account the practices all over the world, is the fact that even if the pandemic ends, distance education will always be necessary as a requirement of the technology and information age (Garrison, 2000). From this point of view, necessary evaluations should be made based on the current situation in Turkey, and according to the results obtained, plans should be made both for the present and for the future in terms of technical infrastructures, improvement, design, content development, etc.

The orientation towards different learning, knowledge, content-acquisition styles and methods requires also teachers to have the necessary competences in this context; in this way, educators are expected to blend them both pedagogically and technologically in the best way (Anderson & Dron, 2011). In distance education, which is one of the radical changes in education, teachers are expected to be "consultants or guides" (Isman, Z. Altınay, & F. Altınay, 2004). However, the fact that teachers do not have sufficient knowledge about distance education, which they have to be involved in, causes them to have problems (Kocayiğit & Uşun, 2020); on the other hand, it is thought that the level of anxiety of teachers has increased in the use of distance education environments and tools due to many reasons such as their inexperience in teaching in front of the camera despite giving face-to-face training for years (Yildiz, Çengel, & Alkan, 2021). Teachers do not have enough experience in integrating education with DE technologies or web 2.0 technologies (Eken, Tosun, & Tuzcu Eken, 2020). Teachers, whose roles in normal education differ, want to prefer the face-to-face school environment they are used to for different reasons. One of these reasons is that they have challenges in distance education in terms of giving feedback to students and making assessment-evaluation (Galusha, 1998). In addition, teachers' feelings of inadequacy in using technological tools or having challenges in incorporating technology into the lesson cause them to exhibit negative attitudes towards distance education. Moreover, authorities need to train teachers in terms of both adapting to their new roles in distance education, which takes more time and coping with the challenges they face (Valentine, 2002).

To conduct research on teachers to reveal the situation of distance education in Turkey; it will be useful in terms of revealing the experiences of teachers who continue distance education on issues such as "instructional plan and teaching a lesson, teacher competences, relations with parents and students, and

technology". In addition, as a result of the literature review for the COVID-19 pandemic period, which has only been 1 year since it entered the life of humanity and the whole world is still struggling with, it has been determined that the scales for this process are almost non-existent in the literature. When we look at the literature, we found the "Attitude Scale Regarding the Use of Distance Education Environments in the Pandemic Process" regarding the attitudes of the students regarding the challenges faced. The purpose of the scale is to measure student attitudes towards distance education environments in the pandemic (Yıldız et al., 2021). Another scale in the literature is the "Distance Education Perceptions of Teachers Scale" and it aims to examine and reveal the views of teachers on distance education, which is applied urgently and suddenly during the pandemic period (Kurnaz et al., 2020). Apart from the relevant scales, no other scale has been found in the literature regarding both distance education and challenges faced in distance education during the pandemic period. The scale developed within the scope of this research draws attention to the problems faced by teachers in distance education during the pandemic period. Therefore, this study, it is aimed to develop a scale to measure the perceptions of teachers about the challenges they face during the distance education process during the pandemic period and to describe these perceptions.

1.1. Research Problem

In this study, it is sought to answer the questions: "Is the perceptions scale towards the challenges faced by teachers in distance education valid and reliable? What are their perceptions of the challenges they face in this process?''

1.2. Sub Problems

1. Is the perceptions scale towards the challenges faced by teachers in distance education valid and reliable?
2. What are the perceptions of teachers regarding the challenges they face in distance education during the pandemic period?
3. Do teachers' perceptions of the challenges they face in distance education during the pandemic period differ according to gender?
4. Do teachers' perceptions of the challenges they face in distance education during the pandemic period differ according to age groups?
5. Do teachers' perceptions of the challenges they face in distance education during the pandemic period differ according to the teaching level they work?
6. Do teachers' perceptions of the challenges they face in distance education during the pandemic period differ according to their branches?
7. Do teachers' perceptions of the challenges they face in distance education during the pandemic period differ according to the settlements where they work?

1.3. Limitations

1. Only teachers who give live lessons were included in the study, the opinions of other teachers were not included.
2. Since the identity or pseudonym information of the participants could not be obtained during the data collection process, test-retest could not be applied, so stability analyzes could not be performed.

2. METHOD

2.1. Research Design

In this study, descriptive survey design, one of the quantitative research designs, was used. In this framework, a scale was developed in the first part of the study, and in the second part, the challenges faced by teachers during the pandemic were described through the data obtained with this scale. In this research model, which is highly preferred in the field of education, a specific group, that is, the sample, which can be generalized to the large group (the universe), is selected and it is tried to determine the opinions of the sample about a certain subject or situation with data collection tools such as questionnaires

or scales (Creswell, 2017).

2.2. Participants

To create the item pool of the scale developed within the scope of the research, a semi-structured interview form was applied to 40 teachers from different branches and age groups, who were determined voluntarily. Then, draft assessment form obtained was applied to 955 teachers working in public schools in Turkey, giving live lessons within the scope of distance education from all levels and branches. The study group of the research was determined by convenience sampling method. The distribution of the teachers participating in the research by branch and gender is summarized in Table 2.1.

Table 2. 1. *Distribution of Teachers by Branch and Gender*

		Gender		
		Female	**Male**	**Total**
Branch	Mathematics	26	21	47
	Foreign Languages	310	47	357
	Turkish	77	35	112
	Science Lessons	107	30	137
	Information Technologies	6	14	20
	Arts and Sports Lessons	31	14	45
	Social Lessons	18	24	42
	Culture of Religion and Knowledge of Ethics	8	16	24
	Primary School Teaching	71	50	121
	Vocational Lessons	11	10	21
	Preschool	27	2	29
Total		**692**	**263**	**955**

As can be seen in Table 2.1, due to the low number of teachers participating in the research from some branches, these branches were grouped appropriately. English, French and German Teachers in Foreign Languages; Science, Physics, Chemistry and Biology Teachers in Science Lessons; Music, Visual Arts, Technology and Design, Physical Education Teachers in Art and Sports Lessons; Social Studies, History, Geography, Philosophy Teachers in Social Lessons, and finally, vocational high school teachers are grouped under the group of Vocational Lessons.

2.3. Data Collection Tools

A perception scale was developed within the scope of the research. For the research results to be valid and reliable, it is important to be sensitive to the quality of data collection tools (McMillan & Schumacher, cited in Turgut & Kurşun, 2019). To positively affect the validity of both the developed scale and the research, attention was paid to the compatibility between data collection tools and the study's design, purpose and sub-problems, method, the feature to be measured, and which data were desired to be obtained (Lynn, 1986). In this direction, the following stages were carried out in the development of the scale:

Phase 1: The purpose of the scale to be developed and which features it will measure are determined. The scale aims to reveal the perceptions of teachers about the challenges they face in distance education during the pandemic period. In this context, the concept of perception has been defined.

Phase 2: To create the item pool of the scale, a semi-structured interview form including the following questions was applied to 40 teachers:

- What are the challenges you faced while planning the education?
- What are the challenges you faced while teaching the lesson?

- What are the challenges you faced regarding teacher competences?
- What are the challenges you faced with educational technologies and distance education systems?
- What are the challenges you have with students' parents?
- What are the challenges you have with students?

The data obtained were examined, and the thoughts about the challenges presented by the teachers were turned into perception sentences and a draft item pool was created. There were 37 items in the item pool obtained within this framework. However, the obtained item pool was re-examined and the items determined to measure the same or similar perception were removed, thus an item pool of 24 items was created.

Phase 3: The created 24-item pool was sent to three field experts who have doctoral degrees in Computer and Instructional Technologies Education for their review in terms of both relevance and content validity. All three field experts stated that the item pool is appropriate in terms of content validity and there is no need to add new items. In addition, all three field experts suggested that nine items in total should be revised and corrected in terms of language, spelling, and clarity. The item pool was reviewed according to expert opinions and necessary corrections were made. At the last stage, the item pool, which was examined by a Turkish language expert, took its final form.

Phase 4: The 24-item item pool was arranged in a 5 point Likert type and applied to the study group through the Google Forms application. Online teacher groups were used to access the study group.

2.4. Data Analysis

Qualitative data collected through the semi-structured interview form were analyzed by content analysis method and the obtained opinions were transformed into scale items. The quantitative data obtained were subjected to a preliminary examination and 54 data that were left blank or showed a pattern were excluded from the analysis. Using the remaining 955 data, validity and reliability analyzes were performed first, and then descriptive analysis was performed.

Within the scope of the construct validity of the scale, firstly, Kaiser-Meyer-Olkin (KMO) and Bartlett analyzes were applied to determine whether factor analysis could be performed. It is stated that KMO provides information on whether the data are suitable for factor analysis and that a KMO higher than .90 is considered to be a very good value for applying factor analysis (Büyüköztürk, Çakmak, Akgün, Karadeniz and Demirel, 2017). Exploratory factor analysis (EFA) was applied to establish the construct validity and the factor structure of the scale. Exploratory factor analysis is a statistical technique widely used and applied in social sciences (Osborne et al., 2008). The factor structure of the scale was determined using the principal component analysis technique. The factor loadings of the scale were analyzed using the varimax orthogonal rotation technique. Orthogonal and oblique rotation methods are used in rotation processes. The orthogonal rotation method ensures that the factors do not interact with each other. In the oblique rotation method, the factors are not independent of each other. For this reason, the orthogonal rotation method is generally preferred. The principal component analysis is a statistical technique used to derive conceptual structures with variable subtraction (Büyüköztürk, 2018). Principal component analysis was preferred because it is more common and practical than principal axis factoring, it is more useful for calculating scores and reducing data to be used in other analyses, and it includes all of the variances for all items in the analysis. As a result of the analysis, the items with a factor load lower than .40 and items that were distributed over more than one factor were removed from the scale and the analyzes were renewed. As a result of the factor analysis applied, the discrimination of the scale was determined by applying the independent samples t-test. Item discrimination is a method that shows to what extent the items discriminate individuals according to the feature to be measured (Büyüköztürk et al., 2017). After determining the discrimination of the scale, the level of serving the purpose of the items was determined according to the item-total correlations using the Pearson's r test. In order to determine the reliability of the scale, first of all, Cronbach's Alpha, Equal Halves Correlation, Guttman Split-Half and Spearman-

Brown reliability coefficients were examined by using the internal consistency coefficient method. It has been stated that the reliability coefficient of .70 and higher is generally sufficient for the reliability of the items in the scale (Büyüköztürk, 2018). In order to determine whether parametric analyzes can be performed on the data with proven validity and reliability, it was analyzed whether the data were normally distributed and the results are presented in Table 2.2.

Table 2. 2. *Normality test results*

Factors		Kolmogorov-Smirnov (Sig.) / Shapiro-Wilk	Skewness	Kurtosis
Perceptions towards the Challenges Faced by Teachers in Distance Education	F1: Student and Parent-Oriented Challenges	,000	-1,450	1,492
	F2: Teacher Competences-Oriented Challenges	,000	-0,430	-0,327
	Total Score	,000	-1,225	1,448

When Table 2.2 is examined, it is seen that the significance level of the data collected according to the Kolmogorov-Smirnov and Shapiro-Wilk test results is less than 0,05, in other words, the data are not normally distributed. However, since the skewness and kurtosis coefficients are examined, it is seen that these coefficients are between +1,5 and -1,5, and also in this direction, the data can be considered normal (Büyüköztürk, 2018). The scores obtained in this framework were analyzed using the arithmetic mean, standard deviation, independent samples t-test, Anova, and Pearson r correlation and regression analyzes.

3. FINDINGS

3.1. Findings Regarding the Validity of the Scale

To test the construct validity of the scale, first of all, KMO and Bartlett analyses were performed on the data. As a result of the analysis, KMO value was .931; Bartlett value was $\chi^2 = 9960,451$; standart deviation (sd) was 276 (p=,000). For factor analysis, the KMO value is expected to be higher than .60 (Büyüköztürk et al., 2017). It has been concluded that factor analysis can be done on a 24-item scale within the framework of the values obtained. Principal component analysis was used to understand whether the scale had a single factor, and the varimax orthogonal rotation technique was used to understand factor loads. The resulting item loads were examined and 8 items with item loads lower than .40 were removed from the scale. The factor analysis, which was applied again after this process, was made on the remaining 16 items in the scale. The discarded items were examined in terms of content validity, and it was decided that these items would not affect content validity and it was decided to remove them from the scale after receiving expert opinion. After the analysis, it was seen that the remaining 16 items were grouped under two factors. The KMO value of the 16-items final version of the scale was ,932; Bartlett value was $\chi^2 = 7939,416$; sd was 120 (p= ,000). After the analysis with the remaining 16 items of the scale, the loads after the varimax orthogonal rotation technique were found to be between .562 and .825. As a result, it was determined that the items and factors in the scale explained 57.128% of the variance. After these results, the items in the factor were examined and the factors were named.

10 items were collected under the first factor called "Student and Parent-Oriented Challenges" and 6 items were collected under the second factor called "Teacher Competences-Oriented Challenges". The findings regarding the variance explanation amount of the remaining 16 items in the scale, the eigenvalues of the factors, and the distribution of the item loads according to the factors are given in Table 3.1.

Table 3. 1. *Exploratory Factor Analysis Results*

		Items	Common Variance	F1	F2
F1: Student and Parent-Oriented Challenges	i19	The negligence of some parents, their lack of cooperation with teachers in terms of attendance, homework, responsibility, "providing the study environment and other necessary conditions" negatively affect the success of the students.	,463	,825	
	i18	Some parents' unconsciousness about distance education, not taking distance education as seriously as school, and being away from technology use cause problems for students.	,550	,824	
	i21	The absence of any sanctions in terms of student success and attendance negatively affects lesson participation.	,555	,812	
	i24	In the distance education process, students do not want to do homework or take responsibility by acting as if the school is on vacation; even if they do, I think they do it without any goals and reluctantly.	,445	,805	
	i23	Students who attend live lessons irregularly for various reasons have trouble catching up with their learning outcomes and keeping up with the class level.	,618	,803	
	i15	I think that some students have problem with lesson attendance because they do not have enough opportunities (technological materials, etc.); moreover, this situation also causes integrity problem in teaching a lesson.	,566	,722	
	i17	The fact that the parents do not pay attention to the elements such as making noise while the student is in the live lesson negatively affects my lessons.	,482	,653	
	i16	The inability of some students to reconcile technology with school he fact that they perceive technology only as games, entertainment, and social media makes it difficult for me to involve them in the process.	,607	,628	
	i14	Internet, network, sound problems, etc. technical problems affect my lessons negatively.	,513	,575	
	i22	Unfamiliarity with the concept of distance education, taking time to get used to platforms such as ZOOM makes it difficult for students to adapt to the process.	,497	,562	
F2: Teacher Competences-Oriented Challenges	i11	I find it difficult in terms of planning and implementation to get immediate feedback on the topics covered in live lessons and then in assessment and evaluation.	,709		,748
	i12	Considering individual differences and different learning styles, I find it difficult to combine different teaching methods and techniques with technology and include them in live lessons.	,696		,732
	i5	I have challenge in motivating, engaging, attracting and keeping students' attention during the live lesson.	,674		,720
	i6	Compared to face-to-face education, I have more challenge in classroom management because the smallest sound, systemic and technical problems in live lessons disrupt the lesson order instantly.	,445		,705
	i2	I have challenge in determining student readiness in distance education.	,658		,680
	i8	I feel that I am not able to communicate effectively with students in live lessons due to the lack of sincerity, warmth, and eye contact as in a face-to-face classroom environment.	,662		,546
		Eigenvalue		5,627	3,513
		Explained variance		35,172	21,956

As seen in Table 3.1, the factor loads of the items collected under the first factor vary between ,532 and ,825. The contribution of this factor to the total variance is 35,172% and its eigenvalue is 5,627. The factor loads of the items collected under the second factor ranged from .546 to .748. The contribution of this factor to the total variance is 21,956% and its eigenvalue is 3,513. In this context, it can be said that the scale has a two-factor structure and this structure is valid. The correlation between the items in each

factor in the scale and the scores obtained from the factors were calculated using the item factor correlation method. As a result of this analysis, the level of the items in the scale was determined in terms of serving the general purpose. The calculated item-factor correlation values of the items in the scale are given in Table 3.2.

Table 3. 2. *Item–Factor Correlations*

F1: Student and Parent-Oriented Challenges		F2: Teacher Competences-Oriented Challenges	
Item	r.	Item	r.
i19	,801	m11	,779
i18	,828	m12	,741
i21	,785	m5	,754
i24	,779	m6	,752
i23	,774	m2	,656
i15	,789	m8	,671
i17	,725		
i16	,724		
i14	,699		
i22	,682		

N = 955 **= p< .001

When Table 3.2 is examined, it is seen that the item-factor correlations of the items in the first factor are between ,682 and ,828, and the item-factor correlations of the items in the second factor are between ,656 and ,779. It is seen that the relationship between the items in the scale and the factors they contain is positive and significant (p< ,000). According to these results, it can be said that the items serve the purpose of the factor and the scale.

To calculate the discrimination strenght of the items that make up the scale, the scores of the items were ordered from the largest to the smallest. After that, groups consisting of 258 people in the upper-lower groups of 27% were determined. Independent samples t-test was applied to the scores of the formed groups to calculate the item discrimination strenght. The t-values showing the discrimination strength of each item in the scale and their significance levels are given in Table 3.3.

Table 3. 3. *Item Discrimination Strength*

F1: Student and Parent-Oriented Challenges		F2: Teacher Competences-Oriented Challenges	
Item	t	Item	t
i19	17,648	m11	27,185
i18	19,492	m12	24,176
i21	15,598	m5	22,799
i24	16,915	m6	24,757
i23	14,600	m2	16,343
i15	18,875	m8	20,600
i17	22,184	F1	27,919
i16	22,028	F2	38,699
i14	20,040	FT	41,985
i22	22,394	Df: 514; p< .001	

When Table 3.3 is examined, it is seen that the values obtained as a result of the independent samples t-test for the 16 items, factors, and the total score in the scale vary between 14,600 and 38,699, the t value of the overall scale is 41,985, and the difference between the scores for all items and factors is significant (p< ,001). Accordingly, it can be said that the discrimination level of the items in the scale and the overall scale is quite high.

3.2. Findings Regarding the Reliability of the Scale

The factors and the reliability analysis of the whole scale were examined by using Cronbach's Alpha, Equal Halves Correlation, Guttman Split-Half, and Spearman-Brown reliability coefficients. The reliability analysis results regarding the factors and the overall scale are summarized in Table 3.4.

Table 3. 4. *Factor Internal Consistency Coefficients*

Factors	Number of the Items	Cronbach's Alpha	Equal Halves Correlation	GuttmanSplit-Half	Spearman Brown
F1: Student and Parent-Oriented Challenges	10	,915	,758	,862	,863
F2: Teacher Competences-Oriented Challenges	6	,820	,695	,818	,820
Total	16	,911	,617	,763	,763

When Table 3.4 is examined, the Cronbach's Alpha value of the scale consisting of 2 factors and 16 items is ,911; Equal Halves Correlation is ,617; Guttman split-half value is ,763; Spearman-Brown value is determined as ,763. However, when the reliability values of the factors are examined, Cronbach's Alpha values are ,915 and ,820; Equal Halves Correlations are ,758 and ,695; Guttman split-half values are ,862 and ,818; Spearman-Brown values are determined as ,863 and ,820. According to these results, it can be said that each of the factors and the whole scale can make consistent measurements.

3.3. Teachers' Perceptions of the Challenges Faced in the Distance Education Process

The findings regarding teachers' perceptions of the challenges they faced in distance education during the pandemic period are summarized in Table 3.5.

Table 3. 5. *Teachers' Perceptions of the Challenges They Face in Distance Education during the Pandemic Period*

	Factors	N	Min	Max	X	Sd
Perceptions towards the Challenges Faced by Teachers in Distance Education	F1: Student and Parent-Oriented Challenges	955	10	50	42,20	7,9
	F2: Teacher Competences-Oriented Challenges		6	30	20,22	5,4
	Total Score		17	80	62,41	11,8

According to Table 3.5, while the lowest score that can be obtained in the "Student and Parent-Oriented Challenges" factor of the perceptions scale towards the challenges faced by teachers in distance education is 10, the highest score that can be obtained is calculated as 50, and the average perception score of the teachers participating in the research (N=955) is (X) 42,20. In the factor of "Teacher Competences-Oriented Challenges", the lowest possible score was 6, while the highest score was calculated as 30, and the average perception score of the teachers participating in the research (N=955) was determined as (X) 20,22. Considering the total score of the scale, the lowest possible score was 17, the highest score was 80, and the mean score (X) was 62,41. Accordingly, it can be said that teachers have a high perception of the challenges they experience in distance education, in other words, teachers have challenges in terms of both students and parents and teacher competences in distance education carried out during the pandemic period. The findings regarding whether the perceptions of teachers regarding the challenges they experienced in distance education during the pandemic period differ according to gender are summarized in Table 3.6.

Table 3. 6. *Teachers' perceptions of the challenges they faced in distance education during the pandemic period by Gender*

			N	X	Sd	t	sd	p
Perceptions towards the Challenges Faced by Teachers in Distance Education	F1: Student and Parent-Oriented Challenges	Female	692	42,5	7,5	2,425		,016
		Male	263	41,1	8,6			
	F2: Teacher Competences-Oriented Challenges	Female	692	20,1	5,4	-,311	955	,756
		Male	263	20,3	5,3			
	Total Score	Female	692	62,7	11,5	1,480		,139
		Male	263	61,4	12,4			

When Table 3.6 is examined, while it is seen that the perceptions of teachers regarding the challenges they experience in distance education according to their gender are similar in terms of both the total score (t(2-955)=1,480, p>0,05) and the teacher competences-oriented challenges (t(2-955)=-0,311, p>0.05), but there is a significant difference in terms of the student and parent-oriented challenges factor (t(2-955)=2,425, p<0,05). Looking at the averages, it is seen that the differentiation is in favor of female teachers. Accordingly, the perception levels of female teachers towards the challenges they experienced in distance education applied during the pandemic period were similar to male teachers in terms of the teacher competences-oriented challenges and total scores; on the other hand, it can be said that they have more challenges than male teachers in terms of the student and parent-oriented challenges. The perceptions of teachers regarding the challenges they face in the distance education process according to age groups are summarized in Table 3.7.

Table 3. 7. *Perceptions of Teachers on the Challenges They Faced in Distance Education during the Pandemic Period by Age Groups*

Factors	Age	N	X	Sd
F1: Student and Parent-Oriented Challenges	20-25 Ages	40	45,1	6,5
	26-30 Ages	248	43,5	7,1
	31-40 Ages	454	42,7	7,3
	41-50 Ages	167	39,1	9,1
	51 Age and above	46	38,6	9,3
F2: Teacher Competences-Oriented Challenges	20-25 Ages	40	21,9	4,7
	26-30 Ages	248	21,2	5,2
	31-40 Ages	454	20,2	5,2
	41-50 Ages	167	18,6	5,5
	51 Age and above	46	18,6	6,4
Total Score	20-25 Ages	40	67,0	9,9
	26-30 Ages	248	64,7	10,9
	31-40 Ages	454	62,9	10,9
	41-50 Ages	167	57,7	13,0
	51 Age and above	46	57,2	14,4

When Table 3.7 is examined, it is seen that there are differences in the averages in terms of age groups in the perceptions of teachers about the challenges they face in distance education. The results of the analysis of variance regarding whether these differences are significant or not are summarized in Table 3.8.

Table 3. 8. *Differentiation between Perceptions of Teachers by Age*

		The Sum of Squares	df	Mean Squares	F	p	Difference
F1: Student and Parent-Oriented Challenges	Between Groups	3057,381	4	764,345	12,853	,000	• Between 20-25 and 41-50 and 51 and above
	In-group	56493,610	950	59,467			• Between 31-40 and 41-50 and 51 and above
	Total	59550,991	954				
F2: Teacher Competence-Oriented Challenges	Between Groups	890,835	4	222,709	7,830	,000	• Between 20-25 and 41-50 and 51 and above
	In-group	27020,730	950	28,443			• Between 26-30 and 31-40,41-50 and 51 and above
	Total	27911,564	954				
Total Score	Between Groups	7160,792	4	1790,198	13,593	,000	• Between 20-25 and 31-40,41-50 and 51 and above
	In-group	125116,657	950	131,702			• Between 26-30 and 41-50 and 51 and above
	Total	132277,449	954				• Between 31-40 and 41-50 and 51 and above

When Table 3.8 is examined, it is seen that there is a significant difference in terms of the total score [f(4-950)=13,593, p<0,05) between their ages and teachers' perceptions of the challenges they experience in the distance education process. According to the results of the LSD test conducted to determine the source of the difference, it was determined that the differentiation was between the teachers in the age group of 20-25 and the teachers in the age group of 31-40, 41-50, 51 and above. When the total score averages in Table 3.7 are examined, it is seen that the teachers in the 20-25 age group compared to the teachers aged 30 and above; the teachers in the 26-30 age group compared to the teachers aged 40 and above and the teachers in the 31-40 age group compared to the teachers aged 41 and above, the perceptions of the challenges experienced in the distance education process are significantly higher. Accordingly, it can be said that the younger the teachers, the more challenges they have in the distance education process applied during the pandemic period. In other words, it can be said that older teachers have less challenge in the process.

When examined in terms of the factors, it is seen that the perception levels of teachers regarding the challenges they face in the distance education process differ significantly in terms of the student and parent-oriented challenges factor [f(4-950)=12,853, p<0,05). According to the results of the LSD test, which was conducted to determine the source of the difference: It has been determined that the differentiation is between the teachers aged 20-25 and the teachers aged 41-50, 51 and above, and between the teachers aged 31-40 and the teachers aged 41-50, 51 and above. Accordingly, when the averages of the relevant factor in Table 3.7 are examined: It can be said that the students and parents-oriented challenge levels of the teachers aged 20-25 were significantly higher than those aged 41-50, 51 and above, and 31-40-year-old teachers have significantly higher student and parent-oriented challenge levels than those aged 41-50, 51 and above. Accordingly, it can be said that as their age gets younger, teachers experience more students and parents-oriented challenges in the distance education process applied during the pandemic period.

It is seen that the perception levels of teachers regarding the challenges they experience in the distance education process according to their age differ significantly in terms of the teacher competences-oriented challenges [f(4-950)=7,830, p<0,05). According to the results of the LSD test conducted to

determine the source of the difference, it was determined that the differentiation was between the teachers aged 20-25 and the teachers aged 41-50, 51 and above, and the teachers aged 26-30 and the teachers aged 31-40, 41-50, 51 and above. Accordingly, when the averages of the relevant factor are examined in Table 3.7: It is seen that the student and parent-oriented challenge levels of teachers aged 20-25 are significantly higher than those aged 41-50, 51, and above; it is seen that the students and parents-oriented challenge levels of the teachers aged 26-30 are significantly higher than those aged 31-40, 41-50, 51 and above. Accordingly, it can be said that as their age gets younger, teachers experience more challenges in terms of the teacher competences in the distance education process applied during the pandemic period. The perceptions of the teachers regarding the challenges they face in the distance education process according to the teaching levels they work are summarized in Table 3.9.

Tablo 3. 9. *Teachers' Perceptions of the Challenges They Face in Distance Education during the Pandemic Period According to the Teaching Level They Work*

Factors	Level	N	X	Sd
F1: Student and Parent-Oriented Challenges	Pre-school	20	38,1	13,0
	Primary School	185	41,0	7,9
	Secondary School	545	43,0	7,2
	High School	205	41,2	8,5
F2: Teacher Competences-Oriented Challenges	Pre-school	20	20,5	6,8
	Primary School	185	19,6	5,2
	Secondary School	545	20,1	5,4
	High School	205	20,8	5,2
Total Score	Pre-school	20	58,6	19,5
	Primary School	185	60,7	11,4
	Secondary School	545	63,2	11,1
	High School	205	62,1	12,5

When Table 3.9 is examined, it is seen that there are differences in the averages in terms of teachers' perceptions of the challenges they face in distance education in terms of the teaching levels they work. The results of the analysis of variance regarding whether these differences are significant or not are summarized in Table 3.10.

Table 3. 10. *The Difference between Teachers' Perceptions According to Teaching Levels*

		The Sum of Squares	df	Mean Squares	F	p	Difference
F1: Student and Parent-Oriented Challenges	Between Groups	1144,540	3	381,513	6,212	,000	• Between Pre-school and the others
	In-group	58406,450	951	61,416			• Between Primary and Secondary School
	Total	59550,991	954				
F2: Teacher Competences-Oriented Challenges	Between Groups	138,969	3	46,323	1,586	,191	one
	In-Group	27772,596	951	29,204			
	Total	27911,564	954				
Total Score	Between Groups	1186,309	3	395,436	2,869	,036	• Between Primary and Secondary School
	In Group	131091,140	951	137,846			
	Total	132277,449	954				

When Table 3.10 is examined, it is seen that there is a significant difference in terms of the total score [f(3-951)=2,869, p<0,05) between the teaching level they work and the teachers' perceptions of the challenges they face in the distance education process. According to the results of the LSD test conducted to determine the source of the difference, it was determined that the differentiation was between the teachers working in primary and secondary schools. When the total score averages in Table 3.9 are examined: It can be said that the averages of the teachers working in primary school are significantly

lower than those working in secondary schools. Accordingly, it can be said that primary school teachers have less challenge than secondary school teachers in the distance education process applied during the pandemic period.

When examined in terms of the factors, it is seen that there is a significant difference in terms of the teaching levels between the perception levels of teachers regarding the challenges they experience in the distance education process, with the factor of student and parent-oriented challenges [f(3-951)=6,212, p<0,05). According to the results of the LSD test conducted to determine the source of the difference, it was determined that the differentiation was between the teachers working in pre-school and the others, and between the teachers working in primary school and those working in secondary schools. When the averages of the relevant factor in Table 3.9 are examined: It is seen that the student and parent-oriented challenge levels of the pre-school teachers are significantly lower than the teachers working at the other levels, and the scores of the teachers working in primary school are also significantly lower than the teachers working in secondary school. Accordingly, it can be said that in the distance education process applied during the pandemic period, secondary school teachers have fewer students and parent-oriented challenges than the teachers at the other levels, and primary school teachers have fewer students and parent-oriented challenges than secondary school teachers.

It is seen that there is no significant difference between the perception levels of teachers regarding the challenges they experience in the distance education process according to the teaching levels and the factor of teacher competences-oriented challenges [f(3-951)=1,586, p>0.05). Accordingly, it can be said that the distance education process applied during the pandemic period and the challenges faced in terms of the teacher competences with regard to the related teaching levels are similar.The perceptions of teachers regarding the challenges they face in the distance education process according to their branches are summarized in Table 3.11.

Table 3. 11. *Teachers' Perceptions of the Challenges They Face in Distance Education during the Pandemic Period by Branch*

Factors	Level	N	X	Sd
F1: Student and Parent-Oriented Challenges	1. Mathematics	47	44,0	5,5
	2.Foreign Languages	357	42,9	7,4
	3.Turkish	112	42,2	8,5
	4.Science Lessons	137	41,7	7,0
	5.Information Technologies	20	42,0	6,6
	6.Arts and Sports Lessons	45	42,7	7,9
	7.Social Lessons	42	41,3	9,1
	8.Culture of Religion and Knowledge of Ethics	24	44,5	6,7
	9.Primary School Teaching	121	40,9	8,1
	10.Vocational Lesons	21	37,1	11,4
	11.Preschool	29	38,5	10,6
F2: Teacher Competences-Oriented Challenges	1.Mathematics	47	20,9	4,1
	2.Foreign Languages	357	19,9	5,4
	3.Turkish	112	21,5	5,1
	4.Science Lessons	137	19,7	5,0
	5.Information Technologies	20	19,5	6,2
	6.Arts and Sports Lessons	45	20,6	5,4
	7.Social Lessons	42	20,5	6,4
	8.Culture of Religion and Knowledge of Ethics	24	19,7	6,1
	9.Primary School Teaching	121	20,4	5,0
	10.Vocational Lessons	21	18,0	6,5
	11.Preschool	29	19,6	6,3
Total Score	1.Mathematics	47	64,9	8,2

2.Foreign Languages	357	62,9	11,2
3.Turkish	112	63,7	12,4
4.Science Lessons	137	61,4	10,4
5.Information Technologies	20	61,5	10,8
6.Arts and Sports Lessons	45	63,3	12,0
7.Social Lessons	42	61,9	14,2
8.Culture of Religion and Knowledge of Ethics	24	64,3	10,6
9.Primary School Teaching	121	61,4	11,6
10.Vocational Lessons	21	55,1	17,3
11.Preschool	29	58,2	15,7

When Table 3.11 is examined, it is seen that there are differences in the averages of teachers' perceptions of the challenges they face in distance education in terms of their branches. The results of the variance analysis regarding whether these differences are significant or not are summarized in Table 3.12.

Table 3. 12. *The Difference between Perceptions of Teachers According to Their Branches*

		The Sum of Squares	df	Mean Squares	F	p	Difference
F1: Student and Parent-Oriented Challenges	Between Groups	1685,980	10	168,598	2,750	,002	• Between 9 and 7,8,10
	In-Group	57865,011	944	61,298			• Between 11 and 1,2,3,4,6 and 7
	Total	59550,991	954				• Except 10 and 11, among others
F2: Teacher Competences-Oriented Challenges	Between Groups	422,223	10	42,222	1,450	,153	None
	In-Group	27489,341	944	29,120			
	Total	27911,564	954				
Total Score	Between Groups	2617,413	10	261,741	1,906	,041	• Between11 and 1,2 and 3
	In-Group	129660,036	944	137,352			• Except 10 and 11, among others
	Total	132277,449	954				

When Table 3.12 is examined, it is seen that there is a significant difference in terms of the total score [f(10-944)=1,906, p<0,05) between branches and teachers' perceptions of the challenges they experience in the distance education process. According to the results of the LSD test conducted to determine the source of the difference, it was determined that the differentiation was between Preschool teachers and the teachers in Mathematics, Foreign Languages, and Turkish branches, and between Vocational Lesson teachers and the other branches teachers except for Preschool. When the averages in Table 3.11 are examined in terms of total scores: It can be said that Preschool branch is significantly lower than Mathematics, Foreign Languages, and Turkish branches. It was determined that, with the exception of Vocational Lessons and Pre-School branches; Mathematics branch is significantly higher than the others; Foreign Languages branch is significantly higher than Science Fields, Information Technologies, Primary School Teaching and Social Fields; Turkish branch is significantly higher than the branches except Mathematics and Culture of Religion and Knowledge of Ethics; there is no significant difference between Science Fields and Primary School Teaching branches; Information Technologies is significantly higher than Science Fields and Primary School Teaching branches; Arts and Sports Branches are significantly higher than Foreign Languages, Science Fields, Information Technologies, Social Fields and Primary School Teaching branches; Social Fields is significantly higher than Science Fields, Information Technologies and Primary School Teaching; Culture of Religion and Knowledge of Ethics branch is significantly higher than the other branches except Mathematics; and finally, Primary School Teaching branch was significantly lower than the other branches.

When examined in terms of the factors, it is seen that there is a significant difference between the perception levels of teachers regarding the challenges they experience in the distance education process, and the students and parents-oriented challenges [f(10-944)=2,750, p<0,05). According to the results of

the LSD test, which was conducted to determine the source of the difference, it was determined that the differentiation was between Primary School Teachers and Social Lessons, Culture of Religion and Knowledge of Ethics and Vocational Lessons Teachers; in addition, between Pre-School Teachers and Mathematics, Foreign Languages, Turkish, Science Lessons, Arts and Sports Lessons and Social Lessons Teachers; and among the other branches except for Vocational Lessons Teachers and Pre-School Teachers. When the averages in Table 3.11 are analyzed in terms of total scores: While the averages of the Primary School Teachers are significantly lower than Social Lesson Teachers, Culture of Religion and Knowledge of Ethics, it is seen that it is significantly higher than Vocational Lessons Teachers. It is seen that the averages of Preschool Teachers are significantly lower than Mathematics, Foreign Languages, Turkish, Science Lessons, Arts, and Sports and Social Lessons Teachers. With the exception of Vocational Lessons and Pre-School branches it was determined that; Mathematics Teachers is significantly higher than the others except Culture of Religion and Knowledge of Ethics; Foreign Languages Teachers is significantly higher than Science Lessons, Information Technologies, Arts and Sports, Primary School and Social Lessons Teachers; Turkish Teachers are significantly higher than Science Lessons, Information Technologies, Social Lessons and Primary School Teachers; Science Lessons Teachers are significantly higher than Social Lessons and Primary School Teachers; Information Technologies Teachers are significantly higher than Science Lessons, Social Lessons and Primary School Teachers; Arts and Sports Lessons are significantly higher than the other branches except Mathematics, Foreign Languages, Culture of Religion and Knowledge of Ethics; Social Lessons Teachers are significantly higher than Primary School Teachers; Culture of Religion and Knowledge of Ethics Teachers are significantly higher than the other branches; and finally, Primary School Teachers are significantly lower than the other branches.

It is seen that there is no significant difference between the perception levels of teachers regarding the challenges they face in the distance education process according to their branches and the competences-oriented challenges [f(10-944)=1.450, p>0.05). Accordingly, it can be said that the challenges experienced in terms of teacher competences in terms of the branch related to the distance education process applied during the pandemic period are similar. The perceptions of teachers regarding the challenges they face in the distance education process according to the settlements where they work are summarized in Table 3.13.

Table 3. 13. *Teachers' Perceptions of the Challenges They Faced in Distance Education during the Pandemic Period by Settlement where They Work*

Factors	Level	N	X	Sd
F1: Student and Parent-Oriented Challenges	City Center	358	41,1	8,6
	Village	207	43,9	6,5
	District Center	390	42,2	7,7
F2: Teacher Competences-Oriented Challenges	City Center	358	19,7	5,5
	Village	207	20,7	5,5
	District Center	390	20,3	5,1
Total Score	City Center	358	60,8	12,6
	Village	207	64,7	10,4
	District Center	390	62,6	11,3

When Table 3.13 is examined, it is seen that there are differences in the averages in terms of teachers' perceptions of the challenges they face in distance education in terms of the settlements where they work. The results of the analysis of variance regarding whether these differences are significant or not are summarized in Table 3.14.

Table 3.14 *Differences in Perceptions of Teachers by Settlement where They Work*

		The Sum of Squares	df	Mean Squares	F	p	Difference
F1: Student and Parent-Oriented Challenges	Between Groups	1056,859	2	528,429	8,600	,000	Between the village and the others
	In-group	58494,132	952	61,443			
	Total	59550,991	954				
F2: Teacher Competences-Oriented Challenges	Between Groups	156,697	2	78,348	2,687	,049	Between City Center and Village
	In-group	27754,868	952	29,154			
	Total	27911,564	954				
Total Score	Between Groups	1981,637	2	990,819	7,239	,001	Between all of them
	In-group	130295,812	952	136,865			
	Total	132277,449	954				

When Table 3.14 is examined, it is seen that there is a significant difference in terms of the total score [f(2-952)=7,239, p<0,05) between the settlements where they work and the perceptions of the teachers about the challenges they face in the distance education process. According to the results of the LSD test conducted to determine the source of the difference, it was determined that the differentiation was between the teachers working in the city center, village, and district centers. Accordingly, when the total score averages in Table 3.13 are examined: It can be said that the teachers working in the village are significantly higher than the teachers working in the province and district centers; it can be said that the teachers working in the district center are also significantly higher than those working in the city center. In other words, it can be said that the teachers working in the city center are significantly lower than the teachers working in the village and district centers. Accordingly, it can be said that the smaller the settlement they work, the more challenges teachers have in the distance education process applied during the pandemic period.

When analyzed in terms of the factors, it is seen that there is a significant difference between the perception levels of teachers regarding the challenges they face in the distance education process and the challenges that are focused on students and parents [f(2-952)=8.600, p<0,05) according to the settlements where they work. According to the results of the LSD test conducted to determine the source of the difference, it was determined that the differentiation was between the teachers working in the village and the teachers working in the city and district centers. Accordingly, when the averages in Table 3.13 are examined, it can be said that during the distance education process implemented during the pandemic period, the teachers working in the villages experienced more student and parent-oriented challenges than the teachers working in the city and district centers.

It is seen that there is a significant difference between the perception levels of teachers regarding the challenges they experience in the distance education process and the teacher competences-oriented challenges [f(2-952)=2.687, p<0,05) according to the settlements where they work. According to the results of the LSD test conducted to determine the source of the difference, it was determined that the differentiation was between the teachers working in the city center and the teachers working in the villages. Accordingly, when the averages in Table 3.13 are examined, it can be said that the teachers working in the city center experienced less challenge in terms of the teacher competences-oriented challenges compared to the teachers working in the villages during the distance education process implemented during the pandemic period.

4. DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

According to the results of the pilot scheme relating to the scale which is developed in the first stage of the research: By performing KMO, Bartlett analysis, factor analysis, principal components analysis, taking into account variance calculations and applying varimax orthogonal rotation technique,

the 10 items for the first factor called "Student and Parent-Oriented Challenges" and the 6 items for the second factor called "Teacher Competences-Oriented Challenges" were chosen. In other words, it has become clear that the scale consists of 2 factors and 16 items. In a study conducted by Baran, Correia and Thompson (2011), it is emphasized that there are problems related to both teachers' competencies and the teacher training process in the online teaching process, and that teacher competencies are an important factor in online education. Similarly, in a study conducted by Gülbahar and Kalelioğlu (2015), it was emphasized that teacher competencies are a very important factor in the e-learning process and that it is important for teachers to keep their competencies up to date by constantly improving them. In another study by Kara and Yılmaz (2020), it is emphasized that the qualifications of faculty members are an important factor for the success of the distance education process. Research by Ferri, Grifoni, and Guzzo (2020) discusses the opportunities and challenges of emergency distance learning based on COVID-19 emergency experiences. Within the scope of the research, the lack of digital competences of teachers and students was emphasized within the scope of pedagogical difficulties. In the research conducted by Kara, Erdoğdu, Kokoç, and Çağıltay (2019) on the difficulties faced by adult learners in online distance education, it was emphasized that the lack of students' proficiency is one of the factors that negatively affect distance education. As a result, it can be said that it would be appropriate to consider the difficulties experienced in the distance education process under two factors as student and teacher competencies.

As a result of the findings of the explained variance rate of the items, the eigenvalues of the factors, and the distribution of the item loads according to the factors, the scale has a two-factor structure and this structure is valid. According to the applied item factor correlation method, the items in the scale serve the general purpose. The "Distance Education Perceptions of Teachers Scale" developed by Kurnaz et al. (2020), on the other hand, was prepared as 41 items after taking expert opinion, validity and reliability analyzes were made according to the data obtained from 356 teachers, and construct validity was tested using EFA and it calculated 62.47% of the total variance. The scale was concluded as 37 items and 5 factors. Yildiz et al. (2021) developed the "Attitude Scale Regarding the Use of Distance Education Environments in the Pandemic Process". Within the scope of the reliability and validity studies of the scale, 321 students were consulted. For the content and face validity of the scale, the opinions of 1 language, 3 field experts, 1 assessment and evaluation expert, and 1 psychological counselor were consulted. Afterward, construct validity was tested with EFA and a 24-item 4-factor scale was developed that explained 73.42% of the total variance. Kılıç Çakmak and Gök (2020) developed an online questionnaire administered to 81 instructors and explained 56.88% of the total variance as a result of EFA, and the questionnaire was concluded as 21 items, 3-factor and 5 point Likert type.

In addition, according to the results of the independent samples t-test and the ranking of the item scores from the largest to the smallest to calculate the discrimination strenght of the items, the discrimination level of the items in the scale and the scale itself is quite high. According to the analyzes made by using the factors and Cronbach's Alpha, Equal Halves Correlation, Guttman Split-Half and Spearman-Brown reliability coefficients for the scale reliability analysis, each of the factors and the whole scale can make consistent measurements. The internal consistency coefficient of the scale developed by Kurnaz et al. (2020) was calculated as .901 with Cronbach's Alpha. The internal consistency coefficient of the developed scale developed by Yildiz et al. (2021) was calculated with Cronbach's Alpha and found to be .93. As a result of the confirmatory factor analysis of the 4-factor scale, it was determined that the fit indices were at the desired level. Kılıç Çakmak and Gök (2020) calculated the internal consistency coefficient of the questionnaire they developed with Cronbach's Alpha and reached the result of .91. For the reliability of the scale, the Cronbach's Alpha value is expected to be between .70 and .95 (Brown, 2002).

Teachers have a high perception of the challenges they face in distance education; in other words, teachers are experiencing challenges in terms of both students and parents and teacher competences in distance education applications carried out during the pandemic period. In Halitoğlu's (2021) research,

the attitudes of the participants are at a high level, according to the data obtained from the internet with the "Attitudes of Student Teachers towards Distance Education" scale. In the case study conducted by Eken et al. (2020), in EDE applied during the pandemic period; they have concluded that there are some problems due to reasons such as students, socioeconomic inequalities, inequality of opportunity, and geographical settlements and that the problems experienced by the teachers are because the educators do not have enough experience and knowledge on this subject yet. In the research conducted by Kılıç Çakmak and Gök (2020) on the perceptions of instructors regarding distance education, the education-teaching plan factor was found to be the highest level, access to resources and the basic perspective factors and the entire questionnaire were found to be medium level. It has been concluded that more experienced instructors have a more positive approach to DE and undergraduate graduates have more problems in DE than those who receive postgraduate education. In Demir and Özdaş's (2020) research, which aims to reveal the views of the teachers working in primary school in distance education applied in the COVID-19 pandemic, it has been concluded that teachers have problems in terms of "infrastructure, participation, planning, communication, uncertainty and EBA (Education Information Network)" in EDE. In Sezgin's (2021) research, which aims to analyze contentwise the EDE researches conducted worldwide during the COVID-19 pandemic process, it has been concluded that the concept of "digital divide" is encountered when the concepts and problems that are at the forefront of EDE process are examined. In the study of Schleicher (2020), which aims to examine the impact of the pandemic crisis on OECD countries on education, it has been concluded that 18% of teachers need to develop themselves more in terms of technology and 36% of them attend online seminars or courses. In their study, Pradas et al. (2021) concluded that with the case study method, there was an increase in the academic achievement of students in EDE and this increase supports the idea that it is beneficial to examine and consider the effective factors in the successful implementation of EDE. According to the research conducted by Trust and Whalen (2020) to reveal the experiences of instructors in EDE during the COVID-19 crisis, it was stated that 325 teachers in EDE are faced with problems such as feeling under pressure and unprepared for online lessons, technical problems for students, changing individual needs and it was stated that they faced some challenges such as coping and the uncertainty in the education systems of the countries due to the pandemic and they needed support.

In terms of the teacher competences-oriented challenges and total score, female teachers and male teachers' perception levels about the challenges they face in distance education applied during the pandemic period show similarity. On the other hand, in terms of the student and parent-oriented challenges, female teachers face more challenges than male teachers. The reason for this may be that there are more female participants in the study, taking into account the "challenges focused on student-parent and teacher competences", or it may be that women have taken more responsibility with the curfews applied during the pandemic period. This situation can be investigated with new researches. In Halitoğlu's (2021) research, there is no significant difference between the attitudes of the participants and the gender, according to the data obtained from the internet with the scale of "Attitudes of Student Teachers towards Distance Education". According to the research conducted by Kılıç Çakmak and Gök (2020) on the perceptions of instructors regarding distance education, the groups did not show a significant difference in terms of gender. Kurnaz et al. (2020) stated that there was no significant gender difference between EDE and teachers' views in their study, which aimed to examine the views of teachers on distance education, which the whole country had to implement due to the pandemic.

As their age gets younger, teachers face more challenges in the distance education process applied during the pandemic period. In other words, older teachers face less challenge in the process. As their ages get younger, teachers experience more student and parent and teacher competences-oriented challenges in the distance education process implemented during the pandemic period. The reason for all these results is, considering the factors of "student and parent-oriented and teacher competences-oriented challenges"; it may be that young teachers have less professional experience, especially inexperience in classroom management, or that they often work in rural and disadvantaged areas. This situation can be

investigated with new researches. According to the research conducted by Kılıç Çakmak and Gök (2020) on the perceptions of instructors regarding distance education, the groups did not differ significantly in terms of age. Kurnaz et al. (2020) stated that there is no significant difference between EDE and teachers' opinions in terms of seniority year and teaching experience level, which aims to examine the views of teachers on distance education, which the whole country has had to implement due to the pandemic.

In the distance education process applied during the pandemic period, primary school teachers experience less challenge than secondary school teachers. Moreover, secondary school teachers have less student and parent-oriented challenges than the teachers at the other levels and primary school teachers also have less student and parent-oriented challenges compared to secondary school teachers. The challenges faced in teacher competences are also similar. In the study of Kurnaz et al. (2020), which aimed to examine the views of teachers on distance education, which the whole country had to implement due to the pandemic, it was stated that there was no significant difference between EDE and teacher views in terms of teaching level.

Pre-School Teachers have less challenge than those in Mathematics, Foreign Languages, and Turkish branches. With the exception of Vocational Lessons and Pre-School branches; Mathematics Teachers face more challenges than those in the other branches; Foreign Languages Teachers have more challenges than those in the branches of Science, Information Technologies, Primary School Teaching and Social Fields; the teachers in Turkish branch have more challenges than those in the branches other than Mathematics and Culture of Religion and Knowledge of Ethics; the challenges faced by the teachers in Science Fields and Primary School Teaching branches are similar; the teachers in Information Technologies branch have more challenges than those in Science Fields and Primary School branches; the teachers in Arts and Sports Branches have more challenges than those in Foreign Languages, Sciences, Information Technologies, Social Sciences and Primary School branches; the teachers in Social Fields branch have more challenges than those in Science Fields, Information Technologies and Primary School branches; the teachers in Culture of Religion and Knowledge of Ethics branch have more challenges than those in the other branches except Mathematics; and lastly, the teachers in Primary School branch have less challenge than those in the other branches. In the study of Halitoğlu (2021), it was concluded that there is a significant difference in favor of Turkish and Guidance and Psychological Counseling, that is, they have a higher attitude score, according to the data obtained from the internet with the "Attitudes of Student Teachers towards Distance Education" scale. In the study of Kurnaz et al. (2020), which aimed to examine the views of teachers on distance education, which the whole country had to implement with the pandemic, it was stated that there was no significant difference between EDE and teacher views in terms of the branch.

As the development level of the settlement they work decreases, teachers face more challenges in the distance education process applied during the pandemic period. In this process, the teachers working in villages experience more challenges focused on students and parents than the teachers working in the city and district centers. On the other hand, the teachers working in the city center experienced less challenge in terms of the teacher competences than the teachers working in villages. In Halitoğlu's (2021) research, there is no significant difference between the attitudes of the participants and the region they live in, according to the data obtained from the internet using the "Attitudes of Student Teachers towards Distance Education" scale. In the case study conducted by Eken et al. (2020), it was determined that there were problems in EDE applied during the pandemic period due to reasons such as student, socioeconomic inequalities, equal opportunity, and geography. In the study of Kurnaz et al. (2020), which aimed to examine the views of teachers on distance education, which the whole country had to implement due to the pandemic, it was stated that there was no significant difference between EDE and teachers' opinions in terms of settlement.

According to the results of the research, the following recommendations can be made:

- The developed scale can be used to examine and reveal the challenges faced by teachers in terms of student and parent and teacher competences during the pandemic period based on gender, age, branch, teaching level, and settlement where they work.
- Based on the conclusion that younger teachers have more challenges in distance education process implemented during the pandemic period, especially younger teachers can be supported with in-service training, group teachers meetings, or different studies.
- In the distance education process implemented during the pandemic period, support activities can be carried out for secondary school teachers because secondary school teachers have more challenges than primary school teachers.
- Excluding Vocational Lessons and Pre-School branches; because the teachers in the mathematics branch have more challenges in the distance education process applied
- during the pandemic period compared to the teachers in the other branches; Mathematics teachers can be supported in the distance education process in terms of the challenges they face.
- According to the result that teachers have more challenges in the distance education process applied during the pandemic period, as the settlement where they work gets smaller, solutions can be produced for the challenges they encounter, especially by collaborating with teachers working in disadvantaged areas.

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