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The Effect of Teachers' Cognitive Flexibility on Attitudes towards Compulsory Distance Education during the COVID-19 Pandemic

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ABSTRACT

The period when education services were tried to be provided remotely due to the COVID-19 epidemic enabled teachers to be intertwined with technology-supported teaching platforms. The acquisition of the technology required to use the platform, adaptation of the existing teaching strategies, methods, and techniques to the platform, and the need to stay in touch with all stakeholders related to education in this process have led to new experiences for teachers and many challenging situations. During this process, it was predicted that teachers frequently use their cognitive flexibility, which enables them to think about different solutions and make functional changes for different or problematic situations. The research is a survey study. Data were collected from teachers with the Cognitive Flexibility Inventory and the Attitude Scale towards Compulsory Distance Education. Their validity and reliability were retested within this research's scope. The results of this study, in which the data were analyzed with descriptive statistics, show that the cognitive flexibility of the teachers participating in the research was high during the epidemic period. They had attitudes that could not be evaluated positively or negatively regarding compulsory distance education. Although there is a relationship between teachers' cognitive flexibility levels and their attitudes towards compulsory distance education, it is low. The cognitive flexibility of teachers can predict a very small part of their attitudes towards compulsory distance education. The findings obtained from the research are discussed with other research results.

Keywords:
Cognitive flexibility, compulsory distance education, attitude towards compulsory distance education, teacher

1. Introduction

The COVID-19 epidemic has changed the way public services are delivered worldwide, and the global epidemic has caused perhaps the most challenging period for education services (Bawa, 2020; Daniel, 2020). , Human presence in areas with intense social interaction was restricted to control the spread of the epidemic in many countries. In this direction, face-to-face education was suspended in many countries, with UNESCO's call for distance education to be switched to this restriction in schools (UNESCO, 2020a; UNESCO, 2020b). Distance education is defined by the United States Distance Education Association as "access to education using technology-based technologies as satellite, audio-visual, graphical, computerized and multimedia, etc." (USDLA, 2004 cited by Koçoğlu & Tekdal, 2020). In summary, distance education is multimedia-based education which includes activities such as interactive learning-teaching, guidance, classroom management, time and place-independent e-learning, digital transfer, and distance exams (Guohong et al., 2012). Although it is accepted that distance education provides an advantage compared to face-to-face education as it enables the use and sharing of multiple resources simultaneously to support the teaching and learning process, as well

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as the space and time flexibility it provides (Arat & Bakan, 2014; de Oliveira et al., 2018; Guthrie & McCracken, 2010; Olszewski-Kubilius & Corwith, 2011), although its usability during natural disasters such as epidemics has been experienced before (Almond, 2006; Basilaia & Kvavadze, 2020; Cauchemez et al., 2014), the success of the application depends on the provision of some prerequisites. Lashley et al. (2020) describe these prerequisites as structuring a new teaching and learning space as 'ecology'. Regarding the ecology that needs to be established, UNESCO (2020c) stated that the service's technical, economic, pedagogical, and learning-teaching dimensions should be carefully planned. The application should be functionalized to provide distance education services properly. In this direction, the technological subsystem used for distance education during the COVID-19 epidemic period should be evaluated in the context of country conditions. Reliability of local power sources, availability of internet connection (especially for students with disabilities and low-income families), continuity, security, and user privacy should be considered for the technology subsystem to be selected. Depending on the digital skill levels of teachers and students, it should be decided whether high-tech or low-tech solutions will be used. Psycho-social difficulties should be resolved before teaching; measures should be taken to connect schools, parents, teachers, and students; regular human interaction should be provided; possible psycho-social difficulties should be eliminated; experience sharing should be facilitated; coping strategies when learning difficulties are encountered should be included. The distance education program should be carefully planned. The program should discuss with stakeholders whether it should focus on teaching new knowledge or increasing and reinforcing students' existing knowledge. Appropriate teaching-learning methodologies should be selected according to the home-based quarantine situation. Formative questions, exams, or exercises should be designed so that students' learning processes can be closely monitored, and feedback should be used to control the process. And finally, based on students' self-regulation skills, the distance education process should be structured flexibly (UNESCO, 2020c). It is unclear how much countries can take these recommendations into account during the COVID-19 epidemic. By the second half of 2021, inequality in access to education discussed worldwide is now associated with “digital inequality” (Nguyen, Hargittai, & Marler, 2021; van Deursen, 2020; Zheng & Walsham, 2021). It has been determined that the education services provided from a distance have adverse effects on all education levels, from primary education to higher education, especially in disadvantaged countries. The education of approximately 123 million students was disrupted during the COVID-19 epidemic period. Indicators even point out that 23.8 million children and youth are at risk of not returning to school even after the epidemic (UNESCO, 2020d-e; UNESCO, 2021).

1.1. Distance Education Services in Turkey

As in many countries, all face-to-face education services in Turkey have been suspended for all education levels as of March 2020 (Ministry of National Education [MoNE], 2020; Higher Education Council [HEC], 2020). In the intervening period, although hybrid or blended teaching practices were tried to be made in primary education, secondary education, and higher education level for some programs throughout the country, the continuity of each application in itself could not be ensured. Thus, education services at all levels, from primary education to higher education in Turkey, were generally provided remotely until the fall semester of the 2021-2022 academic year. The epidemic period education services offered since March 2020 differ from the known distance education services. The institutions affiliated with HEC concentrate only on the teaching part of distance education. In this context, “emergency distance education”, which produces a “temporary solution” (Leonardi, 2020), in which the essential value is “sustainment” (Sułkowski, 2020), “face-to-face is provided online” (Bawa, 2020) to ensure sustainability until the crisis is over (Akyürek, 2020; Barbour et al., 2020; Bozkurt & Sharma, 2020; Hodges et al., 2020). In the institutions affiliated with the MoNE, the Education Informatics Network (EBA), activated to support education services since 2012, has been used intensively. As a digital education platform, EBA is a system where course materials are presented online, supported by television broadcasts, and all teachers and students across the country can access the course content. For EBA, MoNE provided 6-8GB of free internet access to support students and families. In addition, EBA programs adapted to television during the COVID-19 global epidemic period were broadcast by seven television companies, apart from the official television channel of the country. EBA TV Programs are shorter than the actual course length. However, the lessons are supported by thousands of videos and animations. More than 100 teachers voluntarily recorded their lessons on television in the process. Thus, it tried to provide students access to primary, secondary, and high school education programs (The World Bank, 2020). Finally, in the first period when it was first affected by the COVID-19 global epidemic, and the MoNE offered all its

teaching services entirely remotely, EBA was among the top ten education platforms most visited globally between March 23 and April 30, 2020 (MoNE, 2020b).

Distance education is characterized by teaching and learning provided by the media. In principle, students and teachers do not meet face to face. Their interaction is achieved through asynchronous communication between the teacher and the learner through one or more media such as audio and video recordings, telephone conversations, television, and computer communication (Delling, 1987). Communication can be at least two ways; one-way communication is established between the supporting organization and the students. Pre-produced learning materials are delivered from the organization to the students. With two-way communication, teachers and learners interact with each other synchronously or asynchronously on the platforms provided by the media (Keegan, 1990, p. 44). While the MoNE (supporting organization) shares previously produced learning materials with teachers and students through the live classroom application of EBA (media/digital platform used for educational services), it tried to provide simultaneous communication between teachers and students. The system was also supported in the programs presented via television. In the same period, the Ministry launched a psycho-social support system consisting of a hotline and guides to repair the negative psychological effects of the COVID-19 epidemic on students and parents. In cooperation with UNESCO, in-service training programs were provided to 125,000 teachers through distance education across the country to adapt to the process more quickly (Özer, 2020). Thus, while the distance education services provided in the epidemic period throughout Turkey are carried out in the form of "emergency distance education" at the higher education level, it can be evaluated that a compulsory distance education application, closer to the infrastructure of distance education at the education levels affiliated to the MoNE, is carried out through EBA.

Although the compulsory distance education supported by EBA has created various opportunities for its practitioners and users (İnal, Sakarya & Zahal, 2021; Türker & Dündar, 2020), some negativities have also been experienced despite EBA support. Aytaç's (2021) study, which investigates the problems faced by teachers during the COVID-19 global epidemic, reveals that psychological issues of teachers and students, lack of motivation, and parents' inability to create suitable learning spaces for their children shows that they are negatively affected by insufficient knowledge to use the distance education technologies. Similarly, according to the research completed with general education first-grade teachers, it was determined that the teachers were able to adapt the teaching methods they know to distance education, ensure student motivation and attendance, control the oppressive and negative behaviors of parents on their children during the lesson, and solve the technical problems faced by students related to the distance learning technology. These results show teachers have difficulties producing solutions (Uysal, 2021). Therefore, it can be considered that compulsory distance education at the education levels affiliated to the Ministry in Turkey creates positive and challenging experiences for teachers and learners.

1.2. Cognitive Flexibility and Attitude

Cognitive flexibility is an individual cognitive skill that includes thinking about solutions for different or problematic situations and making functional changes. Skill consists of the tendency to perceive challenging situations as controllable. Those with cognitive flexibility perceive alternatives to events or human behaviors and can produce a series of solutions to solve difficult situations (Dennis & Vander Wal, 2010). In summary, it can be said that cognitive flexibility is the ability to successfully adapt someone's behaviors and thoughts to new, changing, unexpected, and challenging situations. Cognitive flexibility enables the person to gather information from their environment to adapt their behavior to the changes required by the case and helps them respond to the situation flexibly and effectively. It makes it possible to set goals, make a plan, realize the plan, and regulate the individual's behaviour depending on the results of their actions. Those with cognitive flexibility can better tolerate mistakes and changes, empathize, and easily find a way to compromise (Gabrys et al., 2018).

Cognitive flexibility has been the subject of many studies in which educators participated. Some of these studies point out the positive effect of cognitive flexibility on the teaching profession empathic attitude and solving interpersonal problems (for example, Esen-Aygün, 2018; Kaçay, Güngör & Soyer, 2021). Again, findings show that cognitive flexibility is related to the "Technological Pedagogical Content Knowledge" (Kereluik et al., 2011 and Koehler & Mishra, 2005 cited by Öztürk, Karamete & Çetin, 2020) of teachers, whose

content, pedagogy, and technology knowledge are formed together (Öztürk, Karamete & Çetin, 2020). Jelińska and Paradowski (2021), in their study with distance education teachers during the COVID-19 epidemic, found that teachers who feel comfortable when faced with unexpected situations can change their lesson plans and class contents according to the situation and those who can simplify the grading system, are more comfortable with the difficulties brought by distance education. It shows that they can handle it easily. It can be evaluated that those who cope with these difficulties use more efficiently their cognitive flexibility in a sense.

Attitude is about the way a person handles a problem or situation. Attitude has cognitive, emotional, and behavioral aspects. While the cognitive dimension of the attitude is formed by "interest, belief, thought and knowledge" about the situation or object (Giner-Sorolla, 1999, p. 443), the emotional dimension provides positive or negative thinking about that situation or object. The behavioral dimension of the attitude governs the behaviors related to the condition or object (Zanna & Rempel, 1988, p. 316, cited from Rosenberg & Hovland, 1960). It is known that those who accept that behaviors should be adjusted according to situational factors are more cognitively flexible than those who accept that there is only one appropriate or correct behavioral response (Martin & Rubin, 1995). It can be evaluated that any event, changing situation, or attitude towards a different practice is affected by the person's cognitive flexibility. Although teachers have developed positive attitudes towards distance education during the COVID-19 epidemic, some research findings show that they experience various problems due to their insufficient knowledge of using technology (for example, Hebebci, Bertiz, & Alan, 2020; Karakaya et al., 2020).

The COVID-19 epidemic has made it mandatory to provide distance education in Turkey, as in many parts of the world. It required teachers to adapt to new educational practices such as virtual classrooms, online teaching, and distance assessment. Students have had to deal with motivation problems related to distance learning, security and inequalities in the digital field. This study aims to determine the effect of teachers' cognitive flexibility on their attitudes towards compulsory distance education. It is predicted that teachers' attitudes are affected by their cognitive flexibility levels while adapting to this new field. This research seeks answers to the following questions:

What is the level of cognitive flexibility?

- Is there a difference between cognitive flexibility and attitudes towards compulsory distance education according to gender, branch, professional seniority, and the level of technology use?
- Is there a relationship between cognitive flexibility levels and attitudes towards distance education?
- What is the effect of cognitive flexibility levels on their attitudes towards distance education?

2. Methodology

2.1. Research Model

The research is a descriptive study examining the effect of teachers' cognitive flexibility on their attitudes towards compulsory distance education. "Descriptive research is the method used to portray the existing situation exactly as it is." (Balcı, 2004, p. 228; Karasar, 2002, pp: 89-90). In this research, in addition to the correlation design in which relational statistics (correlation, structural equalization, regression…) are used to "measure or describe the relationship" between two or more variables or some score groups, the causal comparison was used in which two or more groups were compared in terms of an emerging cause (or independent variable) (Cresswell, 2013, p.12; Fraenkel, Wallen, & Hyun, 2012). Thus, the correlation pattern between cognitive flexibility and compulsory distance education and the effect of cognitive flexibility on compulsory distance education were analyzed. In causal comparison, the differences between cognitive flexibility and compulsory distance education scores in the context of the independent variables selected in the research (gender, branch, seniority…) were examined. The data in the study were collected by the survey that provides a quantitative description of "the tendencies, attitudes or opinions in the universe through studies carried out on a sample selected from a population" (Creswell, 2013, p. 155).

2.2. Research Sample

The research population consists of teachers working in K12 schools in the Giresun province of Turkey (N=5.798). Only 320 teachers could participate voluntarily in the data collected via Google Form. This number

constitutes 5.5% of the research population. In this context, the descriptive of teachers participating in the research in Giresun are presented in Table 4 below.

Table 1. *Descriptives of Participants*

	Gender	Branch	Seniority	Level of Technology Use
Female	176			
Male	144			
Preschool teacher		18*		
Classroom teacher		69*		
Branch teacher		233		
1-5 Years			66	
6-10 Years			137	
11-15 Years			71	
16-20 Years			26**	
21 Years and above			20**	
Basic				18
Moderate				243
Advance				59
Total	320	320	320	320

* In the analysis, the preschool and the classroom teachers were combined and renamed the primary teacher.
** Those with 16-20 years and 21 years of seniority were combined and included in the analysis as 16 years and above.

2.2. Data Collection Tools and Procedure

In this study, two data collection tools were used together. These tools can be introduced as:

Compulsory Distance Education Attitude Scale (DEAS): It was developed by Tzivinikou, Charitaki, and Kagkara (2020) to determine teachers' attitudes during the transition to compulsory distance education, especially during the COVID-19 epidemic. Goodness of fit indices (TLI = .96 > .95, RMSEA = .04 < 0.08, CFI = .94 ≥ .90, $\chi 2(34) = 57.93$, p = .000, and SRMR = .03 < .08) analyzed by the scale developers. Cronbach's alpha coefficient of the determined scale was calculated as $\alpha = .76$. DEAS has two sub-dimensions: “Efficacy and Difficulties”. There are six items in the "Efficacy" sub-dimension and four in the "Difficulties" sub-dimension. Items 4 and 5 under this dimension are reverse items. The "Efficacy" dimension includes teachers' attitudes towards the functionality of distance education. The "Difficulties” sub-dimension, on the other hand, provides the determination of the attitudes towards the use of the database system used during compulsory distance education.

DEAS was adapted into Turkish by the researchers within the scope of this research. In this context, the researchers first translated the scale into Turkish; after a foreign language instructor checked the translation, three teachers (a special education teacher, a classroom teacher, and a mathematics teacher) working in the field were consulted for clarity of the items. First, the English version of the scale, and three weeks later, the Turkish version of the scale was applied to a group (n=23) working in the field, mostly foreign language teachers, via Google Form. Among the scores obtained, the Pearson Product-Moment Correlation Coefficient was .99 (p = 00) for the “Efficacy” sub-dimension of the scale and .98 (p = 00) for the “Difficulties” sub-dimension. Based on the correlation coefficients obtained for the sub-dimensions and expert opinions, it was concluded that the scale's parallelism was achieved in terms of translation.

The scale was applied to 110 teachers from various branches working in primary and secondary education in Turkey to test whether the scale preserves the factor structure in its original form. The obtained data were transferred to SPSS 22 and AMOS package programs. The fit index scores obtained from the Confirmatory Factor Analysis (CFA) performed on this group are summarized in Table 1 below. The values confirming the structure are outlined in Figure 1 below.

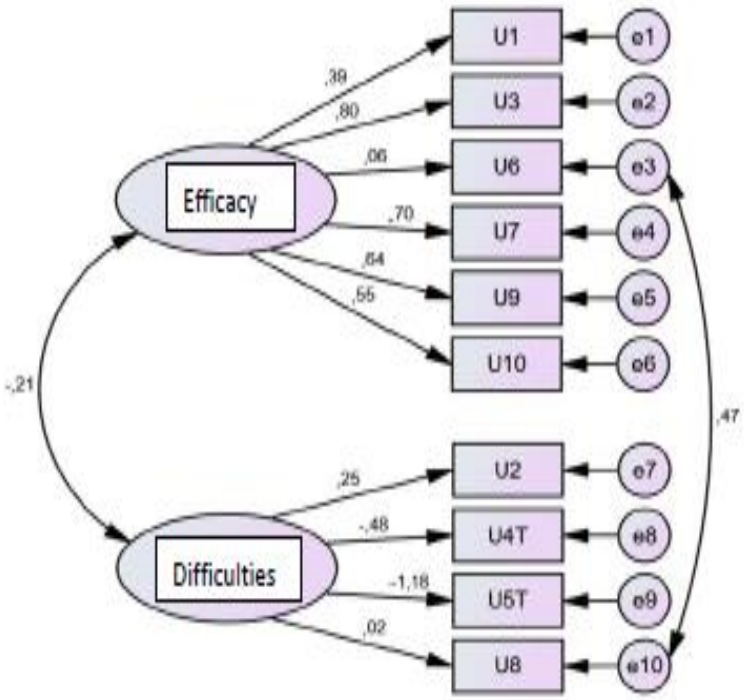

Figure 1. *CFA Model of DEAS*

The obtained fit indices (Table 2) are stated as acceptable values in the literature (Table 2).

Table 2. *The Goodness of Fit Index in Literature*

Goodness of Fit Index	Limits of Acceptance	Limits of Excellence	References
RMSEA	0.050≤RMSEA≤0.080	0.000≤RMSEA≤0.050	Çokluk, Şekercioğlu, & Büyüköztürk, 2010; Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999
RMR	0.050≤RMR≤0.080	0.000≤RMR≤0.050	Çokluk, Şekercioğlu, & Büyüköztürk, 2010; Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999; Kline, 2005; Vieira, 2011
GFI		0.900 and above	Hooper, Coughlan, & Mullen, 2008; Kline, 2005
AGFI		0.900 and above	Hooper, Coughlan, & Mullen, 2008; Kline, 2005
NFI		0.950 and above	Hooper, Coughlan, & Mullen, 2008; Kline, 2005
IFI	0.900≤IFI≤0.940	0.950 and above	Hu & Bentler, 1999; Jöreskog & Sörbom, 1993
CFI	0.900≤CFI≤0.940	0.950 and above	Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999; Karagöz, 2017
X^2/df	2.000<X^2/df≤5.000	0.000≤X^2/df≤2.000	Kline, 2005; Özdamar, 2015; Tabachnick & Fidell, 2013

According to the fit indices of the DEAS (Table 2) results, it was decided that the DEAS measures the attitudes of teachers in Turkey towards compulsory distance education with 10 items and two sub-dimensions validly and reliably (Figure 1, Table 2).

Table 3. *The Fit Indices of DEAS*

χ^2	sd	χ^2/sd	RMSEA	AGFI	SRMR	RMR	NNFI	CFI	NFI	IFI
50,804	33	1,540	0,070	0,87	0,055	0,120	0,96	0,92	0,81	0,92

The reliability of the scale's sub-dimensions within the scope of this study was 0.72 for "Efficacy"; 0.51 for “Difficulties”. These values are accepted as “moderate reliability” (Özdamar, 2015, p. 555).

Cognitive Flexibility Inventory (CFI): The inventory was developed by Dennis and Vander Wal (2010), and it was adapted into Turkish by Sapmaz and Doğan (2013). The inventory has a five-point Likert-type structure. The validity and reliability study of the inventory was completed on university students. CFI consists of 20 items and can be used as the total cognitive flexibility score and the totals of two sub-dimensions, the "Alternatives" sub-dimension score and the "Control" sub-dimension score. Items 2*, 4*, 7*, 9*, 11*, and 17* of the inventory are reverse items and need to be recoded for analysis. There are 13 items in the "Alternatives"

sub-dimension and 7 in the "Control" sub-dimension. The "Alternatives" dimension of the inventory includes the perception of the individual that "alternative solutions can be found in managing difficult situations". The "Control" sub-dimension measures the perception that "difficult situations can be controlled". In the adaptation study of the inventory, the Cronbach's alpha reliability coefficient was calculated as .90 for the entire scale, .90 for the "Alternatives" sub-dimension, and .84 for the "Control" sub-dimension. The test-retest reliability coefficient was .75 for the entire inventory, .78 for the "Alternatives" sub-dimension, and .73 for the "Control" sub-dimension (Sapmaz & Doğan, 2013).

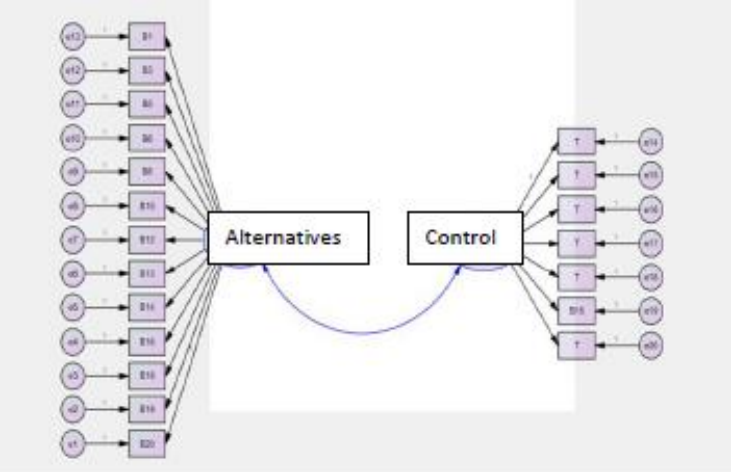

Figure 2. *CFA Model of CFI*

The CFA was examined over the data set collected from 220 teachers from various branches working in the elementary and secondary education levels to determine whether the CFA preserves its original factor structure with the teachers whose data was collected within the scope of this research. The CFI results are presented in Table 2 below, and the values confirming the structure are shown in Figure 2 above.

The obtained fit index values (Table 2) are acceptable in the literature (Table 1). However, it has been determined that the inventory does not work with the total score (Figure 2).

Table 4. *The Fit Indices of CFI*

χ^2	sd	χ^2/sd	RMSEA	AGFI	SRMR	RMR	NNFI	CFI	NFI	IFI
342,23	169	2,025	0,068	0,84	0,055	0,05	0,85	0,92	0,85	0,92

The internal reliability of the CFA was .88 for the "Control" sub-dimension and .91 for the "Alternatives" sub-dimension, based on the data set collected from the teachers. Reliability coefficient values between .70 and .90 for scales are accepted as "high reliability" (Özdamar, 2015, p. 555).

2.3. Data Analysis

Data collected from 320 teachers via DEAS, CFI, and Google Form were transferred to the SPSS 22 program. In the study, the cognitive flexibility level of the teachers was determined according to the mean. For the analysis of differences between teachers' attitudes towards cognitive flexibility and compulsory distance education according to their gender, branch, professional seniority, and level of technology use causal comparison tests were used. The Scheffe test was used to analyze the differences between groups. The Scheffe test was preferred as it controls the margin of error if the number of groups to be compared is large and does not assume that the number of observations in the groups is equal (Scheffe, 1953; Scheffe, 1959 cited by Kayri, 2009). Also, the correlation analysis for the relationship between cognitive flexibility levels and attitudes towards compulsory distance education; regression analysis to determine the effect of cognitive flexibility levels on attitudes towards compulsory distance education were used. The normal distribution precondition was checked in the data set collected from 320 teachers for the related analyzes. In this context, "the arithmetic mean, median and mode values of the total scores of the data are equal" (Sezgin, 2009, p. 83), skewness and kurtosis coefficients are in the range of ±1 (Cokluk et al., 2010, p. 16) checked for normal distribution in the data set collected. The data set was also analyzed with the Kolmogorov-Smirnov Test (Table 5).

In the data set, the arithmetic mean, median, and mode values of the research sub-dimensions were not the same, but the values were close to each other. The skewness and kurtosis values are in the range of ±1. According to the Kolmogorov-Smirnov test results, the scale sub-dimensions did not show a normal distribution (Table 5).

Table 5. *Normality Test Results*

	CFI		DEAS	
	Alternatives	Control	Efficacy	Difficulties
N	320	320	320	320
Arithmetic Mean	56,6156	26,1500	18,1281	13,2719
Median	57,0000	27,0000	17,0000	13,0000
Mod	65,00	29,00	16,00	12,00
Standard Error	6,46227	5,95669	5,04455	2,65187
Skewness	-,539	-,678	,385	,376
Std. Error Skewness	,136	,136	,136	,136
Kurtosis	-,316	-,039	-,242	-,163
Std. Error Kurtosis	,272	,272	,272	,272
Assymp. Sig. (2-tailed)	0,00	0,00	0,00	0,00

Şencan (2005) states that "the calculated p-value does not always give correct results because the Kolmogorov-Smirnov test is greatly affected by a small number of discrete/outlier values" (p.196). With the results of other analyzes, it was decided that the data set obtained in this study can be accepted as normally distributed in the context of the sub-dimensions of the research scales.

2.4. Ethical

This research was carried out following the ethics committee decision of the Republic of Turkey Giresun University Social Sciences, Science and Engineering Research Ethics Committee dated 21/07/2021 and numbered 12/16 and the permissions obtained from the developers/adapters of the scale/inventory used in the research.

3. Findings

The findings of the research questions are summarized under the relevant headings.

The mean regarding the cognitive flexibility level of the teachers participating in the research is summarized in Table 6 below. Balcı's (2004, p. 220) score ranges were adapted for evaluation and interpretation of weighted average scores (Table 6-7).

Table 6. *Cognitive Flexibility Levels of Teachers*

CIF	N	Highest-Lowest Values	$\bar{X}$	S
Alternatives	320	13-65	56,6	6,4
Control		7-35	26,4	5,9

Table 6 results can be evaluated as *relatively high* for the "Alternatives" dimension, which includes teachers' perceptions of "alternative solutions can be found in managing difficult situations" of cognitive flexibility ($\bar{X}$ Alternatives = 56,6) and *relatively high* for the "Control" sub-dimension, which includes difficult situations that can be controlled ($\bar{X}$ Control = 26,4).

The mean of teachers' attitudes towards compulsory distance education is summarized in Table 7 below.

Table 7. *Teachers' Attitudes Towards Compulsory Distance Education*

DEAS	N	Highest-Lowest Values	$\bar{X}$	S
Efficacy	320	6-30	18,1	5.0
Difficulties		4-20	13,3	2,7

Table 7 results indicate that teachers have attitudes that can be considered *neutral* in the context of "Efficacy" ($\bar{X}$ Efficacy = 18,1) and "Difficulties" ($\bar{X}$ Difficulties = 13.3) of compulsory distance education. Thus, it shows that the teachers participating in the research have attitudes that cannot be evaluated positively or negatively

regarding the "functionality of distance education" and "the use of the database system used during compulsory distance education".

The t-test results (Table 8) and ANOVA results (Table 9) are presented below.

Table 8. *T-test Results for Difference Analysis of the Sub-Dimensions of CFI and DEAS by Gender and Branch Variables*

	Sub-dimensions	Gender	N	$\bar{X}$	S	sd	t	p
CFI	Alternatives	Female	176	55,6	,51	318	-3,244	0,001*
		Male	144	57,9	,49			
	Control			25,3	,47		-2,805	0,005*
				27,2	,47			
DEAS	Efficacy			4,7	,35		3,740	0,000*
				5,3	,44			
	Difficulties			2,5	,19		-2,148	0,033*
				2,8	,23			
	Sub-dimensions	Branch	N	$\bar{X}$	S		t	p
CFI	Alternatives	Primary Teacher	87	57,4	,68	318	1,376	,171
		Branch Teacher	233	56,3	,42			
	Control			25,0	,65		-2,046	,043*
				26,6	,38			
DEAS	Efficacy			18,7	,61		1,143	,254
				17,9	,31			
	Difficulties			13,1	,27		-,724	,470
				13,3	,18			

When Table 8 is examined, both the sub-dimensions of the CFI and the DEAS according to the "gender" of the teachers participating in the research were found to be different ($t_{(318;\ Alternatives)} = -3.244$; $t_{(318;\ Control)} = -2.805$, $p<.05$), ($t_{(318;\ Efficacy)} = 3.740$; $t_{(318;\ Difficulties)} = -2,148$, $p<.05$) . Attitudes of male teachers towards sub-dimensions are *relatively more positive* than female teachers.

According to the branch independent variable, while there is no difference between the attitudes in the DEAS sub-dimensions ($t_{(318;\ Efficacy)} = 1.143$; $t_{(318;\ Difficulties)} = -,724$, $p>.05$); There is only a difference in the "Control" sub-dimension of the CFI ($t_{(318;\ Alternatives)} = 1.376$, $p>.05$; $t_{(318;\ Control)} = -2,246$, $p<.05$). The mean scores of the "Control" sub-dimension of the CFI of the branch teachers are higher than the preschool and class teachers. This finding shows that branch teachers in the research have more positive perceptions of "controllability of difficult situations" than primary teachers.

When Table 9 below is examined, no difference has been determined between the groups for the "seniority" independent variable in the CFI sub-dimensions according to the seniority and technology use independent variables. There is a difference between the groups only for the "Alternatives" sub-dimension of the CFI ($F_{(2-317Alternatives)} = 13.33$, $p<.05$). The results of the Scheffe Test, which was conducted to determine the difference between the groups, show that the attitudes of the teachers with the advanced level of technology use regarding the "Alternatives" dimension of CFI are different from teachers whose technology use levels are at basic and moderate levels. The arithmetic mean of the scores given to the items belonging to the "Alternatives" sub-dimension by the teachers with the advanced level of technology use is higher than the teachers reporting that they have a basic and moderate level of technology use ($\overline{XAdvance} = 60,0 > \overline{XModerate} = 56,1 > \overline{XBasic} = 52,7$). This result shows that teachers with advanced technology use have more positive perceptions that "alternative solutions can be found in managing difficult situations".

Table 9. *ANOVA Results of CFI and DEAS Sub-Dimensions According to the Seniority and Level of Technology Use Variables*

Seniority	Sub-dimensions	N	$\bar{X}$	S	Sd	F	p	Difference
1-5 Years		66						
6-10 Years		137						
11-15 Years		71						
16Y&above		46			3			
CFI	Alternatives				316	,956	,41	
	Control					,926	,43	None
DEAS	Efficacy					,513	,67	
	Difficulties					1,040	,38	
Level of Technology Use	Sub-dimensions	N	$\bar{X}$	S	Sd	F	p	Difference
Basic		18						
Moderate		243						
Advance		59						
CFI	Alternatives	Basic	52,7	,39	2	13,33	,00*	Basic-Advance
		Moderate	56,1	,69	317			Moderate-Advance
		Advance	60,0	2,01				
	Control					2,53	,08	
DEAS	Efficacy					2,33	,09	None
	Difficulties					1,62	,20	

When the correlation test results for the analysis of the relationship between cognitive flexibility levels and attitudes towards compulsory distance education are examined, the CFI sub-dimensions are "moderately" related. The DEAS sub-dimensions are not associated with each other. The “Alternatives” sub-dimension of the CFI has a “low” relationship with both DEAS sub-dimensions. The "Control" sub-dimension, on the other hand, has a "low" relationship with only the "Difficulties" sub-dimension (Table 10).

Table 10. *The Relationship Between CFI and DEAS Sub-dimensions*

	Sub-dimensions		Alternatives	Control	Efficacy	Difficulties
CFI	Alternatives	r	1	,450**	,150**	,111*
		p		,000	,007	,048
		N	320	320	320	320
	Control	r	,450**	1	,100	,189**
		p	,000		,075	,001
		N	320	320	320	320
DEAS	Efficacy	r	,150**	,100	1	,085
		p	,007	,075		,128
		N	320	320	320	320
	Difficulties	r	,111*	,189**	,085	1
		p	,048	,001	,128	
		N	320	320	320	320

*p<0.05 level (2-tailed); p<0.01(2-tailed)

Under this title, the effect of the "Alternatives and Control" sub-dimensions of CFI on "Efficacy and Difficulties", the DEAS sub-dimensions, were determined by regression analysis.

Table 11. *Multiple Regression Analysis Results on the Prediction of the "Efficacy" Sub-Dimension of DEAS*

Variables	B	Std. Error$_B$	ß	t	p	Zero-order r	Partial r
Constant	11,387	2,472	-	4,606	,000	-	-
Alternatives	,103	,048	,132	2,132	,034	,150	,119
Control	,034	,053	,040	,644	,520	,100	,036
R=,155; R^2=,024; $F_{(2,317)}$=3,884; p=,000							

Although the "Alternatives and Control" sub-dimensions of the CFI are associated with the "Efficacy" sub-dimension of DEAS (R = .155, R^2 = .024, p<.01), it explains only a very small part (2.4%) of the total variance of "Efficacy" (Table 11).

DEAS (Efficacy) = 11,387 + ,103 Alternatives + ,034 Control

Table 12. *Multiple Regression Analysis Results on the Prediction of the "Difficulties" Sub-Dimension of DEAS*

Variables	B	Std. Error$_B$	ß	t	p	Zero-order r	Partial r
Constant	10,491	1,291	-	8,125	,000	-	-
Alternatives	,013	,025	,032	,525	,600	,111	,029
Control	,078	,027	,174	2,821	,005	,189	,156
R=,191	R^2=,036						
$F_{(2,317)}$= 5,996	p=,000						

Although the "Alternatives and Control" sub-dimensions of the CFI are related to the "Difficulties" sub-dimension of the DEAS (R = ,191, R^2 = ,036, p<.01), the total variance of the "Difficulties" sub-dimension only explained very little of it (3.6%) (Table 12).

DEAS (Difficulties) = 10,491 + ,013 Alternatives + ,078 Control

4. Conclusion and Discussion

Mandatory remote delivery of all education-related activities during the COVID-19 global epidemic has required teachers who provide and manage services to adapt quickly to technology-supported education applications. This process, conceptualized as *compulsory distance education* within the scope of this research, as implemented in schools affiliated to the MoNE, required coping with many difficulties like the stress created by the existence of the global epidemic that threatens human life, adapting all of the education-teaching activities which are routinely applied face-to-face in the classroom to technology-supported education platforms, and face-to-face communication between administrators, teachers, students, and parents through media (Koçoğlu & Tekdal, 2020; Klapproth et al., 2020; MacIntyre, Gregersen & Mercer, 2020). McShane and Von Glinow (2016) state that attitudes are "conscious logical reasoning" (p. 67). Considering that teachers went through a complex process during the changing education practices, it was predicted that their cognitive flexibility, very effective in "adapting to unexpected situations" (Moore & Malinowski, 2009), was effective on their attitudes towards compulsory distance education. This study investigated the effect of teachers' cognitive flexibility levels on their attitudes towards compulsory distance education during the epidemic.

The research findings show that the cognitive flexibility levels measured by the Cognitive Flexibility Inventory of the teachers are high during the epidemic. Some research findings, completed with teachers working in the field, indicate that teachers' cognitive flexibility levels were high even before the epidemic (for example, Polatoğlu, 2018; Üzümcü & Müezzin, 2018). Although no other research was completed with teachers measuring their cognitive flexibility during the epidemic, some research with novice teachers in the same period shows that their cognitive flexibility levels during the epidemic were high (for example, Yazgan, 2021).

Research findings conducted in the sample of Turkey during the epidemic to determine teachers' attitudes towards distance education show that teachers working in the field have negative attitudes towards distance education (for example, Moçoşoğlu & Kaya, 2020; Yahşi & Kırkıç, 2020). According to the findings of this study, it has been determined that teachers' attitudes towards compulsory distance education are neutral. The cognitive flexibility level and attitudes towards the sub-dimensions of compulsory distance education of male teachers participating in the research are relatively high and more positive than female teachers. Some of the field studies show that gender affects cognitive flexibility and that women adapt to managing risky or challenging situations longer than men (Mather & Lighthall, 2012; Westbrook et al., 2018). While the teachers' branches do not make a difference on the DEAS sub-dimensions, in the CIF "Control" sub-dimension, it was determined that the scores of the branch teachers were higher than the scores of the group consisting of preschool and classroom teachers. This finding shows that branch teachers find the difficulties created by compulsory distance education more controllable than preschool and classroom teachers working with younger age groups. This result may be because students in younger age groups need the guidance of their teachers more in the learning process. Foti's (2020) study, in which she identified the difficulties that preschool

teachers experienced during the epidemic, indicated that teachers could find very few suitable materials that could be used in distance education developed for preschool students. Some students/families do not know how to use technologies suitable for databases used in distance education, and they do not have the tools to use these databases. Saygı (2021), with the data collected from primary school teachers, show that class teachers are negatively affected by students' absenteeism, not being able to provide adequate colleague communication and support, and technological inadequacies regarding distance education services provided during the epidemic. They indicate that they have difficulties in evaluating learning outcomes. The research findings of Yahşi and Kırkıç (2020), especially of Turkish language education teachers, Kara's (2021) research findings of art teachers, and Bingöl's (2020) research findings of physical education and sports academicians' show negative attitudes towards compulsory distance education. These findings indicate that the technologies used in compulsory distance education have created some constraints for language, art, physical education, and sports teaching.

It was determined that the teachers who stated that their technology knowledge was "advanced" showed a significant difference in the "Alternatives" sub-dimension of the CFI scores than those at a "basic and moderate" level. In other words, teachers who can use technology at an "advanced" level have seen many alternatives that can be used in compulsory distance education. Although this finding has been studied at the higher education level, it is supported by the research findings of Tabata and Johnsrud (2008). According to the relevant research findings, those with technological knowledge and experience have more positive attitudes towards distance education.

Research findings has shown that "Alternatives" sub-dimension of CFI has only a "low" relationship with both sub-dimensions of DEAS; the "Control" sub-dimension of CFI has only a "low" relationship with the "Difficulties" sub-dimension of DEAS. To put it more clearly, teachers' perceptions that "alternative solutions can be found in managing difficult situations" are related to their attitudes towards "functionality of distance education" and "usability of the database system used throughout distance education". Again, their attitudes towards "the usability of the database system used during distance education" are related to their perceptions that "difficult situations can be controlled". Nevertheless, cognitive flexibility has been found to have a very limited effect on attitudes towards compulsory distance education. This finding can be interpreted as the teachers participating in the research could use the cognitive flexibility provided by their cognitive flexibility in a limited amount during compulsory distance education. Yaşar (2019) determined that the cognitive flexibility of the parties in crisis and stressful periods and their participation in the decision processes regarding the things to be implemented are also compelling. The research findings of Karbeyaz and Kurt (2020) point out that there are some problems with the content of EBA used in schools affiliated with the MoNE during the epidemic. Although the attitudes of the participants in the related research towards the use of EBA were positive, they reported that their students were negatively affected by the fact that "EBA provides one-way communication, is not interesting, does not comply with the level of readiness and does not have the technological infrastructure required by every student".

5. Recommendations

In the light of these findings, it has been evaluated that especially in times of crisis, teachers' self-management of their students' learning processes and their own determination of the technological infrastructure they will use in teaching will have more positive effects on their attitudes towards distance education and on what is planned to be obtained from the distance education process in such periods.

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