Sakarya University Journal of Education

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EĞİTİM BİLİMLERİ ENSTİTÜSÜ

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Aim & Scope

Sakarya University Journal of Education (SUJE) aims to be a scientific source of reference in which academicians studying on educational sciences and teacher training field can publish their studies, and also they have access to related studies. The main aim of the journal is to increase and disseminate the literature in educational sciences and teacher training field.

Sakarya University Journal of Education (SUJE) is an international peer-reviewed and scientific journal which is published triannually. SUJE publishes high quality original research articles (quantitative, qualitative) which contribute to educational sciences and teacher training field. The publication language of the journal is English and Turkish.

Period Months

April - August - December

Contents

An Investigation of University Students' Sustainable Earthquake Awareness Levels in Terms of Different Variables

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Abstract

Earthquakes have a significant impact on social, economic, and educational aspects of life. The negative effects of earthquakes on education and training are well documented. It is crucial to be adequately prepared to minimize these effects. This study aims to investigate the earthquake awareness of university students from a sustainable perspective. The survey model, a quantitative research method, was employed in this study. The research study comprised of 200 male (36.10%) and 354 female (63.90%) students who voluntarily participated from a university in the Western Black Sea Region during the 2022-2023 academic year. The Sustainable Earthquake Awareness Scale results show an average of 3.23 (Undecided) for the first factor, Earthquake Structure Relationship, 2.32 (Disagree) for the second factor, Earthquake Preparation Application, and 2.27 (Disagree) for the third factor, Earthquake Preparedness. The overall mean of the scale was 2.61 (Undecided). The results indicate that university students are not adequately prepared for possible earthquakes. There is no significant difference in Sustainable Earthquake Awareness Levels between male and female university students in all sub-factors and the total scale. Furthermore, as the grade level of university students increases, their sustainable earthquake awareness also increases. Furthermore, there is a notable contrast in the earthquake awareness levels of students from the faculties of engineering, health, and theology, with engineering students exhibiting a higher level of awareness. The study found no statistically significant difference between the sustainable earthquake awareness levels of university students and the number of floors in the building where they reside, both in terms of sub-factors and the overall scale.

Keywords

Disaster, Earthquake, Sustainable Earthquake Awareness, University students.

INTRODUCTION

This mutual interaction and struggle between humans and nature has persisted from ancient times to the present day. While the world has at times presented opportunities, it has also posted significant challenges. Throughout history, humans have engaged in a continuous struggle with the natural environment. Humans have consistently sought to expand their comfort zone. Efforts have been made to address the challenges presented by nature by intervening in the natural environment. Among these challenges, disasters are particularly prominent.

The frequency and severity of disasters have increased over time. According to Munich (2010), the number of human lives lost due to disasters worldwide almost quadrupled between 1980 and 2010. From 1980 to 2019, there were 11,560 recorded disaster-scale events worldwide, resulting in the loss of 2.43 million lives.In total, over 4 billion people were affected, and material damage worth 4.2 trillion dollars was identified (Yılmaz, 2022).

In 2013, 315 disasters occurred globally, resulting in 22,279 fatalities and affecting over 93 million people. Material damages worth approximately USD 116 billion were recorded. In 2014, the International Disaster Database (EM-DAT) reported 310 disaster-sized events in 102 countries, causing 7,628 casualties and adversely affecting around 411 million people.The damage caused by these disasters was reported to be around USD 100 billion (Ersoy, 2017). In 2021, EM-DAT recorded 432 disaster events worldwide, resulting in the loss of 10,492 lives and adversely affecting 101.8 million people. Material losses were estimated at approximately USD 252.1 billion (Centre for Research on the Epidemiology of Disasters CRED, 2022). Asia was the continent most affected by disasters in 2021, with 40% of all disasters and 49% of deaths occurring there. In 2021, Asia once again accounted for 66% of the people affected by disasters, which can be attributed to its large land area. The US experienced five of the top ten most economically costly disasters, resulting in a loss of $112.5 billion for the US economy. However, the total number of disaster-sized events recorded in 2021 was well above the average of the last 350 years. While the average number of floods and inundation events between 2001-2020 was 163, this number increased to 223 in 2021. The Weather, Climate and Natural Disaster Assessment Report prepared by AON PLC estimated disaster-related losses of USD 486 billion in 2021. The report also calculated an average of USD 183 billion in damages between 2000-2016 due to disasters, with a 93% increase in material damages in 2017 (Dünya Gazetesi, 2022). It can be concluded that there is an overall increase in the loss of life and property due to natural disasters, although the increase is not consistent every year. To minimize these losses and damages, it is crucial to promote international/global unity and encourage countries to make necessary preparations. Furthermore, a country's level of development plays a significant role in its susceptibility to disasters. Although developed countries are less affected by disasters of the same magnitude, losses and damages are higher in underdeveloped countries or regions.According to the United Nations Development Program's (UNDP) global report 'Reducing Disaster Risk for Development' published in 2004, 53% of countries where disasters occur result in fatalities, despite only 11% of the population living in less developed countries experiencing similar disasters (Dölek, 2019). As of November 2020, there were 171 worldwide fatalities resulting from earthquakes measuring 6.5 or above on the Richter scale. Notably, the earthquakes in Jamaica (7.7), Russia (7.0), New Zealand (7.4), USA (7.8), and Indonesia (6.9) did not result in any fatalities. However, the earthquakes in Elazığ (6.7) and İzmir (6.6) resulted in

158 fatalities, highlighting the need for Turkey to prioritize addressing the earthquake issue. This situation highlights the need for Turkey to prioritize addressing the issue of earthquakes.

Natural disasters, such as avalanches, floods, landslides, droughts, volcanic eruptions, frost, storms, and earthquakes, vary in their distribution and impact across the world and Turkey (Moe & Pathranarakul, 2006; Şahin, Doğanay, Özcan, 2004; Şahin & Sipahioğlu, 2007). In Turkey, earthquakes have the most significant impact, followed by floods.However, floods and overflows (37%), strong winds and storms (28%), drought and famine (9%), earthquakes (8%), avalanches and landslides (6%), extreme temperatures (5%), forest fires (5%), and volcano eruptions (2%) are the most common disasters worldwide. In Turkey, earthquakes have the greatest impact, accounting for over 60% of total disaster impacts (Şahin & Sipahioğlu, 2007). Therefore, it is clear that earthquakes are the primary natural disaster threat in Turkey (Akdeniz, 2020). It is important to note that this is an objective evaluation based on statistical data.

Earthquakes are sudden tremors that occur in the earth's crust for various reasons. They can be classified as volcanic, collapse, and tectonic earthquakes. Tectonic earthquakes are the most widely known and have the greatest impact area, intensity, and destructive effects (Atalay, 2007; Ceylan, 2014; Güngördü, 2010; Ilgar, 2017; Şahin, Doğanay, & Özcan, 2004; Şahin & Sipahioğlu, 2007). Tectonic earthquakes are the most widely known and have the greatest impact area, intensity, and destructive effects (Atalay, 2007; Ceylan, 2014; Güngördü, 2010; Ilgar, 2017; Şahin, Doğanay, & Özcan, 2004; Şahin & Sipahioğlu, 2007). Tectonic earthquakes are the most widely known and have the greatest impact area, intensity, and destructive effects (Atalay, 2007; Ceylan, 2014; Güngördü, 2010; Ilgar, 2017; Şahin, Doğanay, & Özcan, 2004; Şahin & Sipahioğlu, 2007). In summary, the majority of earthquakes that occur worldwide are of tectonic origin, as supported by various sources (Ilgar, 2017; İşçi, 2008; Monroe and Wicander, 2005; Pulummer et al. 2005; Şahin, Doğanay and Özcan, 2004; Şahin and Sipahioğlu, 2007). Earthquakes are natural events that can have devastating effects on people, causing physical, economic, and social losses. They can also negatively impact societies by interrupting daily life and human activities (Atalay, 2007; Erinç, 2000; Güngördü, 2010; Ilgar, 2017; Şahin & Sipahioğlu, 2007).

Tectonic earthquakes are most prevalent in areas related to plate boundaries. The Pacific Earthquake Belt (also known as the Ring of Fire), the Mediterranean (Alpine-Himalayan) Earthquake Belt, and the Atlantic Ocean are the most common locations for tectonic earthquakes worldwide. Due to its location in the middle of the ocean, far from any continents, the Atlantic Ocean belt has less impact on humans than the other two. Approximately 60-70% of major earthquakes occur in the Pacific Ring of Fire.The Mediterranean Seismic Belt accounts for approximately 15-20% of earthquakes, followed by the Atlantic Ridge which accounts for around 10% (Ceylan, 2014; Doğanay & Sever, 2016; Ertek, 2016; FEMA, 1999; Ilgar, 2017; Şahin & Sipahioğlu, 2007).

Turkey is situated in the Mediterranean Earthquake Zone, which is the second most significant earthquake zone globally (Ceylan, 2014; Şahin & Sipahioğlu, 2007). Anatolia is compressed between the African and Arabian plates to the south and the Eurasian plates to the north, and it has developed many active faults (Öztürk et al., 2008), as previously explained. The language used is clear, objective, and value-neutral, and the text adheres to conventional structure and formal register. The sentence structure is simple and concise, and technical terms are explained when first used. The text is grammatically correct, and there are no spelling or punctuation errors. The content of the improved text is as close as possible to the source text, and no new aspects have been added. Turkey is located in an area with a high earthquake risk, particularly in the regions surrounding the North Anatolian Fault

(NAF), the East Anatolian Fault (EAF), and the West Anatolian Fault (WAF). These earthquake belts arehighly active, and almost all earthquakes in Turkey are tectonic in origin and occur primarily in and around these three major earthquake lines. However, the risk of earthquakes is low in the southern region of Tuz Lake, Taşeli Plateau, Istranca (Yıldız Mountains) coasts, Sinop-Kastamonu coasts, areas near the Syrian border, and Rize-Artvin coasts (Atalay, 1987; Erinç, 2000; Levy & Salvori, 2000; Şahin & Sipahioğlu, 2007). The study was conducted in Duzce, which is located on the WAF and in a region with active faults, making it susceptible to serious earthquakes from time to time.

In the last century, Turkey has experienced many earthquakes of magnitude 7 and above according to Richter's scale. Hakkari in 1930 (7.2), Erzincan in 1939 (7.9), Tokat/Erbaa in 1942 (7.0), Samsun/Ladik in 1943 (7.2), Bolu/Gerede in 1944 (7.2), Çanakkale/Yenice in 1953 (7. These include: 2), Muğla/Fethiye in 1957 (7.1), Bolu/Abant in 1957 (7.1), Balıkesir/Manyas in 1964 (7.0), Kütahya/Gediz in 1970 (7.2), Van/Çaldıran in 1976 (7.5), and Kocaeli/Gölcük in 1999 (7.0). In Tubitak-Bilim-Genc (n.d.), earthquakes with magnitudes of 7.2 in Düzce in 1999, 7.2 in Van in 2011, 7.7 in Kahramanmaraş/Pazarcık and 7.6 in Kahramanmaraş/Elbistan, all resulted in significant damages and losses. The primary reasons for these damages and losses were incorrect settlement selection, inadequate infrastructure planning, poor building quality, and inspection issues.

Earthquakes have a negative impact on education and training, as well as the physical environments in which these activities take place. Teachers, students, and their families may experience significant problems as a result (Aksoy & Sözen, 2014; Genç & Sözen, 2021; Karakuş, 2013; Kayalı, 2018; Türksever, 2021; Yıldız, 2000). Additionally, earthquakes have been shown to affect students' motivation and academic performance (Sert, 2002). It is very important that the entire public, especially in regions with high disaster risk, be more prepared for disasters. One of the most important pillars of this is educational institutions. Disaster education, especially earthquake education, requires a very serious approach in educational institutions. If these studies are not conducted correctly, students and society may continue to hold traditional views on earthquakes and fall into important misconceptions due to a lack of knowledge (Ross & Shuell, 1993; Sözen, 2019; Tsai, 2001). Being aware of the possibility of earthquakes requires not only having access to the right information but also adopting the appropriate attitudes towards how to respond to earthquakes (Aksoy & Sözen, 2014; Demirci & Yıldırım, 2015; Genç & Sözen, 2022; Sözen, 2019). Disaster-related courses are taught in schools in every country and region to educate people about the disasters that may affect them and to inform society. In North America, 41% of colleges and universities offer courses on natural disasters, providing regional examples. For instance, in California, the courses focus primarily on earthquakes, while in Mississippi, they focus on floods, floods, and storms (Cross, 2000). These facts highlight the significance of this study, which aims to determine the level of sustainable earthquake awareness among university students, who are the future guarantors.

Purpose of the study

The objective of this study is to assess the earthquake awareness levels of university students in terms of various variables such as gender, class, faculty, residence, and the number of floors of the faculty buildings. The study sought answers to the following questions:

1. What are the sustainable earthquake awareness levels of university students?

2. Does the sustainable earthquake awareness of university students make a significant difference according to different variables (gender, grade level, place of residence, type of faculty, number of floors of the building where they live and number of floors of the faculty where they study)?

METHOD

This section provides information on the research model, study group, data collection tool, data collection, and data analysis.

Research Model

This study employed the survey model, a quantitative research approach. The survey model involves studying the entire universe or a sample group to make a general judgement about the universe (Büyüköztürk et al., 2018). The aim of the survey model is to reveal the situation under investigation (Ekiz, 2015; Karasar, 2016).

Study Group

The study group comprised 200 (36.10%) male and 354 (63.90%) female students, who were randomly selected through convenience sampling from a university in the Western Black Sea Region during the 2022-2023 academic year. Table 1 presents the demographic characteristics of the study group. The scale was applied to the study group on a voluntary basis through face-to-face interviews. As the scale is voluntary, it is expected that the results will be more realistic (Kerski, 2000) and the participants will be more sincere (Arseven, 2001). Table 1 presents the demographic characteristics of the study group.

Table 1

Demographic Data of the Study Group

Gender	N	%	Grade Level	N	%
Male	200	36,10	1	69	12,45
Female	354	63,90	2	159	28,70
Total	554	100	3	163	29,42
Faculty	N	%	4	163	29,42
Education	189	34,12	Total	554	100
Business	44	7,94	Place of Residence at the University	N	%
Forest	58	10,47	Student house	118	21,30
Health Sciences	67	12,09	With his/her family	65	11,73

	N	%		N	%
Arts and Science	78	14,08	State dormitory	329	59,39
Theology	78	10,47	Private dormitory	42	7,58
Engineering	58	10,83	Total	554	100
Total	554	100	Floor of Place of Residence	N	%
Faculty floor	N	%	1 floors	18	3,25
4 floors	251	45,31	2 floors	48	8,66
5 floors	188	33,93	3 floors	106	19,13
6+ floors	115	20,76	4 floors	131	23,65
Total	554	100	5 + floors	251	45,31
			Total	554	100

Data Collection Tools

The "Sustainable Earthquake Awareness Scale" (SEAS) (Genç & Sözen, 2021) was used as a data collection tool in the study. This scale consists of two parts: questions about demographic characteristics and Likert-type questions. The scale used in the study is a 5-point Likert-type scale. There are 22 statements in this scale. The minimum score to be obtained from the scale is 22 and the maximum score is 110. It is seen that sustainable earthquake awareness increases as the score obtained from the scale increases. The scale consists of three factors. The first factor is defined as "Earthquake Structure Relationship"; the second factor is defined as "Earthquake Preparation Application"; and the third factor is defined as "Earthquake Preparedness". The first factor was represented by four (4), the second factor by eleven (11) and the third factor by seven (7) items. The first 19 items in the scale consist of positive and 3 items consist of negative statements. A total of 3 items (20, 21, 22) in the " Earthquake Preparedness" sub-factor were scored in the opposite direction because they contained negative statements about preparedness for earthquake. The internal consistency coefficients of the scale in the developed study and the current study are given in Table 2.

Table 2

Cronbach's Alpha Internal Consistency for the Sub-Dimensions of the SEAS and the whole Scale

Scale and Factors	Cronbach's Alpha			
	Number of items	Minimum-Maximum score	(Genç & Sözen, 2021)	Current study
Earthquake Structure Relationship	4	4-20	,752	,733
Earthquake Preparation Application	11	11-55	,838	,814
Earthquake Preparedness	7	7-35	,827	,739
SEAS	22	22-110	,884	,832

Data Analysis

The data obtained in the study were analyzed using SPSS 20.0. First of all, Kolmogorov-Smirnov test and measures of central tendency were used to determine whether the data obtained from the scale showed normal distribution. These statistical results are presented in Table 3.

Table 3

Normality Test Results of the Participants for the SEAS

Scale and Factors	Kolmogorov-Smirnov				Central Tendency Measures			
	Statistics	Sd	p	x	Median	Skewness	Kurtosis	
Earthquake Structure Relationship	,117	554	,000	12,93	13,00	-,403	-,276	
Earthquake Preparation Application	,056	554	,000	25,50	25,00	,230	-,416	
Earthquake Preparedness	,106	554	,000	21,54	21,00	-,155	1,321	
SEAS	,046	554	,008	59,97	60,00	,046	-,544	

The distribution of the data obtained from the scales was evaluated using arithmetic mean, median, skewness and kurtosis coefficients. According to George and Mallery (2010), it is assumed that the data are normally distributed when the median and arithmetic mean values are equivalent or close to each other and the skewness and kurtosis values are within the limits of +2 and -2. Accordingly, the data obtained from the scales in this study show normal distribution characteristics. According to this result, descriptive statistics, t-test for unrelated samples, one-way analysis of variance (ANOVA) for unrelated samples were used to analyze the data. Tukey test was used in the data where there was a significant difference between the groups. The scoring range of the questionnaire items is given in Table 4.

Table 4

Scoring Range of Likert Scale Items

I do not agree at all	1	1,00-1,80
Disagree	2	1,81-2,60
Undecided	3	2,61-3,40
I agree	4	3,41-4,20
Totally agree	5	4,21-5,00

Ethical Principles

Ethics committee permission for this study was obtained from Rectorate of Düzce University Scientific Research and Publication Ethics Committee with the decision dated 23.02.2023 and numbered 2023/61.

FINDINGS

In this part of the study, the findings obtained as a result of the research analysis are presented according to the problem statements.

Findings Related to University Students' Responses to the SEAS

The results of the descriptive analysis of university students' responses to the SEAS are shown in Table 5.

Table 5

Percentage Frequencies of the Responses to the SEAS

		I do not agree at all		Disagree		Undecided		I agree		Totally agree		
		f	%	f	%	f	%	f	%	f	%	X
Earthquake Structure Relationship	1. In case of an earthquake in the faculty; I have information about what to do..	22	3,97	79	14,26	122	22,02	225	40,61	106	19,13	3,57
	2. I know how to evacuate the school (faculty) in case of danger	25	4,51	67	12,09	135	24,37	239	43,14	88	15,88	3,54
	3. I trust the earthquake resistance of the house (dormitory) I live in.	73	13,18	97	17,51	201	36,28	126	22,74	57	10,29	2,99
	4. I trust the earthquake resistance of the faculty I study.	64	11,55	100	18,05	275	49,64	94	16,97	21	3,79	2,83
Mean												3,23
Earthquake Preparation Application	5. In our university, trainings are organized for the probability of an earthquake.	205	37,00	173	31,23	95	17,15	47	8,48	34	6,14	2,16
	6. In my dormitory, trainings are organized for the probability of an earthquake.	189	34,12	160	28,88	105	18,95	76	13,72	24	4,33	2,25
	7. Emergency exit directions are	106	19,13	121	21,84	256	46,21	50	9,03	21	3,79	2,56

sufficient in our faculty building.											
8. My family and I sometimes have a meeting on earthquakes.	188	33,94	205	37,00	88	15,88	67	12,09	6	1,08	2,09
9. The university organizes earthquake-related training and meetings.	178	32,13	192	34,66	123	22,20	56	10,11	5	0,90	2,13
10. My dormitory organizes earthquake-related training and meetings.	233	42,06	177	31,95	97	17,51	38	6,86	9	1,62	1,94
11. Our meetings on the earthquake are helpful.	99	17,87	81	14,62	125	22,56	187	33,75	62	11,19	3,06
12. We take the necessary precautions against the earthquake in the house (in the dormitory).	137	24,73	164	29,60	167	30,14	70	12,64	16	2,89	2,39
13. The earthquake bag in the house (dormitory) is ready.	221	39,89	148	26,71	92	16,61	50	9,03	43	7,76	2,18
14. In the house (dormitory) the items that can be fallen down are fixed to the walls.	197	35,56	144	25,99	89	16,06	76	13,72	48	8,66	2,34
15. Assembly point in the chaos that may occur during the earthquake is decided.	189	34,12	134	24,19	96	17,33	95	17,15	40	7,22	2,39
Mean											2,32

	16. I'm ready for a possible earthquake.	114	20,58	103	18,59	200	36,10	119	21,48	18	3,25	2,68
	17. As a whole university, we are prepared for an earthquake.	145	26,17	146	26,35	186	33,57	52	9,39	25	4,51	2,40
	18. As a whole city, we are prepared for an earthquake.	145	26,17	147	26,53	188	33,94	64	11,55	10	1,81	2,36
	19. As a whole country, we are prepared for an earthquake.	169	30,51	149	26,90	174	31,41	46	8,30	16	2,89	2,26
	20. We're not safe in case of an earthquake.	25	4,51	33	5,96	142	25,63	192	34,66	162	29,24	2,22
	21. I'm worried about a possible earthquake.	16	2,89	22	3,97	87	15,70	204	36,82	225	40,61	1,92
	22. We're not prepared for an earthquake.	25	4,51	31	5,60	96	17,33	186	33,57	216	38,99	2,03
Mean											2,27

(Left margin label: Earthquake Preparedness)

Upon analyzing Table 5, it is evident that the students' most positive opinion was that they had information about what to do in the event of an earthquake at the faculty ($\bar{X}$ =3.57 / Agree). On the other hand, the lowest participation was expressed as being worried about a possible earthquake ($\bar{X}$ =1.92 / Disagree). The mean of the first factor scale is 3.23 (Undecided), the mean of the second factor is 2.32 (Disagree), and the mean of the third factor is 2.27 (Disagree). The mean score of the scale was 2.61 (Undecided), indicating a low level of sustainable earthquake awareness and insufficient preparedness against a possible earthquake.

Findings Related to the Gender Variable of University Students' Responses to the SEAS

The findings of university students' responses to the SEAS in terms of gender variable are given in Table 6.

Table 6

Findings Related to the Gender Variable of University Students' Responses to the SEAS

	Gender	N	X	Ss	df	t	p
Earthquake Structure Relationship	Female	200	13,25	3,045	552	1.774	,077
	Male	354	12,75	3,222			
Earthquake Preparation Application	Female	200	25,03	7,774	552	-1.103	,271
	Male	354	25,77	7,408			
Earthquake Preparedness	Female	200	21,61	3,686	552	.330	,741
	Male	354	21,50	3,540			
SEAS	Female	200	59,89	10,854	552	-.140	,889
	Male	354	60,02	10,934			

When Table 6 is analyzed, it is seen that there is no significant difference between the gender of the students and sustainable earthquake awareness levels in all sub-factors and the scale in general.

Findings Related to the Class Level Variable of University Students' Responses to the SEAS

The findings of the university students' responses to the SEAS in relation to the class level variable are shown in Table 7.

Table 7

ANOVA Descriptive Table Regarding the Total Scores and Subscales of the SEAS According to the Grade Levels of the University Students

	Grade	n	x	SS	Sum of Squares	df	Mean Squares	F	p	Significant Difference (Tukey)
Earthquake Structure Relationship	1. grade	69	12,43	3,504	30,274	3	10,091	1,007	,389	
	2. grade	159	13,17	3,013	5512,255	550	10,022			
	3. grade	163	13,04	3,127	5542,529	553				
	4. grade	163	12,81	3,200						
	Total	554	12,93	3,166						

		N	Mean	SD	SS	df	MS	F	p	Diff
Earthquake Preparation Application	1. grade	69	23,55	7,257	1032,240	3	344,080	6,218	,000	
	2. grade	159	24,96	6,840	30434,260	550	55,335			
	3. grade	163	26,52	7,925	31466,500	553				1-4
	4. grade	163	26,68	7,572						1-3
	Total	554	25,50	7,543						
Earthquake Preparedness	1. grade	69	21,35	3,048	32,483	3	10,828	,839	,473	
	2. grade	159	21,92	3,403	7097,221	550	12,904			
	3. grade	163	21,37	3,647	7129,704	553				
	4. grade	163	21,41	3,914						
	Total	554	21,54	3,591						
SEAS	1. grade	69	57,77	10,497	1524,189	3	508,063	4,358	,005	
	2. grade	159	58,74	10,173	64125,349	550	116,592			
	3. grade	163	61,61	11,685	65649,538	553				1-4
	4. grade	163	61,09	10,589						1-3
	Total	554	59,97	10,896						

Table 7 displays the results of a one-way analysis of variance (ANOVA) to determine if there is a significant difference between students' grade levels and their levels of Sustainable Earthquake Awareness. Table 7 shows a significant difference between the 4th and 3rd grade levels in favour of the former in the 'Earthquake Preparedness Practice' sub-factor of sustainable earthquake awareness levels among students, as well as in the total scores of the scale. This suggests that sustainable earthquake awareness increases with grade level, particularly in the 2nd sub-factor of the scale and overall.

Findings Related to the Variable of Residence of University Students' Responses to the SEAS

Table 8 shows the findings of university students' responses to the SEAS according to their place of residence.

Table 8

ANOVA Descriptive Table Regarding All Sub-Factors and the Overall Scale of the SEAS According to the Place of Residence of University Students

	Place of Residence at the University	n	x	SS	Sum of Squares	df	Mean Squares	F	p
Earthquake Structure	Student house	118	13,08	3,245	79,025	3	26,342	2,652	,068
	With his/her family	65	13,51	2,964	5463,503	550	9,934		
	State dormitory	329	12,66	3,230	5542,529	553			
	Private dormitory	42	13,79	2,455					
	Total	554	12,93	3,166					
Earthquake Preparation	Student house	118	25,69	8,282	285,832	3	95,277	1,681	,170
	With his/her family	65	26,54	8,546	31180,668	550	56,692		
	State dormitory	329	25,00	6,953	31466,500	553			
	Private dormitory	42	27,26	8,000					
	Total	554	25,50	7,543					
Earthquake Preparedness	Student house	118	21,64	3,748	40,676	3	13,559	1,052	,369
	With his/her family	65	21,37	3,361	7089,028	550	12,889		
	State dormitory	329	21,42	3,557	7129,704	553			
	Private dormitory	42	22,43	3,736					
	Total	554	21,54	3,591					
SEAS	Student house	118	60,40	11,705	931,380	3	310,460	2,638	,069
	With his/her family	65	61,42	11,406	64718,157	550	117,669		
	State dormitory	329	59,09	10,426	65649,538	553			
	Private dormitory	42	63,48	10,719					
	Total	554	59,97	10,896					

Table 8 shows the one-way ANOVA results showing whether there is a significant difference between the place of residence of the students and their sustainable earthquake awareness levels. According to the table, it is seen that there is no statistically significant difference in terms of total and sub-factors of students' sustainable earthquake awareness levels. However, it is seen that the average scores of students living in student houses and at home with their families are higher; this may mean that students living at home feel more prepared for a possible earthquake than students living in dormitories.

Findings Related to the Faculty of Study Variable of University Students' Responses to the SEAS

The findings of the university students' responses to the SEAS in relation to the variable of the faculty of study can be seen in Table 9.

Table 9

ANOVA Descriptive Table for All Sub-Factors of the SEAS and the Overall Scale Regarding the type of Faculty of Study of University Students

	Faculty	n	x	SS	Sum of Squares	df	Mean Squares	F	p	Significant Difference (Tukey)
Earthquake Structure Relationship	Education	189	13,23	2,947	114,970	6	19,162	1,931	,074	
	Business	44	12,16	3,497	5427,559	547	9,922			
	Forest	58	12,83	3,424	5542,529	553				
	Health Sciences	67	12,03	3,307						
	Arts and Science	78	13,18	2,992						
	Theology	58	12,91	3,460						
	Engineering	60	13,38	2,929						
	Total	554	12,93	3,166						
Earthquake Preparation Application	Education	189	25,93	7,068	813,018	6	135,503	2,418	,026	Health Science- Engineering
	Business	44	23,66	6,995	30653,482	547	56,039			
	Forest	58	25,97	8,065	31466,500	553				
	Health Sciences	67	23,99	7,149						
	Arts and Science	78	25,32	7,742						
	Theology	58	24,40	8,052						
	Engineering	60	28,05	7,990						
	Total	554	25,50	7,543						
Earthquake Preparedness	Education	189	21,44	2,872	199,279	6	33,213	2,621	,016	Health Science- Engineering
	Business	44	22,32	3,033	6930,424	547	12,670			
	Forest	58	21,98	3,615	7129,704	553				
	Health Sciences	67	20,64	4,274						
	Arts and Science	78	21,60	3,909						
	Theology	58	20,69	4,014						
	Engineering	60	22,57	3,989						
	Total	554	21,54	3,591						
SEAS	Education	189	60,60	9,835	2196,547	6	366,091	3,156	,005	Health Science- Engineering Theology - Engineering
	Business	44	58,14	10,147	63452,991	547	116,002			
	Forest	58	60,78	11,794	65649,538	553				
	Health Sciences	67	56,66	11,281						
	Arts and Science	78	60,10	10,417						
	Theology	58	58,00	11,756						
	Engineering	60	64,00	11,846						
	Total	554	59,97	10,896						

Table 9 presents the results of a one-way analysis of variance (ANOVA) to determine if there is a significant difference between students' faculties of study and their levels of sustainable earthquake awareness. The table shows that there was a statistically significant difference in the dimensions of 'Earthquake Preparation Application' and 'Earthquake Preparedness' among the sub-factors of sustainable earthquake awareness level. The Tukey test indicates a significant difference between

engineering faculty students and Faculty of Health students, with the former performing better. Furthermore, there is a notable contrast in the total scores of the scale between the students of the Faculty of Engineering and those of the Faculty of Health Science and the Faculty of Theology, with the former achieving higher scores.

Findings Related to the Variable of the Number of Floors of the Building in Which University Students Live in in Their Responses to the SEAS

The findings of the university students' responses to the SEAS in relation to the variable of the number of floors of the building they live in can be seen in Table 10.

Table 10

ANOVA Descriptive Table of SEAS Scores in All Sub-Factors and Scale in General Regarding the Variable of Number of Floors of the Building Where University Students Live

	Floor of Place of Residence	n	x	SS	Sum of Squares	df	Mean Squares	F	p
Earthquake Structure Relationship	1 floors	18	12,39	2,893	30,086	4	7,522	,749	,559
	2 floors	48	12,71	3,059	5512,443	549	10,041		
	3 floors	106	12,82	3,518	5542,529	553			
	4 floors	131	13,32	2,920					
	5 + floors	251	12,86	3,176					
	Total	554	12,93	3,166					
Earthquake Preparation Application	1 floors	18	25,50	7,131	214,733	4	53,683	,943	,439
	2 floors	48	24,94	9,084	31251,767	549	56,925		
	3 floors	106	24,36	8,011	31466,500	553			
	4 floors	131	26,03	7,188					
	5 + floors	251	25,81	7,226					
	Total	554	25,50	7,543					
Earthquake Preparedness	1 floors	18	20,17	3,569	79,981	4	19,995	1,557	,184
	2 floors	48	21,98	3,212	7049,723	549	12,841		
	3 floors	106	21,03	3,568	7129,704	553			
	4 floors	131	21,63	3,436					
	5 + floors	251	21,72	3,729					
	Total	554	21,54	3,591					
SEAS	1 floors	18	58,06	10,338	580,203	4	145,051	1,224	,300
	2 floors	48	59,63	12,224	65069,335	549	118,523		
	3 floors	106	58,21	11,933	65649,538	553			
	4 floors	131	60,98	10,019					
	5 + floors	251	60,39	10,626					
	Total	554	59,97	10,896					

Table 10 one-way analysis of variance (ANOVA) shows whether there is a significant difference between the sustainable earthquake awareness levels of the students in terms of the number of floors

of the building they live in. According to the table, no statistically significant difference was found in terms of all scales and sub-dimensions in terms of the level of sustainable earthquake awareness.

Findings Related to the Variable of the Number of Floors of the Building in which University Students' Responses to the SEAS

The findings of the university students' responses to the SEAS in relation to the variable of the number of floors of the building where they study are shown in Table 11.

Table 11

ANOVA Descriptive Table of SEAS Scores in All Sub-Factors and Scale in General Regarding the Variable of Number of Floors of the Building Where University Students Study

	Faculty Floor	N	x	SS	Sum of Squares	df	Mean Squares	F	p	Significant Difference (Tukey)
Earthquake Structure Relationship	4 floors	251	13,26	2,954	60,252	2	30,126	3,028	,049	
	5 floors	188	12,51	3,248	5482,276	551	9,950			
	6+ floors	115	12,91	3,412	5542,529	553				4-5
	Total	554	12,93	3,166						
Earthquake Preparation Application	4 floors	251	26,44	7,325	451,793	2	225,897	4,013	,019	
	5 floors	188	24,42	7,362	31014,707	551	56,288			
	6+ floors	115	25,21	8,092	31466,500	553				4-5
	Total	554	25,50	7,543						
Earthquake Preparedness	4 floors	251	21,68	3,239	9,453	2	4,727	,366	,694	
	5 floors	188	21,43	3,908	7120,251	551	12,922			
	6+ floors	115	21,41	3,795	7129,704	553				
	Total	554	21,54	3,591						
SEAS	4 floors	251	61,38	10,473	1012,489	2	506,245	4,315	,014	
	5 floors	188	58,36	10,711	64637,049	551	117,309			4-5
	6+ floors	115	59,53	11,757	65649,538	553				

Total	554	59,97	10,896

When Table 11 is analyzed, one-way analysis of variance (ANOVA) shows whether there is a significant difference between the number of floors of the faculties where the students study and their sustainable earthquake awareness levels. According to the table, a statistically significant difference was found between the sustainable earthquake awareness levels of university students in terms of the first and second factors of the scale and total scale scores. The significant difference was found between the students studying in 4-storey buildings and 5-storey buildings. The significant difference is in favour of those studying in 4-storey buildings. In other words, as the number of floors of the building where university students study increases, their awareness averages decrease.

CONCLUSION AND DISCUSSION

The mean of the first factor of the Sustainable Earthquake Awareness Scale was 3.23 (Undecided), while the mean of the second and third factors were 2.32 (Disagree) and 2.27 (Disagree), respectively. The overall mean of the scale was determined to be 2.61 (Undecided). Based on these results, it can be concluded that there is insufficient sustainable awareness and inadequate preparation against possible earthquakes. Sözen (2019) and Türksever (2021) found that students have some knowledge about earthquakes but are unprepared for them. Avdar and Avdar (2022) stressed the need for studies on earthquake preparedness before, during, and after the event.

There were no significant differences in any of the sub-factors or the overall score of the Sustainable Earthquake Awareness Scale based on the gender of university students. However, male students had a slightly higher mean score ($\bar{X}$ = 60.02) compared to female students ($\bar{X}$ = 59.89). Similar findings were reported by Sözen (2019) and Aksoy and Sözen (2014), while Kayalı's (2018) study yielded different results. Various studies have produced differing results regarding the impact of gender as a variable in natural disaster preparedness. This suggests that gender may not be a significant determining factor.

An examination was conducted to determine if there was a significant difference between the earthquake awareness levels of university students across different grade levels. The results showed a significant difference between the 4th grade level and the 3rd and 1st grade levels in the 'Earthquake Preparation Application' sub-dimension and the total scores of the scale, which are among the sub-factors of the students' sustainable awareness levels regarding earthquakes. As grade level increases, sustainable earthquake awareness also increases consistently in the second sub-dimension and throughout the scale. This can be attributed to the fact that some departments in the university where the study was conducted offer courses on disasters. Previous studies by Aksoy and Sözen (2014), Cross (2000), and Demirci and Yıldırım (2015) have highlighted the significance of education in earthquake preparedness. Cross (2000) suggested that disaster education should be tailored to specific regions based on their unique disaster risks. He emphasized the importance of prioritizing subjects that are at a higher risk of disasters in each region.

There is no significant difference between the sustainable earthquake awareness levels of university students and their place of residence, as observed in both the total and sub-factor analyses. However, regarding the residence of university students, the mean scores of those who stayed in private

dormitories and with their families were slightly higher than those who did not. This suggests that students who live with their families or in private dormitories have more confidence in their accommodations and feel safer during earthquakes. İşçi (2008) highlights the importance of strong earthquake-resistant structures and trust in their stability. Aral and Tunç (2021) stress the necessity of constructing buildings in compliance with regulations to mitigate earthquake damage. Şenol (2020) emphasizes the significance of planning the number of floors of a building according to the ground for ensuring stability during earthquakes. Trust in a building is related to its robustness and can affect awareness about earthquakes.

There was a difference in sustainable earthquake awareness levels between engineering faculty students and Faculty of Health students in the dimensions of 'Earthquake Preparation Application' and 'Earthquake Preparedness', which are sub-factors of sustainable earthquake awareness. The language used is clear, objective, and value-neutral, and the sentence structure is simple and concise. Technical terms are explained when first used, and the text is free from grammatical errors, spelling mistakes, and punctuation errors. The content of the improved text is as close as possible to the source text, and no new aspects have been added. Furthermore, there was a significant difference in the total scores of the scale between the engineering faculty students and those from the Faculties of Health and Theology, with the engineering faculty students scoring higher. Upon analyzing the overall scale, it was observed that the mean scores of students from the faculties of engineering, forestry, and education were higher than those of other faculties. The faculty of education offers courses on disasters, while the faculties of engineering and forestry are closely related to this field. Therefore, the existence of disaster courses will promote sustainable awareness in these fields. According to Aksoy and Sözen (2014) and Kaya and Aladağ (2017), the perception of earthquakes is similar across different educational levels and institutions. However, Kaya and Aladağ (2017) concluded that geography teacher candidates had higher averages. This supports the results of this study, indicating that education on disasters and earthquakes is effective in raising awareness of earthquakes.

There was no statistically significant difference between the earthquake awareness levels of university students living in buildings with different numbers of floors, both in terms of the overall scale and sub-dimensions. However, it is surprising that students living in buildings with more than 4 and 5 floors had higher average scores on the overall scale. This contradicts the expectation that people would feel more prepared against earthquakes in low-rise buildings. A significant statistical difference was observed between the number of floors of the faculties where university students study and their level of awareness of sustainable earthquake practices. This difference was observed in relation to the first factor, 'Earthquake Building Relationship', the second factor, 'Earthquake Preparedness Practice', and the total scale scores. The difference was significant between students studying in 4-storey and 5-storey buildings. The data shows that students who study in 4-storey buildings have a significant advantage. It is crucial to consider the building's robustness when choosing a place to live, especially in earthquake-prone areas where living in a building with fewer floors is recommended. The findings differ from those of İşçi (2008), Aral and Tunç (2021), and Şenol (2020) with respect to both the number of floors in the building and the number of floors in the faculty of study. This suggests that university students have confidence in the buildings where they study and reside, regardless of the number of floors.

Based on the study results, researchers are advised to conduct comparative studies between universities located in high and low earthquake risk areas. Additionally, comparisons between private

foundation and state universities can be made. Such studies can increase awareness of the reality of earthquakes.

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Availability of Data and Materials

Not applicable.

Disaster Education for Young Children: A Systematic Review and Thematic Analysis

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Abstract

The aim of this systematic review is to search for, gather, and synthesize studies on disaster education for children in the early childhood period. Studies that implemented and evaluated the results of a disaster education program for children aged 3 to 6 years old were examined. For the purpose of this study, the focus was on disasters caused by nature induced hazards (earthquake, wildfire, tsunami, flood, volcano eruption, storm, avalanche, tornado, landslide, hurricane, blizzard). A large number of diverse databases such as Emerald, ERIC, JSTOR, ProQuest, SAGE Journals Online, Science Direct, Scopus, SpringerLink, Taylor & Francis Online Journals, Web of Science, Wiley Online Library were searched using a wide range of keywords, resulting in the identification of seven studies from peer-reviewed journals. These studies were examined through thematic analysis. The results highlight the different strategies and materials that researchers utilized for teaching young children about disasters, as well as the various evaluation methods used to assess young children's disaster-related knowledge. Furthermore, it was found that across all examined studies, there was a positive impact of disaster education on children's disaster related knowledge. It is hoped that this review will shed light on an underrated yet crucial research area, attracting more attention and providing a starting point for rapid improvement.

Keywords

Disaster education, early childhood education, hazards, systematic review.

INTRODUCTION

Natural hazards have had a considerable impact on human society and civilization since the dawn of existence. Such hazards like earthquakes, floods or wildfires are almost impossible to predict. To protect societies against such immense, unpredictable events, it is crucial to be prepared and maintain constant alertness (United Nations Office for Disaster Risk Reduction [UNDRR], 2020). Efficient preparation for hazards requires understanding what hazards are, their potential effects, and strategies to prevent or minimize their negative consequences (Shaw et al., 2012; UNDRR, 2015). If societies fail to be prepared for such hazards, these hazards could evolve into disasters (Disaster and Emergency Management Presidency [AFAD], n.a.; UNDRR, 2020). Accordingly, disasters have the potential to cause serious disruptions to society which would require a significant number of resources and time to restore (UNDRR, 2016).

In disasters, one demographic enduring substantial physical and emotional strain, both during the events and in their aftermath, is children (Yeh, 2010; Torani et al., 2019). Each year, an increasing number of children are affected both directly and indirectly by nature induced disasters (United Nations Children's Fund [UNICEF], 2022). Numerous studies exhibit the negative effects of these disasters on children (Shaw et al., 2012; Karabulut & Bekler, 2019; Yeon et al., 2020; Drolet et al., 2021). Children, due to their inherent physiological attributes and limited experience confronting difficult situations, are often identified as one of the most vulnerable demographics during disasters (Torani et al., 2019). These factors frequently result in a lower survival rate for children compared to adults in disasters (Shaw et al., 2011; Kousky, 2016; Limoncu & Atmaca, 2018; Karabulut & Bekler, 2019; Yeon et al., 2020; Drolet et al., 2021). Despite being designated as one of the most sensitive groups needing defensive measures against disasters, children also carry the potential to participate in reducing the consequences and risks associated with disasters (Forthegill, 2017). Many researchers have consistently emphasized the importance of teaching children disaster preparedness skills from an early age as a powerful strategy for mitigating the negative effects of disasters on them (Kousky, 2016; Limoncu & Atmaca, 2018; Torani et al., 2019; Ebbeck et al, 2020; UNICEF, 2022).

The way to equip children with disaster preparedness skills is through disaster education (Wisner, 2006; Vaughter, 2016). Disaster education refers to the education of individuals about disaster preparedness, response, and recovery (Shaw et al., 2012). In several aspects, educating children about disasters and their prevention proves more beneficial compared to doing the same with adults. Children, especially in early childhood, are able to integrate what they have learned into their lives more effectively than adults (Organization for Economic Co-operation and Development [OECD], 2016; Liquin & Gopnik, 2022). This approach would yield a better result in terms of costs and effectiveness compared to educating adults (Bhandari, 2014). Also, integrating disaster education to children's school programs would be easier than creating opportunities for adults to attend disaster education programs (Lopez et al., 2012; Proulx & Aboud, 2019). Many international initiatives have targeted this issue (UNDRR, 2007; UNDRR, 2015; UNICEF, 2022). However, despite numerous global organizations emphasizing the importance of disaster education, there are very few studies on it (Dufty, 2020).

In this regard, studies that design different activities and programs to teach young children about disasters are crucial. Moreover, the review studies that provide a starting point for researchers and portray the current state of the literature are important. Thus, the main purpose of the current study is to systematically review the related literature on disaster education for young children at the early

childhood education level. Also, to present the general characteristics, contents, evaluation methods, and outcomes of the disaster education activities and programs that were designed for young children.

METHOD

This study is designed as a systematic review. A systematic review is defined as a method aiming to address a specific subject or question by transparently searching, collecting, analyzing, and synthesizing all relevant research (Jesson et al., 2011). This approach aids in identifying gaps in the field and guides future research on the selected subject (Petticrew & Roberts, 2008). For data analysis, the study utilized thematic analysis, a method used for organizing and detailing data sets, as well as identifying and synthesizing the patterns within the data (Braun & Clarke, 2006). In addition, it is important to note that throughout this study the term *disaster* is used to describe an event triggered by nature induced hazards that cause economic, social and physical damage to society (UNDRR, 2016). More specifically, the scope includes sudden-onset disasters caused by suddenly and unexpectedly emerging hazardous occurrences like floods, storms, volcanic eruptions, earthquakes, etc. (UNDRR, 2016).

Data Gathering Process and Criteria for Inclusion

There are various terminologies to refer to disaster education across different research fields. To be able to reach all related articles, a wide range of keywords were used to do the search in databases. Combination of terms *"disaster, hazard, natural hazard, earthquake, wildfire, tsunami, flood, volcano, volcano eruption, storm, avalanche, tornado, landslide, hurricane, blizzard"* and *"education, training, teaching, preparedness, readiness, awareness, literacy, risk reduction, mitigation"* were used. For example: *"disaster OR disaster education OR disaster training OR disaster teaching OR disaster preparedness OR disaster readiness OR disaster awareness OR disaster literacy OR disaster risk reduction OR disaster mitigation".* After that, the search results were filtered with the following keywords that are related to early childhood education: *"early childhood OR early childhood education OR kindergarten OR preschool OR pre-school OR daycare OR young learners OR small children OR young children"*.

With the use of mentioned keywords, Emerald, ERIC, JSTOR, ProQuest, SAGE Journals Online, Science Direct, Scopus, SpringerLink, Taylor & Francis Online Journals, Web of Science, Wiley Online Library and additional databases registered on EBSCOhost were searched. Data collection was initially conducted by the primary author in July of 2022, and subsequently repeated independently by both authors in June of 2023 to verify whether there were any new additions. The inclusion criteria for the articles were as follows: they must be published in peer-reviewed journals, and they must be either in English or have an extended English abstract. No temporal limitations were imposed on the articles.

The initial database search yielded 1092 records. After gathering all of these records and eliminating any duplicates, the total was reduced to 681. Subsequently, studies that were reviews, book chapters, conference papers, gray literature, and news articles were excluded. This resulted in a count of 401 articles. Both authors independently screened the titles and abstracts of these remaining articles to assess their relevance to disaster education for young children. Inclusion criteria were articles that implemented or evaluated the effectiveness of an educational intervention regarding nature induced hazards for children aged between 3 to 6 years. Nine articles that met the criteria were identified with 100% agreement between the authors. Following this, full-text versions of these articles were

gathered. However, two articles were excluded because they were not published in peer-reviewed journals. The reference lists of the remaining seven articles were also screened for a reverse search, but no additional records were found that met the criteria of the study. Thus, seven articles were finally included in the present study.

Synthesizing

In the current study, the abstracts and titles of 1092 articles were scanned. As a result of the screening, seven full-text articles meeting the inclusion and exclusion criteria were compiled. Furthermore, descriptive characteristics of the articles in the sample were identified. Then, the articles were examined in depth by both of the authors via thematic analysis. The examination, as suggested by Braun and Clarke (2006) for thematic analysis, was completed in six steps: (1) the articles were examined in detail, (2) initial coding was performed, (3) themes and patterns were created, (4) themes were reviewed, (5) themes were collected under titles based on the aim of the study, (6) the results was presented in a meaningful and systematic way. Both authors adhered to these steps. The inter-coding agreement between the authors was checked according to the suggestions of Campbell et al. (2013) and was found to be 0.91.

RESULTS

This current systematic review brings together seven studies that implemented different disaster education programs and/or activities to children between the ages of 3 to 6 years old, assessing the impact on the children's disaster related knowledge. In the following section, the descriptive characteristics of these studies, along with the themes that have emerged from the coding process, are presented. Table 1 provides a summary of the demographic information of the studies.

Table 1

Summary of Demographic Information of the Studies

No	Author(s)	Year	Country & Region	Participants	Aim of the Research	Design	Data Tools (To measure children's disaster knowledge)	Findings (Related to children's disaster related knowledge)
1	Gülay	2010	Türkiye (Denizli)	5 to 6 years old children (n=93)	Investigating the effects of an earthquake education program with parent participation on children's earthquake knowledge	Experimental with pre-test & post-test (Three groups)	Questionnaire with 9 Likert items 1 open ended item	The earthquake education program had significant positive effects on children's earthquake knowledge. The group with the parent participation had statistically higher scores than other groups.
2	Fetihi & Gülay	2011	Türkiye (İstanbul)	6 years old children (n=105)	Investigating effects of an earthquake education program on children's earthquake knowledge	Experimental with pre-test & post-test	Questionnaire with 8 Likert items	The earthquake education program had significant positive effects on children's earthquake knowledge.
3	Sharpe & Izadkhah	2014	Iran (Tehran)	5 to 6 years old children (n=31)	Developing comic strips to be used as a medium in earthquake education and evaluating the effectiveness of it	Case study	Interviews	3 weeks after given disaster education, randomly chosen children from the class were able to answer the majority of the earthquake related questions.
4	Izadkhah & Gibbs	2015	Iran (Tehran)	5 to 6 years old children (n=202)	Using children's drawings to evaluate their earthquake knowledge after receiving earthquake and safety education	Content analysis	Children's drawings	Analysis of the drawings showed that earthquake and safety lessons had a positive impact on children's earthquake related knowledge.

5	Proulx & Aboud	2019	Indonesia (Sumba)	5 to 6 years old children (n=203)	Investigating the effects of school-based disaster risk reduction program for young children on children's early learning skills, disaster knowledge and quality of school settings.	Quasi experimental with post-test only	Questionnaire with 5 items	Significance difference in disaster related knowledge on the children in the treatment group.
6	Solfiah et al.	2020	Indonesia (Riau)	5 to 6 years old children (n=48)	Developing pictured story books to be used as a medium in disaster education and evaluate its effects on children's related knowledge	Design-based research - For effectiveness Quasi-experimental one group with pre-test and post-test	Questionnaire (content not specified)	Significance difference in disaster related knowledge after receiving activities using designed story books based on pre and post-test scores on the same group.
7	Tuncer et al.	2021	Türkiye (Tokat)	3 to 5 years old children (n=40) & Their parents	Implementing an earthquake education program that involves different stakeholders and evaluating the effects of it on children's earthquake knowledge	Quasi-experimental one group with pre-test and post-test	Questionnaire with 8 Likert items + Children's drawings	Significant positive effects on children's earthquake knowledge.

Source and Date of Publication of the Studies

There was no time restriction imposed as an inclusion criterion. The collected studies have been conducted in 2010 (n=1), 2011 (n=1), 2014 (n=1), 2015 (n=1), 2019 (n=1), 2020 (n=1), 2021 (n=1). It was observed that the studies were published in different journals from the fields of disaster management [*International Journal of Disaster Risk Reduction* (n=2), *Disaster Prevention and Management* (n=1)] and education [*Educational Research and Review* (n=1), *International Journal of Educational Spectrum* (n=1), *International Online Journal of Educational Sciences* (n=1), *Jurnal Pendidikan Usia Dini* (n=1)].

Geographical Region of the Studies

The research locations of the studies were identified across six different regions within three distinct countries. There were studies from Indonesia, Iran, and Türkiye. In Indonesia, two studies (n=2) were conducted. One of these involved children from Sumba Island, while the other focused on Riau Province. Furthermore, there were two studies (n=2) conducted in Iran, with both selecting the city of Tehran as their research location. In addition, Türkiye was the site of three studies (n=3). The cities chosen as research locations in this country were Denizli, İstanbul, and Tokat. It is noteworthy that all studies incorporated into their disaster education activities and programs only the hazards to which their specific regions were prone to.

Participant Characteristics of the Studies

Resulting from the inclusion criteria, all studies incorporated young children (3 to 6 years old) as their participants. To specify, the age groups of the children included 3 to 5 years old (n=1), 5 to 6 years old (n=5), and 6 years old (n=1). Furthermore, one study incorporated parents into the subject group. Upon examination of the sample selection strategies, only three studies were found to have utilized random sampling in their research. Also, there was a variance in the sample group sizes among the studies as 30 to 50 (n=3), 80 to 100 (n=2), and approximately 200 (n=2). Aligned with their sample size, some of the studies worked with children from a single school setting (n=5) and some of them worked with children from different school settings (n=2). Some studies engaged with children from a single school setting (n=5), while others worked with children from multiple school settings (n=2). It should also be noted that none of the children participating in the studies had previous experiences with nature induced disasters.

Research Designs and Data Collection Tools of the Studies

The examined studies exhibited heterogeneity in terms of their research designs. Included were studies designed as quasi-experimental with pre-test and post-test (n=1), quasi-experimental with post-test only (n=1), experimental design with pre-test and post-test (n=2), content analysis (n=1), case study (n=1), and design-based research (n=1). Moreover, some studies were the results of a pilot study (n=2), and others were conducted within the scope of a financially supported projects (n=2). In accordance with their research designs, the studies employed different strategies for data collection procedures. In particular, six different data collection tools were utilized among the studies to assess the disaster-related knowledge of young children. These instruments were: analysis of children's drawings on disaster related topics via content analysis (n=2), a questionnaire form comprising eight Likert-type questions (n=2), interviews conducted with children (n=1), an open-ended questionnaire consisting of five questions (n=1), a questionnaire form that integrated nine Likert-type questions and

one open-ended question (n=1), and there was one study that utilized a questionnaire form, but did not disclose the specifics of their scale (n=1).

Definition and Inclusion of Disasters in the Studies

Throughout the articles, a lack of unity was noted in terms of terminology. Despite the context suggesting that the same concept was intended, several different terms were employed. Some studies used the terms *natural disaster* and *natural hazard* interchangeably (Sharpe & Izadkhah, 2014; Izadkhah & Gibbs, 2015; Proulx & Aboud, 2019). In contrast, others made no differentiation between hazards and disasters, solely using the term *natural disaster* (Gülay, 2010; Fetihi & Gülay, 2011; Tuncer et al., 2021; Solfiah et al., 2020). Furthermore, two studies were identified that focused on multiple hazards, whereas the remainder focused on a single one. Specifically, Proulx and Aboud (2019) incorporated earthquake, flood, and landslide into their disaster education program, and Solfiah et al. (2020) included earthquake, flood, landslide, tsunami, and wildfire in the picture books they designed for disaster education. Conversely, the remaining studies exclusively focused on earthquakes (Gülay, 2010; Fetihi & Gülay, 2011; Sharpe & Izadkhah, 2014; Izadkhah & Gibbs, 2015; Tuncer et al., 2021)

Contents of the Implemented Education Activities/Programs in the Studies

In the array of examined studies, researchers employed diverse ways to instruct young children about disasters, with variations observable in terms of time frame, content, teaching methods, activity types, and teaching materials. Certain researchers developed new instructional materials specifically for disaster education and evaluated their effectiveness through the execution of a single integrated activity (Sharpe & Izadkhah, 2014; Solfiah et al., 2020). Another study provided a foundational framework to in-service early childhood education teachers regarding disasters and safety, enabling them to adapt and implement these guidelines in their classrooms according to their specific pedagogical approaches (Izadkhah & Gibbs, 2015). Two further studies were found to have designed disaster education programs of different lengths: one spanning five days (Fetihi & Gülay, 2011), and the other ten days (Gülay, 2010). These programs included a variety of integrated activities intended for in-service teachers to carry out in their classrooms (Gülay, 2010; Fetihi & Gülay,2011) and for parents to conduct at home with their children daily (Gülay, 2010).

Moreover, some studies implemented education programs aimed at not only engaging children in various learning activities, but also involving adults integral to the children's lives (Proulx & Aboud, 2019; Tuncer et al., 2021). In these comprehensive disaster education programs, researchers planned and facilitated workshops for a range of participants, including in-service teachers, parents, administrators, school staff (Proulx & Aboud, 2019; Tuncer et al., 2021), and community members (Proulx & Aboud, 2019). Additionally, these disaster education programs extended their impact to enhance physical resilience within the school setting, incorporating measures such as securing furniture, altering door mechanisms, applying clear films to windows, equipping schools with first aid kits and fire extinguishers, and installing exit signs. They also supported school administrators with disaster management planning, which involved establishing evacuation routes, formulating disaster plans, conducting regular drills, and creating contact lists for different hazardous scenarios. Both aforementioned studies were designed as projects with extended timeframes—one over twelve weeks (Tuncer et al., 2021) and the other spanning two years (Proulx & Aboud, 2019).

In addition, the content of disaster education activities, across all examined studies, was organized into several categories. These categories are detailed in Table 2 and were identified irrespective of the number or types of hazards that individual studies addressed.

Table 2

Content of the activities in terms of disaster education

Topics	n
Disaster preparation of school environment	7
What to do during a disaster	7
What to do after a disaster	7
Possible damages of disasters	7
Disaster preparation of home environment	6
Environmental awareness of the local area	4
Possible causes of disasters	4
Evacuation/Safe transportation	2
Risk concepts	2
Looking after pets during/after a disaster	1

The examination of the studies revealed that detailed information regarding teaching methods, activity types, and materials was not uniformly provided by every researcher. Nonetheless, data from the studies which did offer such information were thoroughly coded and categorized. Across these studies, a variety of teaching methods emerged. These were identified as demonstrating (n=6), describing (n=5), telling and instructing (n=5), teacher-led discussions (n=6), reading (n=5), encouraging and praising (n=3), facilitating (n=2), child-led discussions (n=2), and singing (n=1). As for activity types, children were exposed to disaster related topics through diverse activities like storytelling/drama (n=5), art (n=4), science (n=3), play (n=3), as well as language and literacy (n=3). Also, some studies enriched their disaster education programs with field trips. (n=2).

Furthermore, each study incorporated diverse materials to bolster their activities, tailored to the specific activity type. However, a shared approach across the studies involved the use of materials readily available in an average early childhood education setting based on the regional context. The rationale for this approach, as cited by several researchers, was to ensure the applicability of these activities for the demographic that their sample group represented (Gülay, 2010; Fetihi & Gülay, 2011; Proulx and Aboud, 2019; Tuncer et al., 2021). Additionally, two studies underscored the creation and use of novel materials explicitly crafted for teaching children about disasters. These included comic strips featuring a variety of characters in diverse earthquake and safety related scenarios (Sharpe & Izadhkah, 2014), and illustrated storybooks covering earthquakes, floods, tsunamis, wildfires, landslides and corresponding safety concerns (Solfiah et al., 2020). These materials were designed with the consideration of the regional context.

Outcomes and Research Limitations of the Studies

In an in-depth review of the results from all examined studies, it was noted that there was a significant increase in children's knowledge related to disasters. This knowledge included an understanding of

what hazards are, the actions that should be taken before, during, and after the occurrence of different types of hazards in a variety of environments, as well as basic safety measures. As briefly outlined earlier, various strategies were implemented to assess the knowledge of young children following the delivery of disaster education. With detailed investigation, a range of outcome indicators used by the researchers were identified. These have been categorized into twelve groups, as shown in Table 3.

Table 3

Outcome Indicators of the Studies

Indicators	n
Knowledge of safety during disasters	6
Knowledge of safety right after a disaster	5
Anxiety about disasters	4
Ability to identify different disasters in local context	4
Knowledge of causes of hazards	3
Knowledge of disaster preparedness in school context	3
Knowledge of contents of a disaster bag	3
Knowledge of disaster preparedness in home context	2
Ability to identify safe/unsafe places during disasters	2
Knowledge of causes of injuries	1
Knowledge of how to seek or offer support after a disaster	1
Knowledge of basic safety measures	1

The implemented disaster activities or programs across all studies demonstrated marked improvements in children's disaster-related knowledge. However, researchers also reported additional outcomes from these activities and programs. Proulx and Aboud (2019), for instance, observed that their disaster education program significantly improved the early learning skills and child-teacher interactions of children from low-income families compared to the control group. Their disaster education program comprised comprehensive disaster education workshops for in service teachers, school staff, and community members. They attributed this outcome to the integration of sessions related to early childhood education in their teacher workshops, suggesting that teachers might have applied their newly-acquired knowledge in other classroom activities. Additionally, Gülay (2010) highlighted the positive impact of incorporating parent involvement activities into disaster education programs, noting a significant difference in the post-test scores of two experimental groups that had undergone disaster education with and without parent involvement activities.

Finally, researchers identified the limitations of the studies as having small (n=6) and non-randomized (n=4) sample groups, which both make the findings of their studies difficult to generalize to the wider population. Another stated limitation was the insufficient number of studies about disaster education for young children (n=6) in the literature. This shortage of research, they noted, hindered the formulation of more meaningful interpretations of their findings. Additionally, researchers offered several suggestions for future studies. Some of these recommendations included integrating disaster education into early childhood education curriculums (n=5) and pre-service teacher education

curriculums (n=3); incorporating parents into the disaster education programs for more effective, long-term results (n=3); utilizing various types of materials simultaneously to maintain young children's attention over extended periods (n=2); and employing multiple different measurement methods for assessing children's disaster-related knowledge (n=1).

CONCLUSION AND DISCUSSION

A considerable number of studies have been published on disaster education of children. Despite this, the amount that includes children from early childhood education level is very limited. This lack of focus has been acknowledged by numerous other researchers as well (Johnson et al., 2014; Amri et al., 2018; Torani et al., 2019; Proulx & Aboud, 2019; Koç et al., 2020). Besides the studies that focus solely on young children, which are reviewed in the current study, there are several studies that focus on a large sample of children from different age groups including children in the early childhood education level. However, when these mixed aged group studies are examined in detail two issues emerge. Firstly, the percentage of children who are aged 3 to 6 is very low compared to the whole sample group, producing insignificant data. Secondly, in some cases, the missing data were from those young children in the sample group due to the reason that many of them cannot perform well in the questionnaires designed for literate, older children. Thus, they were not included in the current study. Moreover, there were studies that investigated the aftermath of disasters in the context of early childhood education setting. These studies were excluded too because the focus of those studies was only on the recovery of affected children. Also, studies that investigated the disaster awareness of young children who did not receive any disaster related education were excluded as well due to their lack of disaster education activities or programs in their content. Additionally, Boland et al. (2017) emphasized the importance of the quality of the chosen documents in review studies. One of the quality criteria set by the authors for the documents in the sample group was being published in a peer reviewed journal. Some of the studies (n=2) from the initial data set had to be removed for not being published in a peer-reviewed journal. Reasoning behind this was to make findings of the current study to be credible and therefore, beneficial for other researchers. As a result, the sample of the current study consisted of the seven articles shown in Table 1.

While there was no time constraint for the publication years of the studies, the ones examined were only published between the years of 2010 and 2021. Disaster education for young children is relatively a new area of research (UNICEF, 2012), so it was expected that the publication years would fall within this timeframe. Although not directly linked, the emergence of these studies in the last roughly 13 years could be associated with the Hyogo Framework for Action (HFA). HFA was the first globally accepted disaster risk reduction strategy plan which was designed with the participation of various stakeholders, spanning the years from 2005 to 2015. One of the priority action items of the HFA was urging the usage of education, innovation and knowledge to create a culture of safety and resilience around the globe (UNDRR, 2007). Thus, policies to raise awareness about disasters were implemented, and disaster education drew the attention of the researchers from different fields more intensively following this (UNDRR, 2015).

The primary focus of the current study is disaster education for children at the early childhood education level. Although early childhood education typically encompasses birth to eight years (National Association for the Education of Young Children [NAEYC], 2020), the authors have set the cut-off for participant age groups at six years. This decision stems from the global average age for

children starting primary school being lower than eight (The World Bank, 2022). In disaster risk reduction related literature, studies that work with primary school children usually include a wide range of age groups together in their sample. Consequently, these studies employ disaster education materials and assessment methods suitable for older, literate children, rendering these studies less feasible within an early childhood education context. Hence, sample groups of children of the examined studies were in the age frame of 3 to 6 years. The majority of the sample group amongst studies were 5 to 6 years old children (n=6), with only one study incorporating a sample group of 3 to 5-year-olds. This age distribution might be due to individual countries' early childhood education policies regarding school starting age.

The researchers in most studies included a diverse age range of children in their sample (n=6), but their findings did not reflect this diversity. This could indicate either the absence of significant differences across the age groups, or that in-service teachers who implemented the activities were able to accommodate different age groups at their own pace. Nevertheless, there is no specific data to support these inferences. Another thing that was a uniform feature of the studies was the balance in gender distribution within their samples, with either an equal number of children from both genders or numbers that were very close to each other. Regarding outcome indicators based on genders, a significant difference was observed in only one category across all studies. Izadkhah and Gibbs (2015) reported that girls exhibited more anxiety related characteristics in their drawings than boys after receiving an education on earthquakes. In the existing body of literature on disaster education with children, there are only a handful of studies have found any difference on children's disaster related knowledge by gender and these instances favored girls (Johnson et al., 2014; Rahman, 2019). Given the limited sample size in these studies, there is not enough data to conclusively relate gender to disaster-related anxiety in this context.

As previously noted, researchers selected one or multiple hazards for their disaster education activities and programs. However, a shared trait among the studies was the selection of hazards based on their region's dominant natural hazard(s). For example, both studies from Iran (Sharpe & Izadkhah, 2014; Izadkhah & Gibbs, 2015) were conducted in Tehran, focusing on earthquake education. This choice aligns with Tehran's known susceptibility to earthquakes (United Nations International Strategy for Disaster Reduction [UNISDR], 2012). In another study from the Sumba Island of Indonesia, that chose to incorporate floods, earthquakes, and landslides in their disaster education program due to the region's propensity for these hazards (Proulx & Aboud, 2019). A further related issue with hazards was the inconsistent usage of the terminology across studies. Given that the examined studies were authored by researchers from various fields and, in some cases, by non-native English speakers, some misuse of terms or errors was expected, as might occur in the current study as well. The main concern, however, was the specific terms used within the disaster education content. The use of *natural disasters* instead of *nature induced/triggered/caused disasters* or interchangeable usage of the terms *hazards* and *disasters* was noted. One of the focal points of disaster education is to teach children that disasters are not natural. While they may be triggered by natural hazards, damages of disasters result from a lack of preparedness (UNDRR, 2020). Consequently, using the term *natural disasters* could lead to young children developing misconceptions and potentially missing the core concept behind disaster education.

A variety of approaches were observed when examining the activities used by researchers to educate children about disasters, especially concerning the timeframe. The studies that implemented a single disaster related activity for one time only, highlighted the importance of supplementing their approach with various activities and materials for long-term effect and suggested future researchers to do so (Sharpe & Izadkhah, 2014; Solfiah et al., 2020). On the other hand, a study that implemented a disaster education program for the entire school year mentioned the potential negative effects on children's school readiness, particularly for children from low socioeconomic families (Proulx & Aboud). They justified this statement with the fact that, due to an ongoing drought at the time, children from that region already faced difficulties attending school. Therefore, the limited school time was occupied by disaster education. In the light of these findings, a potentially more beneficial approach might be integrating disaster education into curriculums, as also suggested by other researchers as a more effective solution (Johnson et al., 2011; Johnson, 2014; Amri et al., 2018). Moreover, several categories emerged when evaluating the disaster-related content of the activities and programs as these were shown in Table 2. The content of the activities and programs from the studies were aligned with the suggested guidelines for disaster education content (Shaw et al., 2011; Bahandari, 2014; Shiwaku et al., 2016). Additionally, one of the studies (Sharpe & Izadkhah, 2014) included the concept of caring for pets during earthquakes as a part of their educational content. Researchers stated that this prompted children to engage in post-activity discussions about disasters. Children continued to talk about disasters from the point of view of their own pets, this approach fostered engagement as well as allowed children to explore disaster scenarios from diverse perspectives.

It is important to note that throughout all of the studies, except one (Sharpe & Izadkhah, 2014), in-service early childhood education teachers, rather than researchers, implemented the activities in their own classrooms. These in-service teachers received disaster, safety, and teaching method related workshops (Proulx & Aboud, 2019; Tuncer et al.) and/or were provided with pre-determined activity plans by researchers (Gülay, 2010), or they were given guidelines about the content of the activities (Izadkhah, 2014). Furthermore, some researchers highlighted the lack of knowledge among in-service teachers regarding disasters (Proulx & Aboud, 2019). As per the recent related literature, in-service teachers need to be trained to effectively teach children about disasters, given the misconceptions and anxiety teachers may have regarding disaster-related issues. The result of a study (Bulut, 2020) conducted with in-service early childhood education teachers (n=35) indicated that nearly 95% of the participants believe disaster education should be an integral part of every early childhood education curriculum. However, the majority of these participants stated that disaster education for young children in early childhood education settings should be guided by an expert or through a field trip to a professional institution. These results show that in-service teachers may not feel confident to teach children without receiving training themselves first. Moreover, another study that focused on in-service early childhood educators working in daycare centers to gather information about their disaster preparedness level (n=373) found similar results (Uhm, & Oh, 2017). In this instance, findings revealed that although the majority of the in-service teachers possessed knowledge in disaster-related issues, they felt inadequate to implement what they knew. Consistent with these studies, a study focusing on administrators from preschools also found that despite being knowledgeable about disaster-related issues, they felt incompetent in this regard (Konaklı, & Kaplan, 2018). Therefore, based on these findings, it can be inferred that providing guidelines or training to in-service teachers before allowing them to teach young children may have potentially increased the effectiveness of disaster

education for young children and perhaps improved in-service teachers' anxiety level and information regarding disasters.

In conclusion, considering the significance of disaster education for young children and the limited amount of research in this area, there is an urgent need for further study. For future research focusing on disaster education for young children, several recommendations can be made based on the collective results of the examined studies and related literature. Almost all of the studies about disaster education for children discuss only the short-term effects of disaster education activities and programs. Hence, there is a pressing need for longitudinal studies to investigate the long-term effects of disaster education programs implemented at the early childhood education level. It is believed that in-service early childhood education teachers, administrators, parents or primary care givers and school staff should be trained about disaster prevention methods and included in the disaster education programs for young children. Incorporating various stakeholders into disaster education programs and conducting regular drills with everyone's participation might enhance these programs' long-term effects. As suggested by many researchers, we concur that integrating disaster education into early childhood education curriculums and pre-service teacher education curriculums could be beneficial. This approach might increase awareness among teachers, boost their confidence in teaching disaster-related subjects, and potentially reduce overall casualties in hazardous situations. Additionally, it was observed that there was no information concerning children with special needs. Therefore, it would be beneficial to include information regarding inclusion of special needs children in future disaster related activity plans or disaster education programs. Lastly, it is hoped that by shedding a light into relevant literature, results of the current study will draw attention to the subject of disaster education for young children and serve as a foundation for future researchers.

Limitation

The present study's sample was restricted to articles from peer-reviewed journals, thus excluding theses, conference papers, book chapters, and gray literature. Moreover, it included only articles that were written in English. This approach potentially overlooked relevant research published in different languages, thereby limiting the comprehensive reach of the authors.

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Candidates' Teaching Practice Experiences in the Natural Disaster Period

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Abstract

Natural disasters cause great damage to society as they cause great destruction and risks. Educational services provided after a disaster have an important role for the children and young people to be able to cope with the trauma experienced. One of the regulations regarding the educational process after a natural disaster is related to the practice courses in higher education institutions. In the scope of regulations made by the Council of Higher Education regarding the teaching practice courses of final-year students in the Faculty of Education, students benefited from the right to complete their practices at higher education institutions in different provinces. This study was carried out at a state university in the Aegean Region. 6 special education teachers determined with purposive sampling participated in the study on a voluntary basis. The data of this study which was conducted in phenomenological design as a qualitative research were collected with the focus group interview technique. The data of the study were analyzed holistically using content analysis. In the findings consisting of four main themes which are *Information Resources Sharing and Planning, Professional Expectations and Preparation Process, Educational Life After the Natural Disaster,* and *About the Path Taken One Step Before the Profession,* it was stated that attention was drawn to the up-to-date information of the institutional websites through written and social media explanations of official announcements during the announcement, follow-up, and application processes. The participants emphasized the importance of institutional information and communication in the quality of accommodation, transportation, education, and training practices while making decisions. It could be suggested that teaching practices include holistic preparation based on feedback in the process one step before the profession.

Keywords

Natural disaster, special education, teaching practice, teacher candidate.

INTRODUCTION

Natural disasters include hazardous events that disrupt the functioning of a society and cause material, human, environmental, and economic losses (United Nations Office for Disaster Risk Reduction [UNDRR], 2021). It is seen that there has been an important increase in the severity and number of natural disasters from the past to the present (Pamidimukkala et al., 2020). While the number of disasters seen in developed countries, as well as developing countries, was reported around 100 every year in the 1980s, the number of disasters was reported more than 300 in the 2000s (Pamidimukkala et al., 2020). It is known that natural disasters have caused great destruction for people since ancient times. These destructions include displacement of people, physical destruction, economic losses, and especially loss of life (Deryugina, 2022). Between the years 2000 and 2010, approximately 2 billion people were directly or indirectly affected by natural disasters and these disasters caused 960 billion dollars of loss (Centre for Research on the Epidemiology of Disasters [CRED], 2015).

Many problems caused by natural disasters significantly affect societies. Education is one of the most effective tools for countries to cope with the social traumas experienced as a result of natural disasters (Le Brocque et al., 2017). When educational services are not ready to be implemented immediately after natural disasters, this situation causes negative effects on students (Global Campaign for Education 2016; Nicolai et al., 2016). UNESCO (2016) states that natural disasters have some negative effects on children and young people. These effects show many characteristics such as long-term interruption of education, permanent separation from the education system, low quality in learning experiences, long-term psychosocial anxiety, dealing with health problems, delays in development, early marriage and pregnancy of children, smuggling, and exploitation of labor. Besides all these, the long-term effects of natural disasters are also observed. For example, in case of the situations such as drought and elevation of sea level, the population of the region migrates to a different place, sources of income get into danger, and a sense of insecurity increases. All these factors also affect the access of children and young people to a quality education service negatively. Education services have an important role in protecting children and young people from many negative factors that arise after a natural disaster. In this regard, it is necessary to continue education services at all levels as soon as possible after a disaster (UNESCO, 2016). Schools, which have a fundamental role in education services, are institutions that significantly contribute to the welfare of society. They need to be reopened to maintain the routine after a natural disaster. One of their fundamental achievements is to provide students with their daily routines and help them get over the negative effects of natural disasters (Kilmer et al., 2010). School environments contribute to the factors such as more quality education achievements for students and society, however, the functioning of schools is disrupted, and academic outcomes, education, and health fields are interrupted by natural disasters (Fothergill & Lori, 2015). This situation causes students to have negative experiences with academic concepts and skills.

The literature includes few studies on how schools academically function in societies affected by natural disasters (Layton, 2014). The recovery process in educational services that change after natural disasters differs in all countries. Differences are observed in factors such as resuming educational services after disasters, opening schools, and time planning (Esnard, Lai et al., 2018). In the studies to academically recover schools after natural disasters, it is considered important to examine factors such as economically disadvantaged student groups, school attendance rates of students, student-teacher rates, and teacher experiences. For example, it is emphasized that the students who do not attend

school during the academic year show lower academic performances than their peers, and encounter economic problems more frequently (Morrissey et al., 2014). These students may lack financial support and family support to maintain success in school. Natural disasters also affect the institutional infrastructures of schools negatively. After the disasters, it is necessary to fight against factors such as allocation stages of communities and municipalities regarding schools, human loss, duration of education, financing, staff/students whose place has been changed, and decrease in the number of materials, and mental health that has been lost (Meier et al., 2003).

After the natural disaster, in the higher education process that has an important place in educational services, it is suggested to provide educational services to university students at the earliest possible period as in the other areas of education. This regulation is highly important for the recovery of students and cultural, economic, and social support of society (UNESCO, 2016). University students who are in the group affected by natural disasters encounter various problems such as access to campus, interruption of activities, interruption of classes, and damage to school buildings (Jaradat et al., 2015). However, in recent years, it is seen that universities have started to more frequently include awareness activities such as media, seminars, and sharing experiences regarding being prepared for natural disasters and risks that may arise from them. These awareness activities include various subjects such as preparation for natural disasters, minimizing their effects, factors that cause disasters, and decisions that may be made individually or collectively (Nipa et al., 2023). Although there is an increase in awareness activities, it is seen that the use of adequate planning, intervention, and methods to lighten the effects of the disaster before and after the disaster is insufficient in many universities and state schools at different levels (Safapour et al., 2021).

Higher education life provides students with an opportunity to have many academic, social, and cultural experiences. In higher education life, which is an important process in realizing universal values and gaining professional competencies, characteristics, theoretical and applied education competencies of the institution where the individual receives education are important. In the literature, it is stated that higher education institutions, with their academic, administrative staff, and administrators, are a prerequisite for effective education by taking the individual educational needs of students into account (Greere, 2023). In a higher education life that takes the needs of learners into account, students who convert scientific evidence-based practices into achievements through theoretical and elective courses are considered to have access to an opportunity for quality education in the pre-vocational process. For example, the education that teachers who have a highly important role in the success of school systems receive about the teaching profession in higher education, and the extent to which their knowledge and skills have improved constitute a very important dimension. Besides, the fact that they implement these skills when they start their profession and contribute to education and training services constitutes a determining characteristic of their pre-vocational achievements. Thus, adequate and quality practices regarding the teaching profession also affect the efficiency of teacher candidates in effective teaching, inclusiveness, student success, and learning-teaching processes positively when they start their professional life (Matts Mattsson et al., 2011). In practices regarding the teaching profession, a coherent process should be followed with components based on many structures including university, practice school, and student. An interaction is expected to be formed with the decisions made, practices, experiences, and contexts (Kemmis & Grootenboer, 2008). The school-based and university-based vocational preparation processes have multiple stakeholders. The most important stakeholder of this processes, which consist of interaction-based professional practices within a certain structure and system, is the teacher candidates. Thus, it is

thought to be important to examine the quality and planning process of professional practices in teacher training from the viewpoints of teacher candidates. After the earthquake disaster in Turkey on February 6, 2023, teacher candidates were able to continue their education in different provinces in the scope of teaching practice courses in higher education. It is thought to be important to examine the experiences regarding this course as it provides information about the functioning of educational services after the disaster. Thus, based on the importance mentioned, this study aims to examine the special education teacher candidates' opinions and suggestions based on their experiences regarding the Teaching Practice II course in higher education institutions in the spring term of the 2022-2023 academic year. For this purpose, it is aimed to examine teacher candidates' experiences in planning their educational processes, communication and cooperation, and the teaching profession in extraordinary situations such as natural disasters.

In conclusion, as a result of decisions taken in our country to conduct teaching practices throughout the country including the higher education institutions located in the earthquake zone in the spring term of the 2022-2023 academic year, a need to examine teacher candidates' experiences in teaching practice course has arisen. As a result of this study, participants' experiences, suggestions, and opinions regarding teaching practices after the natural disaster are thought to contribute to the regulations. This study aims to examine the practice experiences of special education teaching final-year students after the natural disaster in the process one step before the profession. For this purpose, the answers to the questions below have been sought:

After the earthquake disaster of February 6, 2023:

1. What do special education teacher candidates think about information resources in planning the education process?

2. What are their experiences in the implementation of the Teaching Practice course regarding application and preference?

3. What do they think and suggest about the support areas they need in the structuring of the practice process?

4. What do they think about the implementation of the Teaching Practice course and suggest about the regulations that will be conducted on this subject?

METHOD

This section includes information about the study's method, design, participants, researchers, data collection tool, data analysis process, validity and reliability studies, and ethical principles that were taken into account in the study.

Study Design

In the study, phenomenological design was used as the participants' experiences, opinions, and suggestions based on a phenomenon were examined. In the study carried out in the qualitative research method, purposive sampling and focus group interview technique were preferred to determine special education teacher candidates' opinions and suggestions about the teaching practice process after the earthquake disaster (Bogdan & Biklen, 2007; Denzin & Lincoln, 2017). In studies

carried out in phenomenological design, the experiences of the participants about the subject of the study are taken as a basis and it is aimed to define their experiences as they lived (Hoover, 2021; Patton, 2014; Tenny et al., 2022).

Participants

The participant group consists of teacher candidates who were special education teaching final-year students in the 2022-2023 academic year and applied to and completed the Teaching Practice II course in the spring term in a different higher education institution other than the one they were registered after the earthquake disaster in February 2023. In accordance with the purposive sampling method, the following criteria were sought in the study: a) being an active final-year student in the Faculty of Education in the 2022-2023 academic year, b) having completed the Teaching Practice II course in the spring term of the program in a different higher education institution, c) being a volunteer to support the study. 6 special education teacher candidates participated in the study. The participants were informed that there were no right or wrong answers to the questions that will be asked in the focus group interview process and their approvals for volunteer participation were obtained. Besides, they were informed that they had a right to withdraw at any stage they wanted. Demographic information of the teacher candidates is shown in Table-1.

Table 1

Demographic Information of the Study Group

Code Name	Age	Gender	Is the Education Institution he/she is registered in the Earthquake zone?	Does he/she Have a Computer/iPad etc.?	The institution where she/he Teaching Practice	Continued
					Fall Term	Spring Term
Ebrar	22	Female	Yes	No	Special Education Practice School Stage III	Special Education Practice School Stage II
Esma	23	Female	No	Yes	Special Education Practice School Stage I	Special Education Practice School Stage II
Hasan	23	Male	No	Yes	Special Education Vocational School Stage I	Special Education Practice School Stage II
İzzet	23	Male	Yes	No	Special Education Practice School Stage III	Special Education Practice School Stage II
Tuana	22	Female	No	Yes	Special Education Practice School Stage I	Special Education Kindergarten
Nalan	22	Female	No	Yes	Special Education Practice School Stage I	Special Education Practice School Stage II

As seen in Table-1, the age average of the participants is 22.5, 4 of the participants are female, and only four teacher candidates had personal computers in the distance education and face-to-face education processes. The higher education institution where Ebrar and İzzet were registered is located in the earthquake zone and the higher education institution where Esma, Hasan, Tuana, and Nalan

attended until the last term is not in the earthquake zone. The participants who generally continued teaching practice in the Special Education Practice School at the Primary School level in the first term participated in the teaching practice courses in Special Education Practice School Stage II in the second term. The students were asked about their accommodation conditions in the period until spring term and it was determined that Ebrar, Hasan, İzzet, Tuana, and Nalan stayed in the dormitories of Student Loans and Dormitories Institution (KYK) and Esma stayed in a private student dormitory. In the spring term, Hasan, Ebrar, Nalan, Tuana stayed with their family, and Esma and İzzet stayed with a relative.

Researchers

This study which is based on the participants' experiences in the preparation and process of the teaching profession after the disaster period is teamwork carried out by two researchers. Both researchers contributed to the planning, obtaining ethical permissions, conducting pre-interviews with the participants and receiving their consent, preparing data collection tools and conducting focus group interviews, data documentation, validity and reliability analysis, writing the findings, and discussion and conclusion stages. Both researchers received their undergraduate degrees in classroom education (classroom teaching) and have teaching experience within the Ministry of National Education for 7-15 years. The researchers, who completed their postgraduate education in primary school and special education fields, have been working in the faculty of education and conducting special education teaching practices. Both researchers took courses on the qualitative research method during their postgraduate education and have thesis consultancy and research practice experiences as academic members. The study was planned in the spring term of 2023 and the interviews were carried out in an online environment after the graduation of the participants.

Data Collection Tool

The data collection tool of this study consists of demographic information and an interview form consisting of seven (7) open-ended questions which took their final form by taking the opinions of two experts. The participants were informed that there were no right or wrong answers to the questions with the written consent form and they were also reminded verbally at the beginning of the meeting. It was explained that they could only answer the questions within their personal opinions and thoughts, their answers would provide data for scientific research if they agreed to participate in the study, and their personal information and the information about the institutions they continued would not be included, their opinions would be included in the study report in accordance with the ethical principles and would not be shared with any person or institution. When preparing the data collection tool, firstly, a) The effect of natural disasters on educational processes, b) Implementation decisions regarding extraordinary situations for the students who continue higher education in distance education and face-to-face education practices, c) Conducting the theoretical and elective Teaching Practice courses by taking effective teaching processes into account, d) The Council of Higher Education and Ministry of National Education's official decisions and legal regulations regarding the period after a natural disaster regarding the pre-vocational processes of teacher candidates were examined. National and international information resources were examined by scanning the studies based on this subject in the literature. An interview questions pool was created, opinions of a (1) Practice Teacher who has been conducting special education teaching practices in the classroom for at least five (5) years and who gave teaching practice courses in the classroom before and after the disaster and opinions of an (1) expert who conducts teaching practice course in the Department of

Special Education Teaching and has a doctoral degree in special education were received. In the form submitted to the experts' opinions, their feedback is categorized as *"appropriate, not appropriate, and should be changed".* After the feedback, the interview form took its final form. Written information about teacher candidates' age, gender, whether the higher education institution where they continue their undergraduate education is located in the earthquake zone, whether they have a device such as computer-iPad, etc., type of the school where they carried out their practices in the Fall-Spring Terms, and the school level was obtained and seven (7) open-ended questions were asked. The open-ended questions aim to obtain their opinions and suggestions about how they followed the regulations regarding higher education institutions, how they decide on their educational preferences according to the official decisions after the natural disaster, and their spring term teaching practice course experiences.

Data Collection and Analysis

In the study, the data were collected through the focus group interview technique, both researchers made preliminary preparation, shared information with the participants, controlled the functioning of technical equipment and connection accounts, and planned and reminded the participants about the day and time. 6 teacher candidates and 2 researchers attended the focus group interview. 3 participants (Ebrar, Tuana, and İzzet) had problems in obtaining healthy participation due to technical problems such as the power of connection. When these technical problems could not be solved, the researchers received written opinions from all three participants about the subjects discussed, they also completed the interviews through mobile devices in August. In online participation, the focus group interview lasted 65 minutes and 29 seconds, the interview with Ebrar lasted 17 minutes (09-.00-09.20), written opinions of Tuana and İzzet were received after the meeting, and interviews were completed. Thus, the interviews lasted 82 minutes and 29 seconds in total. Code names were given to each participating teacher candidate as well as practice teachers, academic members, and administrative staff (Practice Teacher Özlem, Instructor Neşe). The total transcription of the interviews was converted into a descriptive document of 57 pages, 1830 lines. After the data were converted into written text, inter-evaluators reliability calculations were made for accuracy. The consistency of the transcript of 29 minutes voice record obtained from the total data of 82 minutes and 29 seconds and voice record of this transcript was examined. Confirmation of the participants was obtained for the transcript of voice records. In the analysis of the research data in the form of descriptive documents which was proved to be consistent with the voice record, content analysis technique was preferred. The data were read repeatedly by both researchers and repeating statements were determined to reach the concepts, attention was paid to the relationship of similarities and differences in the codes. Main themes and sub-themes were obtained by bringing together the codes that are related to each other. The method of systematic examination and organization of the data were followed during the content analysis. Firstly, the data were prepared for analysis (converted into written transcript), after reading all the data, their conceptual infrastructures were examined and tried to understand, themes and sub-themes were reached by coding (Creswell & Creswell, 2022). Lastly, the data were interpreted and explained to create the findings of the study. In coding studies, thematic coding was conducted and an inductive approach was adopted (Bogdan & Biklen, 2007; Seidman, 2006; Yıldırım & Şimşek, 2018). As a result of data analysis, 4 main themes and 10 sub-themes were obtained by bringing together the codes related to each other.

Ethical Principles

In line with the aim of the study, ethical principles were taken into account in all stages including planning, implementation, participant rights, confidentiality of personal information, data analysis, and converting opinions into findings. Ethical Committee Approval of the study was obtained and the working plan and research schedule were determined. Pre-interviews were conducted with the participants, participants were informed personally in the pre-interviews carried out online or through mobile devices, and their written consents were received in advance. A mutual day and time were determined with the teacher candidates who accepted to participate in the study and the day and time for the focus group interview was determined based on the preparations of the researchers and information sharing. Information about the day, time, and online (zoom platform) meeting address was shared with all participants through their personal e-mail addresses. In the first stage of the study, a mobile device online instant messenger (WhatsApp) account was created to have healthier group communication and to be able to see preferences and similar suggestions. It was committed that personal information would not be included, code names would be used, and information regarding province, institution, school, practice teacher, and practice classroom students would be protected with ethical and confidentiality principles and would be described in the findings; this information was shared in written form and verbally.

In the data of the study, the inter-coder reliability coefficient regarding the themes was calculated based on Miles & Huberman's (1994) "agreement/ (agreement + disagreement) x 100" formula. According to the coding by two researchers, the inter-coder reliability rate was calculated as 94%. In the study, both researchers made independent coding and completed this process with an inductive understanding. The written texts that were descriptively documented were sent to the participants and their confirmations were received. Processes such as preparing the question form by receiving the opinions of experts, conducting pre-interviews, preparation, and the process are the studies that were conducted for the credibility and consistency of the process. For this study, ethical permission has been obtained from Zonguldak Bulent Ecevit University Human Research Ethics Committee (20.07.2023-250).

FINDINGS

Regarding the teaching practices after the natural disaster, teacher candidates drew attention to the information sources sharing and planning processes in the first theme and drew attention to the professional expectations that affect the preparation process and institutional cooperation in the second main theme. In the third main theme, they emphasized that it is necessary to pay attention to professional roles, responsibilities, and equality of opportunity in planning educational processes in natural disaster periods; in the last main theme, they emphasized the importance of providing feedback to teacher candidates, holistic assessment, and roles of the stakeholders in conducting teaching practices in the period one step before the profession. The following section includes the themes and sub-themes of the study respectively.

Table 2

The Main Theme of Information Sources Sharing and Planning and Its Subthemes

Main Theme	Subthemes
Information Sources Sharing and Planning	Reliable institutional announcements
	Priorities and conditions
	Decision-making process

The participants stated that they followed the statements of the authorities on social media and national press most intensely as well as the officers and advisors at the higher education institutions where they were registered after the natural disaster. The teacher candidates whose institutions were in the earthquake zone stated that they needed the information from their friends and relatives who continue their education in different provinces more intensely and followed the institutional websites and announcements instead of social media. They stated that they followed these addresses as they are official and accountable.

For example, **Ebrar** stated that she encountered different statements regarding the official statements of the institution staff and following academic and administrative processes and expressed that the variables that mostly affected herself and her family in the decision-making process were accommodation, transportation, financial opportunities, being safe as well as continuing practice courses. She said: *I saw it on the official website of ... University and I started to prepare my documents with the help of student affairs. ...communication in every institution... they were not informed about the script but how? My family says how could such a thing happen, I am going or I am not going? The staff doesn't know... Let's see if there is a document like this in their province, it was sent... Oh, how come the document hasn't come yet... they said... I experienced uncertainty, I contacted many institutions then because my school was in the earthquake zone.* Regarding the decision-making priorities, she said: *I had relatives and friends in...... As it was a city I know, I certainly made my decision in this way.*

Tuana expressed her opinions by saying: *After the natural disaster, I followed the news that regards higher education institutions from the news that was broadcasted on TV, higher education institutions, and official social media accounts of ... university where I continue my undergraduate education... As I mentioned previously, the information sources I applied/received support were the news on TV and official social media accounts. The reason why I followed these sources is that access to these sources is easier and that I find the announcements that were made by the relevant people reliable.* She mentioned that the instant notifications of official institutional accounts and the authorities in the institution where she continued her education made consistent explanations.

Similarly, **Nalan** emphasized the importance of interaction with the authorities of the institution and written and verbal feedback by saying: *I received information from the television and my instructors from the university where I continue my education in this process. I mostly followed social media accounts that give information in the same direction as the news channels. After I submitted my documents in line with the information on the websites, I waited for feedback from the universities I applied to get results.*

Table 3

The Main Theme of Professional Expectations and Preparation Process and Its Subthemes

Main Theme	Subthemes
Professional Expectations and Preparation Process	Institutional characteristics Interaction and cooperation

The participants stated that their professional expectations were effective in their decisions for continuing education and planning the process after the natural disaster.

Nalan said: *I think that face-to-face implementation of teaching practice is highly important for the teacher candidates. Learning any job or skill by seeing and experiencing it makes this skill and job even more memorable. There are a lot of differences between academic knowledge and practice. Academically, how to treat a student and what to use in teaching are taught but when we meet a student face-to-face, academic knowledge is not sufficient...* and stated that practice is her priority and she preferred institutions where the staff who gave feedback according to their calendar planning and contacted her worked.

Hasan said: *.... University and... University student affairs that I received support while applying... I used student affairs as the information source because the information I would receive through student affairs would be more reliable and clear. While making decisions... I wanted to do my internship in the province I was in because I live there. Accommodation, transportation, and the fact that I wondered about the Department of Special Education Teaching at .... University were effective in my decision. First of all, ... University works very well on this subject. They informed and helped us and made cooperation with us from the beginning of the application process to the end of the process. They dealt with our problems as if we were their own students.* He stated that their professional priority was face-to-face practice in the process and mentioned the importance of institutional characteristics, characteristics of the staff, interests, communication, and interaction. In this regard, teacher candidates stated that getting information before the application and interaction and information sharing with the authorities during the application process highly affected their preferences.

Table 4

The Main Theme of Education Life after the Natural Disaster and Its Subthemes

Main Theme	Subthemes
Education Life After the Natural Disaster	Professional roles and responsibilities Preparation and equality of opportunities (technology, materials, sharing, etc.)

The participants, stating that orientation and preparation are one of the most distinguishing factors in educational life after the natural disaster, expressed that they frequently communicated through mobile devices in the application and follow-up processes after they made their decisions, they needed to receive responses to e-mails and institutional contact information. They stated that it was a great

contribution for the institutions to start the orientation programs before the practices by becoming quickly organized, to register students in the platforms where courses are given by introducing the technological infrastructure, and to carry out online meetings to provide planning with all instructors.

Esma, emphasizing the roles and effects of teachers for preparing for the profession, said: *My instructor used to always say something to us. Develop as many materials as you can, children, so much more? If you are creative and develop materials, it will be better for you. He/she provided us with such an experience.* She mentioned the differences between the classrooms where they carry out their practices and stated that teacher candidates are exposed to more intense and effective teaching processes in some classrooms while they experience limitations in observation and practice opportunities in some classrooms in the preparation for the profession stage.

Similarly, **Hasan** stated his opinion by saying: *This subject should be interpreted from a broader perspective because it is a broad problem, I mean, let me tell you, the institution where I did my internship in the first term and the institution I did it in the second term were different. My work environment was so different. First of all, my instructor in the first institution where I did my internship was not originally from special education teaching. All responsibilities, I mean totally, were on the teacher candidates, everything was, you know, actually, without receiving much support...*The teacher candidates emphasized preparatory aspects of institutional preparations and many factors such as material, the effect of the staff, and physical equipment.

Table 5

The Main Theme of About the Path Taken One Step Before the Profession and Its Subthemes

Main Theme	Subthemes
About the Path Taken One Step Before the Profession	Self-confidence, sense of belonging, role of stakeholders
	Holistic assessment (roles of all stakeholders and follow-up)
	Teaching practice in different conditions

Participants, emphasizing the duration of the undergraduate education program which they continue in the faculty of education one step before the profession, mentioned that the institutions should be holistically prepared for different extraordinary situations such as natural disasters and pandemics. For example, **Esma** stated that she had concerns when she came to a different province and continued teaching practice at a different school, however, she saw that all preparations and information sharing were made even for half a semester... *My instructor was from my field of practice, I mean, my classroom was very good. I was in Özlem teacher's (code name of the practice teacher) classroom, she had an intern student for the first time but she was very easygoing, I mean she hmm was solution-oriented even the slightest, well, for example, what could I do... I wanted to face with the student. Well, she helped me more with this, she was good, I mean, she didn't actually force me…*

İzzet said: *... They should teach the student all kinds of documents, etc. that she/he will encounter in the profession, should see the students as a teacher and show respect, should behave as she/he is a teacher... If such a negative situation occurs again, students who study teaching should receive practice*

courses like the health students when other students receive online courses and he stated that school climate, professional roles, and institutional characteristics are important in teaching practice. He mentioned the importance of feedback and systematic follow-up in theoretical and practice courses.

DISCUSSION

The findings of this study that aims to examine the opinions and suggestions of teacher candidates about the "Teaching Practice II" course they took in different provinces after the natural disaster are gathered around four main themes. Discussion of the themes obtained from the study in relation to the literature is given below. It is seen that teacher candidates stated their opinions under three subthemes regarding the first theme of the study, *"Information sources sharing and planning".* They also drew attention that there were differences between their universities and practice institutions in other universities in terms of teachers, technological equipment, administrative practices and they mentioned the support of teachers in the institutions in terms of the richness of practices. Another point that the teacher candidates drew attention to and stated positive opinions in the scope of this theme is the fact that not only their peers in the earthquake zone changed their practice schools but also other teacher candidates all over the country benefited from this right. According to the declaration of the United Nations (2010) earthquakes are among the natural disasters whose time and destructive effects are uncertain. In these disasters that deeply affect social processes as well as people's health, it is stated that it is possible for the students to continue their daily routines when the educational services are provided in the earliest period possible (Le Brocque et al., 2017). In our study, in terms of providing educational services as soon as possible after the earthquake, it is stated that the authorities planned and organized the official process for teacher candidates to take practice courses in any state university outside the earthquake zone in the country. However, it is seen that teacher candidates had some problems in access to information and communication in this organization. It is thought that the fact that there was not enough time for a planned organization to quickly get rid of the negative effects of the earthquake may have caused these difficulties. It is seen that the participants have positive opinions about conducting practices in different universities and institutions in the scope of the Teaching Practice II course. In the literature, this situation is included in the factors that are important for decreasing the psychosocial anxiety of teacher candidates, providing a faster recovery, and continuing education without interruption (Jaradat et al., 2015). Thus, it is seen that the teacher candidates are satisfied because they continued their education without interruption, did not have problems in access, and did not face any negativities in participation in activities. It is also seen that teacher candidates drew attention to the institutional structures of the universities and stated that they conduct better practices in environments where they can express themselves easily in terms of communication.

According to the second theme of the study, "Professional expectations and preparation process", it is seen that teacher candidates drew attention to the characteristics of institutions where they conduct their practices, cooperation between practice schools and faculties, and interaction. Besides, they stated that the teachers in the institutions must be experts in their fields and have a supportive attitude. In the literature, Kayhan & Işıkdoğan-Uğurlu (2022) stated that cooperation of teachers, students, practice schools, and faculties is effective for teacher candidates to receive effective educational services. It is stated that it is important for teacher candidates to experience effective

teaching methods and make observations in order to be successful in their professional life (Güzel-Özmen et al., 2012; Kayhan & Işıkdoğan-Uğurlu, 2022). Similarly, it is seen that teacher candidates drew attention that teachers in practice schools should be well-qualified in terms of knowledge and skills, include different sample practices, and provide feedback. Another point that the teacher candidates drew attention to in terms of cooperation is the cooperation of faculties with the teachers in practice schools. It is stated that receiving feedback from the instructors/faculty members in the faculty and practice teachers will provide the development of skills such as determining more effective teaching methods/techniques, and preparing, implementing, and assessing plans in this respect. The literature includes similar studies that mention the positive effects of cooperation (Friend & Cook, 2010; Griffin, 2012).

Regarding the third theme of the study, "educational life after the natural disaster", teacher candidates stated that face-to-face education of teacher candidates should continue, uncertainties related to practice courses should be eliminated, the technological infrastructure should be provided in all practice schools and home environments, and opportunities to reach and effectively use materials should be increased. In the literature, it is seen that it is stated that the materials got lost/decreased in number in educational environments, the environment was not appropriate for education, technological opportunities could not be provided for a certain period of time, and many problems were seen in the functioning after the natural disaster that occurred (Meier et al., 2003). Besides, it is stated that the educational period started later according to the characteristics of the natural disaster and the structure of the society, and many troubles were temporarily encountered in education (Esnard, Lai et al., 2018). The findings of this study that state similar processes were experienced shows similarity with the literature. The fact that the earthquake disaster that occurred in our country was effective in a highly broad area had effects on places, materials, instructors' starting teaching, and planning education services. Thus, the opinions of the teacher candidates about the situations experienced after the natural disaster show similarity with the studies in the literature in many aspects.

Regarding the last theme of the study, "About the path taken one step before the profession", it is seen that teacher candidates stated opinions about receiving feedback, being happy to take practice courses at different universities, equality of opportunities in practice, cooperation of faculty advisor, practice teacher, and the school, and proof-based assessment in the practice courses. Fernandes, et al. (2021) stated that students must implement the courses that they theoretically take and they should be supported in terms of teaching by feedback. Thus, teacher candidates have the opportunity to conduct more effective practices by receiving feedback in appropriate environments. It is seen that the teacher candidates who participated in our study want to receive feedback about their practices to conduct quality and effective teaching and start the profession in a well-qualified way. It draws attention that they want to cooperate with their advisors in the faculty and the practice teachers to gain experiences that will prepare them for the profession and they want to implement the theoretical information they learn about different disability groups. In the studies in the literature, it is seen that the teachers, who play an important role in community, social, and economic development, directly affect the success of the students (Husain, 2022). Thus, providing educational services based on professional competencies in pre-vocational teacher education enables the integration of well-qualified teachers into society (Darling-Hammond, 2017). Regarding professional competencies, teachers provide effective services to students by having many characteristics such as professional skills, experience, professional values and attitudes as well as field knowledge. As with all teacher candidates, the professional knowledge and skills of special education teacher candidates are aimed

to develop with practice courses in addition to theoretical education. Thus, besides having an opportunity to implement their knowledge on different disability groups, teacher candidates correct and reinforce their knowledge with feedback (Darling-Hammond, 2017). Similar to the literature, in our study, teacher candidates draw attention that although they obtain an opportunity to implement their knowledge, there are different methods for different disability groups and they need to receive feedback. It is thought that this situation varies according to the characteristics of teachers in the schools where they continued before and after the disaster and the support of advisors in the universities. Participants, drawing attention that teachers in the institutions where they continue should graduate from the field of special education, stated that they improve themselves more in terms of their profession in this way.

Based on the study findings, it is seen that the teacher candidates experienced some uncertainties about information and access to information in the period when they conducted teaching practice courses in different universities and institutions after the natural disaster and they tried to eliminate negativities by following university board's decisions through their friends, social media, and official websites. Some differences were observed in the experiences of teacher candidates who took teaching practice courses in different universities and institutions in terms of the institutions' structure, functioning, equipment, teachers who work in the institution, and advisor of the course. Regarding these differences, they stated that they need the field knowledge of the teachers in the institution, variety in materials, and guidance of the advisors in the university. They also stated that interaction with the teachers and staff in the institutions where they conduct their practices and with the advisors in the university will enrichen their learning and contribute positively to their professional life. Regarding the transition to the profession period, they emphasized that equality of opportunities should be provided by taking into account the differences such as physical equipment, material, and lack of staff in the institutions where they conduct their practices. They stated that the feedback should be provided immediately after the activities/practices and different teaching methods used in the special education field should be included. Based on the results of this study, the following suggestions are presented for the field and further research.

- Natural disasters have continued with an increase in severity and frequency. It can be suggested to plan the educational services at the earliest period possible and prepare action plans for unexpected natural disasters.

- It can be suggested that intervention-based courses such as emergency medical aid courses can be compulsory in all departments of universities.

- It can be suggested that information, planning, and implementation stages about what to do before, during, and after the natural disasters can be converted into educational content in educational services and they can be shared with the staff and students through seminars and courses.

- Regarding transition to the profession period, accessible materials can be prepared for the implementation of teaching practices.

- It can be suggested to increase cooperation between higher education institutions and practice schools.

- In institutions' preparation to teaching practices process, characteristics such as physical equipment, material, sufficient number of personnel should be taken into account and planning should be made to provide equality of opportunities.

For further research;

- In this study, the opinions and experiences of special education teacher candidates were examined; in further studies, it can be suggested to plan the same study for different teacher groups.

- It can be suggested to examine the experiences of teachers working in education institutions regarding children with special needs after the disaster. It can be suggested to conduct studies on the practices of universities before and after the disaster.

LIMITATIONS

This study is limited to the opinions of special education teacher candidates who applied to a different university after the natural disaster in the scope of practice courses about their experiences in the practice courses in the last term in a different higher education institution. In further studies, practice course and theoretical course experiences of last-year or other grade students who continue their education in different undergraduate programs can be examined. Studies can be conducted based on the opinions of practice instructors, practice teachers, and institution administrators by broadening the participant group and adding different data collection methods.

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Availability of Data and Materials

Not applicable.

Views of Psychological Counselors Involved in Post-Earthquake Psychosocial Support Activities Regarding the Support Process

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Abstract

The purpose of this research is to reveal the views and recommendations of guidance counselors involved in psychosocial support activities regarding the support process after the earthquake centered in Kahramanmaraş, known as one of most catastrophic disasters of the century. The research is structured in the form of a case study design, which is one of the qualitative research types. The study group consists of 21 participants who are psychological counselors working in Samsun and who volunteered to provide psychosocial support by travelling to the earthquake-affected region. In the research, a demographic information form and a semi-structured interview form were used as data collection tools. The research data were analyzed using the content analysis method. The research data were categorized into three themes: process, coping skills, and recommendations. In the research, it was determined that guidance counselors involved in psychosocial support activities were affected by trauma, therefore, it is essential to emphasize preventive mental health studies for those involved in psychosocial support activities and volunteers who want to contribute to the support process should be strengthened through pre-process training before the process.

Keywords

Psychosocial support, psychological counselor, earthquake.

INTRODUCTION

Natural disasters such as epidemics, flood, volcanic eruption, earthquake, tsunami, excessive rainfall can be regarded as events that human beings have no impact on causing and that begin completely naturally, some of which last only a few seconds while some of which last for decades and that disrupt daily living conditions, cause significant loss of life and property, as well as psychologically and sociologically traumatic consequences in the social memory (Sözcü & Aydınözü, 2019). Earthquakes are disasters, which cause the loss of life and damage the most.

In addition to loss of lives and property, earthquakes also bring about economic, social and psychological problems in social memory (Altun, 2018). People who have lost many things after the earthquake are in a very difficult mood when their lost loved ones are added to the fear and anxiety they experience. The natural functioning of people's lives is disrupted due to the earthquake (Makwana, 2019). It is generally observed that there is a risk of developing psychopathology in this type of traumatic losses and the need to normalize the process with treatment becomes mandatory. While it is defined as a traumatic experience for the individual to feel fear, helplessness and horror as a result of the physical harm he or she experiences or witnesses in this process (DBE, 2023), the process that individuals will experience in their emotional states after the traumatic event is described by Hacıoğlu et al. (2002) explained it in four stages. The first stage, the Psychological Shock Process can last more than 24 hours and is accompanied by reactions such as sudden physiological arousal, inability to concentrate, hypersensitivity, forgetfulness, seeming unreal (dissociation), hardening, dulling of emotions and short-term shock. The second stage is seen after two to six days, that is the Reaction Process, in which emotions such as anger, irritability, anxiety, guilt suspicion, fear and physical reactions such as nausea, palpitations, tremors and constant mobility are observed. The third stage, called The Awareness Process, begins approximately one week after the disaster; and the individual does not want to talk about the event and about what happened, begins to mourn for what has been lost, and displays a conflicting and angry attitude with emotions such as sadness and longing. A long time after the disaster, the individual tries to adapt to the process and life; begins to feel calm and well and tries to determine future goals, which is expressed as fourth stage; the Recovery Process.

The post-traumatic negative impact of individuals, which begins with the psychological shock process, and the psychological and biological reactions that occur immediately after individuals are exposed to intense stress, are defined as post-traumatic stress disorder (Aşık, 2021). Post-Traumatic Stress Disorder (PTSD) can be seen in people whose physical and spiritual integrity is threatened or who are terrified, helpless and extremely frightened after a severe traumatic event (Binay & Başgül, 2022). PTSD occurs after the traumatic event, but is remembered and experienced repeatedly, and progresses in a state of hyperarousal and avoidance of trauma-related stimuli (Astill Wright, Sijbrandij, Sinnerton, Lewis, Roberts & Bisson, 2019; Şener & Sağlam, 2020). According to the Psychiatric Association of Turkey (PAT, 2023), an individual with PTSD experiences inability to sleep, has nightmares and a fear of reliving the moment of disaster, anxiety, becomes easily startled, feels on edge, and hopelessness about the future, along with alienation, thinks that no one understands him/her, and avoids situations that remind him/her of the event. Post-traumatic stress disorder (PTSD) caused by a traumatic event usually resolves within a few weeks, but sometimes persists for much longer.

It is important for individuals who experience trauma after a disaster to receive support from experts in their field (Elmhadhbi, Karray, Archimède, Otte & Smith, 2021). Support that is given according to

individuals' age and psychological needs will help minimize the effects of trauma. At this point, psychosocial support and training are very important (Kukuoğlu, 2018). Psychological support activities carried out after the disaster are based on the principle of expressing and sharing the emotions caused by the disaster and describing them as "normal reactions to an extraordinary situation". Efforts to normalize life with the aim of returning to pre-disaster conditions are significant. It is necessary to make individuals feel that they are safe and to regain the sense of self-confidence and loss of control they have lost. Individuals should regain their sense of control through continued studies (Karancı, 2008).

The first studies to be carried out in this context are referred to as psychological first aid. These are the first stages of psychosocial studies implemented after the disaster. Meeting basic needs such as safety and health and providing psychological first aid for those affected by the incident are studies that should be done in the early period (Özkan & Kutun, 2021). Psychosocial support studies especially carried out by experts with wide participation and that are regularly updated, are crucial in the post-disaster period (Bisson, Tavakoly, Witteveen, Ajdukovic, Jehel, Johansen, ... & Olff, 2010). In the post-disaster period, studies carried out to ensure the psychological well-being of individuals and to return their lives to normal are called psychosocial support studies. The basis of psychosocial support studies handled with more than one discipline is to ensure returning the individual's reactions to the traumatic event to normal and enabling the individual to gain problem-solving skills by revealing their weaknesses and strengths in coping with challenging events of life, and increasing the psychosocial capacity of the individual, family, group and communities (Aşık, 2021).

Psychosocial support studies are extremely important for Turkey, which is located in the Mediterranean, Alpine-Himalayan seismic zone where one fifth of the earthquakes in the world occur, and is located on three main fracture systems, also called the north, south and west fault lines, and 93% of whose territory is in the earthquake zone. For this reason, Turkey has great experience in psychosocial support studies. Psychosocial Support Programs, which were prepared in 2001 in cooperation with the Ministry of National Education (MEB) and the United Nations Children's Fund (UNICEF) after the 1999 Marmara earthquake and implemented until 2017, can be given as an example. The same program was developed with the Renewal of Psychosocial Support Programs Project between 2017-2019 and was implemented after the Elazığ/Malatya and İzmir earthquakes that occurred in 2020 (Aşık, 2021).

With this experience, MEB provided psychosocial support to a total of 294,912 people, including students, teachers and adults (AFAD, 2023; MEB, 2023) in the first month of the earthquake, which was known as the disaster of the century and killed more than 50 thousand people, which affected 11 provinces on February 6, 2023 and occurred consecutively in Pazarcık (magnitude 7.7) and Elbistan (magnitude 7.6) districts of central Kahramanmaraş, Gaziantep, Şanlıurfa, Diyarbakır, Adana, Adıyaman, Kahramanmaraş districts being the center. It was also felt strongly in Osmaniye, Hatay, Kilis, Malatya and Elazığ provinces.

In addition to loss of lives, the post-earthquake period (nutrition, shelter, transportation, communication, etc.) also caused different traumas. In the first month of the earthquake, the Ministry of Interior Disaster and Emergency Management Presidency (AFAD) established 332 tent cities and 189 container cities in Kahramanmaraş and surrounding provinces and districts, and provided temporary shelter for 329,960 people affected by the earthquake by providing shelter in different provinces. With the coordination carried out by AFAD, Turkish Red Crescent, Ministry of National

Defense, Gendarmerie and NGOs tried to solve the nutritional needs of earthquake victims with 369 mobile kitchens in order to meet the nutritional needs of those affected by the disaster, while simultaneously damage assessment and debris removal efforts continued. In addition, 4720 counselors were assigned by the Ministry of National Education for psychosocial support activities for people who survived the earthquake, experienced great losses or witnessed this process. Counselors provided psychosocial support services to a total of 1 million 226 thousand 659 people, including 782,739 students and 443,920 parents, in the first two months of the earthquake (AFAD, 2023; MEB, 2023).

Psychological counselors, who volunteered in the first week of the earthquake, continued to provide psychosocial support in the earthquake area and in the places where earthquake victims were relocated, even though they had to face an awareness process. Even if they were not directly exposed to the trauma, the counselors became traumatized by witnessing this traumatic process. witnessing this traumatic process left counselors under the influence of trauma (Gökçe &Yılmaz, 2017). In disasters such as earthquakes, fires and floods, the focus is usually on those who experience the trauma, so people who help and provide support are ignored, and over time, those who help can result in becoming hidden victims (Polemikou, 2021). Based on this, the research aims at determining the situation of counselors who participated in psychosocial support activities after the earthquake. Therefore, this study tries to reveal the opinions of counselors about the psychosocial support process, their coping skills during the psychosocial support process, and their suggestions for psychosocial support studies.

METHOD

Research Model

The research was structured as a case study, one of the qualitative research types. According to Creswell (2019), qualitative research enables the collection of different types of data. Qualitative research methods can be used to understand the concept in the minds of individuals, to describe an environment or situation, to reveal the context between events and to interpret the contexts, to indicate the characteristics specific to a culture, and to understand the process of an event. Büyüköztürk, Kılıç-Çakmak, Akgün, Karadeniz & Demirel (2022) state that case studies can be used for research such as the historical processes of a private institution, collecting data on a phenomenon, or examining a particular event from different perspectives. For this reason, the research was prepared in the case study pattern, which allows analysis by examining an event in depth (Kandemir, 2022).

Study Group

The criterion sampling method was preferred when selecting the study group on a voluntary basis. Criterion sampling, which is expressed as meeting some criteria determined for data collection (Creswell, 2019) is defined as the gathering of certain qualities, people, events, situations etc. in the observation unit in a research (Büyüköztürk et al., 2022). The criterion in this research was defined as working as a guidance counselor and taking part in psychosocial support activities in the earthquake area.

In this regard, the study group of the research consisted of 21 counselors. The characteristics of the study group are given in Table 1.

Table1

Personal Information of Participants

		f	%
Sex	Female	12	57,1
	Male	9	42,9
Education	Undergraduate	12	57,1
	Graduate	9	42,9
Natural Disaster Experience in the Past	Earthquake	5	23,9
	None	16	76,1
Loss of a Relative Due to Earthquake	Yes	0	0
	No	21	100
Volunteer in Psychosocial Support Work	Yes	21	100
	No	0	0
Status of Receiving Psychosocial Support Training	MEB Practitioner	13	61,9
	MEB Advanced Level	3	14,2
	None	5	23,9
Working Time in Earthquake Zone	0-7 Days	14	66,7
	8-14 Days	4	19
	15 Days and More	3	14,3

When looked at Table 1 including the information of the participants, it is seen that 57,1% of the 21 participants in the study are female and 42,9% are male.

Participants stated that they took part in psychosocial support activities voluntarily and 57,1% of which have a bachelor's degree and 42,9% of which have a master's degree. While 23,9% of the participants stated that they experienced a natural disaster in the past, 76,1% stated that they did not experience a natural disaster. Moreover, it is seen that none of the participants lost a relative due to the earthquake. 61,9% of the participants received a MEB Practitioner training and 14,2% of them received a MEB Advanced Level psychosocial support training, while 23,9% stated that they did not receive any psychosocial support training. When the participants' working hours in the earthquake zone are examined, it is seen that 66,7% worked between 0-7 days, 19% worked between 8-14 days and 14,3% worked for 15 days or more.

Data Collection Tools and Process

A general information form and a semi-structured interview form were used in the research. Semi-structured interviews make it easier to obtain in-depth opinions from the participants (Büyüköztürk et al. 2022). For the interview form, firstly, the relevant literature research was conducted and opinions were received for the form from a total of three experts, one from the field of educational sciences and two from the field of guidance and psychological counseling. The pilot study of the form was applied on two counselors who provided voluntary psychosocial support during the earthquake. After this application, two items that were thought to be difficult to understand were changed and the form was finalized and interviews were held. Data were collected online and face to face. The interviews, which lasted approximately 20-30 minutes, were recorded and written. In addition to general information during the interviews, the counselors were asked 12 questions about situations of

involuntary influence from the process, avoidance of support, arousal and methods of coping with stress were asked to the guidance counselors.

Data Analysis

Data analysis was carried out with the content analysis method. Content analysis method is explained as a process in which researchers code and classify the data they collect in detail through methods such as observation and/or interviews, and summarize and interpret these data with descriptive themes. Content analysis is used very frequently, especially in the field of social sciences, as it allows indirect studies on making sense of human behavior (Büyüköztürk et al., 2022).

A total of 12 questions were asked to the participants through a semi-structured form. Interview records were transferred to digital media and the responses were examined in detail. In the interview results that were transferred to digital media for data analysis, each participant was named K1, K2… and K21, then the obtained data were classified by giving code labels and categories were created. The data obtained in this direction was grouped into three themes: process, coping skills and recommendations. The categories related to the themes are detailed in Table 2.

Table 2

Table of Themes and Categories

Themes	Codes
Process	Involuntary influence
	Avoidance
	Arousal
Coping Skills	Stress situation
	Psychological support
	Request for reassignment
Recommendations	Personalized recommendations
	Professional recommendations

According to Table 2, which includes the themes and categories created in the light of the data obtained; it is seen that the participants' responses to the involuntary influence, avoidance and arousal situations they experienced during the psychosocial support process were coded and categorized under the process theme. The participants' responses regarding their coping skills were coded and categorized as stress situations, psychological support, and willingness to take on new duties. In another theme, the theme of recommendations, the participants' responses were coded and categorized as recommendations for people who will take part in psychosocial support studies and professional recommendations.

Validity and Reliability

To ensure validity and reliability, two researchers participated in the interviews simultaneously. The data obtained from the interviews were recorded without any additions or deletions, and an attempt was made to increase reliability was tried to be increased. The analysis of the data was made by two

researchers, and the analyzers analyzed the data independently of each other and compared the results. In this way, reliability was tried to be increased by taking into account the analysis of the data and the consistency of the observations.

In order to increase the reliability of the study, the Miles-Huberman reliability formula was used to ensure consistency between coding made by different researchers. In this regard, codes, themes and categories related to the research data were prepared by different experts in the field of guidance and psychological counseling. According to the formula of Miles and Huberman (Baltacı, 2017), where the consensus between the coders is expected to be at least 80%, the agreement level was calculated as 91.3%. In this situation, it can be said that there is consistency and harmony between the coding and the data analysis is reliable.

In order to ensure the validity of a research, in addition to characteristics such as consistency and stability, it is important that the raters are impartial and that the application is carried out under appropriate conditions (Büyüköztürk et al., 2022). For this reason, in addition to the consistent results obtained in data analysis contributing positively to the validity of the research, it is also important to try to eliminate the bias effect with different evaluators. In addition, it is important for participants to take part in the research voluntarily and to participate in the research when and where they feel comfortable in order to increase the validity of the study.

Ethical Principles

Ethics committee permission for this study was obtained from Ondokuz Mayıs University Social And Humanities Research Ethics Committee Decisions with the decision dated 29.03.2023 and numbered 2023-247.

FINDINGS

In this section, the findings obtained from the research are presented in detail. Findings and sample expressions for each theme are presented under relevant headings.

Process Theme

The codes related to the involuntary influence, avoidance and arousal categories created based on the participants' answers are shown in Table 3.

Table 3

Process Theme Category and Code Table

Categories	Participant Codes	f	%
Involuntary Influence	K1, K2, K5, K7, K9, K10, K11, K12, K13, K14, K16, K17, K21	13	61,9
Avoidance	K1, K6, K9, K12, K14, K20	6	28,5
Arousal	K1, K2, K3, K5, K9, K11, K12, K13, K14, K17, K18, K20	12	57,1

In order to determine the existence of **"Involuntary Influence"** situations in the Process theme, participants were asked, *"Did you have an interview that deeply affected you during the psychosocial*

support process?" "Explain briefly". 61,9% of the participants stated that they had conversations that deeply affected them. Some of the answers given are as follows;

K2, "11. He was an 11th grade student, his name was Furkan. He lost his brother and no one helped him for the first two or three days. "They gave him the body bag and told him to put it in if he could take it out."

K5 said, "The stories of the teacher who lost his best friend and his students affected me very deeply."

K12, "The helplessness of a young mother whose forty-day-old baby fell ill because she could not bathe her in the tent city."

K17 said, "I met with the mother who came out of the bathroom naked to save her child during the afternoon earthquake. "She experienced despair and shame at the same time."

Regarding the **"Avoidance"** category in the theme, participants were asked, *"Have there been times when you felt inadequate during the psychosocial support process and wanted to stop providing support?" "Explain briefly"*. 28,5% of the participants stated that they felt inadequate during the psychosocial support process and thought they could not help. Some of the answers given are as follows:

K6: "People's pain was so great that it was hard to empathize and give support."

K12, "Trying to remain calm and provide support in an environment where people's fears were triggered by aftershocks and even their basic needs could not be met made me feel quite inadequate."

Participants regarding the **"Arousal"** states, which is the last category in the process theme; the participants were askes "*Have there been any changes in your own attitudes and behaviors during the psychosocial support process? "Explain briefly"*. 57,1% of the participants answered that there was a change in their attitudes and behaviors. Some of the answers given are as follows;

K5: "I learned to be more patient and stoic."

K11, "I felt like I was staying in a hotel in the school building where we stayed despite the existing impossibilities."

K14, "As I felt the pain, I felt emotionally worn out. "After a while, I started to act as if I were emotionless, despite my emotions."

K20: "I thought I was more constructive and made an effort."

Coping Skills Theme

The codes related to the categories of stress, receiving psychological support and willingness to take on new duties, which were created based on the participants' answers, are shown in Table 4.

Table 4

Coping Skills Theme Category and Code Table

Categories	Participant Codes	f	%
Stress situation	K1, K6, K8, K9, K10, K12, K13, K14, K17, K20, K21	11	52,3
Psychological support	K1, K6, K14, K17, K21	5	23,8
Request for reassignment	K1, K2, K3, K4, K5, K6, K7, K8, K9, K10, K11, K13, K14, K15, K16, K17, K18, K19, K20, K21	20	95,2

Related to the theme of coping skills regarding **"Stress Situation**, participants were asked *"Did you experience stress during this process?" If so, what ways did you use to cope with stress?"*.52,3% of the participants stated that they experienced stress during the psychosocial support process and used various ways to cope with it. Some of the answers given are as follows;

K8, "Yes, I experienced it. That's why I walked away from the environment where we worked. "I had dinner in different parts of the city so that I wasn't always in the same environment."

K9, "Yes, I experienced it. Since the earthquakes continued, I generally tried to stay outdoors. I didn't apply any particular technique. I tried to intervene by observing my thoughts. Unfortunately, there were times when I tried to calm down by eating."

K10, "I experienced it from time to time. "I became stronger after meeting with my colleagues, taking time for myself, and talking to my family and children."

K17, "Yes, I lived and overcame it with religious references such as breathing exercises or praying."

Regarding the **"Receiving Psychological Support"** situation in the relevant theme, the participants were asked; *"Did you get psychological support or did you need psychological support after returning from the earthquake area? "Explain briefly"*. 23,8% of the participants stated that they needed psychological support. Some of the answers given are as follows;

K6, "Yes, I needed it. I had a hard time. "Fear and anxiety continued for a while.""

K14: "I felt very worn out psychologically."

K17, "I did not see anyone except my family for two days. "Talking made me want to cry.""

The participants were asked the question *"Would you consider taking part again in the psychosocial support process?"* corresponding to the last category in the coping skills theme, *"**Request for reassignment".** 95,2% of the participants stated that they would be able to work again. Some of the answers given are as follows;

K5, "Yes, I will consider it."

K12, "No, because I have two young children."

K14, "Yes, I can think about it. Because it was a very different experience for me."

Recommendations Theme

The codes related to the personal and professional recommendations categories created based on the participants' answers are shown in Table 5.

Table 5

Recommendations Theme Category and Code Table

Categories	Participant Codes	f	%
Personal Recommendations	K1, K4, K5, K6, K7, K9, K10, K11, K12, K13, K15, K17, K18, K20, K21	15	71,4
Professional Recommendations	K2, K3, K8, K14, K16, K19	6	28,6

The participants were asked: *"Based on your experiences in the psychosocial support process, what are your suggestions for psychological counselors and counselors who will take part in support activities?" "Explain briefly."* The answers were collected in two different categories. Regarding this, 71,4% of the participants made "Personal Recommendations", while 28,6% stated "Professional Recommendations".

Some of the answers given to **"Personal Recommendations"** are as follows;

K6, "They should definitely take part. "At first, people are afraid and worried, but being involved in the helping process is good for both those people and themselves."

K11, "Those who have time limits, are indecisive, have low immunity, and get tired easily should not take part. They should definitely receive supervision from our colleagues who have worked in that region. "They should make preparations for accommodation, shelter, nutrition and healthy living."

K15, "I think it has a positive contribution to our own psychological process. While I was trying to help people who suffered from a major disaster by taking part in support activities, I realized that I was improving myself. It was an experience that made me feel hopeful and useful. "I left there feeling sad and wanting to take part again."

Some of the answers given regarding the **"Professional Recommendations"** category are as follows;

K3, "Being planned and programmed. I realized that students should be separated gradually and be better equipped."

K14, "It is a process that teaches children to play games and spend time. In this respect, preparations can be made for this situation before leaving. Listening to the pain of adults can sometimes cause psychological wear and tear."

K16, "They should not set out without having information about psychosocial support studies."

Themes of the Responses of Participants Who Have Experienced Earthquakes in the Past

The answers given by five participants who stated that they had experienced an earthquake in the past, regarding the presence (√) or absence (x) of the relevant categories in the process theme are shown in

Table 6

Response Table Based on Process Theme of Participants with Earthquake History

Participant	Involuntary Influence	Avoidance	Arousal
K 10	✓	x	x
K 13	✓	x	✓
K 17	✓	x	✓
K 19	x	x	x
K 21	✓	x	x

According to the table, of the guidance counselors who have experienced earthquakes in the past, 80% show involuntary response and 40% show arousal response. When the responses to avoidance symptoms are examined, it is seen that these people do not have avoidance symptoms.

The answers given by five participants who stated that they had experienced an earthquake in the past, regarding the presence (✓) or absence (x) of the relevant categories in the theme of coping skills are shown in Table 7.

Table 7

Response Table Based on the Theme of Coping Skills of Participants with Earthquake History

Participant	Stress Situation	Psychological Support	Request for reassignment
K 10	✓	x	x
K 13	✓	x	✓
K 17	✓	x	✓
K 19	x	x	x
K 21	✓	x	x

According to Table 7, 80% of the participants who experienced an earthquake stated that they experienced stress and 40% needed psychological support. However, all of the guidance counselors who had experienced an earthquake before stated that they could work again despite of their affection.

The answers given by five participants who stated that they had experienced an earthquake in the past, regarding the theme of suggestions, are given in Table 8.

Table 8

Response Table of Participants with Earthquake History Depending on the Suggestions Theme

Participant	Personal Recommendations	Professional Recommendations
K 10	✓	x
K 13	✓	x
K 17	✓	x
K 19	x	✓
K 21	✓	x

According to the table, 20% of the participants who stated that they had experienced an earthquake in the past made professional recommendations, while 80% made personal recommendations.

Some of the answers given by participants with a history of earthquakes are as follows;

K10, "I would recommend that our colleagues who have intense traumas, are impulsive or have difficulty controlling their emotions, and have not received training before should not participate in psychosocial studies."

K19, "It would be good for the friends who will participate to gain experience by implementing psychosocial sessions."

CONCLUSION, DISCUSSION AND RECOMMENDATIONS

Conclusion and Discussion

The results of the research are discussed in themes and presented below.

Process Theme

The opinions of counselors who took part in post-earthquake psychosocial support activities regarding the support process they provided were discussed under the title of "Process Theme" and classified under the categories of involuntary influences, avoidance and arousal.

Witnessing a traumatic experience, listening to it, and even receiving news about the event can cause the individual to show post-traumatic stress symptoms such as avoidance, arousal, and startle at varying levels. (Gökçe & Yılmaz, 2017; Kurt & Gülbahçe, 2019; Şener &Sağlam, 2020; Aşık, 2021). The actions of individuals can sometimes cause them to become secret victims (Polemikou, 2021). Working with trauma victims due to the type of work creates secondary traumatic stress in the individuals themselves (Boscarino, Adams & Figley, 2010; Gürkan & Yalçıner, 2017; Brooks, Rubin & Greenberg, 2019). Of course, professional staff such as search and rescue teams, medical personnel, security forces, media workers and psychosocial support teams who work on the front lines after disaster-like events work intensively in the disaster area and are more exposed to trauma (Erdener, 2019; Işıkhan, 2021; Doğan, Keskin & Dönmez, 2021; Pak Güre, 2022). In this case, employees working after a disaster such as an earthquake can be expected to show secondary traumatic symptoms at various levels (Tominaga, Goto, Shelby, Oshio, Nishi & Takahashi, 2020; Aşık, 2021). Secondary traumatic reactions

that occur as a result of indirect exposure to trauma are similar to post-traumatic stress disorder and may be the source of it (TPD, 2023; Aşık, 2021; Şener & Sağlam, 2020; Gökçe & Yılmaz, 2017).

In light of this information; the fact that 61,9% of the participants showed signs of involuntary impact, 28.5% showed avoidance behavior, and 57,1% showed arousal reactions indicates that counselors who provide psychosocial support services were affected by trauma at different levels and the findings were consistent with the relevant literature.

Of the participants in the study group, 23,9% stated that they had experienced an earthquake in the past. In addition to the fact that 80% of these people responded that they showed involuntary impact and 40% showed signs of arousal, all of the participants who had memories of earthquakes in the past reported that they did not show avoidance behavior. Individuals may show stress reactions and avoidance behavior after traumatic events such as disasters even if they have not been exposed to any traumatic experiences in their past. In this study, individuals with earthquake memories in their past stated that they showed signs of involuntary influence and arousal, as well as no symptoms of avoidance. When we look at the relevant literature, avoidance behavior appears as a predictive variable for traumatic stress symptoms (Yılmaz, 2007). However, when the results of Kahil's (2016) research on professional and volunteer aid workers are examined, it is seen that professional aid workers show more traumatic stress symptoms than volunteer aid workers. The fact that all counselors in the study group voluntarily participated in psychosocial support activities can be considered as the reason why they did not engage in avoidance behavior despite their past earthquake experiences.

Coping Skills Theme

The opinions of guidance counselors who took part in post-earthquake psychosocial support activities on the stress situation during the support process, the willingness to receive psychological support and take on new duties were discussed under the title "Coping Skills Theme" and classified under relevant categories.

Natural disasters such as earthquakes deeply affect the society in which they occur, but also bring with them many new psychological, sociological and economic problems (Sözcü & Aydınözü, 2019; Altun, 2018). After the disaster, individuals who work in the earthquake zone and are indirectly exposed to trauma experience changes in their post-disaster emotions (Hacıoğlu, et al. 2002) and show symptoms of stress because they see the seriousness of the threat that may befall themselves and other people (Yılmaz, 2007).

The fact that 52.3% of counselors working in psychosocial support studies stated that they experienced stress is similar to the studies in the literature on the stress situation of individuals working in the field after the disaster (Yılmaz, 2007; Yanbolluoğlu, 2019; DBE, 2023).

Erdener (2019), in his master's thesis titled *"Examination of Psychological Resilience and Secondary Traumatic Stress Levels of Professionals Working in the Field of Disaster",* states that there is a negative and significant relationship between psychological resilience and secondary traumatic stress levels of professionals working in the field of disaster.

Among the counselors who stated that they developed various methods to cope with the stress they experienced during the psychosocial support process, 23,8% stated that they felt the need to receive psychological support after completing their duties. This can be interpreted as that field workers have individual differences in coping with stress and may need psychological support after challenging tasks (Trumello, Bramanti, Ballarotto, Candelori, Cerniglia, Cimino, ... & Babore, 2020).

The fact that 95,2% of them stated that they could take reassign again shows that they are willing to carry out psychosocial support activities even if they have experienced difficulties. This situation can be explained by the fact that guidance counselors have skills such as empathy, helpfulness, responsibility and motivational resources such as professional satisfaction and competence (Demir, 2020; Yıldırım, 2019; Alakara Özcan, 2018; Aşık, 2021; Gündüz & Öntürk Akyüz, 2022).

According to some studies (Yanbolluoğlu, 2019; Gökçe & Yılmaz, 2017), the level of secondary traumatic stress increases as the duration of working in a trauma environment and with its victims increases. The fact that 66,7% of the participants who worked between 0-7 days, 19% between 8-14 days, and 14,3% of the participants who worked for 15 days or more reported that each of the participants was willing to work again was considered to be related to the duration of duty. Moreover, Erdener (2019) stated in his study that the length of post-disaster working time does not affect the psychological resilience levels of individuals.

In addition, Tominaga, Goto, Shelby, Oshio, Nishi & Takahashi (2020) found in their study with the mental health professionals working after the disaster that involuntary reactions significantly predicted post-traumatic stress symptoms 2 months after the aid activities and previous knowledge/skills were important variables. Clinical symptoms were predicted positively, while burnout was predicted negatively. In the research, it was stated that increasing the education and knowledge level of the personnel involved in support activities will increase satisfaction with post-disaster relief efforts by reducing burnout reactions. From this point of view, considering that 76,1% of the participants in the study group received psychosocial support training before taking part in support activities; it is thought that there may be a relationship between the desire for reassignment and the educational status.

Taking into the fact that 23,9% of the participants had experienced an earthquake before consideration, it can be observed that 80% of these people stated that they were experiencing stress and 40% needed psychological support. However, all of these individuals who had experienced an earthquake before stated that they could take part again despite being affected. Based on this, it can be said that counselors who have an earthquake story in their past also manage the process by developing various coping methods.

Recommendations Theme

The findings related to the "Recommendations Theme" were grouped into two different categories: personal recommendations and professional recommendations.

When the opinions of the participants were examined, it was seen that 71,4% made personalized suggestions. These are the recommendations for those who will provide psychosocial support and they include that those should be prepared for the process in terms of both their spiritual and physical needs and should definitely come and participate in psychosocial support activities.

When the answers given by guidance counselors who had experienced earthquakes in the past were examined separately, it was seen that 80% of them gave personal recommendations and 20% gave professional suggestions. The answers given by these people were also similar to the answers of the general group.

All participants, 61,9% of whom were practitioners and 14,2% of whom had received advanced psychosocial support training, took part in post-earthquake psychosocial support activities voluntarily.

This situation can be explained by the level of professional awareness, empathy and helping skills of the counselors (Duru, 2002; Yıldırım, 2019; Demir, 2020).

Considering that 28,6% of the participants made professional recommendations and 23,9% of the participants did not receive any training, it is thought that there is a significant relationship between them. The professional recommendations such as not coming to the region without receiving psychosocial support training and making preliminary preparations for work with children strengthen this opinion.

Suggestions

Suggestions Regarding the Research

The excessive number of dead and injured people after the disaster, seeing broken or buried bodies, witnessing pain and sorrow, working under pressure, feelings of helplessness, extreme fatigue, hunger or insomnia, corpse odors, blood, events and nightmares that remind them of these, may play a decisive role in the level of trauma impact of aid providers. For this reason, understanding the reactions correctly has an important place in the preparation of intervention plans (Işıkhan, 2021).

According to the literature-based review study by Brooks, Rubin & Greenberg (2019), many post-disaster social and occupational factors affect the mental health of trauma-exposed employees. Effective social support provided both during and after a disaster increases the psychological resilience of employees. Well-supported employees tend to perform better at their jobs.

Based on these results and examining the findings of the research; it can be stated that it is quite normal for counselors who work after events that deeply affect society, such as an earthquake, to predict when and where it will occur, to experience psychological difficulties due to the fact that they work in traumatic areas and with people who have been directly exposed to trauma. For this reason, these people who will carry out the post-traumatic recovery process need to be strengthened with regular training. Looking at the literature on the subject (Gürkan & Yalçıner, 2017; Gökçe & Yılmaz, 2017; Brooks, Rubin & Greenberg, 2019; Erdener, 2019; Tominaga, Goto, Shelby, Oshio, Nishi & Takahashi, 2020; Doğan, Keskin & Dönmez, 2021; Aşık, 2021; Pak Güre, 2022) similar results have been reached and therefore studies such as training, supervision, knowledge, skills and competence are very important. In addition, social support activities, which are one of the most important protective factors against post-traumatic stress disorder or secondary stress reactions (Özkul & Çalık Var, 2018; Kahil & Palabıyıkoğlu, 2018), will make positive contributions to individuals' coping skills.

When the mentioned precautions are taken, the risk of health problems and long-term mental illness in trauma-exposed employees can be reduced (Brooks, Rubin & Greenberg, 2019).

Suggestions for Researchers

The research on the extent of the earthquake in Kahramanmaraş and the effects of the process will span a long period and area. Of course, new information will be obtained in this process. It is a fact that every new study on the subject will contribute to the field.

According to the study of Gökçe and Yılmaz (2017); sources of stress experienced by aid workers due to trauma may be related to the characteristics of the event/task in which the employees are involved, as well as being specific to the profession, and some individual and professional characteristics predict secondary traumatic stress reactions. Therefore, it is significant to determine the source of post-traumatic stress reactions in aid workers and the risks and protective factors that lead to these

reactions in order to provide a scientific basis for preventive and/or facilitating solutions to cope with stress reactions.

For this reason, it is thought that the studies to be conducted are very important in terms of contributing to the literature as well as the individual and professional development of field workers and guiding program developers.

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Availability of Data and Materials

Not applicable.

Evaluating The Turkish Textbooks In Terms Of Sufficiency Of Disaster Education

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Abstract

This study evaluated the appropriateness of disaster-themed texts and activities in Turkish textbooks for disaster education competence. The evaluation was based on the criteria established by the United Nations International Strategy for Risk Reduction (UNISDR) for the education curricula of developing countries. The method used for the study was document analysis, with content analysis used to analyze the data. The sample of the study consists of Turkish textbooks. Expert opinion was sought for validity, while inter-rater agreement was determined for reliability (Reliability = 90%). The study revealed that the texts and activities in Turkish secondary school textbooks are inadequate in reflecting regional and local hazards, vulnerabilities, and the possible effects of disasters in terms of disaster education competence. Particularly, texts at the 6th-grade level are unsatisfactory in creating the desired behavior due to the type of text used. Furthermore, disaster risk reduction is not discussed in most of the texts, highlighting the insufficiency of Turkish textbooks. Even though disaster-themed texts are included in Turkish textbooks, they fail to create a holistic consciousness for disaster education that covers the before, during, and after aspects of disasters. As a result, it can be concluded that Turkish textbooks are inadequate in terms of disaster risk reduction and disaster education in general.

Keywords

Disaster education, Cross-curriculum discipline, Textbooks, UNISDR.

INTRODUCTION

A disaster is a natural, technological, or human-induced event that results in physical, economic, and social losses for the whole society or certain segments. Additionally, a disaster stops or interrupts normal life and human activities, and the coping capacity of the affected society is not enough to handle it (Disaster and Emergency Management Authority [AFAD], 2014, p. 23). Turkey is a country that experiences disasters frequently. Every year, one or more disasters, such as earthquakes, landslides, avalanches, or floods, are witnessed throughout the country (AFAD, 2018). In the Kahramanmaraş earthquake on 6 February 2023, over 48,000 people lost their lives, and more than half a million buildings were damaged (Presidency of Strategy and Budget, 2023).

Disaster education aims to increase citizens' awareness about hazards and risks and inform people and institutions about the activities carried out in all stages of disaster (risk reduction, preparation, response, and recovery) to minimize the damages affecting society (Coppola & Maloney, 2009). In disaster education, disaster risks and hazards of their environment should be explained to individuals, and information should be given about the institutions where they can get help during and after the disaster (Tanaka, 2005).

Awareness training and capacity-building programs on disaster risk are vital in developing resilience against disasters. Two action plans have been initiated by United Nations International Strategy for Risk Reduction (UNISDR, 2005) to reduce disaster damages and increase society's resistance to disasters. The first plan is the Hyogo Framework for Action (HFA, 2005-2015), an international program defining actions to reduce disaster risks (UNISDR, 2005). The program emphasized the critical importance of disaster education in schools, and the need to include disaster risk reduction content in school curricula was also highlighted (UNISDR, 2007). The second plan is the Sendai Action Plan (2015-2030), which aims to create a disaster-resilient society. Turkey has approved both of these international strategies.

In 2010, the Japan International Cooperation Agency (JICA) and the Ministry of National Education [Millî Eğitim Bakanlığı (MEB)] signed a protocol for the 'School-Based Disaster Education Project' in Turkey. The 'School-Based Disaster Education Project' project aimed to promote disaster education in the country. To achieve this, this project involved comparing curricula in Japan and Turkey, evaluating educational materials, creating in-class activity plans, reorganising disaster and emergency plans in schools, and implementing them more effectively (Özmen & İnce, 2017). The project provided teachers and school administrators face-to-face and online training, including disaster awareness and proactive response to disasters. The ultimate goal was to create a culture of preparedness for disasters throughout Turkish society by ensuring that schools, teachers, students, and parents all gained awareness of disasters. In this way, the project aimed to establish standardized disaster training and ensure its sustainability.

According to Davis et al. (2003), formal education received by children in schools is crucial in enhancing disaster awareness because the knowledge acquired can be effectively disseminated to society. However, children are one of the most vulnerable groups during disasters worldwide. Therefore, it is imperative to educate children about disasters, the risks they pose in their region, and methods for reducing these risks from an early age (Peek, 2008).

Disaster education is a cross-curriculum discipline introduced into the Turkish curriculum in 2006. The curriculum, constructed with a constructivist approach, aims to develop multidimensional skills in

students and assist in the realisation of course outcomes through intermediate disciplines associated with the main discipline (Taş, 2010). The objective is for students to integrate and apply the knowledge and skills acquired in different school and social life disciplines. In the Turkish curriculum (MEB, 2006), the theme of "disaster education and safe life" was established as a cross-curriculum discipline. However, upon further examination, it was discovered that only the 7th-grade textbook included the topic "Explains the reasons for what should be done in closed and open areas during landslides," indicating that disaster education was not structured to cover all grades, regional hazards, sensitivities, or disaster risk reduction at the desired level (Kansızoğlu, 2014).

In the 2018 revised curriculum, it was emphasized that Turkish textbooks were structured according to the thematic approach. One of the themes deemed appropriate to be covered in the Turkish curriculum and to be included in teaching materials is the theme of "Nature and the Universe." Among the topic suggestions related to this theme is the topic of "natural disasters" (MEB, 2019). Primary school age is the most appropriate period for students to gain disaster awareness (Özgüven, 2006). It has been reported that regional disaster awareness and preparations of students at different levels of education are insufficient (Adanalı et al., 2022; Şahin et al., 2018). Primary and secondary school teachers attach importance to disasters and training related to disasters and welcome the integration of the subject with teaching (Demirdelen & Çakıcı, 2021; Bulu, 2023). However, although teachers care about disaster education, they consider themselves inadequate in disaster preparedness for various reasons (inadequate materials, not integrating the course with the expectations and outcomes of disaster education) (Çelik & Gündoğdu, 2022).

To foster a secure community, the materials crafted for disaster education should target enhancing knowledge and skills related to preparedness, protection against, and prevention of risky situations. Every year, Turkey experiences various disasters, such as earthquakes, floods, and landslides. In the event of a disaster, the awareness of society plays a crucial role in dealing with the situation. One of the recommendations made by UNSDR in 2007 for increasing disaster awareness and reducing disaster risk is to incorporate disaster education into the education system. In the Turkish lessons, disasters are taught as a cross-curricular discipline. To provide a comprehensive and interdisciplinary approach to disaster education, creating texts and activities that relate to the subject in a manner that supports disaster education will help to reinforce students' sensitivity towards this issue. The most commonly used material in Turkish lessons is the textbook. Programme achievements are tried to be realised through textbooks. Therefore, the texts and activities in the textbook must be structured for the purpose. This study examined whether the texts and activities in Turkish textbooks reflect the knowledge and skills related to disasters and disaster risk reduction. In this way, it aims to contribute to structuring the disaster subject in Turkish lessons by international standards by evaluating whether the contents in the textbooks are sufficient in terms of disaster education. For this purpose, the criteria related to formal education prepared by the United Nations International Strategy for Risk Reduction (UNISDR) and reflecting the expectations of developing countries regarding disaster education in curricula were used, and the following problem was sought:

1. Do secondary school Turkish textbooks (5th-8th grade) align with UNISDR criteria for disaster education?

METHOD

Research Model

This study was conducted to evaluate the appropriateness of disaster-themed texts and activities in Turkish textbooks regarding disaster education competence. The evaluation was based on the criteria established by the United Nations International Strategy for Risk Reduction (UNISDR) for the education curricula of developing countries. The texts and activities in Turkish textbooks were analysed using the document analysis technique, a qualitative research method. In document analysis, the researcher systematically collects written sources such as books, newspapers, and magazines related to the research and evaluates them systematically (Merriam, 2018).

Sample

The research analysed the Turkish textbooks (grades 5 to 8) approved by the Ministry of National Education for the academic year 2022-2023. All the texts and activities in the textbooks were inspected to determine if they included any disaster-related content. The contents that reflected disaster-related information were assessed based on the predetermined international criteria.

Table 1

Turkish Textbooks Analysed in the Study

Grade	Author(s)	Publication	Content related to disaster education
5th	Şule ÇAPRAZ BARAN, Elif DİREN	Anıttepe	Yes
6th	Nihal ERTÜRK, Seray KELEŞ, Damla KÜLÜNK	MEB	Yes
6th	Mehmet Ozan SARIBOYACI	ATA	Yes
6th	Gülten ERKEK, Kadir DURU, Murat PASTUTMAZ, Sabri CEYLAN	MEB	Yes
7th	Ahmet AKGÜL, Ali UYSAL, Duygu KARADAŞ, Ebubekir GÜRCAN, İlkay KARAHAN, Nurcihan DEMİRER	MEB	No
7th	Emine KIRMAN, Seda YAĞIZ, Tolga KIR	MEB	No
7th	Hilal ERKAL, Mehmet ERKAL	Özgün	Yes
8th	Hilal ESELİOĞLU, Sıdıka SET, Ayşe YÜCEL	MEB	Yes

Table 1 shows no content related to disaster education in two different 7th-grade Turkish textbooks of MEB Publication. Therefore, these books were not included in the sample.

Data Collection

Data were obtained from textbooks. Official and unofficial documents prepared for curricula on educational issues can be examined (Patton, 2002). The United Nations International Strategy for Risk Reduction (UNISDR, 2007) prepared seven (7) questions that should be used in evaluating the education curricula of developing countries regarding disaster education. Three of these seven questions aim to analyse formal education in terms of disaster education.

In a general question form prepared for formal education curricula, these items were reorganised as a checklist to examine the texts and activities in the Turkish textbook. The data obtained were evaluated according to the criteria in the checklist. Firstly, the original questions were translated into English-

Turkish bilaterally and checked by a field expert. The following questions are related to the UNISDR curriculum (2007, p. 65):

1. Does the curriculum reflect hazards and vulnerabilities in both national and local scales? Does it make the information locally relevant by focusing on the social, economic and environmental dimensions of hazards and on wider public exposure to risk where students and their families live?

2. Does the primary school curriculum communicate information in an appealing manner (e.g. through games, field trips, dramatic arts and other forms of student engagement)?

3. Do schools and other learning centres engage external speakers and experts, and seize opportunities to bring together younger and older generations to discuss disaster risk reduction?

The above-mentioned general items were reorganised for the texts and activities in the Turkish textbooks. Five experts in the field were consulted to ensure that the reorganised items were appropriate in terms of language expression and scope. The characteristics of the experts are as follows:

Table 2

The characteristics of the experts

List	Gender	Experience	Education	Expert field
1	Female	19	Master	Turkish education
2	Female	14	Master (ongoing)	Turkish education
3	Male	20	PhD	Educational science
4	Female	12	Master	Turkish education
5	Female	14	PhD (ongoing)	Classroom education

The questions generated six items initially. However, with the expert opinions, the number of items increased to eleven. The experts reviewed the items and provided feedback. The form correction process was repeated until all experts agreed. For instance, the original Q1 was lengthy and contained multiple evaluations. Therefore, it was split into two, then four, and finally, six items. The second question generated two items, while the third question produced three items. Table 3 displays the items designed to assess the disaster education competence of Turkish textbooks regarding their text and activities.

Table 3

Disaster Education Sufficiency Checklist for Turkish Textbooks

Items for question 1	Yes	No
I1. Do the texts on disaster in Turkish textbooks reflect regional and local hazards and vulnerabilities in terms of disaster education?		
I2. Do the activities in the disaster-themed texts in Turkish textbooks reflect regional and local hazards and vulnerabilities in terms of disaster education?		
I3. Do the texts on disaster in Turkish textbooks focus on the social, economic, and environmental effects of hazards at regional and local scales in terms of disaster education?		
I4. Do the activities in the texts on disaster in Turkish textbooks focus on the social, economic, and environmental effects of hazards at regional and local scales in terms of disaster education?		
I5. Do the texts on disasters in Turkish textbooks provide information at the local level in terms of disaster education when students and their families are more exposed to risks in the region where they live?		
I6. Do the activities in the disaster-themed texts in Turkish textbooks lead students and their families to obtain information at the local level (about what will happen) when they are more exposed to risks in the region where they live in terms of disaster education?		
Items for question 2		
I7. Are the texts on disasters in Turkish textbooks structured to provide the desired behaviour in terms of disaster education (visuals, font, content information, message, other forms to attract students' attention)?		
I8. Do the activities in the texts on the disaster in Turkish textbooks convey information for the desired behaviour (through games, field trips, dramatic visuals, and other forms to attract students' attention)?		
Items for question 3		
I9. Do the texts on disasters in Turkish textbooks discuss disaster risk reduction in terms of narration? (In terms of showing witnesses, comparison, discussion, conflict elements)		
I10. Do the activities in the disaster-themed texts in Turkish textbooks encourage students to benefit from external speakers and expert individuals and organisations?		
I11. Do the texts and/or activities in the Turkish textbooks provide opportunities to bring together older and younger generations to discuss disaster risk reduction?		

Analysis

Content analysis was used to analyse the data. With content analysis, the texts and activities in the textbooks were evaluated and interpreted according to the determined criteria. In this way, it is aimed to reach concepts or relationships that can explain the data (Yıldırım & Şimşek, 2013). The data obtained in content analysis can be coded and digitised in various ways (Balcı, 2016). The texts and activities in the textbooks were analysed one by one in terms of the adequacy of disaster education and coded as "1" for the appropriate ones and "0" for the inappropriate ones and classified as present (1)/absent (0). For the validity and reliability of the study, the text units and visuals obtained were analysed separately by two different researchers. At last, common views were determined by coming

together. The formula [Reliability = Consensus/(consensus+disagreement)*100] was used for reliability (Miles & Huberman, 1994). There are eight themes in Turkish textbooks. There are four texts in each theme. A total of 192 texts in six textbooks were analyzed. Accordingly, disaster content was identified in eight texts in the textbooks, and each text was evaluated according to 11 criteria. Reliability= 80/88x100=90% and this result was considered sufficient for reliability. For the evaluations with disagreement, common views were determined by coming together at the last stage.

RESULTS

This section presents the findings and analysis of the data collected from documents related to the sufficiency of disaster education. The study evaluated the texts and activities in the textbooks based on specific criteria for disaster education. Samples that met the criteria were coded as 1, indicating their presence, while samples that did not meet the criteria were coded as 0, indicating their absence. The results are presented in Table 4.

It is seen in Table 4 that two texts in the 5th-grade textbook of Anıttepe Publishing have disaster content. In the 6th grade textbook, one text in the book of Ata Publishing and two in the book of MEB Publishing have disaster education content. In 7th grade, one text in the book of Özgün Publishing, and in 8th grade, one text in the book of MEB Publishing had disaster content.

Table 4

The Middle School Turkish Textbooks in Terms of Disaster Education Sufficiency

Grade/ Pub.	Theme/ Title of the Text	I1. Do the texts on disaster in Turkish textbooks reflect regional and local hazards and vulnerabilities in terms of disaster education?	I2. Do the activities in the disaster-themed texts in Turkish textbooks reflect regional and local hazards and vulnerabilities in terms of disaster education?	I3. Do the texts on disaster in Turkish textbooks focus on the social, economic and environmental effects of hazards at regional and local scales in terms of disaster education?	I4. Do the activities in the texts on disaster in Turkish textbooks focus on the social, economic and environmental effects of hazards at regional and local scales in terms of disaster education?	I5. Do the texts on disasters in Turkish textbooks provide information at the local level in terms of disaster education when students and their families are more exposed to risks in the region where they live?	I6. Do the activities in the disaster-themed texts in Turkish textbooks lead students and their families to obtain information at the local level (about what will happen) when they are more exposed to risks in the region where they live in terms of disaster education?	I7. Are the texts on disasters in Turkish textbooks structured to provide the desired behaviour in terms of disaster education (visuals, font, content information, message, other forms to attract students' attention, etc.)?	I8. Do the activities in the texts on the disaster in Turkish textbooks convey information for the desired behaviour (through games, field trips, dramatic visuals and other forms to attract students' attention)?	I9. Do the texts on disasters in Turkish textbooks discuss disaster risk reduction in terms of narration? (In terms of showing witnesses, comparison, discussion, conflict elements etc.)	I10. Do the activities in the disaster-themed texts in Turkish textbooks encourage students to benefit from external speakers and expert individuals and organisations?	I11. Do the texts and/or activities in the Turkish textbooks provide opportunities to bring together older and younger generations to discuss disaster risk reduction?
5th/ Anıttepe	Nature and Universe/ Deprem	0	0	0	0	0	0	1	1	0	0	0
5th/ Anıttepe	Nature and Universe/ Bu Nehir Bizim	0	0	1	0	1	0	1	1	1	1	0
6th/Ata	Nature and Universe/ Rüzgar	0	0	0	1	0	0	0	0	0	0	0
6th/MEB	Science and Tecnology/ İklim Değişikliği ve Toplum	0	0	1	0	0	1	0	0	0	0	0
6th/MEB	Nature and Universe/ Su Kirliliği	0	0	0	0	1	0	1	1	0	1	0
7th/Özgün	Nature and Universe/	1	0	0	0	0	0	1	1	0	1	0

	Küçük Yunus											
	Nature and Universe/											
8th/MEB	Hava Kirliliği	1	0	1	0	0	0	1	1	1	0	0

5th-grade Turkish textbook results and comments on the sufficiency of disaster education

In the 5th-grade Turkish textbook (Çapraz-Baran & Diren, 2022), there were expressions found in two items related to disaster education competence in the text titled "Deprem (Earthquake)" under the "Nature and Universe" theme. I7 and I8 evaluate whether the texts and activities aim to gain the desired behaviour and whether the content is interesting. The sentence, "Then my father came with a flashlight and took us to the kitchen, near the table (I remember they taught something like this at school. I wish I had listened to the lessons more carefully). Finally, the earthquake was over. Mum and Dad held our hands tightly and took us downstairs," aims to raise awareness about how to behave during an earthquake. The activity "Learn what to do during an earthquake" (Çapraz-Baran & Diren, 2022, p. 85) in the preparatory work also directs students to obtain information on this subject. However, although Turkey is an earthquake country, the textbook does not include statements about where earthquakes can occur in our country at regional and local levels, how to be prepared for earthquakes, and the dangers and effects of earthquakes. The absence of expressions and activities related to disaster risk reduction is also evident. Disaster education should cover before, during, and after the disaster. Therefore, the limited focus on the disaster sequence suggests that this text is insufficient in terms of disaster education.

The fifth-grade Turkish textbook contains a text titled "Bu Nehir Bizim (This River is Ours)" in the "Nature and the Universe" theme, which discusses disaster content. Although water pollution is not directly labelled as a disaster in the literature, it can be included in the disasters that develop suddenly or slowly due to natural and human causes. The text highlights the pollution of a river due to toxic wastes flowing from a factory and the damage it causes to the environment. It also explains what citizens can do in such situations. In terms of disaster education competence, the text provides findings related to I3, I5, I7, I8, I9, and I10. I3 and I5 focus on the social, environmental, and economic effects of hazards at regional and local levels and provide information about what will happen in the long term.

"He remembered their picnics and swimming races by the river. "I learnt to swim in this river, and so did my father and his father. My children should continue to swim in this river. I cannot let them destroy it!" They said that the fertility of the district's land depended on it. Why were they so insensitive to something so important in their lives? I will not let our river die." (Çapraz-Baran & Diren, 2022, p. 68)

The text explains that the social activity area of the people living in the region will be destroyed as a result of the factory continuing to release toxic wastes into the river. Agricultural productivity will decrease, and an environmental disaster will occur with the destruction of the river. I7 and I8 focus on the information about what kind of behaviour individuals should acquire during a disaster. I9 and I10 focus on what can be done to reduce the risk of disaster. The text explains that the students noticed the polluted water flowing into the river, and they wanted to meet with the owner of the factory. They collected signatures by displaying an example of social responsibility on the issue, and they took

samples from the river water to justify their claims and had them analysed. Finally, they tried to take measures to reduce the risk of disaster by reporting the issue to the local authorities and the press with the evidence they had.

The preparatory activities in the text direct the students to search for environmentally sensitive organisations. Additionally, Activity 12 in the textbook (Çapraz-Baran & Diren, 2022, p. 77) provides information on reducing the risk of disaster and establishing a club to protect nature. To reduce the risk of disaster and to provide information on this subject, firstly, information about ÇEVKO was given, and students were asked to establish a club to protect nature and to write a story by researching this subject. The students are asked to imagine that they have established a club for the protection of nature and write a story about their work with this club.

"12th Activity

b) Imagine that you and your friends have established a club for the protection of nature and write a story about your work with this club." (p. 77)

Overall, the text serves as a valuable resource for students to learn about the effects of disasters and the importance of taking action to prevent them.

6th-grade Turkish textbook results and comments on the sufficiency of disaster education

In the 6th grade Ata Publications Turkish textbook, the text titled "Rüzgâr (Wind)" (Sarıboyacı, 2022, p. 134) in the "Nature and Universe" theme is in accordance with an item related to disaster education competence. The activities in the I4 textbook draw attention to the social, economic and environmental effects of regional and local hazards on disaster. The activity in the preparatory work of the text draws students' attention to the situations caused by wind (Sarıboyacı, 2022, p. 133):

"1. Research how wind is formed, in which regions it is most common and the events it causes."

With the above activities, it was tried to raise awareness that wind is a disaster. However, there is no content in the content and activities of the text to create disaster awareness about how to be protected from this disaster, what precautions can be taken, and what can be done during and after the disaster.

In the 6th grade Turkish textbook of MEB Publishing, there are four items (I5, I7, I8, I10) related to disaster education competence in the text titled "Su Kirliliği (Water Pollution)" (Ceylan et al., 2021, p. 152) in the "Nature and Universe" theme.

I5 evaluates what can happen in case of prolonged exposure to disaster in the environment where they live. In the statements in the text, it is stated that the use of contaminated drinking water can cause various epidemics and the extinction of living things. "As a result of using contaminated fresh water as drinking water, epidemics may occur. The drinking water problem occurs. In addition, various animals and plants living in rivers, lakes and seas are damaged by pollution." (Ceylan et al., 2021, p. 153)

I7 and I8 are related to whether the texts and activities on disaster contain information appropriate for the desired behaviour. The text includes information about the causes of drinking water pollution, the importance of water, the negative consequences, and how to clean drinking water. When the activities are analysed, in Activity 3 (Ceylan et al., 2021, p. 155), there is a visual with the slogan "Take your rubbish along with your memories" in a picnic area with a river. There is a visual with the slogan. It can be said that the students were directed to the desired behaviour by asking them to share their

thoughts about this slogan. The question "What do you think life would be like without water?" (Ceylan et al., 2021, p. 152), also included in the preparatory activities, directed the students to think about not polluting water and using it consciously. I10 is about getting information/assistance from external sources for disaster risk reduction. In Activity 4 (Ceylan et al., 2021, p. 156), information about recycling was given, and students were directed to the Ministry of Environment and Urbanisation website to access more information. It can be said that with this activity, an awareness towards risk reduction was tried to be created in students.

In the 6th grade Turkish textbook of MEB Publishing, there are two items (I3, I6) related to disaster education competence in the text titled "Climate Change and Society" (Ertürk et al., 2021, p. 206) in the "Science and Technology" theme. The texts and activities in the M3 and M6 textbooks focus on the social, economic and environmental effects of hazards regionally and locally and the effects that may occur when exposed to the region for a long time. Although climate change itself is not a disaster, it can lead to various situations that may cause climatic, social, and human disasters. These situations include destroying agricultural areas due to droughts, melting glaciers, floods, depletion of water resources, spreading epidemics, and migration. The following text provides information on the potential outcomes of climate change.

"If the sea level rises even by 1 metre due to climate change, 17% of Bangladesh will be flooded, and millions of people will be displaced. If there is a hurricane disaster on top of this, millions of people could die, just like in 1970." (Ertürk et al., 2021, p. 207)

In activity 2 (Ertürk et al., 2021, p. 208), the question "What kind of problems does climate change cause in your neighbourhood?" draws students' attention to the problems in their region.

7th-grade Turkish textbook results and comments on the sufficiency of disaster education

In the 7th grade Turkish textbook, the text titled "Küçük Yunus" (The Little Dolphin) (Erkal & Erkal, 2022, p. 132) in the "Nature and Universe" theme includes four items (I1, I7, I8, I10) in terms of disaster education competence.

I1 evaluates whether the texts in the textbook reflect regional and local hazards and sensitivities about the disaster. In the text, it is explained that a small member of a dolphin family swimming in the Black Sea died after being hit by radioactive barrels thrown into the sea uncontrollably. In the text, the danger and sensitivity related to the pollution of the seas and the extinction of sea creatures as a result of human disasters are indicated in bold: "Sewage, toxic factory wastes, rubbish dumped carelessly and barrels loaded with chemicals were the killers of the living sea." (Erkal & Erkal, 2022, p. 134)

I7 and I8 are related to whether the texts and activities on disaster include information appropriate to the desired behaviour. It tried to create disaster awareness for the desired behaviour in students through the message intended to be given in the text. The visuals used in the text (the dead dolphin fish washed ashore and the barrels on the sea) convey the message of "not polluting the water for the life of living things". The information about dangers and sensitivities in Activity 9 tries to direct students to positive behaviour based on negative information.

"Activity 9

1 litre of waste oil can pollute 1 million litres of drinking water and threaten the lives of fish and other living things in the water,

A glass bottle does not disappear in nature for 4000 years, plastic for 1000 years, bubble gum for five years, tin can for 10-100 years, cigarette filter for two years,

Which of the above information interested you the most? Based on this information, talk to your friends about the benefits of recycling." (Erkal & Erkal, 2022, p. 139)

I10 is about getting information/assistance from external sources for disaster risk reduction. The question "Give information to your friends about non-governmental organisations working to protect the environment." (Erkal & Erkal, 2022, p. 132) in the preparatory work of the text directs students to research the subject.

8th-grade Turkish textbook results and comments on the sufficiency of disaster education

In the text titled "Hava Kirliliği (Air Pollution)" in the "Nature and the Universe" theme in the Turkish textbook of the MEB Publishing (Eselioğlu et al., 2021, p. 242), there is content for five items (I1, I3, I7, I8, I9) related to disaster education competence. I1 and I3 include hazards and vulnerabilities related to disasters and evaluate the social, environmental and economic impacts of these hazards regionally and locally. In the text, it is explained that the air pollution in Ankara and Istanbul is at a disaster level. A curfew was declared due to the pollution, schools were cancelled, official delegations gave up coming to Ankara, and in the long run, people suffered from chronic diseases. Air pollution has reached dangerous dimensions for people by explaining that the Anatolian side cannot be seen from the European side of the Bosphorus due to air pollution.

I7 and I8 evaluate whether the text and activities are aimed at gaining the desired behaviour. The text includes information about what causes air pollution, its damages and how to find a solution (e.g. installing filters on the chimneys of factories, using natural gas as fuel). In activity 7 (Eselioğlu et al., 2021, p. 245), two cartoons reflecting air pollution give a message about preventing air pollution.

I9 assesses whether the textbook contents cover the topic of disaster risk reduction. The text describes the measures taken to reduce air pollution since 1995 and includes air pollution maps. It also explains the improvement activities undertaken after taking measurements.

CONCLUSION AND DISCUSSION

The study analysed Turkish textbooks used in middle schools for the 2022-2023 academic year. Out of the eight textbooks examined (one for 5th grade, three for 6th grade, three for 7th grade and one for 8th grade), only five contained content related to disasters. Two textbooks for 7th grade published by MEB had no disaster content. The disaster content was limited to specific themes within the textbooks. Two texts in the "Nature and Universe" theme for 5th grade, two texts for 6th grade (one in "Nature and Universe" and one in "Science and Technology"), and one text each in the same theme for 7th and 8th grade contained disaster content. The disasters covered in the textbooks included natural disasters like earthquakes and wind and climate disasters like air pollution. The other five texts discussed climate change and water pollution, which can lead to humanitarian or climatic disasters in the long run. Although climate change and water pollution are not disasters per se, they were included in the study as they have disaster content. The Sendai Declaration, a global strategy for disaster risk reduction, highlights the importance of health, climate change, and sustainable development (Aitsi-Selmi et al., 2016).

The criteria determined by UNISDR for disaster education competence were adapted to the texts and activities in the Turkish textbook. Accordingly, it is possible to summarise the results under three headings:

1. The first six items (I1, I2, I3, I4, I5, I6) aim to evaluate the adequacy of Turkish textbooks about disaster education. These items provide information on the long-term effects of risks on individuals in their environments by assessing whether hazards and vulnerabilities are reflected at the regional and local and their social, economic, and environmental impacts. It has been observed that the Grade 5 Turkish textbook does not include any regional and local level information regarding the subject of "Deprem (Earthquake)."

Turkey is a country prone to earthquakes, which is why students need to be aware of the potential risks of earthquake disasters at regional and local levels. Students should also learn how to prepare for earthquakes and deal with their dangerous effects. According to a report by the Investigation Commission of the Grand National Assembly of Turkey (Turkiye Buyuk Millet Meclisi [TBMM], 2010), the primary education curriculum in Turkey should include topics on earthquake preparedness and how to behave during and after an earthquake.

Most textbooks only cover one or two specific topics, usually at a regional or local level. For example, the 7th-grade textbook covers water pollution in the Black Sea region, while the 8th-grade textbook focuses on air pollution in Istanbul and Ankara. Some textbooks try to make the subject relevant to students' lives by encouraging research on their local regions. However, these textbooks lack an integrated and spiral structure. A recent study found that secondary school students have insufficient awareness and preparation for regional disasters. They do not understand the purpose of emergency kits, their families do not contribute enough to disaster preparations, and they experience negative emotions such as anxiety, sadness, and fear during natural disasters (Adanalı et al., 2022).

According to Petal and Izadkhah (2008), disaster education for children should focus on the dangers of natural disasters and how to prepare before, during and after the disaster from a holistic perspective. A study revealed that even adult students have inadequate levels of pre-disaster preparedness (Şahin et al., 2018). For instance, in Cuba, a project was undertaken to enhance disaster preparedness through the addition of educational content specific to the types of disasters prevalent in the region to school programs (United Nations, 2006).

It would not be wrong to characterise Turkey as a country of disasters because almost every year, one or more disasters, such as earthquakes, landslides, avalanches, and floods, are experienced throughout the country (AFAD, 2018). The "Nature and the Universe" theme in Turkish textbooks that are thematically prepared usually focuses on disasters. Upon analysis, it is evident that the texts convey messages that aim to prevent, avoid, or cope with disasters. These texts in the textbooks indicate that the intention is to raise disaster awareness among students through Turkish language lessons. Therefore, including current information, sensitivities, and potential disasters at the regional and local level in the disaster texts and activities in the textbooks can significantly contribute to disaster education at all grade levels.

2. Items 7 and 8 (I7 and I8) of the study are focused on evaluating the adequacy of Turkish textbooks in educating students about disasters. The evaluation criteria for these items examine whether the textbooks and related activities provide sufficient information to encourage desired behaviour. The

results of the evaluation show that the texts titled "Rüzgar (Wind)" and "İklim Değişikliği ve Toplum (Climate Change and Society)" in the 6th-grade textbooks do not provide the necessary information to promote desired behaviour. The text type used in the "Wind" poem does not focus on disasters but only aims to raise awareness that wind can be a disaster. Similarly, the text titled "Climate Change and Society" provides only brief information about the disasters that result from climate change. Therefore, it can be concluded that the 6th-grade textbooks are inadequate in terms of disaster education. It is crucial to pay attention to the structure and content of the text used to raise students' awareness about disasters in the sixth grade. In contrast, at other grade levels, the texts generally contain visuals, expressions, and messages that promote desired behaviour.

The majority of disaster awareness activities tend to focus on research-based information gathering, with very few practical activities being carried out. According to Mızrak (2018), practical disaster awareness activities are more effective in helping students acquire the necessary knowledge and skills. Another study by Musacchio et al. (2016) found practical disaster education activities attract students' attention and increase participation rates. Additionally, research has shown that individuals who have experienced disasters have a higher level of disaster awareness than those who have not (Yakar & Dikmenli, 2019; Özen, 2020).

To effectively integrate disaster education into Turkish lessons, teachers can use the sample lesson plans and activity book with material ideas in the "School-Based Disaster Education" project, which covers all levels and disciplines (MEB, 2021a; MEB, 2021b). These resources can be accessed via the Education Information Network (EBA). Integrating disaster education into course content is important, as this ensures that the knowledge and skills gained are retained and applied in practice. In the past, various institutions and organisations developed disaster awareness training programs after the 1999 earthquake, but they were not sustainable due to a lack of integration into the education system (Sanduvac & Petal, 2010).

3. Items 9, 10 and 11 (I9, I10, I11), which evaluate Turkish textbooks in terms of disaster education adequacy, evaluate the texts and activities in the textbooks in terms of disaster risk reduction. According to the Global Risk Index, Turkey ranks 45th among 191 countries and is among the countries in the "high-risk" group. Risk reduction is the basis of successful disaster management. Thus, planning, response and recovery processes can be carried out more successfully (AFAD, 2018). Today, in addition to raising awareness of individuals about disasters through disaster education, individuals are also expected to take an active role in disaster risk management processes. In the Sendai Framework for Disaster Risk Reduction (2015-2030) adopted at the United Nations World Conference on Disaster Risk Reduction III (2015), it was emphasised that all segments of society should be made aware of disaster risk reduction through education (MEB, 2021b). The participation and awareness of civil society, the private sector and citizens will ensure progress in terms of disaster management and risk reduction (AFAD, 2018).

Upon analysis of the findings, it was discovered that the text entitled "Deprem (Earthquake)" in Grade 5 and the texts entitled "Rüzgâr (Wind)" and "İklim Değişikliği ve Toplum (Climate Change and Society)" in Grade 6 did not include any expression or activity related to disaster risk reduction. It is important to incorporate disaster risk reduction in Turkish lessons by discussing the subject matter within the context of the text, bringing together young and old generations and directing them to relevant institutions and organisations for information. Unfortunately, none of the texts have content that would enable young and old generations to come together to reduce disaster risk. However, it is critical

for them to work together to gain a broader perspective and experience (İnal et al., 2018). Collaborating with relevant institutions such as AFAD, Red Crescent, fire brigade, non-governmental organisations, can also be effective in raising awareness about disasters. Most of the textbooks did not discuss disaster risk reduction, which indicates that the Turkish textbooks are inadequate.

As part of the School-based Disaster Education Project, teachers were given training to improve their knowledge and skills in disaster risk reduction. The goal was to empower our teachers to conduct disaster education activities in their classrooms and prepare our children for disasters at an early age (MEB, 2021b). Updating the content of disaster programs and involving families can enhance the effectiveness of disaster risk reduction education programs.

Recommendations

Textbooks are important in gaining knowledge and skills for all courses. For adequate disaster education in Turkish lessons:

Disaster education can be integrated with the content of the course and text selection, and this content can prepare activities. Disaster types can be diversified. Students can learn about a variety of disasters, not just natural ones. Current information and visuals can be used in textbooks. Practical activities can be emphasised while preparing activities. Disaster education can be planned as before, during and after. Social responsibility projects can be prepared with students to develop disaster awareness.

In future studies, primary school Turkish textbooks can also be analysed in terms of disaster education adequacy, and a holistic perspective on the subject at the primary education level can be put forward. Course contents suitable for disaster education can be designed, and their effectiveness can be measured from various aspects.

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Author Contributions

The author planned, modeled, and conducted the study.

Conflict of Interest

No potential conflict of interest was declared by the author.

Supporting Individuals or Organizations

No grants were received from any public, private or non-profit organizations for this research.

Ethical Approval and Participant Consent

Ethics committee permission for this study is not needed.

Copyright Statement

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Plagiarism Statement

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Availability of Data and Materials

Not applicable.

Acknowledgements

No acknowledgements.

Education in Disaster Situations: The Impact of The Kahramanmaraş Earthquake on Teachers' Experiences

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Abstract

This study examines how the earthquake that occurred on February 6, 2023, in Kahramanmaraş, Turkey, has affected educational activities in the region. The research utilized questionnaires to survey teachers and gather information about the main problems they experienced after the earthquake and their solution suggestions. The findings provide valuable insights for educators and policymakers to tackle the challenges teachers and students face after a natural disaster. The study employed a basic qualitative research design within qualitative research methods. The study group comprised 42 volunteer teachers from eleven different Turkish provinces at various education levels who experienced the February 6, 2023, earthquake centered in Kahramanmaraş and participated in educational activities in the same area following the earthquake. The group of research participants was selected through easily accessible case sampling, one of the types of purposeful sampling. The data collected underwent content analysis. As per the study results, teachers detected issues that have arisen after the earthquake in the realms of educational infrastructure, psychosocial well-being, security, communication, and other factors. They then devised individual and collaborative solutions to address these challenges. Additionally, the study discussed the proposed solutions of teachers for addressing the psychosocial issues that students face in the aftermath of an earthquake. It provides crucial insights for comprehending the problems in post-earthquake education and extending support to students. Teachers' recommendations for enhancing earthquake education and awareness can significantly aid future preparedness and crisis management.

Keywords

Earthquake, education, disaster situations, teacher perspectives.

INTRODUCTION

People think with concepts and express their thoughts with concepts. Disaster, one of these concepts, is defined as any destruction that deeply affects humanity (Özey, 2011, pp. 1). Disasters leave unforgettable traces because they change normal living conditions. In this respect, all kinds of disasters experienced in the past constitute the memory of people and societies regarding geography. In this context, the vital memories of teachers who experienced the earthquake whose epicenter was Kahramanmaraş on February 6, 2023, and who continued their educational activities in their regions after this earthquake are seen as an essential source of knowledge in preventing the damages of disasters that may occur in the future.

Most disasters are of natural origin, and there is no intervention of humans in any way (Özey, 2011, pp. 2). On the other hand, natural events cyclically affect the people in the geography where they occur. People become aware of natural events through the knowledge they acquire through experience and education (Shaw et al., 2004). However, any action they take without considering their knowledge of natural phenomena such as earthquakes, volcanic eruptions, storms, heat, etc., without basing natural phenomena and ways of protection from them on scientific data, results in damage and loss.

As Turkey is in a highly seismic region, it is a country with a high probability of facing earthquake-related disasters at any time (Değirmenci et al., 2019). Earthquakes are sudden oscillations and vibrations in the earth's crust that can cause significant changes in the earth. The extent of damage caused by earthquakes on the earth is directly proportional to the geological structure of the land, the resistance of buildings, the level of development of countries, and the earthquake awareness of individuals and society (Sözcü, 2019, pp. 1-8). Earthquakes cannot be prevented, but the consequences of earthquakes can be minimized with disaster awareness. Individuals can gain disaster awareness through a lifelong disaster education process. Disaster education is essential for individuals to know their geography, how to act in the face of possible disasters, to raise disaster awareness, and for this awareness to be sustainable. The most crucial feature of disaster education is that it can make the individual and, thus, the society conscious and resistant to disasters. In this context, disaster education can be defined as the process that allows individuals and society to act consciously against natural events. Disaster education aims to raise awareness of individuals about the risks that may arise before, during, and after disasters within the scope of disaster preparedness and to minimize disaster risks as much as possible.

Disaster training is generally given in schools, and the subject and material are human beings. It is only possible for teachers to provide an effective disaster education and for students to receive a good disaster education with a safe learning environment. Therefore, it is essential to ensure the continuity of post-disaster education. Because post-disaster education often provides psychological support for students' mental health, coping, and happiness (Lai et al., 2019; Masten et al., 2015; Masten & Narayan, 2012; Robinson et al., 2014). This function of education can become a symbol of the post-disaster recovery of society (Pacheco et al., 2022). However, it will contribute significantly to survival and return to normalcy after a significant trauma (Masten & Obradovic, 2008). The presence of students in safe learning environments and the provision of all kinds of support by teachers are two of the most important issues students need. The Ministry of National Education, the expert institution in education, develops curricula considering society's needs the individual, and nature. Therefore,

providing education after an earthquake is also among the duties of this institution. Teachers who fulfill this school duty prepare their students for daily life and the future. The strengths and weaknesses of teachers and curricula in the face of disasters can be better seen through post-earthquake education activities. However, it is argued that the curriculum should be organized around topics related to the concept of disaster, helping students to see the world as more than a set of experiences (Young vd., 2014, pp. 94), but this should be experience-based. If we accept this curricular approach, the fact that the knowledge to be taught about disasters is relevant to students' lives and includes scientific theoretical concepts will provide a strong rationale for the inclusion of disaster in the curriculum (Wrigley, 2018, pp. 7). The urgency and importance of disasters and their social demands are essential in showing how the learning objectives related to disasters should be in Turkey. For this reason, teachers' rich educational experiences related to disasters may contain both the rationale for developing programs and clues in creating individual and social disaster awareness that is more resilient against earthquakes. At the same time, this situation may reveal post-earthquake education-teaching problems and may contain solution suggestions.

Teachers receiving earthquake-disaster training during their normal education processes and acquiring experienced scientific knowledge about disasters may help them make effective decisions in post-disaster education activities. In addition, knowing teachers' earthquake and post-earthquake education experiences contributes to disaster-education culture and awareness. It is assumed that teachers' pre- and post-earthquake education experiences will include knowledge, skills, and values related to before, during, and after disasters, provide in-depth examples of experiences for precautions to be taken before disasters, and constitute a rich data source in minimizing the damages of disasters.

Earthquakes are natural events that affect large areas, and earthquakes affect children the most (Dyregrov et al., 2018; Norris et al., 2002; Peek, 2008). Children may face significant problems both physically and emotionally after earthquakes. These problems include post-traumatic stress disorder, fear, anxiety, sadness, helplessness, panic, anxiety, shock, confusion, and feeling empty (Houston, 2012). In the face of these and similar problems, post-earthquake education can play an essential role in helping children (students) return to their everyday lives and cope with post-traumatic stress (Johnston et al., 2011). In other words, education can greatly support students in returning to their routine daily lives and emotional normalization. It can also provide an essential link between children, families, and society in disaster preparedness (Dufty, 2009; Finnis et al., 2004; Ronan et al., 2008).

When the literature on disasters is examined, it is seen that many different studies have been conducted. Sözcü (2019) stated that Turkey is located on the Alpine-Himalayan earthquake belt, Sever (2019) stated that earthquakes deeply affect society in terms of social, economic, and psychological aspects, Karagel, D. (2019) noted that the training for prediction and early warning of natural disasters to understand what will happen is evaluated within the scope of disaster risk method, Budak (2019) stated that disaster cultures and disaster awareness of societies can be improved through disaster education, Karagel, H. (2019) indicated that it is essential to form teams that can cope with disaster in post-disaster crises, Kuzey and Göçgen (2021) stated that adults know the disasters they have experienced more than the disasters that may occur in the geography they live in. Değirmenci et al. (2019) stated that social studies textbooks include earthquake disasters more than the types of disasters frequently seen in the world and Turkey.

In the foreign literature, Pescaroli and Alexander (2018) provide a framework for understanding disasters regarding complex and successive events, interacting and interconnected risks. De Ruiter et al. (2019) addressed the impacts of two or more disasters occurring simultaneously or sequentially on society. Zscheischler et al. (2018) propose a more generalized definition of multiple natural disasters that increase societal or environmental risk. Aghakouchak et al. (2018) state that natural disasters can be of the same or different hazard categories and occur within or across a region or country, but their risks are the same. Cutter (2018) defines natural disasters as extreme events that lead to physical, social, or economic disruption and substantially impact society over time. However, Gill and Malamud (2014) argue that the scope of natural disasters depends on temporal and spatial boundaries. However, no specific temporal or spatial parameter is defined in the literature. Mcaneney et al. (2015) define disasters as physical events that cause damage. Mutch (2014) concluded that schools can be the 'glue' that holds society together. Another study stated that schools were the center of teacher and peer support after the Christchurch earthquake to enable students to cope with problems and provide a stable environment (Mooney et al., 2021; Mutch, 2015). They state that these damages express the susceptibility of the elements at risk with their social, economic, environmental, and infrastructural components to experience loss due to a particular hazard intensity.

More studies on post-earthquake education should be conducted based on the experiences of teachers who have experienced the earthquake. The assumption that the data obtained from teachers who have experienced earthquakes in different geographies on earthquake and education may contain clues in solving post-earthquake education problems makes this research important. In addition, knowing how the earthquake disaster shaped teachers' post-earthquake education awareness and behaviors can guide possible post-earthquake education preparations.

Purpose of the Study

This research aims to reveal the difficulties faced by teachers who have experienced the earthquake themselves and continue to work in the earthquake zone in their post-earthquake education, the problems experienced by students, and what should be done in educational environments to be minimally affected by the earthquake. In line with this purpose, the primary concern of the research can be expressed as "What are the main problems faced by teachers continuing education after the earthquake, and what are the solutions to these problems?". Within the scope of this problem, answers to the following research questions were sought.

1- What are the problems the teachers face in their post-earthquake education, and what are their suggestions for solutions to these problems?

2- According to the teachers, what psychological problems are faced by the students after the earthquake, and what training should be given first?

3- According to the teachers, what is the relationship between the teaching programs of their courses and the preparations to be made against earthquakes?

4- What are the knowledge, skills, and training teachers have regarding earthquake preparedness? How are these trainings used in earthquakes?

METHOD

This study used the "basic qualitative research method" from qualitative research methods. The "Basic Qualitative Research Method" was preferred because it allows teachers to focus on constructing post-earthquake education according to their experiences (Merriam, 2018). In this study, this method was chosen to determine how teachers interpreted their post-earthquake education lives, how they constructed their post-earthquake education processes, what problems they encountered in post-earthquake education processes and how they solved these problems, and what post-earthquake education added to their experiences. Ethics Committee Approval was obtained with the Ethics Committee Decision of Bayburt University Ethics Committee dated 10.10.2023 and numbered 339.

Participants

The research study group comprises 42 volunteer teachers from eleven provinces working at different educational levels who experienced the February 6, 2023, Kahramanmaraş-based earthquake and participated in educational activities in the same region after the earthquake. The study group was formed from volunteer teachers to avoid taking the opinions of individuals who have experienced the earthquake process by force if they do not want to express their opinions. To examine the post-earthquake education experiences of these teachers in more detail, the study group was determined according to easily accessible case sampling from purposive sampling methods. Purposive sampling methods allow for a detailed study of situations that are thought to have rich information. Convenience sampling, which is one of the purposive sampling methods, was determined as the sampling method of the study because it allows the researcher to select a situation that is close and easy to access, economical and time-saving (Yıldırım & Şimşek, 2008). Descriptive information about the participants is given in Table 1 below.

Table 1

Descriptive information about the participants

Participant's Province	Area	Gender	f
	Turkish	Female	2
Kahramanmaraş	Social Sciences	Male	3
	Mathematics	Male	2
	Primary	Male	3
Elazığ	Primary	Female	1
	Religious Culture and Ethics Knowledge	Male	2
	Primary	Male	7
	Primary	Female	5
	Pre-school	Female	1
	History	Male	1
	English	Female	2
	Social Sciences	Male	2
Hatay	Physical Education	Male	1
	Turkish Language and Literature	Male	1
	Pre-school	Female	1
	Turkish	Male	1

	Pre-school	Female	1
Kilis	Primary	Female	1
	Science	Male	1
Osmaniye	Religious Culture and Ethics Knowledge	Male	2
	Philosophy	Male	1
Malatya	Vocational Courses	Male	1

When Table 1 is examined, it is seen that the participants consisted of female (f=14) and male (f=26) teachers, including kindergarten (f=3), primary school (f=17), secondary school (f=18), high school (f=4). However, it is understood that the participants are concentrated in primary and secondary schools and are from all grade levels. Finally, when Table 1 is analyzed, it is seen that the highest number of participants is from Hatay (f=25), and the lowest number is from Malatya (f=1).

Data Collection Tool

The study used a semi-structured interview with open-ended questions to collect data. Before creating the questionnaire questions, the relevant literature was examined, and a pool of questions was created in line with the purpose of the study. The pool of questions was sent to five teachers working in the earthquake zone, and their opinions were sought on whether these questions were in a way to cover their experiences or whether there were any deficiencies. The question pool was reorganized in line with the feedback from the teachers. Then, field experts were consulted to determine whether the questions were suitable for data collection in line with the purpose of the study. Two faculty members who are experts in qualitative research were consulted to get their opinions on the research questions. Then, the research questions were reorganized, and this time, the questions were presented to two faculty members who have academic studies on natural disasters, such as earthquakes, with qualitative research methods in the field of social studies education and who have taught the "Disaster Education" course at the same time. The questions were organized in line with their opinions. The questionnaire was finalized because of the feedback received. The semi-structured interview form was sent electronically (via Google Form) to volunteer teachers who had experienced the earthquake, and teachers (from now on referred to as participants) were asked to express their knowledge and experiences regarding the educational processes they experienced after the earthquake. The number of Google Forms the participants could send for their answers was limited to one. The findings obtained from the semi-structured interview form sent by the participants constitute the primary data source of the study.

Data Analysis

The data of the study were analyzed by content analysis method. Content analysis is a method used to explain the explicit content of written or oral information or messages in an objective, measurable, and verifiable way (Fiske, 1996; Metin & Ünal, 2022). Bernans-Berelson (1952) defines content analysis as making objective, systematic, numerical descriptions of the communication content of written or oral information or messages (Bilgin, 2006). Krippendoff (1986) defines content analysis as a technique for obtaining reproducible and valuable inferences from the data in the content of written or oral information and messages (cited in Aziz, 2015). Content analysis is a research data analysis technique in which valid interpretations from the data emerge from a series of processes. These interpretations

are a technique that provides information about the sender of the information or message, the information and message itself, and the receiver of the information and message (Metin & Ünal, 2022).

The two authors independently analyzed ten randomly selected answer sheets submitted by the teachers participating in the study, and the codes and categories generated were compared. It was observed that the codes and categories obtained were broadly similar. This practice is based on the agreement of two or more coders on the codes used for the same passage in the exact text; that is, it shows whether different coders code a passage with the same or similar name (Creswell, 2017). The reliability formula expressed by Miles & Huberman (1994) (Reliability = Agreement / (Agreement + Disagreement) was used in the study, and the agreement between the coders was found to be 86%. Then, two different study authors analyzed the remaining questionnaire forms and completed the data analysis.

The forms received from the participants were numbered starting from the first form. Forms that did not contain an answer were excluded from the evaluation. Participants' responses to each sub-problem were evaluated under their categories. When describing the participants, the T code was used for the teacher, and the number was used for the number of teachers. For example, (T25) indicates the 25th teacher.

Validity and Reliability of the Study

All research is concerned with producing valid and reliable information within ethical principles (Merriam, 2018). There are several measures taken for both reliability and validity in qualitative research (Yıldırım & Şimşek, 2008). In this study, the expert review was used for validity, consistency review was used for reliability, and confirmation review was used to confirm the results obtained from the research by comparing them with raw data. Within the scope of the expert review, an expert academician who knows qualitative research and research was consulted, and his/her suggestions were taken. Within the scope of the consistency review, the same questions were asked to all participants in the study, teachers were given a flexible period to answer the questions, the data obtained were analyzed by a person who was an expert in the research method, and these analyses were compared with the analyses made by the researchers. Kappa statistic (Cohen, 1960) was used to determine the degree of agreement of the analyses. The level of agreement in the analyses was found to be 0.80, and it can be said that this value is essential in terms of the power of agreement (Landis & Koch, 1977). The more experience the researchers have with the participants in the participants' settings, the more accurate or valid the findings will be (Creswell, 2017). In this sense, the fact that one of the authors of this study has been in the research environment for a long time is another measure to increase validity.

Ethical Principles

Ethics committee permission for this study was obtained from Rectorate of Bayburt University Ethics Committee decisions with the decision dated 10.10.2023 and numbered 339.

FINDINGS

The findings obtained from the research are presented in the tables below according to the order of the questions in the semi-structured interview form. The findings regarding the answers to the research's first question are given in Table 2 below.

Table 2

Findings on the main problems experienced by teachers regarding post-earthquake education

Themes	Codes	*f*
Issues related to psychosocial well-being and feelings of safety	Lack of motivation	3
	Student absenteeism and attention deficit	2
	Children's adaptation problems after a break in education	2
	Lack of concentration and anxiety	1
	Anxiety in students	1
	Adaptation of students	1
	Fear of entering physical space	1
	Psychological states of students, parents, and teachers affected by the earthquake	1
	Motivation, the problem of feeling safe	1
	Psychological	1
	Psychological distress	1
	Fear in students and us	1
	Fear of entering the building	1
	Weariness, demoralization, demotivation fear	1
	Anxiety at school, fear of an earthquake	1
Problems related to the continuity of education and training	Students' attendance problem	3
	Students learning losses	3
	Children's adaptation problems after a break in education	2
	Some of the students are homeless and cannot come to school	2
	Low student enrollment and attendance	1
	Plan program and training material and resource needs	1
	Dual education and student absenteeism	1
	Children not starting education from the 2nd semester until now	1
	Student absenteeism and attention deficit	1
	Students have regressed a lot	1
	Relocation of teachers and students, lack of attendance, inability to stay on task	1
	continuous student transfers	1
Problems related to educational infrastructure and social	School and housing	3
	Training environment and lack of adequate trainers	2
	Lack of equipment	2
	Physical structure inadequacies, finding a place, location	2

	Safety and accommodation problems for both students and us	1
Management and logistics issues	Lack of coordination and transportation problems	3
	Late school planning	1
	Transportation difficulties to container city schools	1
	Problems in meeting the food and beverage needs of the staff	1
Problems with communication and participation	Not reaching students	1
	Ignoring parents' suggestions for solutions	1
	Problems arising from language problems of foreign students	1
Problems related to human resources in education	Uncertainty over the fate of surplus teachers	2
	Training environment and lack of sufficient trainers	1

When Table 2 is analyzed, it is understood that the participants mainly emphasized; "Lack of motivation" (f=3) in the theme of "Issues related to psychosocial well-being and feelings of safety (f=19)", "Students' attendance problem (f=3) in the theme of "Problems related to the continuity of education and training (f=18)", "School and housing (f=3) in the theme of "Problems related to educational infrastructure and social (f=10)", "Lack of coordination and transportation problems (f=3) in the theme of "Management and logistics issues (f=6)", "Not reaching students (f=) in the theme of "Problems with communication and participation (f=3)" and, "Uncertainty over the fate of surplus teachers (f=2) in the theme of "Problems related to human resources in education (f=3)". Also, the teachers who participated in the study mentioned location problems, unsafe educational environments, lack of equipment, housing, and physical structure inadequacies regarding the problems they experienced regarding educational infrastructure and social facilities during the educational processes. People need the space requirements that ensure life safety and comfort most in their daily lives after an earthquake. The opinions of some of the teachers participating in the study on this question are as follows.

"...The fact that education has been suspended for a long time has led to a loss of motivation. Therefore, there is a need for support to overcome the trauma experienced." (T13)

"...Students have attendance problems, both students and we have problems with security and housing." (T26)

"...The psychological states of students, parents, and teachers affected by the earthquake and physical structure inadequacies." (T27)

The findings regarding the teachers' answers to the second question of the study are given in Table 3 below.

Table 3

Findings related to teachers' solutions to the problems they encountered in post-earthquake education processes

Themes	Categories	Codes	ƒ
Individual solutions	Psychosocial support and crisis management	Explaining that earthquake is a reality of our lives	2
		Getting support from the guidance service in schools	2
		Support children and make efforts to help them overcome trauma	1
		Psychosocial support, remedial training, improvement of school management	1
		Creating environments where children will be safe	1
		Not talking about earthquake-related issues	1
		Contacting parents	1
		Stress management	1
		Psychosocial support	1
		Continue to work with patience	1
	Tools, equipment, and collaborative solutions	Using everyday materials with fellow teacher	1
		Solving problems in our ways and taking risks	1
		Protecting the belongings of the school after the earthquake and providing the missing items from the schools to be demolished	1
		Informing and Providing information to parents and responding to their questions	1
		the staff during the process and keeping them informed of developments	1
	Crisis management in the process of teaching courses in distance and face-to-face education	Teaching with more activities and games	4
		To conduct specific lessons in the garden, to work on the safety of the physical space, to raise awareness about what to do in the face of natural disasters	2
		Providing morale and motivation	2
		Conducting camps to train the subjects	1
		First, preparing an educational environment (we started education in a tent), then reaching out to students	1

		Sending homework worksheets via WhatsApp to students who cannot come to school	1
		More physical activity	1
Collaborative solutions	Risk mitigation activities in cooperation with public institutions	Minimization of structural risks	1
		Request psycho-support	1
	Risk reduction activities in cooperation with non-governmental organizations	Working with civil society organizations	1
		Liaison and cooperation with private and voluntary organizations, especially collaboration with volunteer educators from outside the city	1
	Solution provided by the Ministry	National Education to deploy more staff to make things work	1

When Table 3 is analyzed, it is understood that the participants mainly emphasized; "Explaining that earthquake is a reality of our lives (f=2)" in the theme of " Individual solutions (f=29)", "Minimization of structural risks (f=1) in the theme of "Collaborative solutions (f=18)". Also, the solutions developed by teachers for the problems they face in educational processes are categorized under two headings: individual and collaborative solutions. In this context, teachers strive to solve educational problems, develop different solution methods, and have an entrepreneurial spirit. The opinion of one of the teachers participating in the study on this question is as follows.

"... We suggested that earthquake is a fact of life and that we should always be prepared for it if we live in this geography. In addition, it was constantly emphasized that this is an opportunity for us to understand the value of what we have." (T14)

Another crisis solution method developed by teachers as an individual solution is psychosocial support and crisis management. Under this heading, it was determined that the teachers addressed the trauma that occurred to students in the post-earthquake education processes with these methods such as patience and continuous work, awareness of the reality of the earthquake and preparedness, cooperation with the school guidance service, caring and supporting students, empathic communication and providing trust, emphasizing that the earthquake is a natural reality, communication with parents, stress management, motivation, and guidance. The opinion of one of the teachers participating in the study regarding this question is as follows.

"...Instead of lecturing to children, I prepare them psychologically for education." (T22)

Within the scope of individual solutions, it is seen that teachers solve the teaching process of the lessons with distance and face-to-face education. Under this heading, it was determined that teachers realized safe places, preparation of the educational environment, reaching students, psychological preparation, one-to-one communication and activities, awareness raising activities, morale and motivation, fun and active participation, communication and homework, and economic activities. The opinion of one of the teachers participating in the study regarding this question is as follows.

"...Mostly by doing one-to-one interviews with students or by allocating more time for activities or games during the lesson to ensure their interest in the lesson." (T24)

It is seen that teachers develop individual solution methods as well as solution methods by cooperating with institutions and organizations that are experts in their fields. In this context, within the scope of risk reduction studies in cooperation with public institutions and organizations, they applied different methods to sustain the education process, such as minimizing structural risks, requesting psychosocial support, and reducing risk factors. The opinion of one of the teachers participating in the study regarding this question is as follows.

"...We tried to solve problems by contacting and cooperating with private and voluntary organizations, especially volunteer educators from out of town." (T13)

The findings regarding the teachers' answers to the third question of the study are given in Table 4 below.

Table 4

Results related to the problems that teachers encountered and could not find solutions to in post-earthquake education processes

Themes	Categories	Sub-categories	Codes	f
Whether there are problems encountered after the earthquake that cannot be solved	There are	Problems related to ensuring continuity of education and student attendance	Some parents arbitrarily do not send their students to school	3
			Continuing education in containers or tent cities that students are not used to	1
			Inadequacy of the Directorate of National Education in the process of leaving and starting	1
			Lack of expert volunteer trainers	1
			Some students do not attend school	1
			Parental relations and behavioral disorders of children	1
			Educational losses of students and the fact that these losses cannot be recovered	1
			Students are distracted from lessons	1

	Psychological and emotional problems	Difficulty in overcoming the fear of earthquakes	5
		Failure to resolve spiritual problems	1
		Psychological support students need	1
		Failure to overcome the adaptation problem during the orientation week	1
	Infrastructure problems	Shelter, dust, clean drinking water	1
		Shortage of space, reliable environment	1
		Students with housing problems due to damaged houses	1
		Infrastructure problems with electricity, water, natural gas, internet, etc.	1
		Problems related to housing, nutrition, and socialization	1
		Location, lack of transportation	1
	Coping with loss and emotional attachment problems	Lack of communication with students who have lost their relatives due to lack of training on how to approach them	1
		Failure to counsel the bereaved	1
	Problems related to safety and sanitation	Theft, looting	1
		Safety and health	1
There is not			5

When Table 4 is analyzed, it is understood that the participants mainly emphasized; "Difficulty in overcoming the fear of earthquakes (f=5)" in the theme of "Whether there are problems encountered after the earthquake that cannot be solved (f=33)". Also, it is seen that teachers sometimes solve the problems that arise in the educational processes by themselves and sometimes with the help of the institutions, organizations, and non-governmental organizations they cooperate with. However, it is also seen that they need help to solve some problems. Some teachers stated they were inadequate in ensuring continuity of education and student attendance, solving psychological and emotional problems, eliminating infrastructure problems, coping with losses, and improving emotional support,

safety, and health conditions. The opinions of some of the teachers participating in the study on this question are as follows.

"...Psychologically, I think it is difficult to live with the fear of earthquake, and we cannot find a complete solution to this issue." (T42)

"...The fact that students continue their education in container cities or tent cities outside of the school setting they are used to decreases children's motivation." (T14)

Within the scope of coping with loss (grieving) and emotional attachment problems, teachers stated that they experienced problems such as emotional difficulties, lack of communication, lack of suggestions, and lack of training. However, they could not find solutions to these problems. The opinion of one of the teachers participating in the study regarding this question is as follows.

"...Since I lacked training in approaching students who lost someone from their family or loved ones, there could be a lack of communication with them." (T28)

The findings regarding the teachers' answers to the fourth question of the research are given in Table 5 below.

Table 5

Findings on the social problems observed by the teachers after the earthquake and the solutions to these problems

Themes	Categories	Sub-categories	Codes	f
Whether there are social problems and suggestions for solutions	Social problems and suggestions for solutions	Problems related to security and social order	Theft and looting	4
			Shopping and looting of homes and businesses	2
			People withhold what does not belong to them	1
			Looting of damaged schools	1
		Spirituality and values education	Knowledge of morality and spirituality first	4
			Lessons on personality, morality, and honesty should be given	2
			Explaining that stealing is bad behavior	2
			Students can be enabled to empathize	1
			Practices for values education should be increased	1
			To teach students that they should get as much help as they need and share the rest with others	1

	Finding solutions by ensuring justice in the classroom	1
	Emphasize the importance of doing the right known behaviors in all situations	1
	National consciousness should be educated	1
	Raising public awareness	1
Not experienced		14

When Table 5 is analyzed, it is understood that the participants mainly emphasized; "Theft and looting (f=4)" in the theme of "Whether there are social problems and suggestions for solutions (f=37)". In addition, according to Table 5, it is seen that there are participants who are "not experienced (f=14)". Also, teachers were asked this question to determine whether social problems were experienced after the earthquake and, if so, what measures were taken to address these problems. The reasons that disrupt social security and order generally include stress and chaos caused by emergencies, inability to meet basic needs, lack of social solidarity and cooperation, safety, and legal inadequacies. The opinions of some of the teachers participating in the study on this question are as follows.

"...I think that such problems can be solved by making moral values one of the main goals of education." (T7)

"...It should be explained that theft is a bad behavior and that it has much worse consequences when it is done to people who are victimized." (T17)

The findings regarding the teachers' answers to the fifth question of the research are given in Table 6 below.

Table 6

Psychosocial problems experienced by students after the earthquake and ways to support them in coping with these problems

Themes	Codes	*f*
	Fear, anxiety, loss	5
	Psychological problems such as fear of earthquakes and inability to enter the building	5
	Not wanting to be separated from their parents	2
	Their inability to overcome the fear of earthquakes	2
	Being frightened by remembering the occurrence of the earthquake	1
Problems experienced by students	Withdrawal, reduced sociability	1
	Fear of losing relatives	1
	Problems in course engagement	1
	Lack of security and physical needs	1

	What he experienced during the earthquake and the grief of his lost relatives	1
	Panic attacks and reacting to the slightest movement	1
	Anxiety disorder	1
	The occurrence of panic attacks in students	1
	Nail biting, playing with hair, spending time in thoughtfulness	1
	Constantly making speeches about earthquake	1
Solutions to the problems experienced by students	Referral to a guidance counselor or guidance service	5
	Doing some work together with the guidance service	2
	Continuing education with love	1
	Referral to various psychosocial service providers	1
	Trying to support through interviews	1
	By supporting religious beliefs and each other	1
	Providing group guidance	1
	Working in partnership with the guidance service and trying to overcome the problem with games and activities	1
	Explaining that an earthquake is a natural event	1
	Cooperation with the guidance service, school administration, and parents	1
	Treating traumas with compassion	1
	- Acting together, identifying, and overcoming fear	1
	Spend more time with them	1

When Table 6 is analyzed, it is understood that the participants mainly emphasized; "Fear, anxiety, loss (f=5)" in the theme of " Problems experienced by students (f=25)" and "Referral to a guidance counselor or guidance service (f=5) in the theme of "Solutions to the problems experienced by students (f=18)". Within the scope of the problems experienced by students in post-earthquake education processes, teachers stated that they observed post-earthquake trauma and anxiety, safety and basic needs, lack of earthquake awareness and knowledge, and physical and emotional disorders. The opinions of some of the teachers participating in the study regarding this question are as follows.

"...The biggest problem of our students was fear, and we worked with our guidance service."(T6)

"...the ongoing grief of the people they lived and lost at the time of the earthquake." (T29)

"...Behaviors such as panic attacks and reacting at the slightest movement emerged." (T33)

The findings regarding the teachers' answers to the sixth question of the research are given in Table 7 below.

Table 7

Results on which subject students should be taught primarily after the earthquake and whether this situation is included in the curriculum of the courses taught by the teacher

Themes	Categories	Codes	f
Subject and content of the training to be provided	Psychological support training	Giving guidance on issues such as overcoming and coping with fear	3
		Providing psychological support to cope with stress and other problems after the earthquake	2
		To get used to the earthquake	2
		Social support groups related to acceptance should come to school and increase social activities	2
		Teaching how to live with earthquake	1
		Civil defense and panic attack training	1
	Preparedness training and disaster awareness	Training should be given on what to do before, during, and after an earthquake and first aid	6
		What is an earthquake and what to do when an earthquake strikes, disaster awareness	5
		Starting to provide first aid training at an early age	2
		In-service training and seminar presentations informing students about natural disasters can be organized	1
		Natural disaster psychology should be taught	1
		Disaster management	1
		Students should be informed about earthquake	1
		Education should be given on unity, solidarity, love and respect	1
	Values education and social consciousness	Knowledge of morality and spirituality first	2
		Training on cleanliness and safety should be provided on this issue	1
	Other issues	time management and activities that increase students' interest in lessons	1
		Common sense, cooperation, and fairness	1
		Social activities should be included	1

When Table 7 is analyzed, it is understood that the participants mainly emphasized; "Training should be given on what to do before, during and after an earthquake and first aid (f=6)" in the theme of

"Subject and content of the training to be provided (f=35)". Teachers and students have experienced a massive earthquake. In the aftermath of this earthquake, teachers' views were sought on what kind of education should be given to return students to usual living standards. It is seen that the teachers gave important and rich information about the subject and content of the education. Some teachers emphasized that instruction should be given on adapting to the new life after the earthquake. They underlined the importance of having an educational approach to raise students' awareness about coping with post-earthquake problems and living a life accustomed to earthquakes. The opinions of some of the teachers participating in the study on this question are as follows.

"...It would be good if information about what an earthquake is and what to do during an earthquake is given; it would be good if guidance is given on issues such as overcoming fear and coping with it." *(T6)*

"...Education should be given on unity, solidarity, love, and respect. Unfortunately, it is not enough." *(T11)*

"...Education should be given about natural disasters; we should not forget that this reality is always present in our lives." (T14)

The codes of the findings, which include the answers to the question of what subjects the teachers primarily taught the students after the earthquake and whether this was included in the curriculum of the courses they taught, were created and presented in Table 8.

Table 8

Findings regarding the place of earthquake results in the education and curriculum

Themes	Categories	Sub-categories	Codes	*f*
Contents and topics related to earthquake education in the curriculum	Adaptation to new life after the earthquake	Whether it is in the curriculum or not	Partially	1
	Psychological support training		This training was given for a while,	2
			It is in the life science curriculum	1
			It is not part of the training program.	1
	Preparedness training and disaster awareness		It is in the program	5
			Not in my curriculum	4
			Unfortunately, not enough	1

Values education and social consciousness			Included in our curriculum	2
			Not in any course	1

When Table 8 is analyzed, it is understood that the participants mainly emphasized; "It is in the program (f=5)" in the theme of "Contents and topics related to earthquake education in the curriculum (f=18)". The findings regarding the teachers' answers to the seventh question of the research are given in Table 9 below.

Table 9

Findings on whether there are earthquake-related outcomes in the curricula of the courses and the adequacy of these outcomes in raising earthquake awareness in students

Themes	Categories	Sub-categories	Codes	*f*
Whether there is an outcome in the curriculum	There is	Achievement proficiency of the outcome	Not enough	16
			Not earning	2
			I find it sufficient for its level	1
	Partially		Not enough	2
			Adequate	2
	No outcome			11

When Table 9 is analyzed, it is understood that the participants mainly emphasized; "Not enough f=16)" in the theme of "Whether there is an outcome in the curriculum (f=34)". Teachers generally stated that the achievements in their curricula needed to be sufficient despite the earthquake disaster. The opinions of some of the teachers participating in the study on this question are as follows;

"...There is not enough information in the curricula of the courses, this information is not enough for earthquake awareness, disaster situations should be added to the curriculum." (T15)

"...There is not enough information about them in the textbooks. It should definitely be included in the textbooks." (T18)

"...The things to be done during an earthquake were not in my curriculum, but I repeated these topics many times and tried to raise awareness by explaining what to do." (T30)

The findings regarding the teachers' answers to the eighth question of the research are given in Table 10 below.

Table 10

Findings on whether training was received before the earthquake and whether this training was useful

Themes	Categories		Codes	*f*
Whether there is training on earthquake	I received training	Whether the training is proper or not	It did not work (10)	10
			Helpful	5
			I do not know if it works or not.	1
			It did not do us much good	1
			I did not need to use the training received	1
			I acted outside of education.	1
			I did not even think to apply it out of panic.	1
	I do not have any training.			18

When Table 10 is analyzed, it is understood that the participants mainly emphasized; " I do not have any training (f=18)" in the theme of "Whether there is training on earthquakes (f=38)". When we look at the duration of teachers' education, we see they have twelve years of primary and secondary education and four years of undergraduate education. Their total education period covers a long period of twenty years. When it is assumed that they have postgraduate education on top of these educations, it is seen that they have gone through a more extended period of purposeful education. Most teachers did not receive any training directly related to disasters during these long education periods, and the training they received could have been more helpful. The opinions of some of the teachers participating in the study on this question are as follows.

"...There is no training, even if you get it, it is futile, no one can do anything at that moment." (T22)

"...There is education, but everything was turned upside down when I was experiencing that moment. Because when a severe earthquake occurs every 20 years on average in this country, the measures taken are forgotten." (T29)

"...I do not have any training." (T17)

"...I have no training." (T38)

The findings regarding the teachers' answers to the ninth question of the research are given in Table 11 below.

Table 11

Findings related to suggestions or thoughts that teachers would like to add

Themes	Categories	Codes	f
Not express suggestions or opinions.			8
Suggestions	Earthquake education and awareness	We need to be better prepared for disasters.	3
		Psychological support should be provided to students and the public.	2
		Training on earthquake	2
		Disaster education courses should be opened in schools,	1
	Social-psychological support	Earthquake-related topics should be thoughtfully included in the curriculum.	1
	Public duty	Educators should be provided with material and moral support,	2
		Average education must be restored, and basic needs must be met.	2
		Building inspections should be increased.	1
		Identify good managers and educators. Use their experience and expertise.	1
		There should be a coordination plan for training in any adverse situation.	1
		The housing problem must be addressed.	1
	Other suggestions and thoughts	Practical work should be done.	1
		Focus on life after the earthquake.	1
		The sense of solidarity should be kept alive; first aid and rescue training should be given to people of a particular age group.	1

	Students should be directed to more social activities.	1

When Table 11 is analyzed, it is understood that the participants mainly emphasized; "Not express suggestions or opinions (f=8)" in the theme of " Suggestions (f=29)". When the teachers' opinions regarding the ninth question were analyzed, it was determined that they made suggestions regarding the post-earthquake education and improvement process. Under earthquake education and awareness, teachers state that education should be provided to raise awareness of individuals and societies against earthquake disasters and ensure their preparedness. They believe that one of the best methods to realize this is the course curricula since compulsory education is twelve years. The opinions of some of the teachers participating in the study on this question are as follows.

"...Our country is an earthquake zone, so I think it is essential to educate our people before the earthquake." (T5)

"...We should try to be prepared for an earthquake or any natural disaster at any time; more drills and practices can be arranged to be more effective by involving technology." (T22)

"...In our country, which is facing the reality of earthquake, earthquake-related topics should be included in the curriculum very seriously." (T29)

CONCLUSION, DISCUSSION AND SUGGESTION

This study was conducted to try to reveal how the earthquakes that occurred in Turkey on February 6, 2023, centered in Kahramanmaraş, affected education and training activities, the problems that emerged in education and training after the earthquake, and the solution suggestions based on the experiences of teachers who experienced the earthquake. In the study, teachers were first asked what the main problems they experienced related to the earthquake were. Teachers expressed these problems under different headings: problems related to educational infrastructure and social facilities, problems related to psychosocial well-being and feeling safe, management and logistics problems, problems arising from communication and participation, problems related to human resources in education, and problems associated with the continuity of education and training. It was revealed that teachers produced individual and collaborative solutions to the problems mentioned in the first question. On the other hand, it was revealed that teachers had problems that emerged after the earthquake and could not find solutions. Some of these problems were problems related to ensuring continuity of education and student attendance, psychological and emotional problems, infrastructure problems, coping with losses and emotional attachment problems, and problems related to safety and health conditions. It was also revealed that teachers encountered social problems after the earthquake, including problems related to security and social order, as well as problems related to spirituality and values education. Another result was that teachers tried to find solutions for the psychosocial problems that students experienced after the earthquake. Teachers stated that the training given primarily to students after the earthquake should be an adaptation to the new life, psychological support training, preparation training, disaster awareness, values education and social awareness, and other issues. Some of the teachers stated that there are earthquake-related outcomes

in the curricula of the courses and that these outcomes are sufficient for students to gain earthquake awareness.

In contrast, others stated that there are no outcomes or that even if there are, these outcomes are insufficient to gain earthquake awareness. While most of the teachers participating in the study stated that they received earthquake training before the earthquake, a few indicated that they did not. In addition, most of those who received earthquake training noted that the training they received was useless. Finally, it was revealed that teachers had suggestions and expectations regarding earthquake education and awareness development, social and psychological support, and public duty.

According to the findings related to the main problems experienced by teachers regarding post-earthquake education, when people feel that their life safety is in danger, their anxiety increases, and they seek to get rid of this situation as soon as possible. It is stated that irregular and unplanned construction significantly affects this situation. This understanding of construction does not construct students as a part of common areas and space in the education process, which constitutes the social dimension of the earthquake (Akpolat et al., 2021).

Teachers reported psychological distress, fear and uneasiness, motivation, absenteeism, demoralization, and anxiety disorders such as anxiety and fear of entering the physical space regarding the problems they experienced regarding psychosocial well-being and feeling safe during the education process. After the earthquake, students may experience psychological reactions such as these. Some of these are strong mental and emotional states such as confusion, fear, grief, anger, guilt, sleep, and focus. Nakajima (2012) states that what happened during the earthquake can be constantly visualized in students' minds and can reduce efficiency in education, which can be said to be compatible with the result of this study. In addition, this study coincides with the result obtained in a study conducted by Arslan (2023) on earthquakes, in which students' motivation to come to school decreased, fear and anxiety increased in students, and teachers were seriously affected by the earthquake.

Lack of coordination, disruptions related to urban transportation, problems in school planning, container city schools, and insufficient personnel were listed among the problems experienced by teachers regarding management and logistics in educational processes. The existence of such problems negatively affects equality in education and access to equal opportunities and suggests that school and transportation planning was not done before and after the earthquake because planning requires the most rational use of limited resources (Adıgüzel, 2007; Güçlüol, 1991).

Teachers expressed the problems arising from communication and participation in educational processes as needing help to reach students, not considering the solutions proposed by parents and language problems of international students. Based on these findings, teachers emphasize making education more inclusive and effective.

Teachers stated the problems they experienced in the rational use of human resources in educational processes as the uncertainty of the assignment of surplus teachers, students' absenteeism, safe educational environment, and educators. This situation shows that the idea that the coordination of human resources includes the actions taken to combine material and human resources in the organization, to reconcile knowledge and skills, and to achieve organizational goals in this way (Adıgüzel, 2007; Bursalıoğlu, 2021) was not realized after this earthquake.

Teachers expressed the problems they experienced regarding the continuity of education during the education processes, such as the inability to ensure student continuity, constant student transfers, teacher-student relocations, the decline in students' academic development, the inadequacy of educational materials and accommodation facilities, and loss of motivation. This situation suggests that the post-earthquake education crisis could have been managed better. The results of this study support each other with the results of the study conducted by Arslan (2023) that student absenteeism problems increased significantly in schools after the earthquake, students moved to other cities, students in the school transferred, and many new students came to the school by transfer. In addition, the result of this study coincides with the result of Baytiyeh (2018) that the psychological distress after Typhoon Haiyan affected the academic learning of a quarter of the students and decreased their academic performance.

According to the findings regarding the solutions to the problems faced by the teachers in the post-earthquake education processes, it is essential for the continuity and efficiency of education that teachers seek solutions to the problems they face. Teachers' use or development of these methods was interpreted as rapid decision-making in the face of problems that arise in education and training processes, undertaking the risks that may occur, and teachers' dedication to their students. Under the heading of solutions for equipment and cooperation among the individual crisis resolution methods, they developed crisis resolution methods such as using together due to lack of materials, taking responsibility and risk themselves within the scope of do-it-yourself, protecting and providing school materials, informing parents and staff. Teachers have used the educational game method to solve the problems caused by earthquakes in education. However, they still need to include tools such as television, video, overhead projector, slide machine, computer, newspapers, magazines, and photographs within the scope of teaching materials. In the study conducted by Arslan (2023), the results of this study are in line with the results of this study that studies were carried out on students who lacked materials, and studies were carried out to arrange transportation services for students who stayed in tents or other places due to the earthquake.

In this context, teachers developed various solution methods to ensure psychosocial recovery. It is seen that they do not have a standardized method to cope with the trauma experienced by themselves, their students, and their parents, but teachers resort to various methods based on their own and other units' expertise. The fact that teachers solve problems by using many different methods is essential in terms of showing their competence. The result of this study is in line with Arslan's (2023) finding that school principals stated that psychosocial studies were carried out in schools regarding the problems at school. In the study conducted by Sözen (2019), it is seen that the result of this study is compatible with the result of the study that the earthquake awareness of undergraduate students is at an adequate level. Baytiyeh (2018) emphasizes that safe, educational environments are essential in coping with emotional and social problems after disasters. Using these crisis methods developed by teachers, the dangers and risks of possible earthquakes on education can be determined, and the risks of likely earthquakes on education can be reduced. After each earthquake in our country, a great awareness is created in the public, but this awareness is forgotten over time. In addition, during this awareness process, efforts to reduce the damage of earthquakes and pre-earthquake preparation processes are focused more. However, post-earthquake education and training activities are not given the same level of sensitivity. As a result, there are significant problems in continuing educational activities in the regions where earthquake disasters occur.

In this context, teachers enrich the lesson by focusing on their students. This result overlaps with the result of Arslan (2023), conducted after the earthquake, in which extracurricular social activities were emphasized and distance education infrastructure was strengthened. In addition, this result is similar to the result of Baytiyeh (2018), in which online education was switched to ensure continuity in education with the closure of schools after the earthquake. As a result of the earthquake centered in Kahramanmaraş, the Council of Higher Education (CoHE) saw online learning as a solution to ensure academic continuity with alternative teaching access tools in the spring academic semester of 2022-2023 (Telli-Yamanoto & Altun, 2023).

Within the scope of cooperation with non-governmental organizations to reduce the risks of the earthquake on education, teachers stated that they contacted volunteer organizations and developed solutions by ensuring social participation in educational processes. This situation is essential because it has diversity, innovation, resources, support, cooperation, and solidarity.

The Ministry of National Education needs to assign more personnel to carry out educational work, enabling teachers to analyze the problems they face in the educational process more deeply and develop better solutions. MoNE's improvement of educational services, sensitivity to student needs, and expansion of educational services contributed to the sustainability of post-earthquake education.

In post-earthquake psychological assistance, teachers should create an environment where students can express their experiences and feelings without being influenced. This research created such an environment. In our country, improvements were provided with psychosocial support practices for disaster victims in the earthquake that occurred in Van province in 2011 (Açıkalın, 2018).

According to the findings regarding the problems teachers encountered and could not find solutions to in post-earthquake education processes, Earthquakes cause undesirable situations, such as people losing everything they own or being deprived of average living standards.   Within the scope of the problems related to ensuring continuity of education and student attendance, teachers also stated that they could not cope with problems such as school attendance, lack of volunteer educators, senior management's inability to manage the problems they can solve, adverse climatic conditions, negative behaviors of parents and loss of time. In this sense, ensuring total cooperation and coordination between individuals, society, and the state is essential to overcome these problems.

Within the scope of psychological and emotional problems, teachers stated that they could not find solutions to problems such as spiritual problems, fear of earthquakes at school, adaptation to the new normal, and trauma. Fear is considered a serious problem in post-earthquake education processes, and solving these problems is essential for students to continue their educational lives. In their study, Şeker and Akman (2014) stated that most of the participants expressed the earthquake event they experienced as physical, psychosocial, and economic trauma. It is seen that this result is compatible with the result of this study.

These problems show the magnitude of the emotional trauma experienced by individuals. This is supported by the fact that students associate natural disasters with the word death the most (Sucu, 2021).

The inability of some teachers to solve some problems in post-earthquake education-teaching processes may be related to the finding that pre-service primary school teachers have a high level of misperception of disaster education and disaster awareness, a medium level of perception of post-disaster awareness and a low level of post-earthquake knowledge (Tekin & Dikmenli, 2021). In this

context, the finding of Mızraklı (2018) that "for disaster training to be successful, training should be given by experts and experienced people using appropriate techniques" is considered necessary. In Öztürk's (2013) study with classroom teachers, the fact that teachers did not prepare for the earthquakes that may occur later depending on the time that passed after the earthquake can be counted among the reasons why their problems were not solved.

Within the scope of infrastructure problems, teachers emphasized that they could not solve issues such as shelter, school, access to essential services (such as electricity and water), nutrition and socialization, loss and trauma, and lack of communication. These problems experienced after the earthquake are problems that need to be solved urgently and require the support of society as a whole. In addition, in-service training can be provided for educators to be more educated about emotional support. The fact that the students of the First and Emergency Aid Program stated that the most important factor that negatively affects their willingness to work after a disaster is "lack of personal life safety" supports the above result (Şeker, 2019).

Teachers stated that they could not find solutions to theft, looting, and health problems within the scope of the issues related to safety and health conditions. Rebuilding social peace and trust after the earthquake through social solidarity and cooperation can play an essential role in solving these problems.

Findings on the social problems observed by teachers after the earthquake and solutions to these problems: Since teachers have experienced the moment of the earthquake and the aftermath of the earthquake, it is assumed that they are better able to observe which of these reasons or reasons other than these reasons are factors in the disruption of social order. In this context, their responses help take necessary precautions against risks that affect post-earthquake education processes.

Teachers stated that they witnessed theft and looting incidents within the scope of problems related to social security and order. These theft and looting incidents experienced after the earthquake express a social concern. Environments without security of life and property create social chaos and appear as the most critical factors that disrupt public order.

Teachers recommend spirituality and value education in the face of events that disrupt social order. Under this heading, they suggest rules and principles that keep the society together, such as moral values education, sharing necessities and benevolence, national consciousness education, empathy development, religion and ethical values, social justice, and responsibility. In this context, spirituality and values education are necessary for forming a more just and honest society.

The psychosocial problems experienced by students after the earthquake and the ways to support them to cope with these problems; Tanhan and Mukba (2015) reported that students frequently remembered the moment of the earthquake, Mohadjer et al. (2010), university students who participated in the study conducted by Demir-Yıldız and Demir-Öztürk (2023) associated the concept of earthquake with negative metaphors such as death, destruction, fear, loss, abandonment, and the metaphors produced by the students in the study conducted by Kaya (2010) with secondary school students reminded them of the bad experiences they had. This result shows that students need psychological support, scientific knowledge, and trust after the earthquake.

Teachers developed some solution suggestions for the problems experienced by students in post-earthquake education processes. Within the scope of solution suggestions, psychosocial support,

knowledge and trust building, cooperation and coordination, group therapy and motivational studies, religious support, and values education such as solidarity and compassion. Teachers suggested various approaches to support students' mental and emotional recovery after the earthquake and emphasized the importance of guidance services. It is also essential that games are among the teachers' solution suggestions. Because the ideas that "children grow up with games, learn with games and prepare for social reality with games" are common. Playing games with their peers allows children to express their feelings and thoughts and allows them to spend time away from their anxieties. Teachers' presentation of the psychosocial support mechanism as a solution suggestion was valuable because it expresses the services provided to students individually, socially, and publicly (Aral, 2023). In Demir-Yıldız and Demir-Öztürk's (2023) study, it can be said that there is a remarkable similarity between their suggestions to educators, such as allowing students to talk, giving information about negative situations that express reality, providing emotional support, continuing the routine, and teaching earthquake-related concepts.

According to the findings on which subjects students should be trained primarily after the earthquake and whether this situation is included in the curriculum of the courses taught by the teachers, acclimatization processes can help students make more conscious preparations against earthquake risk. It is stated that primary and secondary education curriculum programs in Turkey are insufficient according to the curriculum developed by the United Nations International Strategy for Disaster Reduction (UNISDR) (İnal et al., 2018). Mohadjer et al. (2010) reported in their study that as a result of the implementation of the "Earthquake Science and Hazards Program," middle school students became literate in earthquake hazards, Winarni et al. (2018) reported in their study that one of the most important ways to reduce earthquake disasters is earthquake education at an early age, Ong et al. (2021) stated that focusing on education about what societies should do about earthquake preparedness increases people's awareness, and Mızrak (2018) stated that it is of great importance for children to receive education about disasters for the future of societies.

Some teachers stated that psychological support training should be given to students after the earthquake. Teachers emphasized that students should be trained to overcome their fears, accept living with earthquakes, cope with stress, and support social activities. They expressed the importance of education for students to be prepared for the aftermath of the earthquake and to ensure their psychological recovery.

Some teachers suggested earthquake preparedness training and first aid training within the scope of disaster awareness to reduce the risks of post-earthquake hazards. In this context, they stated that disaster awareness, earthquake knowledge and preparation, first aid training, earthquake drills, and disaster psychology should be included. Teachers recommend education that will enable students to be prepared for earthquakes. In Çavuş and Balçın's (2020) study, teachers' ideas about preparedness education support each other with the view that middle school students more frequently included the things to be done after an earthquake after the Earthquake Education Center visit.

Some teachers mentioned the need to primarily include values education and activities that develop social awareness against the dangers and risks experienced after the earthquake. In this context, they emphasized values of education, spirituality, knowledge, cleanliness and safety, social unity, and solidarity. Teachers believed that human values and life skills should be taught in addition to academic knowledge.

Therefore, it was interpreted that teachers expressed curriculum suggestions to overcome this deficiency. According to the findings on whether training was received before the earthquake and whether it was helpful, It is clear that there will be specific problems in teaching in a field where teachers still need to be trained. Knowledge, skills, and values not obtained from experts or those with experience in this field will always need to be completed. Teachers stated that the training they received was useless, that the training they received and the reality were very different, that they could not control their emotions, and that their training was ineffective. However, five teachers stated that they saw the benefits of the training they received. This situation coincides with the findings of Gezer and Şahin (2022) that the number of pre-service teachers who received training or courses on natural disasters is relatively low. The results of Çoban et al. (2017) showed that individuals who have had various earthquake experiences do not have sufficient knowledge about before, during, and after a possible earthquake, and they do not receive training on earthquakes. Their earthquake experiences are lost over time. Teachers generally stated that they did not receive enough education about earthquakes at the undergraduate level but improved themselves during their teaching (Öcal, 2005).

According to the findings on whether there are earthquake-related outcomes in the curricula of the courses and the adequacy of these outcomes in raising earthquake awareness in students, it can be considered a deficiency in creating individuals and societies resistant to disasters. Therefore, it was interpreted that teachers expressed curriculum suggestions to overcome this deficiency. Ursavaş (2016) stated in his study that curriculum programs have essential tasks and place in bringing natural disaster awareness to society. It can be said that similar findings were obtained from the study.

According to the findings regarding the suggestions or thoughts that teachers would like to add, education is mentioned in most of the studies on disasters. In this context, this suggestion is noteworthy when education is considered to be the process of creating desired behavior change (Ertürk, 2016). In Demirci and Yıldırım's (2015) study, the belief that earthquake knowledge can provide lifelong benefits to students can only be possible with the conscious and purposeful planning and maintenance of earthquake education and training activities supports the above results of the study. Based on the results of this research, the following recommendations can made. Considering the challenges emerging post-earthquake, it is imperative to implement immediate measures for their resolution. Anticipating potential social issues following an earthquake and proactively addressing them is crucial. Expressly, tackling psychosocial challenges confronting students necessitates the deployment of field experts in earthquake-prone areas for extended durations. Enhancing awareness among all stakeholders regarding the sensitivity of grief is paramount. To cope with students' problems, teachers can receive in-service training to refine their emotional support and communication skills. A comprehensive review of curricula content related to natural disasters, particularly earthquakes, should be undertaken. Practical disaster education training should be extended to all public employees, focusing on teachers and the general populace. Post-earthquake unity can be instilled in students across all educational levels, alleviating the suffering of affected individuals. The study collected data from teachers in six different provinces using a semi-structured interview form, suggesting the potential for more extensive research with diverse data collection tools. Limiting the study to teachers' opinions prompts the need for similar research involving other education stakeholders.

Furthermore, future studies can expand the sample group, incorporating qualitative and quantitative data. The current study predominantly features male teachers from primary and secondary schools; thus, future research should ensure a balanced representation of gender and educational levels for a comprehensive understanding. Given the elapsed time since the earthquake, approximately ten months, future investigations can explore ongoing educational efforts and needs at this juncture.

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Plagiarism Statement

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Availability of Data and Materials

Not applicable.

Investigation of Teachers' Sustainable Earthquake Awareness and Earthquake Knowledge Levels

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Abstract

This research aims to examine the relationships between teachers' earthquake knowledge levels and sustainable earthquake awareness levels. A relational survey model with a quantitative research method was chosen for the research. The research group consists of 255 teachers, 166 women, and 89 men, working in private and public institutions in Kocaeli province in the 2022-2023 academic year. The research group was determined by convenient sampling, one of the purposeful sampling methods, and the "Sustainable Earthquake Awareness Scale" and "Earthquake Knowledge Level Scale" were used as data collection tools. The data of the research were analyzed in a particular statistical program using quantitative methods. As a result of the analysis, it was determined that teachers' sustainable earthquake awareness levels did not differ according to their gender and age, and while their earthquake knowledge levels did not differ according to their gender, they did vary according to their age. Additionally, it was observed that there was a positive relationship between teachers' earthquake knowledge levels and sustainable earthquake awareness levels.

Keywords

Earthquake, Earthquake Knowledge Level, Sustainable Earthquake Awareness.

INTRODUCTION

Many changes have occurred in the balance of the world in the process from the formation of the world to the present day. These changes involve a natural process. This process includes natural events such as volcanic eruptions, climate changes, earthquakes, and storms. Natural events take place in the natural order every day, but it cannot be said that all of these natural events are harmful to humans. If natural events cause social, cultural, physical, and economic losses to people, negatively affect people's everyday lives, and interrupt and stop human activities in society, they are called natural disasters (Öcal, 2005). Natural disasters are events that negatively affect society, cause significant loss of life and material damage, and occur due to human-caused reasons and natural factors (Karakuş, 2013).

Earthquakes are one of the natural disasters that significantly impact our country and threaten more than 90% of the people in our country. Until today, people have encountered many natural disasters, but earthquakes are among the disasters that remain in people's minds and threaten society (Değirmençay & Cin, 2016). Earthquakes, defined as short-term natural events that originate from the depths of the earth and cause vibrations on the earth's surface, show their effects more in parts of the earth's crust that are not fully settled (Öcal, 2005). People living in or near fault lines are more likely to encounter an earthquake than people living in areas far from fault lines (Değirmençay & Cin, 2016).

Today, an earthquake with a magnitude of 7.7 occurred in Kahramanmaraş Pazarcık district on February 6, 2023, at 04.17 and affected ten provinces of Turkey, namely Kahramanmaraş, Gaziantep, Adana, Malatya, Diyarbakır, Adıyaman, Hatay, Şanlıurfa, Osmaniye and Kilis. While aftershocks continued to occur, the second earthquake with a magnitude of 7.6 occurred in the Elbistan district of Kahramanmaraş at 13.24 on the same day, further increasing the damage in the provinces. As a result of this earthquake, a seven-day national mourning period was declared throughout the country, and a State of Emergency (OHAL) was declared in ten provinces (Maden, 2023). It has also been observed in the recent disaster that earthquakes affect people in every way. Earthquake is a situation that significantly affects physical, social, psychological, and economic life (Pelling et al., 2002). Although people are affected in many ways, they do not have enough information about earthquakes. It has been observed that people in developed or developing nations are unaware and uninformed about these situations (Thomas et al., 1999). Considering the effects of an earthquake, it is vitally important to minimize the potential for loss and damage seen in areas with high populations (Blutndell, 1981). People need to take precautions to minimize the damage they may experience in an earthquake, and they can do this.

According to Karakuş (2013), the first precaution people will take against earthquakes is continuous and effective earthquake education. In the face of major earthquakes, people affected by earthquakes face significant losses and difficulties. People do not react the same in these situations, and there are differences in their affective states. This difference in the event of an earthquake is related to people's knowledge and preparation levels for earthquakes (Paton & Jang, 2015). It is important for children or adults who encounter a disaster to respond correctly. Education and earthquake knowledge allow people to use strategies to reduce losses and damage from earthquakes (Shaw et al., 2009).

It is clear that earthquakes are one of the unpreventable natural disasters, and they will have severe consequences if necessary precautions are not taken. Thanks to individuals who have sufficient knowledge about what an earthquake is, its consequences and how to take precautions against it, future generations will grow up sensitive to earthquakes. They will take part in society as adults who

are responsible in their roles in society and perform their social duties properly (Aydın, 2010). It is necessary to have earthquake knowledge as the effects of a possible earthquake cannot be avoided. This happens with education. Individuals' knowledge levels must be determined for earthquake education to be effective. Necessary training activities should be arranged in terms of content. Otherwise, negative situations may occur due to incomplete information about earthquakes, and traditional beliefs may continue (Tsai, 2001). In their research examining the relationship between earthquakes and formal education, Shoji, Takafuji, and Harada (2020) stated that a disaster-oriented education program in schools is essential in reducing the risk of death that may occur in disasters.

Another thing to do to reduce the destructive effects of the earthquake is to make sustainable earthquake preparations (Wu et al., 2018; Han et al., 2021). In places where various disasters may occur, minimizing the risks arising from these disasters is necessary. Efforts should be made to reduce risks. One of these studies is individual preparation. In their research, Johnston et al. (2013) stated that individual preparation is generally done as information about earthquakes and their risks, but more is needed.

As a result of public education studies, it has been seen that the public has high knowledge about earthquake risk. However, they stated that for this information to be transformed into sustainable awareness, society should be made interactive by creating programs that include critical thinking, the ability to cope with action, self-efficacy and confidence, and disseminating information. (Johnston et al., 2013). In the research conducted to increase earthquake awareness in Korea, it was observed that the earthquake increased the earthquake knowledge level of the society. Addressing major earthquakes and including them comprehensively in education is essential to creating sustainable earthquake awareness (Ha, 2018).

In order to minimize the damages caused by earthquakes, permanent, accurate, and highly participatory training plays an essential role in schools. Since the responsibility of raising awareness and conveying the necessary information in schools is on teachers, they must first have sufficient experience, knowledge, and awareness about disaster awareness and disaster education (Tekin & Dikmenli, 2021). It is crucial for future generations to grow up knowledgeable on this subject and to ensure accurate information transfer. For this reason, the study aimed to determine teachers' earthquake knowledge and sustainable awareness levels. In this context, the relationships between teachers' earthquake knowledge levels and sustainable earthquake awareness levels were examined in this study. In light of the information obtained from teachers, it is essential to take measures to increase earthquake knowledge and awareness of other members of society, prepare earthquake-related activities, and shed light on subsequent studies.

METHOD

Model of the Research

In this study, it was aimed to determine teachers' earthquake knowledge levels (DBD) and sustainable earthquake awareness levels (SDFD), whether DBD and SDFD differ according to teachers' gender and age, and the relationship between DBD and SDFD and their sub-dimensions. Relational survey model is used in research to describe a situation or event as it is and to determine the relationship between variables that cause this situation or event, the effects of variables and their degrees (Uçar, 2016). The

relationship or lack of relationship between variables is determined by this model (Tekin & Dikmenli, 2021).

Population and Sample

The research group was determined by convenient sampling. Purposeful sampling enables detailed research by selecting rich situations to serve the purpose (Baştürk & Taştepe, 2014). In this method, the units that best serve the purpose are taken into account. It is a method where quick results are obtained by selecting a situation that is easy and close to reach (Yıldırım & Şimşek, 2021). The research is based on volunteering. Convenient sampling was used to obtain fast and practical results.

The population of this research consists of teachers working in public and private institutions in Kocaeli province in the 2022-2023 academic year. The research group consists of 255 teachers, 166 women, and 89 men, working in public and private institutions in Kocaeli province in the 2022-2023 academic year. Table 1 contains demographic information about the participants.

Table 1

Demographic information of participants

Demographic information		Frequency	Percentage %
Gender	Woman	166	65.1
	Male	89	34.9
Age	20-30	39	15.3
	31-40	139	54.5
	41-50	62	24.3
	51-60	15	5.9

Table 1 shows that, 166 (65.1 %) of the teachers in the study are women, and 89 (34.9%) are men. 39 of the teachers (15.3%) are between the ages of 20-30, 139 of them (54.5%) are between the ages of 31-40, 62 of them (24.3%) are between the ages of 41-50, and 15 of them (5.9%) are between the ages of 51-60.

Data Collection Tools

"Sustainable Earthquake Awareness Scale" and "Earthquake Knowledge Level Scale" are the research data collection tools.

Sustainable Earthquake Awareness Scale (SDFÖ)

In this research, SDFÖ developed by Genç and Sözen (2021) in "SDFÖ: Development, Validity and Reliability Study" was used. This scale, consisting of three factors, is thought to support educational studies. These factors are named "Earthquake-Structure Relationship," "Earthquake Preparedness Application," and "Earthquake Preparedness." This scale, consisting of 19 positive and three negative items, was scored as a five-point Likert. According to the reliability analysis of the scale, the internal consistency coefficient (Cronbach's alpha) was found to be 0.884. The internal consistency coefficient (Cronbach's alpha) in the sub-dimensions was calculated as 0.752 for "Earthquake-Structure Relationship," 0.838 for "Earthquake Preparedness Practice," and 0.827 for "Earthquake

Preparedness." According to the reliability analysis of the scale for this study, the internal consistency coefficient (Cronbach's alpha) was found to be 0.875.

When scoring the SDFÖ, "I completely agree" was evaluated as 5 points, "I agree" as 4 points, "I am undecided" as 3 points, "I disagree" as 2 points, and "I strongly disagree" as 1 point. The data analysis scored three items on the scale in the opposite direction. A minimum of 22 and a maximum of 110 points are obtained from the scale. Information about the scoring is given in Table 2.

Table 2

Information on scoring SDFÖ and its sub-dimensions

Dimension	Number of Items	Minimum Points	Most Points
Earthquake Structure Relationship (1)	4	4	20
Earthquake Preparedness Application (2)	11th	11th	55
Being Prepared for Earthquake (3)	7	7	35
Total	22	22	110

According to Table 2, a minimum of 4 and a maximum of 20 points from the "Earthquake-Structure Relationship" sub-dimension, a minimum of 11 and a maximum of 55 points from the "Earthquake Preparedness Practice" sub-dimension, a maximum of 35 and a maximum of 7 points from the "Earthquake Preparedness" sub-dimension. Is obtained.

Some of the questions in the SDFÖ are as follows;

- While I was at the faculty, I had knowledge about what we would do if there were an earthquake.

- I trust the earthquake resistance of the faculty where I study.

- Our earthquake kit is ready at home.

- Our meetings about earthquakes will be helpful.

- As a country, we must be prepared for any possible earthquake.

Earthquake Knowledge Level Scale (DBDÖ)

In this research**,** DBDÖ, developed by Genç and Sözen (2022) in "DBDÖ: Development, Validity and Reliability Study," was used. It is thought that this scale, consisting of three factors, will support educational studies. These factors are named "Distribution Information of Earthquake Regions," "Earthquake Effects Information," and "Earthquake Education." All statements in the scale are positive. According to the reliability analysis of the scale, the internal consistency coefficient (Cronbach's alpha) was found to be 0.868. The internal consistency coefficient (Cronbach's alpha) in the sub-dimensions was calculated as 0.877 for "Distribution Information of Earthquake Regions," 0.841 for "Earthquake

Effects Information," and 0.922 for "Earthquake Education." According to the reliability analysis of the scale in this study, the internal consistency coefficient (Cronbach's alpha) was found to be 0.908.

When scoring the DBSÖ, "I completely agree" is evaluated as 5 points, "I agree" is evaluated as 4 points, "I moderately agree" is evaluated as 3 points, "I disagree" is evaluated as 2 points and "I strongly disagree" is evaluated as 1 point. Since there is no item to be reverse scored in the scale, a minimum of 19 and a maximum of 35 points are obtained from the scale. Information about the scoring is given in Table 3.

Table 3

Information regarding the scoring of DBDÖ and its sub-dimensions

Dimension	Number of Items	Minimum Points	Most Points
Information on the Distribution of Earthquake Zones (1)	7	7	35
Earthquake Effects Information (2)	7	7	35
Earthquake Training (3)	5	5	25
Total	19	19	95

According to Table 3, a maximum of 35 points and a minimum of 7 from the "Knowledge of the Distribution of Earthquake Zones" sub-dimension, a minimum of 7 and a maximum of 35 points from the "Earthquake Effects Knowledge" sub-dimension, and a minimum of 5 and a maximum of 25 points from the "Earthquake Education" sub-dimension are obtained. Is done.

Some of the questions included in the DBDÖ are as follows;

- I have information about natural disasters that may occur in my country.
- I have information about the natural disasters that will be most effective in my country.
- I have information about places with high earthquake risk in my country.
- I know that being aware of earthquakes can sometimes save lives.
- I have information about the effects of earthquakes on structures.

Collection of Data

The data for the research were collected in June 2023 via Google Forms, one of the Web 2.0 technology tools. Participants were informed about the purpose of the research before the application, and data were collected from volunteer participants.

Analysis of Data

The data of the research were analyzed in a particular statistical program using quantitative methods. Frequency and percentage distributions were used to present the descriptive characteristics of the data. Kolmogorov test for the normality of the distribution of the data obtained. It was examined with

the Smirnov test. The difference between demographic characteristics and DBD and SDFD was determined by independent samples t-test, Kruskal Wallis test, and Mann Whitney U test, and whether there was a relationship between the scales was determined by Spearman Correlation Analysis.

Ethical Principles

Ethics committee permission for this study was obtained from Sakarya University Educational Research and Publication Ethics Committee decisions with the decision dated 14.06.2023 and numbered 20/03.

FINDINGS

Table 5 shows the findings regarding teachers' sustainable earthquake awareness levels.

Table 5

Sustainable Earthquake Awareness Levels of Teachers

Sustainable Earthquake Awareness Level Sub-Dimensions		Low	Middle	High	$\bar{x}$	S
Size 1	Range	4-9	10-15	16-20		
Earthquake Building	F	18	147	90	13.9	3.1
relationship	%	7.1	57.6	35.3		
Dimension 2	Range	11-25	26-40	41-55		
Earthquake Preparation	F	54	144	57	32.7	8.9
Application	%	21.1	56.5	22.4		
Dimension 3	Range	7-15	16-24	25-35		
Against Earthquake	F	160	88	7	14.1	45.0
Preparedness	%	62.7	34.5	2.8		
	Range	22-51	52-81	82-110		
Total	F	64	175	16	60.8	14.0
	%	25.1	68.6	6.3		

Table 5, in the 1st sub-dimension of the scale, 16-20 points are high, 10-15 points are medium, and 4-9 points are low. 18 of the teachers (7.1%) received low scores on the scale, 147 (57.6%) received medium scores, and 90 (35.3%) received high scores. The average score of the teachers in the 1st sub-dimension of the scale was found to be ($\bar{X}$ =13.9). Accordingly, it can be said that the score teachers received from the "Earthquake-Structure Relationship" dimension, which is the first sub-dimension of the scale, is at a medium level.

In the 2nd sub-dimension of the scale, 41-55 points are considered high, 26-40 points are medium, and 11-25 points are low. 54 of the teachers (21.1%) received low scores on the scale, 144 (56.4%) received medium scores, and 57 (22.4%) received high scores. The average score of the teachers in the 2nd sub-dimension of the scale was found to be ($\bar{X}$ =32.7). Accordingly, it can be said that the score teachers

received from the "Earthquake Preparedness Practice" dimension, which is the 2nd sub-dimension of the scale, is at a medium level.

In the 3rd sub-dimension of the scale, 25-35 points are considered high, 16-24 points are medium, and 7-15 points are low. 160 of the teachers (62.7%) received low scores on the scale, 88 (34.5%) received medium scores, and 7 (2.8%) received high scores. The average score of the teachers in the 3rd sub-dimension of the scale was found to be ($\bar{X}$ =14.1). Accordingly, it can be said that the scores teachers received from the "Earthquake Preparedness" dimension, which is the 3rd sub-dimension of the scale, are low.

For the total score to be obtained from the scale, 22-51 points are low, 52-81 points are medium, and 82-110 points are high. 64 of the teachers (25.1%) received low scores on the scale, 175 (68.6%) received medium scores, and 16 (6.3%) received high scores. The average of the teachers' total scores from the scale was found to be ($\bar{X}$ =60.8). According to these values, it can be said that teachers' sustainable earthquake awareness levels are at a medium level.

Findings regarding the difference in teachers' DBD and SDFD scores according to their gender

Table 6 shows the findings regarding whether teachers' DBD and SDFD scores differ according to their gender.

Table 6

t-Test results on whether teachers' DBD and SDFD scores differ according to gender

Gender	Scale	N	$\bar{x}$	S	sd.	t	p
Woman	DBD	167	71.60	11.60			
Male	DBD	89	70,60	10.30	254	.677	.499*
Woman	SDFD	167	59.48	14.59			
Male	SDFD	89	62.90	13.06	254	-1.85	.65*

*p>0.05

A t-test was conducted to determine whether the difference between teachers' genders and DBD scores was significant, and it was determined that the difference was not significant (t(254)= 0.677). A t-test was conducted to determine whether the difference between teachers' genders and SDFD scores was significant, and it was determined that the difference was not significant. (t(254)=-1.85; p>0.05).

Findings regarding the difference in earthquake knowledge levels of teachers according to their ages

Table 7 shows the findings regarding whether teachers' earthquake knowledge levels differ according to their age.

Table 7

Kruskal -Wallis test results on whether teachers' earthquake knowledge levels differ according to their age.

Age	Scale	N	rank average	sd.	X^2	p	significant difference
20-30	DBD	39	155.17	3	8.19	.042*	20-30 years - 31-40 years
31-40	DBD	139	123.45				20-30 years-51-60 years
41-50	DBD	62	128.19				
51-60	DBD	15	98.73				

*p<0.05

The Kruskal -Wallis test, which was conducted to determine whether there is a significant difference between teachers' age groups and earthquake knowledge levels, determined a significant difference between age groups and earthquake levels (X^2 (3)=8.19, p<0.05).

Table 8

-Whitney U test results regarding the difference between the earthquake knowledge levels of teachers between the ages of 20-30, 31-40, and 51-60

Groups	Age	N	rank average	rank sum	u	p
with 20-30 years old	20-30	39	106.74	4163.00	2038,000	.018*
31-40 age range	31-40	139	84.66	11768.00		
with 20-30 years old	20-30	39	30.63	1194.50	170,500	.018*
51-60 age range	51-60	15	19.37	290.50		

*p<0.05

Table 8 shows the findings regarding the earthquake knowledge levels of teachers between the ages of 20-30 and 31-40. As a result of multiple comparisons made with the Mann -Whitney U test, it was determined that there was a significant difference between 20-30 years of age (Mdn = 75.0) and 31-40 years of age (Mdn = 70.0) (U = 2038.000, p < 0.05)). According to the findings regarding the earthquake knowledge levels of teachers between the ages of 20-30 and 51-60, as a result of multiple comparisons made with the Mann- Whitney U test, the difference between the ages of 20-30 (Mdn = 75.0) and 51-60 years (Mdn = 69.0) It was determined that there was a significant difference between (U=170.500, p<0.05).

Sustainable earthquake awareness of teachers' findings regarding the difference in levels according to age

Table 9 shows the findings regarding the difference in teachers' sustainable earthquake awareness levels according to their ages.

Table 9

Difference in sustainable earthquake awareness levels of teachers according to their ages

Age	Scale	N	rank average	sd.	X^2	p	significant difference
20-30	SDFD	39	131.06	3	2.23	.531*	-
31-40	SDFD	139	123.63				-
41-50	SDFD	62	138.63				-
51-60	SDFD	15	116.60				-

*p>0.05

The Kruskal -Wallis test, which was conducted to determine whether there is a significant difference in teachers' sustainable earthquake awareness levels according to their age groups, it was determined that there was no significant difference between age groups and sustainable earthquake awareness levels (X^2 (3)=2.23, p>0.05).

Findings regarding the relationship between teachers' DBD and SDFD sub-dimensions

Table 10 shows the Spearman Correlation analysis findings, which determined the relationship between teachers' DBD and SDFD sub-dimensions.

Table 10

The relationship between teachers' DBD and SDFD sub-dimensions

		Earthquake structure relationship SDFD 1st dimension	Earthquake preparedness application SDFD 2nd dimension	Being prepared for earthquakes SDFD 3rd dimension
Earthquake Zones Distribution Information DBD 1st dimension	Spearman's p	.280	,231	.042
	P	,000	,000	.507
Earthquake Effects	Spearman's p	,172	.235	-.029

Information DBD 2nd dimension	P	.006	,000	.642
Earthquake Education DBD 3rd dimension	Spearman's p	,190	.371	,171
	P	.002	,000	.006

* Correlation is significant at p<0.05 level.

The Spearman Correlation analysis performed to determine the relationship between teachers' DBD and SDFD sub-dimensions in Table 10 shows that there is a weakly positive (r=0.280) and significant (p<0.05) relationship between earthquake zone distribution information and earthquake structure relationship. In other words, teachers' knowledge of earthquake zone distribution and earthquake structure relationship increases weakly and significantly.

It is seen that there is a weakly positive (r=0.231) and significant (p<0.05) relationship between earthquake zone distribution knowledge and earthquake preparedness practice. In other words, teachers' knowledge of earthquake zone distribution and earthquake preparedness practices increase at a weak level and significantly together.

It is seen that there is no significant (p>0.05) relationship between knowledge of earthquake zone distribution and preparedness for earthquakes.

It is seen that there is a weakly positive (r=0.172) and significant (p<0.05) relationship between earthquake effects knowledge and earthquake structure relationship. In other words, the relationship between teachers' knowledge of earthquake effects and structure increases weakly and significantly.

It is seen that there is a weakly positive (r=0.235) and significant (p<0.05) relationship between earthquake effects knowledge and earthquake preparedness practice. In other words, teachers' knowledge of earthquake effects and preparedness practices is increasing weakly and significantly.

There appears to be no significant (p>0.05) relationship between knowledge of earthquake effects and preparedness for earthquakes.

It is seen that there is a weakly positive (r=0.190) and significant (p<0.05) relationship between earthquake education and earthquake structure relationship. In other words, the relationship between teachers' earthquake education and earthquake structure is weak and significantly increasing.

There is a moderate positive (r=0.371) and significant (p<0.05) relationship between earthquake education and earthquake preparedness practice. In other words, teachers' earthquake education and preparedness practices increase moderately and significantly.

It is seen that there is a weakly positive (r=0.171) and significant (p<0.05) relationship between earthquake education and earthquake preparedness. In other words, teachers' earthquake education and preparedness increase moderately and significantly.

Findings regarding the relationship between teachers' DBD and SDFD

Table 11 shows the findings of the Spearman Correlation analysis conducted to determine the relationship between teachers' DBD and SDFD.

Table 11

Spearman Correlation analysis results on the relationship between teachers' DBD and SDFD

Variables	n	r	P
DBD	255	,313	,000*
SDFD			

* Correlation is significant at p<0.05 level.

The Spearman Correlation analysis was conducted to determine the relationship between teachers' DBD and SDFD; it was seen that there was a positive and moderately significant relationship between the levels (r = 0.381, p<0.05). According to this result, as the DBD of teachers increases, SDFD also increases, and as DBD decreases, SDFD also decreases.

CONCLUSION AND DISCUSSION

When the findings of the research are analyzed, it is seen that teachers have high level of knowledge about the distribution of earthquake zones and the effects of earthquakes, and medium level of knowledge about earthquake education. In general, it was concluded that teachers' earthquake knowledge levels were at a high level. The reason for the high level of earthquake knowledge of the teachers in the study may be the effect of the Kahramanmaraş earthquake that occurred very recently. Tekin and Dikmenli (2021) stated in their study that more importance was given to what should be done after the earthquake and information. Ha (2018), in his study to investigate earthquake awareness in Korea, stated that earthquake awareness increased after the earthquake in the region and that earthquakes play an important role in increasing earthquake knowledge in society. In this direction, it can be said that recent earthquakes positively affect the level of earthquake knowledge.

According to the study, teachers have moderate knowledge about the relationship between earthquakes and structures and earthquake preparedness practices. Teachers' level of earthquake preparedness is low. In parallel with the results of the study, Jhonston et al. (2013) stated that the public had more knowledge about earthquake risk after public education activities, but the result was separate from earthquake preparedness. The reason for the low level of preparedness of teachers for earthquakes may be that although they have received in-service training on earthquakes at various times, they need more than this training. Yakut (2002) stated in his study that individuals' taking measures to reduce the damages of disasters and developing behaviors about earthquake preparedness require an educational process. In their study, Vicente et al. (2014) emphasized the importance of creating public education and publicity campaigns at the city level and providing education in schools in order to reduce the negative effects of disasters. In this direction, earthquake education can be given seriously and as a process to raise awareness of the society, not after any earthquake disaster.

In the study, it was observed that the levels of earthquake knowledge and sustainable earthquake awareness did not differ according to the gender of the teachers, but the level of earthquake knowledge differed between teachers between the ages of 20-30 and other age groups. Dökmeci and Merinç (2018) stated in their study that increasing the earthquake awareness of future generations will play an important role in the continuation of humanity and that students raised with disaster awareness can form a useful workforce in case of disaster. The high level of earthquake knowledge of teachers in the 20-30 age group may enable them to be useful in regions where manpower is needed in case of a possible disaster.

In the study, it was observed that there was a positive and moderate relationship between teachers' DBD and SDFD. There was a weak positive relationship between teachers' knowledge of earthquake zone distribution and earthquake structure relationship and earthquake preparedness practices. According to this result, it can be said that as teachers' knowledge about the distribution of earthquakes according to regions increases, their level of knowledge about the structures that should be built in these regions, their level of preparedness for a possible earthquake and their level of preparedness for a possible earthquake will increase. There was a weak positive correlation between teachers' knowledge about the effects of earthquake and earthquake-structure relationship and their earthquake preparedness practices. According to this result, when teachers' knowledge about the effects of earthquakes increases, their knowledge about the structures that should be built against earthquakes and their level of preparedness against a possible earthquake will also increase. When the level of knowledge of teachers increases with the earthquake education they receive, their knowledge of earthquake-structure relations, earthquake preparedness and implementation will also increase. In our earthquake-prone country, it is extremely important to be prepared for earthquakes at any time and to take the necessary precautions. In order to increase earthquake awareness in our country, earthquake-related trainings can be given to students in a systematic way starting from the lowest level. Education and earthquake knowledge enable people to use strategies to reduce losses and damages caused by earthquakes (Shaw et al., 2009). After providing information about earthquakes, drills can be conducted regularly. A suitable environment can be provided for drills to be taken seriously. An applied course can be added to the curriculum to make this awareness permanent. A course on disasters and disaster prevention can be given to prospective teachers during their undergraduate years. They can also be encouraged to participate in activities related to disasters.

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The Reflections of Earthquakes on Education: Insights From School Managers

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Abstract

Earthquakes are natural disasters that can affect the performance of schools, educators, and student success. In light of the recent earthquakes that occurred in Türkiye on February 6, 2023, efforts by both authorities and researchers are underway to assess the effects of the earthquake on the education, staff, and students. In this regard, the perspectives of school managers who remained in their positions following the earthquakes and diligently fulfilled crucial responsibilities hold significant value. A limited number of studies have narrowly examined past educational crises caused by earthquakes. However, the effects of these earthquakes, labeled by government officials as the disaster of the millennium, on education services in the zone have not been fully clarified. Consequently, the current study concentrates on the educational conditions, practices, and expectations within the earthquake-devastated zone. The study was conducted in Elbistan district of Kahramanmaraş, known to be one of the two epicenters of the earthquake. The methodology of phenomenological design was employed during the investigations. The views of 10 school managers (four principals and six vice principals) were obtained for the purpose of the study. The results unveiled insufficiencies in the educational environment within the earthquake zone, with limited and challenging educational practices prevalent. However, respondents highly appreciated the efforts made. Findings uncovered that the educational services in the earthquake zone were incapacitated due to physical problems and managerial inefficiencies. Participants had significant expectations regarding enhancing physical conditions, receiving psychological support services, and improving staff procedures (such as payments, transfers, and professional development). Based on the results, some recommendations were made for the researchers and authorities.

Keywords

School manager, earthquake, education, phenomenology.

INTRODUCTION

The pursuit of education is a lifelong process. Persevering through obstacles, fostering creativity, acknowledging societal obligations, and embodying a problem-solving mindset are the sought-after traits instilled by education. The attainment of educational success in a society is closely tied to the elimination of barriers that hinder the implementation of the aforementioned characteristics. Many issues that frequently dominate the public agenda, including inadequate investment in education (Kurul, 2012), academic achievement (Bozkurt et al., 2021; Gümüş et al., 2021) and refugee students (Topaloğlu & Özdemir, 2023), act as obstacles to the smooth functioning of the educational system. However, there are certain barriers that can have a more profound impact on education, educational institutions, educators, and learners. Among these, earthquakes stand out as particularly destructive.

Earthquakes seriously impact the education systems of the countries where they occur (Öztürk, 2013). Damage to schools, destruction of infrastructure (such as internet connectivity, transportation networks, and electronic systems), fatalities, and subsequent tremors all impede the delivery of educational services. Studies conducted in different geographies also confirm the detrimental impact of earthquakes on schools and education (Rodgers et al., 2021; Shaheen, 2008). On the date of February 6th (2023), earthquakes originating in Kahramanmaraş greatly impacted the educational landscape of Turkey, including both students and educators. The four provinces (Kahramanmaraş, Hatay, Adıyaman, and Malatya) and two districts (Islahiye and Nurdağı [Gaziantep]) have been significantly affected by the disasters, resulting in the complete or severe physical damage of a considerable number of educational institutions in these places (Education Reform Initiative [ERI], 2023a; Presidency of Strategy and Budget [PSB], 2023). Educational institutions that incurred minimal damage were assigned to various governmental entities, including municipal authorities, the Disaster and Emergency Management Presidency, and district governorships. The earthquakes on February 6 not only resulted in physical destruction in the specified locations, but also claimed the lives of numerous students and educators, as well as left others trapped, wounded, or with amputations as a direct consequence of the tremors. A vast number of children and educators were obligated to depart from their hometowns and settle in unfamiliar cities, where they faced a multitude of psychological and societal challenges. Despite all this, there has been a gradual reestablishment of educational institutions, and the educational landscape in the earthquake-affected area has been restored to its customary state.

The implementation of restorative measures for schools, reallocation of facilities to alternate organizations, and reintegration of container schools and temporary classrooms fall under the principal initiatives to uphold the continuity of education in the earthquake-affected region. Festivals and projects implemented by The Scientific and Technological Research Council of Türkiye (STRCoT) (STRCoT, 2023) and support from international institutions and organizations (MoNE, 2023a; United Nations Children's Fund [UNICEF], 2023) are other practices used to solve existing problems. In the same manner, educators put forth their utmost efforts in serving their schools and guiding their students (ERI, 2023b). From the first moment of the earthquake, the school principals, vice principals, and teachers worked tirelessly to ensure that schools remained open and ready for education.

As seen in other countries (Mutch, 2021), following the earthquake, schools were quickly transformed into hubs for social support, nutrition, and shelter for students, thanks to the dedicated efforts of educators, particularly the school management team. Even in the face of collapsed or severely damaged buildings, school principals and vice principals served as visiting educators in different

schools, while simultaneously managing their own campuses. They played a crucial role in getting tents, containers, and old schools ready for educational purposes. Through this process, the school management team obtained significant insight into the educational conditions, practices, and expectations in the earthquake zone. In other words, the school principals and vice principals had distinct and remarkable experiences as they worked towards enhancing educational standards in the aforementioned locations. These experiences are precious in presenting the current panorama, evaluating practices, and defining expectations. Indeed, periods of crisis are as valuable as they are challenging (Abaslı, 2017; Kıral, 2018; Sertel et al., 2021). Conducting a thorough assessment of requirements, enriching the crisis management framework, fortifying communication channels, and formulating effective resolutions can be achieved by drawing insights from past crises. (Aksu & Deveci, 2009; Bakioğlu & Savaş, 2001).

The present study aims to analyze the educational conditions and practices in the earthquake zone, as perceived by the school principals and vice principals in Türkiye after the February 6 Earthquakes. For this purpose, school principals and vice principals working in Elbistan district of Kahramanmaraş, one of the earthquake centers, were included in the scope of the research. These individuals were witnesses to the earthquake's effects on education, including the challenges experienced by schools, teachers, students, and the expectations of stakeholders. Examining this process, which has a profound effect on millions of students and hundreds of thousands of educators (ERI, 2023a; ERI, 2023b; UNICEF, 2023), is expected to contribute to the production of knowledge to understand and improve the current situation (Özek & Sincer, 2023). With regards to this matter, the research claims to support the implementation of educational policies, schools, school managers, and teachers. Additionally, the research holds significant implications for addressing educational challenges that may arise in the aftermath of a potential earthquake in Istanbul or the Aegean region. Finally, there is also a need to anticipate potential challenges that schools in disaster-prone countries may face and offer viable solutions for them. Based on the study's findings, a set of recommendations will be presented to school principals, educational authorities, policymakers, and researchers.

Conceptual Framework

Earthquake and Türkiye

Disasters are unforeseeable and unpredictable events that result in societal, psychological, and monetary upheaval for both individuals and the community. They cause massive loss of resources and disrupt many public services. Furthermore, they can result in prolonged interruptions of critical facilities, such as transportation, healthcare, and education, for an extended period of time. Earthquakes are one of the natural disasters whose effects can last for a long time.

Although earthquakes last a few minutes, they are devastating disasters that can cause severe material and moral damage. The geological movements of the plates around it cause Türkiye to experience many earthquakes of various magnitudes every year. This makes Türkiye an earthquake country (Öcal & Topkaya, 2011; Şengör et al., 2008). The historical evidence of numerous seismic events in Anatolia further solidifies this notion. Notably, the August 17, 1999 earthquake served as a pivotal moment in raising the nation's consciousness on this matter. On February 6, 2023, it is possible to say that this awareness peaked with the earthquakes and the damage they caused.

Education in Earthquake Zone

The intensity of earthquakes, their closeness to the surface, and different mistakes (e.g., vertical construction, permitting urbanization near fault lines) hinder the productivity of public institutions in the aftermath of an earthquake (Özek & Sincer, 2023; Yamamoto & Altun, 2023). These impediments manifest in sociocultural and infrastructure services that are utilized by individuals. Among the public services detrimentally impacted by earthquakes are educational activities (Adıgüzel, 2007; Alcocer et al., 2020; Öztürk, 2013).

On the day of February 6, 2023, a catastrophic earthquake struck Kahramanmaraş, resulting in the demise of numerous students, parents, and educators. Furthermore, a multitude of schools were either reduced to rubble or deemed uninhabitable (PSB, 2023). School buildings, most of which had physical damage but were still usable, were allocated for organizations such as DEMP and municipalities. In these centers, earthquake victims were sheltered, aid was stored, and state institutions provided services (ERI, 2023a). During all these difficulties, schools were also prepared for students. In fact, this preparation was sometimes carried out in tents or container schools (Turkish Radio and Television Corporation [TRT], 2023). This process has been greatly aided by the valuable contributions of school principals and vice principals.

Research Context and Problem

School managers, including principals and vice principals, have worked tirelessly to enhance school and teaching conditions in the earthquake-affected area. Nevertheless, it remains a challenge to ascertain the attainment of optimal quality in educational and pedagogical services within the region. At this point, school principals and vice principals, who have played a crucial role in elevating schools to their current state, hold a special significance and are expected to make significant contributions in the future. The available literature examining the effects of earthquakes on education mainly comprises of reports collected from different institutions and organizations (ERI, 2023a; ERI, 2023b; PSB, 2023; UNICEF, 2023). In this regard, it is thought that evaluating the educational activities, practices, conditions, and expectations in the earthquake zone through the perspectives of school principals and vice principals would yield important outcomes. Therefore, in light of the perspectives of school principals and vice principals, the present inquiry delves into the educational circumstances, practices, and expectations in the earthquake-affected area. The study aims to provide a better understanding of the state of schools and education in the earthquake zone. In this way, it is desired to strengthen the knowledge base of the February 6 Earthquakes, which will have long-lasting effects and are estimated to cause billions of dollars in damage to educational institutions. Based on the results obtained, recommendations will be made regarding educational policies and practices. Within the scope of the research, the answers to the following questions were sought:

1) How do you evaluate the educational conditions in the earthquake zone?

In this context, what are your thoughts on;

a) Physical and instructional facilities and

b) Managerial practices in educational environments?

2) What are your views on educational practices in the earthquake zone?

In this context, what are your thoughts on;

a) The appropriateness and diversity of educational practices and

b) Their effectiveness?

3) How would you organize education services in the earthquake zone?

In this context,

a) Can you share your views on the services that need to be changed or improved?

b) What are your suggestions for improving the current conditions?

METHOD

In this inquiry, a qualitative research modality was employed, with a particular focus on utilizing *phenomenology* as a design methodology. This facilitated the revelation of participants' subjective experiences, perspectives, and assessments pertaining to the topic at hand (Özdemir, 2010, p. 328). Indeed, undertaking an analysis of phenomena provides a holistic understanding of individuals' perspectives on exceptional circumstances. (such as earthquakes[1]) (p. 334).

Study Group

The individuals selected for the present study were chosen through the utilization of the criterion sampling technique. *Criterion sampling* is a sampling approach that permits the examination of participants' views, who have predetermined gauges (Patton, 2015, p. 425). Considering the context at hand, it was determined that the selection of study participants would encompass school principals and vice principals serving in Elbistan district of Kahramanmaraş, who have maintained their professional roles following the earthquake. Based on the criterion above, the views of 10 participants were sought. Demographic information about the participants is presented in Table 1:

Table 1

Demographic Information of the Participants

No.	Code Name	Title	Gender	Age	Marital Status	Education	*Seniority in Management	Current School	Status of School	Shelter Earthquakes
1	SP-M01	School Principal	Male	39	Married	Bachelor's	10	3	Moderate Damaged	Container
2	VP-M01	Vice Principal	Male	33	Single	Bachelor's	2	1	Minor Damaged	Own Home

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[1] Authors' note.

3	SP-M02	School Principal	Male	49	Married	Bachelor's	23	1	Minor Damaged	A Relative's Home
4	VP-M02	Vice Principal	Male	32	Married	Bachelor's	7	7	Minor Damaged	A Relative's Home
5	SP-M03	School Principal	Male	33	Married	Bachelor's	8	8	Undamaged	Tent
6	SP-M04	School Principal	Male	38	Married	Bachelor's	13	4	Minor Damaged	School
7	VP-M03	Vice Principal	Male	39	Married	Master	5	5	Undamaged	Own Home
8	VP-M04	Vice Principal	Male	38	Married	Bachelor's	4	4	Undamaged	A Relative's Home
9	VP-M05	Vice Principal	Male	35	Married	Bachelor's	4	4	Undamaged	A Relative's Home
10	VP-M06	Vice Principal	Male	37	Married	Bachelor's	8	3	Undamaged	School

Notes: *, Year; SPM, School Principal; M, Male; VP, Vice Principal.

Data Collection Tool and Process

The data were collected through a semi-structured interview form developed by the researchers. The interview form consists of two parts. The first section includes questions regarding the demographic information of the participants. The second section includes the research questions and sub-questions. Upon completion of the necessary arrangements by the researchers, the interview form was reviewed by three experts who had prior experience conducting qualitative studies. Two of these experts are located in Turkey, while the other is based abroad. Upon careful consideration of the experts' opinions and recommendations, the interview form was officially approved. Prior to the implementation, two school principals and vice principals were interviewed as part of the pilot stage. At the end of these interviews, it was seen that the interview form was clear, understandable, and could serve the purpose of the research. After conducting the pilot study, it was concluded that the interview form could be effectively utilized for the research and interviews were subsequently executed. Morse (2015) acknowledges that obtaining comparable data in a qualitative study indicates data saturation. The interviews were concluded upon reaching data saturation (which occurred after the 10th participant was interviewed in this study). Subsequently, data analysis was conducted.

Ethical Principles, Trustworthiness and Rigor

The research was carried out based on the permissions received from Trabzon University Social and Humanities Research and Publication Ethics Committee (Date: 08/09/2023, No.: 2300049763 and Kahramanmaraş Provincial Directorate of National Education (Date: 15/06/2023, No.: 78343088). The

research was conducted with the participants' full consent. Prior to the interviews, the participants were briefed on the research topic, questions, and objectives. During these preliminary interviews, school principals and vice principals were asked to save/write their views on an online form. It was also stated to the participants in these meetings that they could terminate the process whenever they wanted. In this way, it was aimed to run a reliable and valid data collection process. The alignment of the participants' perspectives with the researchers' interpretations plays a crucial role in ensuring the validity of qualitative research. To guarantee the same results in this study, all participants were interviewed via telephone 10 days after the data collection was finished. During these last interviews, In the final round of interviews, the researchers reviewed the research data by seeking clarification on any statements that were unclear. Following the evaluations, all participants confirmed a strong correlation between the researchers' conclusions and their personal perspectives. Some minor inconsistencies and unclear points were eliminated by collaborating with the participants in this process. Additionally, qualitative research software was utilized to further validate the trustworthiness of our research data.

During the analyses, participants were anonymized by coding their names (such as *SP*=school principal, *VP*=vice principal, *M*=male, *01*=participant number). In this way, the identities of the participants were kept confidential. In the study, the experts involved in formulating the research questions were also consulted for matters regarding code compatibility and the creation or merging of themes. In addition, the data were analyzed with MAXQDA 2020. Finally, the summary of the interviews was presented to the participants two weeks after data collection to confirm their views. All these factors collectively contribute to the validity and reliability of the study (Yıldırım & Şimşek, 2016).

Analyses

The analysis procedure developed by Miles and Huberman (1994/2019) was followed while analyzing the data in the current study. According to this procedure, the data were first (*i*)simplified, then (*ii*)visualized, and finally (*iii*)inferred and verified. The data in the online form were edited to simplify the research data. The researchers or participants' perspectives are represented by the symbols "<<< … >>>" in the simplified data. Recordings were systematically coded and thematized using MAXQDA 2020 qualitative research software. Thematization was achieved through the concept coding technique, which facilitated document analysis and the examination of phenomena as a whole. This combines the phenomenology design and concept coding utilized in the present study (Saldana, 2015, p. 120). The results were visualized using tables and code matrix. The process of drawing conclusions and verifying them was incorporated throughout the conclusion and discussion part.
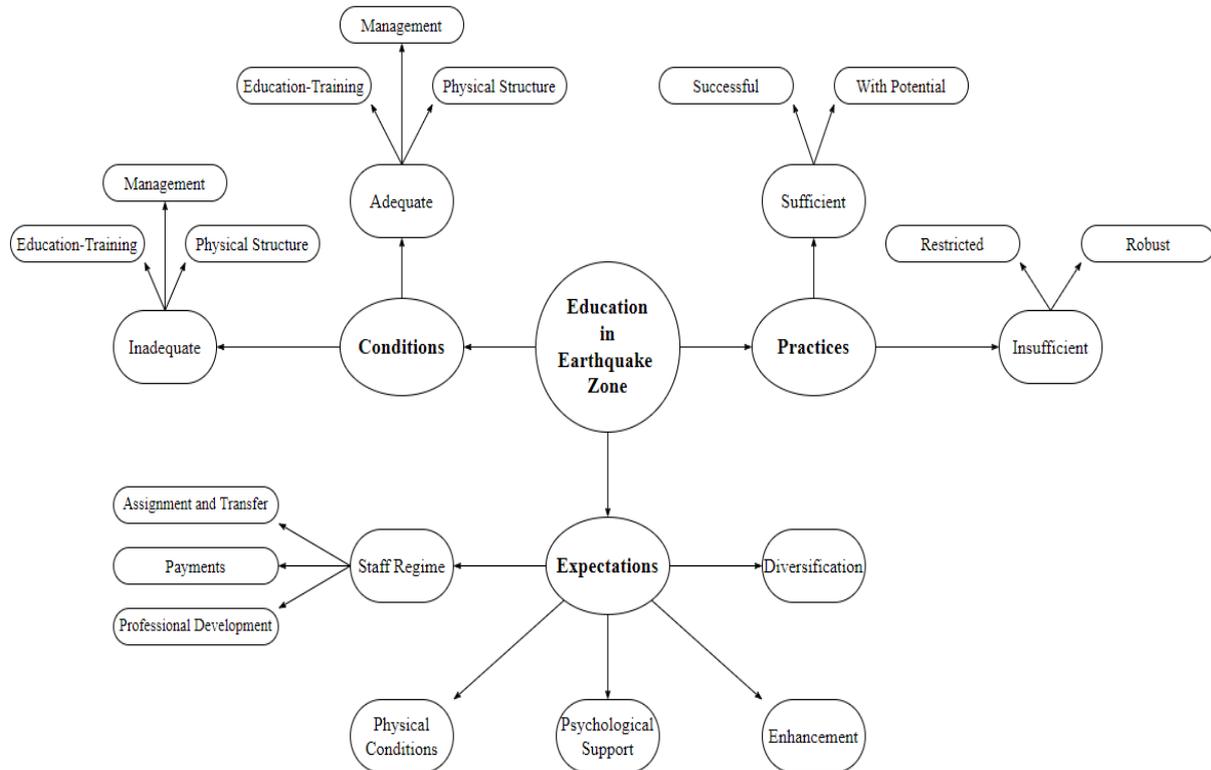
FINDINGS

After examining the perspectives of the participants, a total of 132 codes were identified. These codes were then used to develop three main themes and nine sub-themes, which were ranked in order of frequency. The distribution of these codes belonging to themes and sub-themes is presented in Table 2.

Table 2

Code Matrix

Education in Earthquake Zone				
Conditions		Practices		Expectations
Sub-Themes				
Adequate	Inadequate	Sufficient	Insufficient	Diversification
Education-Training	Education-Training	Successful	Restricted	Enhancement
Management	Management	With Potential	Robust	Psychological Support
Physical Structure	Physical Structure			Physical Conditions
				Staff Regime
				Assignment and Transfer
				Payments
				Professional Development

Note: Those written in *italics* are sub-themes belonging to sub-themes.

As seen in Table 2, the codes relating to the *expectations* theme have the highest frequency, while those under the *practices* theme have the lowest. *Physical conditions* is the sub-theme with the most depth, while the sub-themes of *education-training*, *management,* and *with potential* have relatively few codes. It is possible to visualize the view of themes and sub-themes in Figure 1.

Figure 1

Themes and Subthemes

Findings Related to Educational Conditions

When the participants' views were analyzed for the first question of the study, "How do you evaluate the educational conditions in the earthquake zone?" two themes were reached: *Adequate* and *inadequate. The conditions* theme consists of two sub-themes. Of these, *adequate* has three sub-themes: *Education-training, management*, and *physical structure. The education-training* sub-theme consists of the codes that include school principals' positive opinions about students and courses. These positive views are also valid for the *management* sub-theme. However, a small group of participants, whose opinions fell under the *physical structure* sub-theme, are employed in areas that were not heavily impacted by the earthquake. They noted that the education system in these regions was not greatly affected. It is possible to say that the codes under the *adequate* sub-theme do not contain solid, definite views. Participants (e.g., VP-M01, SP-M04, VP-M02) present their views here with adjectives such as "good", "positive", "normal" or "sufficient".

The second sub-theme of the *conditions* theme is *inadequate*. In this theme, participants emphasize the inadequacies of educational conditions. The *inadequate* theme, like the *adequate* theme, consists of the sub-themes of *education-training*, *management,* and *physical structure*. In the *education-training* sub-theme, it is understood that the participants doubt the quality of the services provided by the schools. For example, VP-M03 expresses his view on this issue with the following striking

statements: "Yes, schools provide services, but I doubt what we can provide. I think the following semester's services will be better. However, right now, we are doing the minimum ".

VP-M05 and VP-M06 have similar views on the quality of educational conditions. Moreover, both participants think the forced dual education practice calls into question the quality of education provided. *Management* is the sub-theme where participants criticize authorities and education policies. VP-M03 criticizes the authorities for failing to coordinate education services, while VP-M02 complains about constantly changing managerial practices. SP-M04 questions the leadership abilities of top managers at this point. He summarizes the current panorama with the sentence, "School managers are doing paperwork and are unable to perform their main job of educational leadership, visionary and idealist identity <<<leadership>>.". SP-M03, who had similar thoughts, reported that some of the managers had difficulties in analyzing the conditions of the earthquake zone during the crisis. According to this participant, this situation prevents cooperation among education professionals. Additionally, SP-M01 complains that managerial practices sometimes become rigid during the crisis process. VP-M03, who has overlapping views, expresses his views on this issue as follows:

My personal view is that we are not managing schools effectively. Some of the schools' damage records <<<official records>> turned from "heavy" <<<damage>>> to "moderate" <<<damage>>>, some were turned into <<<social>> markets, some were robbed… We could not manage the process. Especially at the beginning, there was a search for a solution. There were days when everyone looked at each other and tried to run away from the school buildings <<<because they might collapse>>>. We did not know what to do, and this was also because we were afraid for our lives. Maybe we did not fail in management, but we failed; we had to make up work.

Within the *physical structure* sub-theme, VP-M05 highlighted the challenges of using schools with diverse structures. He noted this as a stressor within the institution. Similarly, SP-M01 and SP-M02 report that infrastructural problems negatively affect educational conditions. According to these participants, physical problems have a detrimental effect on the psychology well-being of both students and teachers, and they view these limitations as a significant barrier to providing effective educational services. In this regard, VP-M05 confirms these views by saying, "A school was opened in one container town. Schools could have been opened in other container cities as well.". This sheds light on the lack of school buildings and, thus, on the structural problems of educational conditions. In the *inadequate* sub-theme, participants harshly criticize the educational conditions in the earthquake zone. In fact, participants frequently used expressions such as *problem*, *doubt*, *necessity*, *complex,* and *ineffective* when expressing their views.

Findings on Educational Practices

The second research question, "What are your opinions on educational practices in the earthquake zone?", yielded data that were divided into two sub-themes, labeled *sufficient* and *insufficient*, within the broader *practices* category. The participants' views under the *sufficient* sub-theme align with the results gathered from those who perceived the educational practices in the earthquake zone as positive and appropriate. In the *successful* sub-theme, the managers see the educational practices as *good* and *satisfactory*. For instance, SP-M04 stayed at the school for a while after the earthquake and closely witnessed the preparation of educational practices. He described the educational practices as "A style of education close to the normal one continues. Students are treated a little more flexibly" and deemed it as successful. In addition, VP-M04 also had parallel views and stated that "Suitable

conditions were provided by the measures taken in the short period." These findings demonstrate how managerial practices affect educational practices positively, distinguishing it from SP-M03 and VP-M06. The *with potential* sub-theme under *sufficient* presents a positive outlook on educational practices, while also including critiques. For instance, SP-M02 and VP-M05 highlight shortcomings, but also acknowledge that the situation is improving. VP-M06 explains the source of this improvement with the educational culture of the city where the research was conducted:

As I mentioned above, our education has suffered; however, Elbistan is one of the cities that will recover the fastest in education among the provinces and districts in the earthquake zone. My reason for saying this is this: Our city has an established educational culture, and I do not see that culture as a phenomenon that will collapse in an earthquake.

The *restricted* sub-theme under *insufficient* consists of codes where educational practices are limited. The general outlook of the relevant sub-theme can be defined as "favorable but with room for improvement." Here, SP-M01 states that there was an effort to integrate educational practices into the garden. However, the curriculum does not entirely support this initiative. In addition, SP-M04 notes that guidance and counseling services are not efficient, while SP-M03 argues that students are unable to fully fulfill their duties. VP-M03 holds a similar viewpoint. In this vein, VP-M04 stated, "There is not much of an option right now. It should continue like this.". illustrating the view that educational practices are squeezed into a narrow scope. The theme of *robust* encompasses the challenges encountered in educational practices and discussions. Additionally, SP-M01 and VP-M06 state that recompense training has become obligatory due to the difficulties experienced. The problematic situation and effectiveness of educational practices are clarified by SP-M01, stating that "Recovery may be challenging but not impossible. Therefore, mandatory recompense training is necessary for all levels.". VP-M03 describes the dilemma faced by schools, teachers, and school managers in regards to educational practices by stating that:

We opened the schools with some difficulties. We keep them open. In this context, I have criticisms about the quality. We are still uneasy. What happened, and what will happen? We do not know what would happen if an earthquake occurred in the classroom. The authorities are also struggling. There are always different opinions and thoughts... Everyone is puzzled. (…) I do not expect academic achievement to increase. The issue of academic achievement was closed on the morning of the earthquake, but did we manage to bring a smile to the students? I think yes! On the school way, they <<<students>>> close their eyes <<<<to avoid seeing scenes of destruction, etc.>>>. Under these conditions, effectiveness is not an option.

VP-M05 shares similar perspectives on this matter. He explains that the challenges encountered during training exercises are primarily a result of managerial errors as evidenced in the following statements: "Despite the end of the third week in schools, the continuous transfer of students in and out of schools has negatively affected education services. At the same time, problems in the education services provided after the earthquake also negatively affect children.". Lastly, VP-M02 pointed out the importance of motivation as a major underlying cause of the challenges encountered, and highlighted the vital role of addressing the needs of students and educators.

Findings on Expectations

The analysis of the data related to the third research question, "How would you organize education services in the earthquake zone?" resulted in the identification of five sub-themes falling under the *expectations* theme: *diversification*, *enhancement*, *psychological support*, *physical conditions*, and *staff regime*. *Diversification* contains the participants' expectations regarding educational activities and curricula. For instance, SP-M02 suggests that schools have carried out a diverse range of activities after the earthquake, but there is still a need for increased efforts. Additionally, teacher performance and curriculum updates are seen as crucial factors by SP-M04, while SP-M03 highlights the significance of social activities. In the same parallel, SP-M01 argued that "For elementary education, I would have been meticulous that the lessons were held in open spaces and that the instructional activities were taught through play-based activities. However, unfortunately, the curriculum prevented me a lot.". Additionally, VP-M06 states that recompense training will significantly contribute to minimizing learning losses.

Participants of the *enhancement* theme appear to value the efforts being made. However, all school managers maintain the belief that the current conditions and practices must be upheld and improved. In the same vein, VP-M01 and VP-M04 concur that preserving and advancing the available education and training facilities and services is the appropriate course of action in the earthquake- affected area.

In the *psychological support* theme, school managers acknowledged the importance of guidance and counseling for themselves, their staff, and students. VP-M02 suggests that motivation plays a crucial role in this process. Similarly, SP-M02 states that providing psychological support is essential for helping students develop a positive outlook on their future. SP-M01, a principal at a secondary school, has a strong commitment to the academic growth and achievements of his teachers and students in preparation for central exams. Here are his thoughts on this subject:

Considering the environmental factors, making education appropriate can be supported by psychological support and various activities. (…) Students need to protect themselves from negative factors without feeling anxious. As valuable educational actors, teachers need to be mentally and physically rehabilitated. If this is ensured, effectiveness occurs. (…) Considering the losses suffered by educators in the earthquake zone, teachers should be supported economically, their wages should be increased, and they should be provided with periodic guidance and psychological support services. Housing support should also be provided to teachers and their families, and teachers' anxiety levels should be reduced. Thus, teachers can be more committed to their work, and education can be improved.

According to VP-M06, psychological assistance and counseling should encompass students, educators, and school managers. Similarly, SP-M03 highlights the importance of psychological support in recovering from a significant trauma, like an earthquake.

The *physical conditions* theme consists of participants' views on improving the conditions of schools. This theme focuses on improving schools' physical conditions and the promotion of opportunities for teachers and students. According to VP-M02, the improvement of the physical environment cannot be delayed any longer, and VP-M03 recommends targeting specific aspects such as the school facilities, outdoor space, internet connection, and power infrastructure.

Staff regime is the theme with the highest participant expectations, which pertains to the employment of teachers and school managers, as well as economic benefits and requirements for professional

growth. Under this sub-theme are the sub-themes *assignment and transfer*, *payments*, and *professional development*. The majority of participants in the *assignment and transfer* theme indicated a preference to be assigned away from the earthquake zone, with a few exceptions (such as SP-M02). The addition of the views on volunteer teachers and school managers working in the earthquake zone indicates that the participants hold expectations regarding the right to transfer. School managers also expect the higher authorities will take necessary steps to place teachers and support staff in schools where their services are required. For example, VP-M05 explains this in the following sentences: "Teachers became over-normed after the earthquake. When assigning these teachers to schools in need, they should have been assigned according to the superiority of service points. There should be fairness in the number of kindergarten and primary school students*.*".

The *payments* sub-theme includes expectations for economic regulations to be established to acknowledge the efforts of educators. The primary references for this expectation are the loss of the former attractiveness of the earthquake zone, rising prices, and economic losses of earthquake victims. *The professional development* sub-theme includes specialization and support for teachers and school managers in their careers. VP-M01 explains this by pointing to other sub-themes under *expectations*:

The staff is exhausted. Both psychologically and physically... They are homeless, they are tired... This needs to be eliminated. "Teaching is sacred. Come to school, bro/sis!" does not make much sense in these conditions. We need to address their most basic needs. There may be career <<<<development>> opportunities, there may be economic regulations. They need to be empowered in these matters.

According to SP-M03, SP-M04, and VP-M06, this approach best benefits teachers and students. Participants believe that the professional development of staff is functional in eliminating the disruptions in schools and education and training services in the earthquake zone.

CONCLUSION AND DISCUSSION

The current research examined the state of education in the earthquake zone through the lens of school principals and vice principals. The purpose was to examine the perspectives of education staff who remained in the region following the February 6 earthquakes in Türkiye. Upon careful analysis of the responses gathered for the first question of the research, "How do you evaluate the educational conditions in the earthquake zone?" are carefully analyzed, it is seen that the majority of the participants find educational conditions inadequate. However, a limited number of participants held a different perspective. In studies focused on the intersection of "COVID-19 pandemic and education," it is not uncommon to encounter sharp criticism from participants, particularly in the areas of education-training and management, as there has been much debate about the quality of education services during the pandemic (Camilleri, 2021; Özdoğan & Berkant, 2020). Moreover, according to studies conducted during the relevant period, it has been observed that the crisis in educational institutions is further intensified by managerial practices (Sertel et al., 2021), leading to a lack of direction among employees (Netolicky, 2020). This provides important insights into education managers' leadership and crisis management competencies in the earthquake zone.

Alongside this, participants expressed many views that centered on physical structure limitations and possibilities. These perspectives emphasized the use of schools for purposes other than education,

such as aid distribution or shelter (e.g., aid delivery or shelter). The research aligns with previous literature on the functions of schools during moments of crisis, adding to the existing body of knowledge within the context of earthquakes (Baltacı & Uçan, 2022; Kıral, 2018). The results of the study indicate the potential for forecasting the physical difficulties and educational aftermath of a potential earthquake in Istanbul or the Aegean region. It is thought that an earthquake in these regions, where a considerable number of Türkiye's students reside, may lead to more drastic consequences than what was uncovered in the present study.

According to the data gathered from the second question of the study, "What are your views on educational practices in the earthquake zone?", a limited number of participants found the educational practices in the earthquake zone "positive". Furthermore, many participants identified the services provided by schools as insufficient. As a whole, these perspectives indicate that the actions performed in schools within the earthquake zone do not meet the desired standards. The findings indicate that individuals who experienced an exceptional crisis did not perceive the education to be sufficient. However, it is recognized that the contributions of authorities, education staff, and volunteers should be valued. This highlights the significant role of school managers in managing crises and carrying out instructional activities. As a result of this role, school managers have many responsibilities in responding to the demands of the authorities (e.g., collecting and disseminating information, organizing social aids, preparing schools for education), leading to education staff, directing and helping to volunteers. This finding highlighted the significance of school managers in navigating through "earthquake" scenarios. According to official reports dated before February 6, 2023, there has been an improvement in educational indicators in certain areas within the earthquake zone (Turkish Statistical Institute [TSI], 2022). The earthquake has impacted the education in the zone, and the extent to which it will be restored to its former level is uncertain.

In contrast to previous studies (Bakioğlu & Savaş, 2001; Özek & Sincer, 2023), the current research highlights the concerns of the participants. In contrast to earlier studies, the present research offers a more thorough examination of the impact of earthquakes on education and the means of mitigating this impact. Türkiye (Yamamoto & Altun, 2023) and different countries around the world (Alcocer et al., 2020; Mutch, 2021; Rodgers et al., 2021; Shaheen, 2008) have experienced devastating earthquakes that deeply affected schools, educators, and students. At this point, reviewing the physical and psychological resources utilized by educators and students to overcome obstacles during educational activities in earthquake-affected countries could prove beneficial. Despite this, the present study reveals that both the participants' interest and the educational measures implemented in the earthquake-stricken region are not in line with this perspective.

The findings on the last question of the study, "How would you organize education services in the earthquake zone?" show that the participants have different expectations to improve educational activities and practices. School managers offer various suggestions for enhancing the learning environment in the earthquake-affected area. Recompense training and revising the curriculum emerge as prominent actions to be taken at this stage. The alignment between the research and literature is evident when taking into account the demands for enrichment educational activities. Indeed, research shows that Türkiye's centralized education system makes it difficult for educators to make curriculum revisions (Bellibaş & Gümüş, 2021; Gümüş et al., 2021). The structure of the Turkish education system, directly shaped by MoNE, limits its innovation capacity. Additionally, this restriction extends beyond the curriculum and is evident in various policies, including school administration and crisis management. Issues pertaining to student and teacher transfers in the aftermath of the

earthquake are typical examples. One common theme in the detailed comments from all participants was the expectation of receiving psychological support. Taking into account the impact of this anticipation on educators (Ford et al., 2019), it can be concluded that the research aligns closely with past studies. Additionally, this could also apply to countries prone to earthquakes, including Chile, Indonesia, Japan, New Zealand, and Mexico. The study's findings provide clues to the authorities and researchers about possible future earthquakes in Türkiye. One area of concern is the preparedness of schools in Türkiye for earthquakes. Is the MoNE currently conducting research on the number of earthquake-proof schools? In light of this, it can be argued that recommendations for studying the physical structure have become increasingly important. Official sources and studies in recent years have revealed significant efforts in Türkiye to build new schools and improve the physical structure of existing schools. Moreover, a significant portion of the MoNE budget has been spent on these efforts for some time (Mavi, 2023; MoNE, 2023b, pp. 15-16). However, with the February 6 Earthquakes, it has become inevitable to increase the budget allocated for the construction, strengthening, and development of schools in the earthquake zone. In this context, it may be appropriate to include earthquake-affected cities under the Regions with Development Priority or Centers of Attraction Program, which are specific programs developed for disadvantaged cities. Both individuals looking to invest in education and educators seeking employment in the region can take advantage of financial solutions in this context. The results indicate that reevaluating the financial benefits of volunteer educators' who are active in the earthquake-affected areas work can have a positive impact on education and training services. Research has proven that economic benefits are a key focus for those in the education field (Hanushek & Rivkin, 2006; Kurul, 2012; Uygun, 2012). Participants believe that addressing the professional development needs of teachers and school managers can lead to positive impacts on academic achievement of students. In light of the impact of professional development on educators (Karacabey, 2021), incorporating the triangle of earthquake, crisis, and education provides a distinctive perspective on the educational situation in the earthquake zone.

While the present study has important implications, it must also be noted that there are limitations to its findings. One of these limitations is that it solely reflects the opinions of school managers, neglecting the input of teachers, students, and parents. A potential criticism is that the research may have benefited from a quantitative methodology. Increasing the number of participants in addressing the aftermath of the February 6 Earthquakes can lead to more accurate predictions. Additionally, the research fails to consider the impact of learning loss and schooling, a crucial aspect of education in the earthquake affected area. However, it is approximated that numerous students moved to new cities in the aftermath of the earthquake, leading to some being unable to continue their studies in the second semester of the 2022-2023 academic year. In light of this, it is recommended for researchers to investigate the decline in schooling and learning in the earthquake-stricken zone.

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Evaluation of Post-Earthquake Mathematics Education Processes By Mathematics Teachers In The Region: Kahramanmaraş Case

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Abstract

This study aims to examine the post-earthquake mathematics education processes in Kahramanmaraş from the mathematics teachers' perspective working in the same region. For this purpose, a purposive sampling method was used and six mathematics teachers who volunteered to participate in this study were interviewed among the mathematics teachers who performed educational activities in public schools in the Kahramanmaraş region both before and after the earthquake. A semi-structured interview form was used during the interviews. In the interview form, in addition to the questions about demographic characteristics, the question "How were the education and training processes carried out after the earthquake?" was asked and the teachers shared their experiences and observations. Phenomenological design, one of the qualitative research methods, was adopted as the research design because it was appropriate for the purpose of this study. Content analysis was employed for data analysis. The analyses were conducted with the MAXQDA Analytical Pro 2022 program. The findings were grouped under six salient themes: starting classes, motivation for the educational process, the process of 8th-grade students, teaching materials and supplies, measurement and evaluation activities, and students' school attendance. Among these themes, there were three sub-themes under the starting classes theme: start dates of classes, feelings when attending classes and activities during classes. Under the theme of motivation for the educational process, there were two sub-themes: difficulty getting motivated and becoming motivated easily. Under the theme of the process of 8th-grade students, there were two sub-themes: came to a complete standstill and continued from where it left off. There were no sub-themes in the other three themes. Teachers mostly made discourses on the themes of opening schools and being motivated for the education process.

Keywords

Earthquake, mathematics education, post-earthquake education.

INTRODUCTION

The February 6, 2023, earthquakes centered in Kahramanmaraş, one of the biggest natural disasters that our country has experienced in recent years, caused many losses of life and property as well as social, economic, and cultural damages in the region. Many houses, schools, hospitals, and workplaces were destroyed, and daily life stood at a standstill in some regions. Although these earthquakes were centered in Kahramanmaraş, they affected many provinces, including Adıyaman, Hatay, Malatya, Gaziantep, Adana, Diyarbakır, Osmaniye, Kilis and Şanlıurfa (Arslan, 2023). It will take time to heal the wounds of this disaster. However, considering that socialization and education are two effective ways to recover, it will be more clearly understood how important the role schools have in this process. Because schools are not only institutions where academic knowledge is learned and taught, but also places where individuals are prepared for life and socialized. Similarly, Mutch (2014) stated that schools have crucial roles in preparation for, response to and recovery from natural disasters. Considering that teachers and students are the fixtures of a school, it can be clearly seen how crucial it is to understand them and their opinions in the process after the earthquake. Moreover, teachers have significant roles before, during and after the disaster process. Because children shape their reactions after the emergency threat is over by modeling the adults around them and in this context, schools play an active role in the post-disaster process (Lazarus, Jimerson, & Brock, 2002). According to Le Brocque et al. (2017), teachers are potentially in a position to follow traumatic events, provide vital support to children, and also identify children with psychosocial difficulties. However, in these disaster processes, the number of teachers, just like their students, whose houses were destroyed and who lost their relatives during the earthquake can be quite high. As Wolmer et al. (2003) point out, since teachers live in the same regions as their students during natural disasters, they may also be struggling to cope with post-disaster traumatic symptoms and personal losses.

Richardson et al. (2015) state that although there are many studies on the impact of natural disasters on the international injury burden, and the role of rescuers and responders, there are a limited number of studies in the literature that examine the impact of natural disasters on education. One of these studies was conducted by Deuchert and Felfe (2015). In the relevant study, authors examined the impact of typhoons, which rarely occur in their country, on children's education and stated that they found negative and permanent effects on children's education. In addition to the short-term negative effects of typhoons on education, the authors also emphasized that in the long run, the differences between the educational levels of the students increased as the children got older, with situations, such as decreasing test scores, widespread grade repetition and decreasing general education. In addition, ERO (2013) reported one of the very few studies on how post-earthquake education processes are carried out. According to the related study, in the aftermath of the Canterbury earthquakes in New Zealand, the importance of bringing students back to school to normalize the situation was emphasized. In this context, before reopening schools, teachers were expected to establish strategies for communicating with their students, offering learning activities that students could do at home or establishing 'learning centers' (ERO, 2013). On the other hand, it was determined that the other studies related to disaster and education talked about the problems experienced in schools after natural disasters (Arslan, 2023), measurement and evaluation activities (Agnew & Hickson, 2012) and the use of distance education in the process (Yamamoto Telli & Altun, 2023). In detail with the research conducted by Arslan (2023), the problems faced by school principals in schools after the 6 February Kahramanmaraş earthquake, their solutions to these problems and their suggestions were examined and it was observed that after the earthquake, absenteeism problems

increased in schools, students' motivation decreased, and fears and anxieties increased. In addition, among the findings of the study, it was emphasized that teachers were seriously affected by the earthquake. Agnew and Hickson's (2012) research aimed to reveal how different online assessment conditions affect final grade distributions in their research based on the online administration of final exams of economy course at the University of Canterbury, which were cancelled as a result of the earthquakes that occurred in Canterbury in 2010 and 2011. According to the results obtained in this context, the assessment results obtained when online assessments are only available for a short period show a higher correlation with the assessment results obtained from invigilated assessments. It means that online assessment conditions are significant for the accuracy of the assessment and teachers should prepare appropriate conditions accordingly. In this context, when we consider the mathematics course in particular, it is a process in which the evaluation conditions should be prepared more carefully due to the nature of the course. Because there is a perception among students that mathematics is difficult (Brown et al., 2008). In addition, since being able to do mathematics has an important place in the exams for transition to the next level of education in our country, any disruption in students' mathematics education may have negative effects on their future. Thus, in addition to the assessment of learning in mathematics, it becomes of particular importance to examine how a course that students perceive to be "difficult" is conducted after a natural disaster such as an earthquake. This necessitates that the research focuses on examining how mathematics teachers conduct mathematics lessons after the earthquake.

However, studies focusing on the post-disaster education process, especially those centered around the experiences of teachers, are crucial and necessary for understanding the effects of the post-disaster education process and developing measures to mitigate these effects. Since it is stated that it may be much more difficult for children to verbalize their feelings than adults (Başarır, 2023), it was thought that interviewing with teachers about post-earthquake education would provide richer information than interviewing with students since to develop the quality of mathematics education after a natural disaster; it is extremely important to see the post-disaster education process and to take measures accordingly. To realize this, it can be said that every study examining the post-disaster education process in terms of the experiences, and opinions of the teachers in the region who experienced both the earthquake and the post-earthquake process, is extremely valuable since those teachers give us first-hand information that is so valuable. With this viewpoint, the research problem of this study was determined as "How are the educational processes in the Kahramanmaraş region after the earthquake evaluated by the mathematics teachers working in the region?"

METHOD

Research Design

Within the scope of this research, phenomenological design, one of the qualitative research methods, was adopted. According to Creswell (2013), in the phenomenological design, phenomena that are recognized but do not have an in-depth and detailed understanding are examined. The phenomena or events subject to the research develop in the natural environment (Patton, 2014). Moreover, Smith and Shinebourne (2012) stated that what is important in the phenomenological design is the feelings, thoughts and discourses of individuals. This study aimed to examine the mathematics education processes in the Kahramanmaraş region after the earthquake based on the feelings, thoughts and

discourses of mathematics teachers working in the region; phenomenological design, one of the qualitative research designs, was employed as the research method.

Study group

This study aims to examine the mathematics education process in the post-earthquake region through the eyes of mathematics teachers; a purposive sampling method was used to determine the study group. According to Patton (2014), in purposive sampling, participants who were appropriate for the purpose of the research and who were thought to have sufficient and rich information for this purpose were selected. Thus, six mathematics teachers who volunteered to participate in this study were included in the study group from among the mathematics teachers who performed their education activities both before and after the earthquake in public schools in the Kahramanmaraş region. The mathematics teachers in the study group were coded as T1, T2, T3, T4, T5 and T6. In this context, detailed information about the participants is presented in Table 1.

Table 1

Detailed Information about the Participants

Participant	T1	T2	T3	T4	T5	T6
Gender	F	F	F	M	M	M
Total years of service in the profession	10	10	5	3	10	17
Years of service at the current school	4	7	1	3	5	11
Where the school is located (center/district)	city center	city center	city center	district	district	city center
Approximate number of students in the school	300-350	450-500	1500-1550	200-220	900-950	1700-1750
Destruction of the school in the earthquake	not destroyed	destroyed	not destroyed	not destroyed	not destroyed	destroyed

As seen in Table 1, three of the teachers in the study group were female, and three were male. It was observed that the teachers' years of service in the profession ranged from three years to 17 years, and their years of service in their current schools ranged from one year to 11 years. In addition, four teachers were working in public schools in the city center of Kahramanmaraş, and the other two were working in public schools in the districts of Kahramanmaraş. According to the statements of the teachers in the study group, the number of students in the schools they worked in varies from 200 to 1750. In other words, in addition to teachers working in small schools, teachers working in larger schools were also included in the study group. Moreover, it was observed that the schools of two of the four teachers working in the provincial center were destroyed while the schools of the teachers working in the district were not destroyed.

Data collection tool and data collection process

A semi-structured interview form was used as a data collection tool. The questions in the interview form were first presented to two mathematics teachers who were not in the study group and two academic experts in the field to determine whether they were eligible for the purpose of this study. The final version of the interview form was created by revising it in line with the feedback from the experts. In this context, in the interview form used as a data collection tool within the scope of this study, in addition to the questions about demographic characteristics, the question "How were the education and training processes carried out after the earthquake?" was asked and teachers were expected to share their experiences and observations. The reason for formulating the question in the data collection tool in this general way is that the themes to be addressed in the findings were not predetermined, and the themes would be structured based on the responses received from teachers. However, since a semi-structured interview form was used as the data collection tool, probing questions were asked as needed (not necessarily to every teacher) to correctly understand or elaborate on the responses provided by the teachers. However, these probing questions were not included here, as they were not planned before the interviews, and the flow of the interviews did not follow the same pattern for each teacher. The interviews were conducted online with each teacher separately and the duration varied from 20 minutes to 35 minutes. These interviews were recorded with the consent of the teachers.

Data analysis

Content analysis was employed in the data analysis process since it is necessary to bring together similar data within the framework of certain concepts and themes in content analysis, (Creswell, 2016). However, Patton (2002) emphasized that inductive analysis should be used in the process of creating themes by bringing together the words that repeat in the data set. In this study, inductive analysis was adopted because the themes were formed in line with the data obtained without predetermining the themes. In addition, direct quotations obtained from the interviews are often used to reflect the views of individuals in a striking way (İlgar & İlgar 2014). To code the research data accurately and completely, the transcribed documents were read several times at different times and transferred to the MAXQDA Analytical Pro 2022 program for the analysis process. According to Creswell (2013), coding is the process of identifying data with similar characteristics and grouping them into small, meaningful pieces. In this context, in the process of coding the data obtained within the scope of this study, firstly, meaningful small pieces with similar characteristics were brought together and codes were created in this way. Then, themes and sub-themes were formed by bringing together those that appeal to similar characteristics from the codes obtained. After the coding process was completed, expert opinion was obtained from an independent researcher as to whether the coding was appropriate or not.

Validity and reliability

Guba and Lincoln (1982) stated that trustworthiness is more important than validity and reliability in qualitative research and that there are four criteria for this: credibility, dependability, confirmability and transferability. In this context, member checking, prolonged involvement and peer debriefing are employed for credibility (Holloway & Wheeler, 1996). To increase the credibility of this study, member checking was frequently used during the semi-structured interviews and peer debriefing was used after the data coding process was completed by an independent researcher. One of the ways to ensure

the reliability criterion is to conduct data source triangulation by interviewing different people on the same subject to access various data sources (Denzin, 1978). In this study, data triangulation was achieved by interviewing six mathematics teachers who experienced the same phenomenon. Confirmability is related to the presentation of every detail of the study, from the data collection process to the findings, and every detail of this study is shared with the reader. Finally, for the transferability criterion, it is stated that how the sample selection is made, and the characteristics of the participants should be clearly explained (Sharts-Hopko, 2002). In this study, a purposive sampling was conducted in accordance with the purpose of this study and the details about the participants were shared in the relevant section.

Ethical Principles

Ethics committee permission for this study was obtained from Rectorate of Aksaray University Human Research Ethics Committee decisions with the decision dated 20.06.2023 and numbered 2023/04-27.

RESULTS

The findings obtained within the scope of this research were grouped under six themes: starting classes, motivation for the educational process, process of 8th-grade students, teaching materials and supplies, measurement and evaluation activities and students' school attendance. The code-subcode model for these themes is presented in Figure 1.

Figure 1

Code-Subcode Model for the Themes
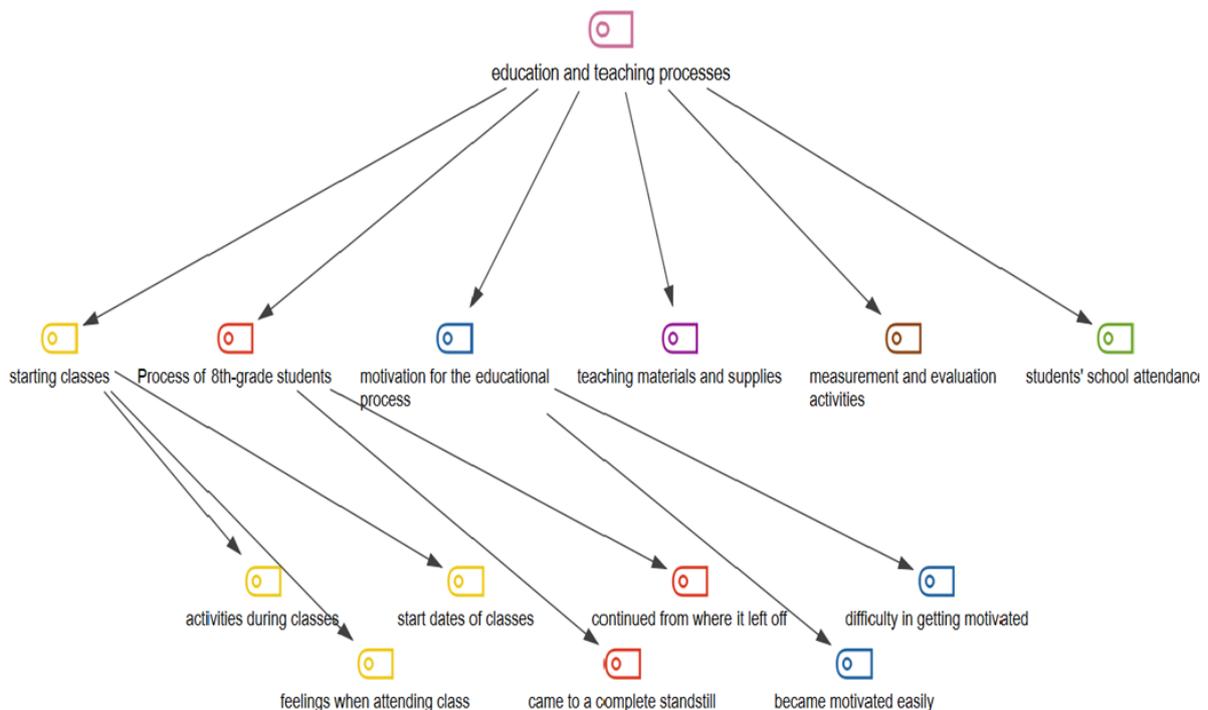
As can be seen in Figure 1, there were various sub-themes belonging to three themes: starting classes, motivation for the educational process, process of 8th-grade students, while there were no sub-themes for the other three themes. When the percentage and frequency values of the usage of the codes forming the themes were analyzed, it was observed that the most emphasized codes were in the themes of starting classes and motivation for the educational process. These were followed by the codes forming the themes of the process of 8th-grade students, teaching materials and supplies, measurement and evaluation activities and students' school attendance. The frequency and percentage values related to the use of the codes belonging to these themes are presented in Table 2.

Table 2

Frequency and Percentage Values of the Codes Belonging to the Themes

Theme	Number of codes used	%
Starting classes	30	36.59
Motivation for the educational process	22	26.83
Teaching materials and supplies	9	10.98
Measurement and evaluation activities	6	7.32
Students' school attendance	4	4.88
Process of 8th-grade students	11	13.41
Total	82	100.00

In this context, the findings related to each theme and sub-theme, if any, are presented below under separate subheadings.

Starting classes

The data obtained from the teachers who made discourses under this theme were grouped under three sub-themes: start dates of classes, feelings when attending classes, and activities during classes. The findings related to these sub-themes are presented separately below.

Start dates of classes

In this context, the comments of the participant teachers about the date when the decision was made to start education were analyzed. Some teachers mentioned that although there was not much loss of life and destruction in their regions, they waited too long for the schools to open, while others stated that it was unnecessary to open schools when vital needs were unmet. T1 expressed this opinion as follows:

"…I mean, there is a problem of shelter and hunger. Tap water is undrinkable. There is a water problem. For this reason, as a teacher, it was not something to think about; there was no need for the school to open;"

while T4 stated that:

"…There was not much destruction in our region, our school and houses are always intact. That's why the opening of the schools was very late, and when it was late, the students were very disconnected from education, and the subjects did not catch up in the remaining time."

Feelings when attending class

When the data on how the participant teachers conducted mathematics lessons after the earthquake were analyzed, it was observed that the teachers stated that education was meaningless in the first period when the schools opened and that teaching mathematics or achieving success in mathematics did not mean anything. They emphasized that especially in regions with high loss of life and destruction, people had difficulties in meeting their shelter, hygiene, food, and security needs before education and that they could not think of teaching mathematics without overcoming these problems. For example, T6 expressed this thought as follows:

"…Honestly, when I think about my students who died, it became a little meaningless for me to teach mathematics, to force students to do it... Because, I mean, children lost their lives and we are still teaching mathematics... it seemed very meaningless at first."

T5, on the other hand, expressed his thoughts as follows:

"…My aim in that process was never to teach mathematics; I just wanted to take the children away from that earthquake and let them focus on different things."

Activities during classes

The teachers, who said that they started to overcome their own shocks gradually in the following periods, stated that they tried to make a quick recovery of the subject in the remaining time but that they could do this superficially. T3 mentioned that:

"…Before the earthquake, we used to do the mathematics lesson by focusing and solving a lot of questions on the board, but after the earthquake, we did it superficially; I never called the students to the board."

T2 similarly said:

"…I can tell you for myself, the first semester subjects are over. I did the lesson with the anxiety of completing the subjects of the second semester, with the anxiety of processing the subjects of the second semester quickly in a short time, without dwelling on it too much, saying that they should see a little bit of everything."

In addition, T2 said:

"…We went from four teachers to three teachers. Since I didn't know the level of those children, the subjects they could and could not handle, our lessons were not very productive anyway."

Another indication that the mathematics lessons before the earthquake and the mathematics lessons after the earthquake were very different may be the functioning of the Support and Training Courses (Destekleme ve Yetiştirme Kursları-DYK) conducted in schools. T4, who stated that there was not much destruction and loss of life in his region, stated that the process was very inefficient in his schools:

"…We had Support and Training Courses, we were doing them regularly before the earthquake. Although there was not much destruction and loss of life in our region, both our schools opened late and after it opened, we did not have courses; our lessons were unplanned and unscheduled."

Motivation for the educational process

It was observed that the data obtained within the scope of this code were grouped under two different sub-themes. In the first sub-theme, teachers stated that both themselves and the students had difficulty getting to motivate themselves for education process. In the second sub-theme, teachers stated that students adapted to the education process very quickly and were surprised by this.

Difficulty getting motivated

T5, who stated that they had difficulty being motivated in the process, said:

"…Before the earthquake, I was running to school, but after the earthquake, both we and the students were disconnected. In other words, we have nothing to do with the lesson."

T3, who stated that the students could not adapt to anything due to their negative psychology after the earthquake, emphasized that they had difficulty motivating many of the students with the following sentences:

 "…Already after the earthquake, the panic-stricken child is completely withdrawn and does not talk about anything."

In addition to this, T2 stated that the students had a lot of difficulty being motivated because they saw the traces of the earthquake in every environment they looked at:

"…There are buildings around our school waiting to be demolished; that is, the view is terrible, and the buildings that are just a pile of iron are constantly working construction machinery. Building demolition works are constantly being carried out. Children cling to the windows when they see these things, and they all have anxiety. There are some who are afraid of entering the building and do not enter."

Became motivated easily

On the other hand, T1, who stated that the students adapted to the education and training process very quickly and that he was surprised by this, said:

"…My teacher said that we would run away when there was an earthquake, but other than that, the word earthquake never came out of their mouths; they had forgotten it. We were surprised when we saw them; we were the bad ones."

Similarly, T4 shared his experiences that the students quickly adapted to the education process with the following sentences:

"…I actually did not see much effect of the earthquake on our children. When I was going back to my duty because the school was opening, I went thinking about how I would teach a lesson and what kind of speech I should give. I didn't even need to do that."

In addition, T6 stated that since many schools were demolished in the region where he worked, a tent city was established in the style of an education camp to carry out only education. He mentioned that there were social areas such as free food, a canteen, playgrounds in this tent city, which motivated the students. T6 said:

"…There were also students who received education in schools, but believe me, there was more demand for our campground. Many students from undamaged schools also came to this campsite. Because there is police protection. No one can enter; no foreigners can enter. It was a very campus-

like environment; they liked it. You know, everything is free in the canteen, they can queue up and buy whatever they want. There are lunch breaks; there is a playground. The children liked that environment. In other words, they distracted their attention in this way and increased their motivation."

In addition, T6 emphasized that teachers from different provinces and various non-governmental organizations come to the region and support education and stated that the motivation of both students and teachers increases when they see such support.

Process of 8th-grade students

Under this code, teachers' statements were again grouped under two different sub-themes. While some of the teachers stated that the preparations of the students preparing for the High School Entrance Exam (Liselere Giriş Sınavı-LGS) came to a complete standstill and they could not recover, some teachers stated that the exam preparation continued from where it left off after a short transition period.

Came to a complete standstill

Some teachers who stated that some of their students migrated to other provinces in the period after the earthquake stated that these students stopped preparing for the exam. Stating that all preparations of 8th grade students for the exam had stopped, T1 said:

"…I mean, this process is not like a pandemic. They have psychological conditions; there are impossibilities. They have three months of not being able to study. For example, let me put it this way even when you go to another place as a guest, we are people who think whether it will be a problem if I charge my telephone or not. As a result, these people went to stay with their relatives and friends. That's why there is no preparation for the exam."

Similarly, T2 emphasized that students preparing for the exam were left to their own devices and that there was no work in the region where he worked in terms of exam preparation.

Continued from where it left off

On the other hand, some of the participant teachers stated that the exam preparation process continued from where it left off sometime after the earthquake. T6 said:

"…I can say that we were active 24/7, especially on WhatsApp. As you already know, during the pandemic period, we were very active on WhatsApp and Zoom, and it continues. We constantly guided the children using WhatsApp. For example, I established question-solving groups for them."

It was determined that they tried to continue their preparations for the exam as much as possible. Similarly, T5, who stated that preparations for the exam continued after a certain period, said:

"…After we gathered with our LGS students, I mean, we had a better process, we did trials. We had already finished the subjects long before. The exam would be based on the first semester subjects. We brought them back into the process with essays."

T3, who also stated that they made efforts to prepare students for the exam, said:

"…Our DYK was continued. Our teachers also had extra courses for the school. They used to pick up the children after school. They were solving questions with them, and the last weeks were full of essays. The children were constantly being tested, and the optics were being collected. Since the

stationery stores were open here, the test results were coming from the optical reader. So we continued our preparation."

Teaching materials and supplies

Under this heading, the discourses of the participant teachers were analyzed in terms of access to materials and resources (e.g., course books, test books, notebooks, pens, pencils, board markers, and white writing boards) required for the education process. According to the data obtained, the participant teachers stated that the resources or materials required for education were accessible in the region after the earthquake. In this sense, it was observed that the teachers attributed the lack of severe problems in accessing teaching materials and resources to the fact that there was not much destruction in the region where they worked or that the aid provided to the earthquake zone was sufficient in this sense. T5 shared his experiences on this issue:

"…Some publishers sent us books. There were enough stationery materials in the aid."

While T4 said:

"…There was not much destruction in our region, our school was strong, we had no shortage of resources. You know, the students had books, and their houses had not been destroyed."

T4 stated that they did not have a shortage of resources and materials. On the other hand, T2 stated that the only source to overcome the deficiencies regarding the teaching materials needed by teachers and students in the region where he worked was the aid coming to the tent cities and said:

"…Aid organizations gave notebooks and so on for the students staying in tents, but I did not see any support from anywhere else."

Measurement and evaluation activities

The teachers who stated that their entire functioning was disrupted due to the earthquake stated that they did not carry out any assessment and evaluation activities after the lessons started and that the report card grades were given the same as the previous semester. T4 stated that no assessment and evaluation activities were carried out after the lessons:

"…We did not do any written work in the mathematics lesson, and we did not even give oral examination grades for students who did not have low averages."

T3, on the other hand, stated that they did not have the chance to measure whether the students understood or not even momentarily during the lessons and expressed this experience as follows:

"…I mean, do the children understand or not? I couldn't even understand this. It is tough to fully realize measurement and evaluation. There should be an exam anyway. In the lessons, we usually just briefly explained the subject and solved a few questions".

Students' school attendance

Participant teachers generally stated that almost 1/3 of the students in their schools did not attend school after the earthquake. While some of the teachers attributed this situation to the fact that students migrated to other settlements with their families after the earthquake, some teachers attributed it to the fact that school attendance was not required after the earthquake. T4 expressed his views on this issue as follows:

"…Our school was strong, and the houses of the students were strong. In fact, there was not much of an obstacle for them to come to school, but since attendance was not compulsory, they came to school and asked what to do. Obviously, there was no situation to bring students to school when there was no exam. Also, there are vineyards and garden work in our region, so the children went there when attendance was not compulsory."

On the other hand, T2 stated that students could not attend school because they had to leave their own homes:

"…Some of our students are staying in tent cities. They cannot come to tent cities and container cities because they are far away. They came to class a couple of times, and then they said, "Teacher, we are not going to come.""

T6 stated that some of the students in his school migrated to other places with their families and continued their education in the places where they migrated. Thus, the enrollment of his school decreased considerably.

CONCLUSION AND DISCUSSION

According to the findings of this study, the experiences and observations of the teachers working in the Kahramanmaraş region about the educational process after the earthquake are grouped under six themes: starting classes, motivation for the educational process, process of 8th-grade students, teaching materials and supplies, measurement and evaluation activities and students' school attendance. Among these themes, teachers mostly made discourses about starting classes and motivation for the educational process.

Under the starting class theme, teachers concentrated on the sub-themes of start dates of classes, feelings when attending classes and activities during classes. While some teachers stated that there was no destruction in the regions where they were working. Therefore, their schools were in a position to start education earlier; some teachers stated that there was too much destruction in their regions and that it was pointless to start classes when they could not even meet their basic life needs. Similar views to those of the teachers who thought that the start of classes was meaningless were also expressed in the study of Yamamoto Telli and Altun (2023). In their study, it was emphasized that the need for education can be addressed after basic life needs are met. Similar to one of the findings of this study, an indicator that people cannot focus on other processes after natural disasters without meeting their basic life needs was also revealed in the study conducted by Richardson et al. (2015). A student who participated in their study stated that after the earthquake, he only tried to survive and could not focus on anything else. Moreover, in this study, teachers who stated that teaching mathematics started to seem meaningless to them when they entered the class stated that they only tried to keep the students away from the earthquake psychology during the lesson processes. For this purpose, Arslan (2023) also emphasized that extracurricular activities are emphasized in schools. Given that returning to school is perceived as a normalization process (Richardson et al., 2015), it can be said that the lesson process remains in the background in this sense.

When the findings related to the theme of motivation for the educational process were analyzed, it was observed that some teachers mentioned that students were easily motivated for the educational process, while some teachers stated that their students had difficulty motivating them for the process. It can be thought that this differentiation may be related to the magnitude of the losses experienced

by the students after the earthquake. MacGeorge et al. (2007) stated that emotional support can be especially useful for people who experience disasters but are not directly affected by them. In this context, it can be concluded that it would be easier for students who experienced the earthquake but were not affected by it through loss of life or property to focus on the educational process with emotional support. In addition, within the scope of this study, some teachers stated that the school environment distracted students from the earthquake psychology, socialized them and helped them to normalize. Consistent results were found in Richardson et al.'s (2015) study. While some of the students participating in the related study were able to recover their motivation immediately after the earthquake and establish a balance in their home, work and school lives, some of them stated that they could not establish this balance. In addition, reflecting consistent findings in the same study, students stated that the normal continuation of classes created stability in an unstable environment. This was a factor that facilitated their motivation. On the other hand, in this study, it was stated that the fear and anxiety experienced by the students in the process negatively affected their motivation by the teachers. Compatible with this finding, Yamamoto Telli and Altun (2023) argue that the fear of earthquakes and concern about the earthquake resistance of buildings may cause people to search for different spaces and to prefer single-storey buildings, and may also negatively affect school success. Thus, teachers and students who cannot enter their schools due to fear of earthquakes may have difficulty motivating themselves and their school achievement may decrease. Similarly, Arslan (2023) stated that the motivation of students who came to school after the earthquake decreased, and behavioral disorders, as well as fear and anxiety, increased in students.

When the findings under the theme of the process of 8th-grade students were examined, as in the theme of motivation for the educational process, some teachers mentioned that the preparation process of the students in their schools for LGS was completely stopped, while some teachers stated that the preparation for the exam resumed after the earthquake for a while. Teachers who stated that they continued to prepare for the exam emphasized that digital communication platforms were effective in this. Similarly, in the literature, there are research results indicating that being able to communicate with teachers via e-mail after earthquakes contributes positively to the continuation of students' education (Richardson et al., 2015), as well as research results indicating that providing continuous dialogue and information sharing through Facebook and other digital platforms in disaster situations creates positive results (Bird, Ling, & Haynes, 2012; Dabner, 2012). On the other hand, one of the biggest reasons given by teachers who stated that exam preparations stopped due to impossibilities was that students did not have suitable environments where they could study. Similarly, Yamamoto Telli and Altun (2023) stated that families whose houses were damaged after the earthquake either took shelter with relatives or had to settle in tents and container cities because these environments were unsuitable for studying.

When the findings under the theme of teaching materials and supplies were examined, it was determined that there was no problem in accessing a teaching material or resource (e.g., course books, test books, notebooks, pens, pencils, board markers, and white writing boards) in general. Similarly, Arslan (2003) stated that the lack of teaching materials after the Kahramanmaraş earthquake was overcome. In this context, Richardson et al. (2015) also mentioned that access to teaching materials and resources is a positive situation. In that study, students emphasized that the availability of resources was critical even if the library was closed after the earthquake.

When the findings under the theme of measurement and evaluation activities were examined, teachers mentioned that no measurement and evaluation activities were conducted within the scope of mathematics classes after the earthquake. In the literature, the number of studies examining the effects of natural disasters on measurement and evaluation activities that should be carried out in the education process is quite limited. In the study conducted by Agnew and Hickson (2012) on post-earthquake assessment and evaluation activities, universities continued their assessment and evaluation activities online after the earthquake, and students who did not have internet access at home used the computer laboratories on campus in this process. Although similar processes were experienced in higher education institutions that switched to distance education after the earthquakes in our country, no assessment and evaluation activities could be carried out in primary and secondary schools affiliated with the Ministry of National Education because the courses were not conducted in a planned manner and school attendance was not required. Thus, students who attended the class could not receive effective feedback on whether they learned or not.

The Ministry of National Education stated that in the spring semester of the 2022-2023 academic year, due to the earthquake, attendance will not be compulsory in schools, and no one will be considered absent (Arslan, 2023). When the findings related to the theme of students' school attendance are analyzed, it can be said that this decision is one of the biggest reasons why students do not attend school because in the findings of the study, it was stated by the teachers that some students could not attend school due to impossibilities. It was concluded that most of them preferably did not attend school because there was no obligation to attend and take exams. Similarly, Arslan (2023) stated that student absenteeism increased significantly in schools after the earthquake. In addition, it is stated in the literature that some students were not able to go to school due to reasons, such as damage to themselves or their families due to the earthquake (Yamamoto Telli & Altun, 2023).

Recommendations

The suggestions presented within the scope of this study can be summarized in two points. The first one is the suggestions that can be presented to recover the education process more quickly after natural disasters. The other one is the suggestions for academic studies that can be conducted on the education and training process after natural disasters. The first suggestion that can be presented to recover the education process more quickly after natural disasters is that the opening dates of schools can vary according to the damage to the regions. For example, face-to-face education can be started earlier in areas with less damage, and in areas with more damage, face-to-face education can be started after basic life needs are met. Until the transition to face-to-face education, distance education can be provided with a solid infrastructure. In this context, teachers can prepare pre-disaster training videos, materials and resources; local authorities can take measures to increase the number and equipment of earthquake-resistant libraries, schools, and study areas. Education camps can be established in areas far away from the buildings that were destroyed or about to be destroyed after the earthquake in settlements that were severely damaged in the earthquake, and education can continue in these camps. Given that schools are centers of socialization and recovery, school attendance may be compulsory under certain conditions and in certain regions, and measurement and evaluation activities may be carried out in this context. Teachers could be informed before the media about how education will continue and given the opportunity to prepare for the education process. Most importantly, school staff, students and parents can be informed and trained about the education process after the earthquake.

Academic studies that can be conducted on the educational process after natural disasters can include topics on students' experiences and expectations. In addition, studies examining both the short-term and long-term effects of natural disasters on the education process can make insightful contributions to the education system.

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Author Contributions

The author planned, modeled, and conducted the study.

Conflict of Interest

No potential conflict of interest was declared by the author.

Supporting Individuals or Organizations

No grants were received from any public, private or non-profit organizations for this research.

Ethical Approval and Participant Consent

Ethics committee permission for this study was obtained from Rectorate of Aksaray University Human Research Ethics Committee decisions with the decision dated 20.06.2023 and numbered 2023/04-27.

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Availability of Data and Materials

Not applicable.

Acknowledgements

No acknowledgements.

Examination of Fourth-Grade Students' Mental Structures Regarding Natural Disasters

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Abstract

Providing students with knowledge and awareness from an early age in natural disaster education is important. This research examines the mental structures of fourth-grade primary school students about natural disasters. The model of the study is a case study, one of the qualitative research methods. The participants were 14 students studying in the fourth grade at a public school in Terme, Samsun. The study group was determined by convenience sampling. Mind maps and semi-structured interview forms were used as data collection tools. The data were analyzed using the content analysis and descriptive analysis methods. As a result of the research, it was revealed that students' mental structures regarding natural disasters were grouped under 13 themes: earthquakes, floods, erosion, landslides, fire, avalanches, tornadoes, tsunamis, volcanic eruption, hurricanes, storms, lightning, and thunder. In addition, many different codes were obtained under the sub-themes of the causes of the natural disaster, its consequences, precautions, and what to do during a natural disaster. These codes revealed that the students had rich mental structures regarding natural disasters. However, it was also determined that they confused some climate events with natural disasters. The interviews supported the idea that the students had sufficient knowledge about natural disasters and the precautions. Updating textbooks on this subject and including more activities to attract children's attention in lessons will ensure that primary school students receive a better education on natural disasters and become more equipped.

Keywords

Natural disasters, fourth-graders, natural disaster education in primary school.

INTRODUCTION

Nature, which offers many opportunities for human survival, also contains many risks. Natural disasters are some of these risks. Natural disasters result from climate events and cause significant losses and damage to the environment and all living things. According to the United Nation Statistics Division (UNSD) (2018), a disaster is "*a situation or event which overwhelms local capacity, necessitating a request to the national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering.*" It affects societies by stopping or interrupting social and everyday life, and the affected communities cannot cope using local resources alone (Kadıoğlu, 2011). For a climate event to be considered a disaster, it must seriously affect people's lives. As a result of natural disasters, many deaths, injuries, and economic losses may occur, and these events may have sociological and psychological effects. For example, if people's lives or their houses are damaged in an area where an earthquake or flood occurs, these natural events are considered disasters. However, if no people live in the areas where natural events occur and there are no houses belonging to them, these events are generally not considered disasters (Dölek, 2016). Therefore, disasters usually cause great human suffering and losses, and their effects are felt for many years (Kaymak, 2003).

Natural disasters such as floods, fires, earthquakes, hurricanes, and tsunamis are experienced more frequently and severely in the world nowadays. As a result of human activities, natural resources are depleted, climate change is experienced, and environmental pollution increases. For this reason, many natural disasters occur in Türkiye. Reports even show that Türkiye is in the highest risk group regarding natural disasters and among the countries where the risk tends to increase (Disaster and Emergency Management Presidency, 2018).

Türkiye's geological, meteorological, and tectonic structure causes different types of natural disasters to occur. The history of these natural disasters dates back many years in Türkiye (Karatağ, 2021). Regarding natural disasters, our country is exposed to most of the 31 types of natural disasters seen worldwide, except volcanic eruptions and tropical storms (Dölek, 2016). A remarkable 60 percent of the deaths caused by disasters in Türkiye are caused by earthquakes (Disaster and Emergency Management Presidency, 2018). Türkiye is located in the earthquake zone, with active fault lines such as the Northern Anatolian Fault and the Eastern Anatolian Fault. Due to these active fault lines, earthquakes constantly occur in Türkiye (Atabey, 2000). In addition, storms, floods, landslides, and erosion frequently occur in coastal areas. Natural disasters such as heat waves and drought can also occur in our country during summer.

Natural disaster education is gaining importance since many natural disasters occur constantly in different regions in our country. Disaster education aims to help individuals and societies build confidence during disaster periods, be prepared for disasters, and solve the problems caused by disasters. In line with this, disaster education aims to provide individuals and societies with resilience and empowerment skills against disasters (Çelik & Gündoğdu, 2022). For a community with a disaster culture, disaster education should start at an early age. Children tend to show high sensitivity to learning at certain developmental stages, and in these stages, they are open to learning (Senemoğlu, 2021). These periods, called critical development periods by psychologists, should not be ignored for disaster education. Especially in primary school, children develop rapidly and can quickly learn everything around them. Therefore, disaster education should start in this period and children should

be equipped with concise knowledge to learn what to do in a disaster (Akman & Yıldırım, 2022). A child who receives effective disaster education from an early age will grow up consciously. In this way, the consciousness of individuals in society will increase, and it will be possible to reduce the effects of disasters on society.

Many studies on disaster education have been carried out in the literature. For example, Kısa (2019) suggested activities on natural disasters for 4th, 5th, and 7th grades. Sözcü and Aydınözü (2019) examined the natural disaster literacy levels of pre-service teachers, and Özen (2020) examined the disaster awareness levels of high school students. Disaster education in the preschool period (Akman & Yıldırım, 2022; Sapsağlam, 2019), secondary school students' awareness levels about natural disasters (Adanalı et al., 2022), teachers' opinions on disaster education practices in primary school (Çelik & Gündoğdu, 2022), examining the achievements of the life sciences, social studies, and geography curricula in terms of disaster education (Başıbüyük & Pala, 2023), and the effects of earthquakes on children (Gürbüz & Koyuncu, 2023) constitute some of the recent studies carried out in our country on natural disasters.

Studies about disaster education have also been implemented abroad. The subjects of some of these studies are as follows: an examination of school safety and disaster education in Brazil, Colombia, Cuba, the Dominican Republic, Jamaica, and Puerto Rico (Munoz et al., 2020), the effects of physics learning media based on android integrated earthquake disaster education on the enhancement of problem-solving abilities and natural disaster preparedness (Abdillah et al., 2020), disaster mitigation and disaster learning in Indonesian elementary schools (Suarmika et al., 2022), and using a web geographic information system (Web GIS) in natural disaster education (Li et al., 2022). Review studies have also been conducted about disaster education. For example, Torani et al. (2019) examined the importance of natural disaster education and the effect of different education methods on individuals' disaster risk reduction and preparedness. For this purpose, they examined the results of 31 studies. The results showed that disaster education is a functional, operational, and cost-effective tool for risk management. Based on the results of the studies, it was concluded that training people about disasters is essential. There are also different methods to educate students about disasters. However, it cannot be said that one way is better than others, and it was determined that trained people can better protect themselves from disasters. Hoffmann and Blecha (2020) reviewed the literature on the impact of natural disaster education on vulnerability to disasters in Southeast Asia. Researchers have stated that education and learning enable individuals to prepare for and cope with the consequences of disasters effectively, and that natural disaster education provides individuals access to resources that can help reduce vulnerability to disaster. Alim et al. (2020) examined the effects of disaster mitigation education at universities in the post-COVID-19 period. They determined that students needed to receive sufficient learning of disaster mitigation education, and that 51.9% of the students participated in disaster education. In another study, Zhang and Wang (2022) examined research conducted to identify global disaster education research trends. The results showed that most articles were produced in Europe and focused mainly on education, disaster nursing, disaster risk and reduction, disaster awareness, and earthquakes. However, when the studies were examined, the knowledge and awareness levels of students who graduate from primary school regarding natural disasters needed to be clarified. More studies on this subject are needed. Therefore, in this study, the mental structures of fourth-grade students regarding natural disasters were examined. The sub-problems are as follows:

1- Under which themes and codes are the mental structures of fourth-grade students regarding the concept of "natural disaster" grouped?

2- What are the views of fourth-grade students regarding natural disasters?

METHOD

Model of the Research

The model of the research is a case study. A case study is a qualitative research approach in which the researcher examines one or a few situations in depth with data collection tools (observations, interviews, audio-visuals, documents, reports) containing multiple sources (Creswell, 2007). In case study research, the focus is on "how" and "why" questions; the researcher has little or no control over the events, and the event or phenomenon is studied within its natural context (Yin, 1984). In this research, the mental structures of primary school students regarding natural disasters were examined within the framework of natural life without any intervention, so the research was carried out using a case study model.

Participants

The research participants comprised 14 students (seven girls and seven boys) studying in the fourth grade of a primary school affiliated with the Ministry of National Education in the Terme District of Samsun Province. The participants were determined using the convenience sampling method. The school has a medium socioeconomic level. The research aimed to examine the mental structures of fourth-grade students who were educated on natural disasters in primary school.

Data Collection Tools

The data collection tools of the research are mind maps and semi-structured interview forms. A mind map is a creative drawing in the form of a branched structure in which the main theme of the subject is depicted with a central concept, and the branches emerging from the significant concept contain the key images or keywords evoked by the central idea (Buzan & Buzan, 1996). In the mind map, the individual expresses everything that comes to his/her mind about the given basic concept on paper and relates them to each other. A semi-structured interview form was also used in the research to obtain richer qualitative data. The interview form aimed to examine students' knowledge and perceptions regarding natural disasters in a versatile way, obtain in-depth information, and better explain the concepts in the mind maps. Expert opinions were obtained from one faculty member and three classroom teachers about the interview form.

Data Collection Process

Before the collection of the data, students were informed about mind maps. They created mind maps on different subjects. In this way, they learned better how to draw a mind map. Then, "Natural Disasters" was written in the middle of a blank paper and distributed to the students. They were asked to write down what came to their mind, draw pictures, and thus prepare their mind map regarding natural disasters. Three lesson periods were used for this study. After completing the mind maps, semi-structured interviews were conducted with the students. Questions about natural disasters and how to prevent them were asked. During the data collection process, care was taken to create an environment where students would not be influenced by each other.

Data Analysis

The data were analyzed using the content analysis method. Content analysis involves bringing together similar data around certain concepts or themes and organizing and interpreting them in a way that the reader can understand (Yıldırım & Şimşek, 2011). This analysis method involves a systematic examination of the content of written, visual, or audio materials that describe a specific topic or data set (Büyüköztürk et al., 2021). With content analysis, students' perceptions about natural disasters were presented more concisely and understandably by classifying specific codes and themes. The mind maps were first numbered sequentially in the analyses, considering student gender (e.g., SM1: StudentMale1, SF1: StudentFemale1). Then, the concepts in the mind maps were examined and coded one by one. Codes were created by considering the words and ways of thinking that stand out in the data (Tavşancıl Tarkun, 2000). The sub-themes were obtained by bringing similar codes together. The resulting codes were expressed in separate tables according to the sub-themes they were included in, and their frequency values were calculated. The data obtained from the interviews were analyzed descriptively. After each natural disaster sub-theme, student opinions were summarized descriptively with direct quotes. After the researcher analyzed the data, the results were presented for expert opinion. The expert examined the mind maps, interview data, and coding results, compared them with the original data, and reviewed the analysis results.

Validity and Reliability of the Research

To increase the validity of the research, more than one data collection tool was used, and semi-structured interviews supported the data collected with mind maps. The analysis results were presented for expert opinion to ensure the reliability of the data analysis. During the research, care was taken to ensure that students participated in the research voluntarily, and no intervention was made in student studies

Ethical Principles

Ethics committee permission for this study was obtained from Ondokuz Mayıs University Social and Humanities Research Ethics Committee decisions with the decision dated 26.05.2023 and numbered 2023-506-507.

FINDINGS

The sub-themes that emerged from the analysis of the concepts in the mind maps are listed in Table 1.

Table 1

Sub-themes that emerged under the natural disaster theme

Theme	Sub-themes	Students	f
Natural disaster	Earthquakes	SM1, SM2, SM3, SM4, SM5, SM6, SM7, SF1, SF2, SF3, SF4, SF5, SF6, SF7	14
	Floods	SM1, SM2, SM3, SM4, SM5, SM6, SM7, SF1, SF2, SF3, SF4, SF5, SF6, SF7	14
	Erosion	SM1, SM2, SM3, SM4, SM5, SM7, SF1, SF2, SF3, SF4, SF5, SF6, SF7	13
	Landslides	SM1, SM3, SM4, SM5, SM6, SM7, SF1, SF2, SF4, SF5, SF7	11
	Fire	SM1, SM2, SM3, SM4, SM6, SF1, SF2, SF4, SF5, SF6, SF7	11
	Avalanches	SM1, SM2, SM3, SM4, SM6, SF1, SF2, SF4, SF5, SF7	10
	Tornadoes	SM2, SM3, SM4, SM5, SM7, SF1, SF2, SF5, SF7	9
	Tsunamis	SM2, SM5, SM7, SF1, SF2, SF4, SF5, SF7	8
	Volcanic eruption	SM5, SF1, SF2, SF3, SF7	5
	Storms	SM6, SF3, SF4, SF7	4
	Lightning	SM4, SM5, SF7	3
	Hurricanes	SM4, SF7	2
	Thunder	SF7	1

Table 1 shows that students' mental structures regarding natural disasters are grouped in 13 sub-themes. All students (f=14) described earthquakes and floods as natural disasters. Erosion (f=13), landslides (f=11), fire (f=11), avalanches (f=10), tornadoes (f=9), tsunamis (f=8), volcanic eruption (f=5), and hurricanes (f=2) emerged as other types of natural disasters in the students' minds. Four students (f = 4) described storms, three students (f = 3) described lightning, and one student (f = 1) described thunder as a natural disaster. However, these are climate events that we frequently encounter in daily life. The concept of disaster generally reflects more significant amounts of damage and danger. Therefore, it can be seen that some students confused natural disasters with climate events in this regard. Table 2 shows the codes that emerged in the earthquakes sub-theme.

Table 2

Codes of the earthquakes sub-theme

Sub-theme	Codes	Sub-codes	Students		f
Earthquakes	Causes of earthquakes	Fault line	SM1, SM4, SM5, SF1		4
		Ground shaking	SF5, SF7		2
	Consequences of earthquakes	Emotional	Sadness	SM1, SM2, SM3, SM6, SF1, SF2, SF4, SF5, SF6, SF7	10
			Vertigo	SM6	1
			Panic	SM3	1
		Destruction	SM2, SM3, SM5, SM6, SF2, SF4, SF5, SF6		8
		Loss of life	SM3, SM4, SME5, SF1, SF3, SF4, SF6		7
		Loss of property	SM2, SM5, SF1, SF6		4
		Debris	SF1, SF7		2
		News	SM3		1
		Earthquake victim	SM1		1
		It happens a lot in Türkiye	SM1		1
	What to do during an earthquake	Earthquake kit	SM1, SM2, SM3, SM4, SM5, SM7, SF1, SF2, SF5, SF6, SF7		11
		Not approaching the window	SM1, SM2, SM6, SF2, SF6, SF7		6
		Life triangle	SM5, SM6, SF1, SF3, SF6, SF7		6
		Not taking the elevator	SM1, SM2, SM6, SF1		6
		Not approaching the stairs	SM4, SF2, SF6		6
		Shouting	SM4		1
	Precautions against earthquakes	Construction of solid buildings	SM2, SM3, SM4, SM6, SF1, SF3, SF4, SF5, SF6		9
		Column-thick iron	SM1, SF3		2
		Good material	SM2,SM6		2
		Good contractor	SM3		1

In Table 2, it was revealed that the students saw the fault line (f = 4) and ground shaking (f = 2) as the causes of earthquakes. Students emphasized sadness, one of the most emotional consequences of earthquakes (f=10). Additionally, destruction-collapse (f=8) and loss of life (f=7) were the most frequently mentioned results. The earthquake kit (f=11) was the most mentioned thing to do during an earthquake, and they emphasized the construction of solid buildings (f=9) as a precaution against

earthquakes. In the interviews, students expressed how earthquakes occurred: SM2: *"A fault passes under the cities, and when that fault breaks, an earthquake occurs."* SF1: *"When the fault line breaks, everything shakes. Houses are destroyed."* When asked whether earthquakes are preventable, they stated that they cannot be prevented, but it is possible to take precautions: SF3: *"No, they cannot be prevented, but precautions can be taken. For example, we can build solid houses. We can inform people what to do before, during, and after an earthquake. We can make an earthquake bag for earthquakes."* The codes created by the students regarding floods are presented in Table 3.

Table 3

Codes of the floods sub-theme

Sub-theme	Codes	Subcodes	Students		f
	Cause of floods	Rain	SM3, SF1, SF7		3
		Overflow	SM1, SM4, SF1, SF2, SF4, SF7		6
		Loss of life	SM2, SM3, SM6, SF4, SF6		5
		Flooding	SM2, SM3, SM4, SF1		4
		Emotional	Fear-anxiety	SM2, SF1, SF6	3
	Consequences of floods		Sadness	SM2, SM6, SF6	3
		Injury	SM2, SM6		2
		Destruction	SM3		1
		Loss of money	SF4		1
		The fish are left homeless	SM4		1
Floods		Dam	SM1, SM3, SM5, SM6, SF1, SF2, SF5, SF6, SF7		9
		Not building houses on the stream bed	SM4, SF1, SF2, SF3, SF4, SF5, SF6, SF7		8
	Precautions against floods	Terracing	SM2, SM5, SF1, SF2, SF3, SF6		6
		Planting trees	SM5, SF1, SF2, SF6		4
		Not leaving the water on	SM5		1
		Binding	SM1		1
		Being prepared for it	SF6		1
		Flood bag	SF4		1
	What to do during a flood	Going to higher ground	SM5		1
		Looking for a safe place	SM5		1

Table 3 shows that the students showed rain (f = 3) as the cause of floods in their mind maps. They expressed many consequences of floods, especially overflow (f = 6) and loss of life (f = 5). As a precaution, dams (f = 9) and not building houses on the stream bed (f = 8) were suggested. One student suggested going to higher ground or looking for a safe place in the event of a flood (SM5). In the

interviews, students expressed their opinions about floods: SM3: *"Floods can be prevented. We can increase the number of dams and embankments on streams. We should not establish settlements, building sites, or houses in low places, on the banks of streams."* SF7: *"Yes, it can be prevented by terracing, afforestation, building dams. There is a high risk of flooding in the basements of buildings."* The codes expressed regarding erosion in the mind maps are shown in Table 4.

Table 4

Codes of the erosion sub-theme

Sub-theme	Codes	Sub-codes	Students	f
Erosion	Causes of erosion	Chemical pesticides	SM2, SM3, SM4, SM5, SF5, SF6, SF7	8
		Drought	SM2, SM4, SM7, SF1, SF5, SF6, SF7	7
		Little water	SM1, SM3, SM5, SF3	4
		Waste of water	SM1, SM6	2
	Consequences of erosion	Cracking of the soil	SM1, SM2, SM5, SM7, SF1, SF2, SF3	7
		End of life - death of plants	SM1, SM3, SM4, SF4, SM6, SF7	6
		Seeds do not grow	SM1, SF2, SF4, SF7	4
		Illness	SM3, SM4	2
		Sinking of the water level	SM3	1
		Sadness	SM6	1
	Precautions against erosion	Using animal manure on the soil	SM3, SF5, SF6	3
		Not throwing garbage	SM1, SM2, SF6	3
		Not harming nature	SF3, SF1	2
		Planting trees	SF2, SF5	2
		Conscious water consumption	SM1, SM5	2
		Dam	SF3	1
		Aerating the soil	SF6	1

Table 4 shows that the students mostly cited chemical pesticides (f=8) and drought (f=7) as the causes of erosion. The most common codes for the consequences of erosion were cracking of the soil (f = 7) and the end of life - death of plants (f = 6). Suggestions such as throwing animal manure on the soil (f = 3) and not throwing garbage (f = 3) were expressed as precautions against erosion. In the interviews, students summarized their thoughts about erosion by emphasizing drought and soil cracking: SM2: *"Erosion occurs when dry soil cracks. It occurs if it does not rain as much as it should."* SF4: *"The soil dries out, and no plants are left there. Life gradually ends; erosion occurs over centuries."* SF2: *"If we leave bad pesticides in the soil and there is less rain than necessary, erosion will occur. To prevent it,*

we should not use bad pesticides and should water the soil as much as necessary." The codes related to landslides expressed in the mind maps are shown in Table 5.

Table 5

Codes of the landslides sub-theme

Sub-theme	Codes	Sub-codes	Students		f
Landsli des	Causes of landslides	Landslip	SM1, SM4, SM5, SM7, SF1, SF2, SF4		8
		Muddy soil	SM1, SM4, SF7		3
		Slope	SF7		1
	Consequences of landslides	Road closure	SF1, SF2, SF7		3
		Loss of life	SF1, SF2		2
		Loss of property	SF1, SF2		2
		Falling stones	SM4, SM5		2
		Avalanches	SM5, SM7		2
		Destruction	SM3		1
		Infertile soil	SM6		1
		Emotional	Fear	SF2, SF4	2
			Distress	SM3	1
			Haste	SF4	1
	Precautions against landslides	Afforestation	SM1, SM4, SM6, SF1, SF2, SF7		6
		Making a barrier	SM1, SF1		2
		Not building houses or roads on the mountain	SM1, SF5		2
		Construction	SM3		1

According to Table 5, landslip (f=8), muddy soil (f=3), and slope (f=1) were stated by the students as the causes of landslides. As consequences of landslides, road closure (f = 3), loss of life (f = 2), loss of property (f = 2), falling stones (f = 2), avalanches (f = 2), destruction (f = 1), infertile soil (f=2) and some emotional consequences were expressed. Among the precautions, afforestation (f = 6) was the code with the highest frequency. In the interviews, students explained how landslides occur: SM1: *"It occur when the soil becomes heavy due to excessive rain and falls off the ground like a mountain."* SM3: *"A landslide occurs when moist soil slides down from a mountain or a slope."* In addition, 12 students said that landslides could be prevented by taking precautions, while two said that they could not be prevented: SF6: *"We should plant many trees and build embankments in downhill areas."* The codes expressed about fire in the mind maps are in Table 6.

Table 6

Codes of the fire sub-theme

Sub-theme	Codes	Sub-codes	Students	f
Fire	Causes of fire	Lighter	SM6, SF6	2
		Broken glass	SM2	1
		Explosion	SM4	1
	Consequences of fire	Loss of property	SM3, SF1, SF2, SF3	4
		Death	SM6, SF4, SF6	3
		Death of animals	SF1, SF2, SF4	3
		Sadness	SM1, SM6	2
		Injury	SM6	1
		Being stuck at home	SF2	1
		Burns	SM4	1
	What to do during a fire	Extinguishing the fire	SM2, SM3, SM6, SF5, SF6	5
		Calling the fire brigade	SM1, SM4, SF1	3
		Pouring water	SM1	1
	Precautions against fire	Gathering reflective tools	SF6	1
		Not throwing garbage in the forest	SF5	1

When Table 6 is examined, it is seen that students considered the causes of fire as lighter (f = 2), broken glass (f = 1), and explosion (f = 1). The consequences are mostly grouped in the codes of loss of property (f = 4), death (f = 3), and death of animals (f = 3). Students stated the codes of extinguishing the fire (f = 5) and calling the fire brigade (f = 3) regarding what to do in case of fire. Students explained their views on how fire occurs in the interviews: SM2: *"It is an event that occurs when people leave the picnic fire without extinguishing it."* SM2: *"We will put out the picnic fire. We will not throw the glass bottle into the forest."* SF5: *"Yes, if we do not throw glass and unextinguished ashes into the forest, we will protect both the forest and the homes of living things. This way, there will be no forest fires."* All 14 students in the research stated that fire was preventable. The codes in the avalanches sub-theme are presented in Table 7.

Table 7

Codes of the avalanches sub-theme

Sub-theme	Codes	Sub-codes	Students	f
Avalanches	Cause of avalanches	Loud sound	SM1, SM3, SM4, SF1, SF2, SF4, SF5, SF7	8
		Slope	SM1, SM4, SM6, SF7	4
		Snow	SM1, SM3, SF7	3
		Mountain	SM3	1
	Consequences of avalanches	Death	SM6, SF1, SF2	3
		Sadness	SM6, SM4	2
		Loss of property	SF1	1
		Destruction	SM6	1
		Injury	SM6	1
	What to do during an avalanche	Running away	SF4	1
		Warning people	SM3	1
	Precautions against avalanches	Making a barrier	SM1, SM3, SM4, SM6, SF1, SF4	6
		Planting a tree	SM2, SM3, SM4, SM6, SF7	5
		Hanging an avalanche danger sign	SM2, SM3, SF1, SF2	4
		Not building a house on a hillside or mountain	SM6, SF5	2
		Staying away from an avalanche area	SM4, SF5	2
		Ordu	SF4	1

In Table 7, the codes that the students cited as the cause of avalanches are loud sound (f=8), slope (f=4), snow (f=3), and mountain (f=1). Death (f=3) was the most common code expressed as a consequence of avalanches. Regarding what to do in case of an avalanche, only one of two students suggested running away, and the other suggested warning people. However, the suggestions in the code of precautions against avalanches showed that students were conscious about avalanches. In the interviews, students expressed their thoughts about avalanche disasters: SM4: *"It is the sliding of a mass of snow when there is loud noise in the mountains or on places such as slopes."* SM1: *"Yes, it can be prevented by placing barriers in places such as ramps, and by afforestation."* SM2: *"Afforestation, or barriers should be built on the slopes where the avalanche will fall."* As a result of the analysis of mind maps, the codes regarding tornadoes in Table 8 were obtained.

Table 8

Codes of the tornadoes sub-theme

Sub-theme	Codes	Sub-codes	Students	f
Tornadoes	Cause of tornadoes	Wind	SM7	1
	Consequences of tornadoes	Everything flying away	SM4, SM5, SF2	3
		Loss of life	SM2, SF2	2
		Thunder	SM7, SF1	2
		Lightning	SM7, SF1	2
		Damage	SF2	1
		Fear	SM2	1
	What to do during a tornado	Looking for a safe place	SM5	1
		Not going out	SF5	1
	Precautions against tornadoes	Building a strong house	SF5	1

Table 8 shows that only one student cited wind as the cause of tornadoes (f=1). Among the consequences of tornadoes, the codes with the highest frequency were everything flying away (f = 3), loss of life (f = 2), thunder (f = 2), and lightning (f = 2). It can be seen that the sub-codes under the codes of what to do during a tornado and precautions against tornadoes were: looking for a safe place, not going out, and building a solid house. However, unlike the mind maps, students could explain their views about tornadoes in more detail during the interviews. SM3: *"A strong wind revolves around the water or land in the form of a curved tornado."* SF5: *"Winds form a tornado, but it is stronger than a storm."* SF6: *"Stronger winds than the storm wind form a tornado. In addition, the wind rotates and sucks in many things."* Students' mental structures regarding tsunamis were grouped under the codes in Table 9.

Table 9

Codes of the tsunamis sub-theme

Sub-theme	Codes	Sub-codes	Students		f
Tsunamis	Causes of tsunamis	Giant wave	SM5, SF1, SF4, SF5		4
		Ocean	SF7		1
	Consequences of tsunamis	Floods	SM2, SM5, SF1, SF2		4
		Loss of life	SM5, SF2		2
		Damage	SF2		1
		Loss of property	SF4		1
		Emotional	Fear	SF4	1
			Unhappiness	SF4	1
	What to do during a tsunami	Surfing	SF1, SF2		2
	Precautions against tsunamis	Inflatable boat-vest	SM5		1
		Making a barrier	SF5		1
		Not building a house on a stream bed	SF2		1

According to Table 9, the codes with the highest frequency are giant wave (f = 4) as the cause of tsunamis and floods (f = 4) as a consequence of tsunamis. Furthermore, various codes emerged in different sub-themes. However, two students suggested surfing during a tsunami (f = 2). In the interviews, students' opinions on how tsunamis occurred differed. It was seen that the students gave reasons such as earthquakes, wind, and tidal events as causes of tsunamis. They expressed their opinions as follows: SM4, SM6: *"It happens because of too much wind."* SM3: *"Earthquakes occur underwater, just like on land. Some of these are large. These large earthquakes create giant waves in the water, namely tsunamis."* SF2: *"If a tornado is in the ocean, a tsunami may occur. It may also be due to the ebb and flow event."* SF7: *"It occurs due to an earthquake or volcanic eruption and collapse at the bottom of the ocean or sea."* The codes related to volcanic eruption are presented in Table 10.

Table 10

Codes of the volcanic eruption sub-theme

Sub-theme	Codes	Sub-codes	Students	f
Volcanic eruption	Cause of volcanic eruption	Lava	SF1	1
	Consequences of volcanic eruption	Loss of life	SF1	1
		Loss of property	SF1	1
		Having fertile lands	SF2	1
	Precautions against volcanic eruption	Not approaching the volcano	SF2	1
		Not building a house near a volcano	SF2	1

Table 10 shows that only two students (SF1 and SF2) included sub-codes related to volcanic eruption in their mind maps. SF1 stated that the cause of volcanic eruption was lava and that it had consequences such as loss of life and property. SF2 listed the precautions that can be taken against an explosion as not approaching the volcano and not building a house on a volcano. All students stated that volcanic eruptions cannot be prevented. Students' opinions about this theme are as follows: SM1: *"Lava suddenly begins to gush out from the volcano."* SF4: *"Lava comes out of the volcano and burns everywhere. There is smoke everywhere."* SF2: *"Lava burns us. How can we stop it? We must escape from there as soon as possible. Losing your life is more important than losing your property."* The codes expressed in the storms theme in the mind maps are shown in Table 11.

Table 11

Codes of the storms sub-theme

Sub-theme	Codes	Sub-codes	Students	f
Storms	Cause of storms	Intense wind	SF4	1
	Consequences of storms	Houses flying away	SF4	1
		Lightning strike	SF3	1
		Fear	SF4	1
	What to do during a storm	Not leaving the house	SF3, SF4	2
		Being careful	SF3	1
	Precautions against storms	Keeping nature in balance	SM6	1
		Building solid buildings	SF4	1

The codes in Table 11 show that very few students included storms in their mind maps. These codes are intense wind (f=1), houses flying away (f=1), lightning strike (f=1), fear (f=1), not leaving the house (f=2), being careful (f=1), keeping nature in balance (f=1) and building solid buildings (f=1 Students' opinions about storms are as follows: SM4: *"The blowing of high-intensity wind forms it."* SF3: *"The meeting of different air masses creates a powerful wind."* SF6: *"Storms cannot be prevented, but*

precautions can be taken. For example, solid chicken coops, houses, apartments, barns, and solid places should be built." Table 12 shows the codes of the lightning sub-theme.

Table 12

Codes of the lightning sub-theme

Sub-theme	Codes	Students	f
Lightning	Fire	SM4, SM5	2
	Death	SM4	1
	Electric shock	SM5	1

The codes regarding lightning are very limited. As seen in Table 12, fire (f =2), death (f =1) and electric shock (f =1) codes were mentioned. During the interviews, it was understood that some students did not see lightning as a natural event but perceived it as a natural disaster. Figure 1 shows a mind map drawn by students.

Figure 1

An example of a mind map
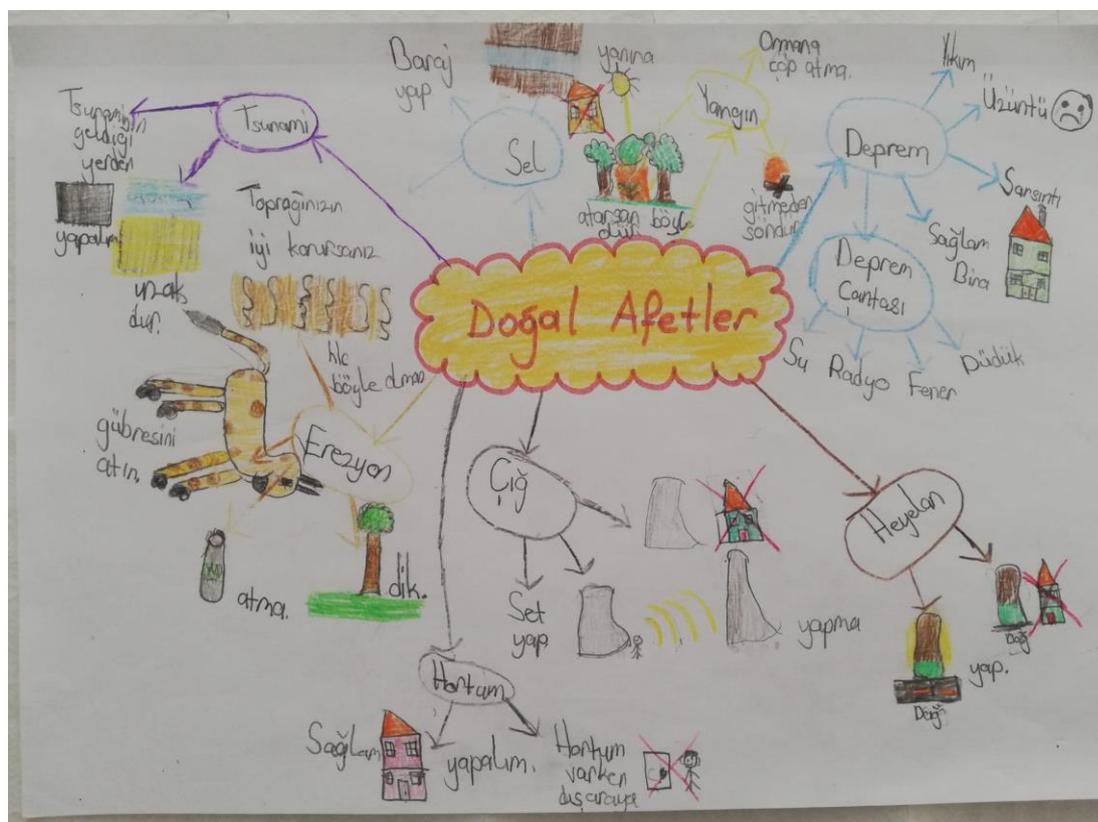
DISCUSSIONS AND CONCLUSIONS

Natural disasters are natural events that occur frequently in different parts of the world, especially in Türkiye, and negatively affect human life. Reducing the harmful effects of natural disasters is possible with natural disaster education. In Türkiye, natural disaster education begins with formal education in primary school. However, the knowledge and awareness levels of fourth-grade students about this subject are unclear. Especially fourth-grade students who graduated from primary school were selected for this study, because basic education is critical in terms of natural disaster education as well as in many aspects. In this regard, the mental structures of fourth-grade students regarding natural disasters were examined. As a result of the research, it was seen that the mental structures of the students regarding natural disasters were grouped under 13 themes, and all natural disasters emerged as a result of the mind map analysis. The themes of earthquakes, floods, erosion, landslides, fire, avalanches, tornadoes, tsunamis, volcanic eruption, hurricanes, storms, lightning, and thunder showed that the students knew about all natural disasters. In addition, the different sub-codes that emerged in each natural disaster theme and the data obtained from the interviews showed that the students had sufficient knowledge about this subject. The research results can be seen as positive for primary school students. However, the results of studies conducted in the literature on this subject vary. Sözcü and Aydınözü (2019) found that pre-service teachers' natural disaster knowledge and behaviors were at a medium level, while their natural disaster literacy was at a relatively high level. However, the results of studies also show that secondary school students' knowledge and awareness levels about natural disasters are low (Adanalı, Yıyın & Özenel, 2022).

As a result of the study, it was also determined that students confused some natural events with natural disasters. In this regard, students can be given a better education with different methods and techniques. Studies have shown that multiple learning methods are used in disaster learning and that none of these methods is superior to the others (Suarmika et al., 2022; Torani et al., 2019). Research on this subject also shows that the spiral systems in textbooks providing education on natural disasters have deficiencies (Kılıç, 2019). Therefore, it is emphasized that it is essential for training programs to have a holistic approach regarding natural disasters in terms of reducing the impact of disasters and preparing students for disasters. It is also stated that education programs should adopt a holistic approach to disasters and cover topics that will enable students to be prepared for disasters (Tanırcan et al., 2017).

In Türkiye, natural disaster education is included within the scope of the life sciences course curriculum (MoNE, 2018a) and social studies course curriculum (MoNE, 2018b) in primary schools. In the 2nd-grade life sciences course outcomes, natural events (rain, hail, fog, snow, wind) and AFAD are introduced, and the precautions to be taken against natural events are emphasized. In the 3rd-grade life sciences course outcomes, the education is formed in line with the outcome of *"Gives examples of what s/he can do when s/he encounters a situation that threatens his/her security in his/her daily life."* Depending on the outcome, earthquakes and floods are emphasized. In the 4th grade, the program includes the outcome of *"Makes the necessary preparations for natural disasters."* Depending on the outcome, natural disasters likely to be encountered are given priority, and earthquake kit preparation is explained (MoNE, 2018a, 2018b). The results of this research have shown that the natural disaster education given throughout primary school is effective and that students have a rich conceptual structure about how natural disasters occur, how they can be prevented, what to do during natural disasters, and the precautions to be taken. Especially in primary school, children are more careful about the environment and open to learning (Senemoğlu, 2021). Therefore, educators' use of up-to-

date information and data on natural disasters in the lessons of primary school students can help them increase their awareness of this issue. In this regard, planning and designing comprehensive educational programs are necessary for students. Reviewing and updating textbooks regularly is also important. Finally, to raise awareness about natural disasters, it is necessary to provide information to students through the media. The media are important for delivering accurate information about disasters to the public, encouraging disaster preparedness, and supporting post-disaster relief efforts.

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Preschool Teachers' Opinions About Disaster Education in the Preschool Period

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Abstract

This qualitative study aims to gather preschool teachers' opinions about disaster education given in the preschool period. The phenomenological approach was used in the study to describe and explain the experiences related to a particular phenomenon and situation in detail. The research study group consisted of 76 preschool teachers selected through criterion and maximum diversity sampling methods. The data collection tools utilized in this study include a semi-structured "Interview Form" consisting of open-ended questions and a "Personal Information Form." The descriptive analysis technique, one of the qualitative data analysis methods, was used to analyze the data obtained from the interview form. According to the research results, most preschool teachers think disaster education is necessary for the preschool period and emphasize that they aim for children to know the types of natural disasters through disaster education. The basic concepts that should be taught to children about disasters are "danger", "precaution", "risk", and "damage." Preschool teachers generally stated that "earthquake" was the most common disaster and "avalanche" was the least common disaster mentioned in disaster education. Most of the teachers indicated that they regularly incorporate "game" activities in disaster education and the education provided should be appropriate for the children's age. Preschool teachers stated the benefits of disaster education for children as "being prepared for emergencies", "gaining life skills" and "raising awareness." Most preschool teachers agree that effective disaster education should give children "the necessary knowledge and abilities to get ready for and manage disasters".

Keywords

Disaster education, disaster awareness, preschool education, preschool teacher, phenomenology design.

INTRODUCTION

Disaster refers to a hazard, whether natural or man-made, that significantly disrupts a community's functioning and causes human, material, economic, or environmental losses and impacts. Furthermore, the disaster exceeds the community's capability to respond to the situation (UN International Strategy for Disaster Reduction [UNISDR], 2009). In addition, a disaster is an unexpected event that damages communities' general health and living spaces and interrupts life by causing physical, mental, social, psychological, and economic losses (Beşeri, 2009; Yavaş, 2005). According to these definitions, disasters like earthquakes, floods, tsunamis, forest fires, hurricanes, and epidemics can cause severe damage and destruction. In the last 20 years, there has been a significant increase in the occurrence of natural disasters on a global scale (Seddighi & Baharmand, 2020), and negatively affected many people (Mörchen et al., 2021). One of the most vulnerable groups in the face of disasters is undoubtedly children due to their psychological, physical, and behavioral developmental levels and dependence on adults (Seddighi et al., 2022; Zahran et al., 2008). Because disasters affect children directly or indirectly in different ways (Norris et al., 2002; Seddighi et al., 2021).

During and after natural disasters, children may be exposed to numerous negative effects, such as physical harm and psychological trauma. Children appear to be more vulnerable to these effects when compared to adults (Kousky, 2016; Peek, 2008; UNISDR, 2015). Children are susceptible to harm and require protection during and after disasters. However, with their different perspectives and abilities, they can also actively participate in reducing the risks and impacts of disasters for their families and communities (Fothergill, 2017). Therefore, reducing vulnerability is the most fundamental way to protect children in disasters (Hoffman, 2009; Seddighi et al., 2019). The effects of disasters can be significantly reduced if individuals possess adequate knowledge of disaster response.

Disaster education is the most important factor in preparing children for disasters (Mermer et al., 2018; Seddighi et al., 2020). Disaster education is crucial in enhancing students' understanding and awareness of potential disasters, as well as their ability to perceive risks and prepare accordingly (Mermer et al., 2018; Ronan & Johnston, 2001). Schools have a critical role in disaster preparedness education (Faydalı et al., 2019). Teachers can contribute to children's disaster preparedness, thus, disaster risk reduction by creating rich learning environments within the scope of the curriculum and using peer education (Bandecchi et al., 2019). Therefore, the primary and crucial type of disaster education is school education (Kurita et al., 2006). Because schools serve as effective institutions to enhance children's safety knowledge and assist in disaster preparation (Bourque, 2015). In recent years, there has been a rise in the quantity of school-based Disaster Risk Reduction (DRR) programs that engage children in disaster preparedness activities, including identifying hazards, conducting drills, planning evacuations, adapting homes, and communicating risks. DRR programs aim to enhance preparedness and reduce risk (Pfefferbaum et al., 2018). Studies show that these programs can benefit children by increasing their knowledge about disaster risks and preparedness (Amri et al., 2018; Johnson et al., 2014a).

Studies on DRR education programs were generally conducted in primary and secondary schools. Although there is a limited amount of research regarding the effects of these programs on preschool children (Johnson et al., 2014a), these studies reveal that these programs raise children's awareness about disaster risks. Sharpe and Izadkhah (2014) found that children learned new information through training on earthquake preparedness and were able to retell this information to their peers and teachers; Gülay (2010) found that training on earthquake preparedness increased children's

knowledge levels, especially their knowledge about what to put in earthquake bags (water, food, flashlight). Studies indicate a lack of disaster education programs for children between the ages of 5-11. The age factor is very important because, especially in developing countries, children between the ages of 5-11 are more negatively affected by disasters. Therefore, it is vital to teach children aged 5-11 years how to prepare for disasters in schools (Seddighi et al., 2022).

One effective method for safeguarding children is establishing an environment in which they are aware of hazards, such as disasters, and engage in risk reduction measures. For this purpose, it is crucial to integrate disaster risk reduction educational programs into preschool education curricula (Morris & Edwards, 2008). Disaster education for children and youth is very valuable in developing their resilience against disasters (Benadusi, 2015; Black & Powell, 2012; Shaw et al., 2004).

Significance and Aim of the Study

Studies reveal that training programs focusing on disaster risk reduction in preschool education institutions can enhance children's awareness and promote positive behavioral changes. This can lead to increased participation in disaster risk reduction efforts in their homes, schools, and communities (Amri et al., 2018), ultimately supporting their capacity to mitigate environmental risks and respond to disasters effectively (Proul & Aboud, 2019). When children are educated about disaster risk reduction from an early age, they are more likely to incorporate new behaviors into their adult lives than adults who attempt to acquire the same skills (UNESCAP, 2015). It is obvious that it is critical for children to receive disaster education during the preschool period and in preschool education institutions (Faydalı et al., 2019; Seddighi et al., 2022). The quality of disaster education provided in the early childhood period increases the awareness and knowledge of individuals on what to do before, during, and after disasters in both childhood and adulthood (Amri et al., 2018; Gülay, 2010; Fothergill, 2017; Johnson et al., 2014a; Mermer et al., 2018). Providing disaster education in preschools is crucial to equip children with basic disaster knowledge. It significantly promotes awareness and prepares them for future emergencies (Izadkhah & Heshmati, 2007). Teachers are the ones who will raise children's awareness and provide basic information on disaster preparedness, disaster prevention, and disaster management in institutions (Das & Malaviya, 2013). Studies reveal that since disaster education is a voluntary subject, the effectiveness of disaster education depends on teachers' awareness and ownership of the subject (Johnson et al., 2014b). Through effective training, disaster risk reduction can be embedded in children's minds and help them be psychosocially prepared (Elangovan & Kasi, 2015). Therefore, teachers play a very important role in disaster education. Since teachers are actively involved in disaster education for children, it is very valuable to regularly evaluate their knowledge and skill levels (Chondekar, 2019). In this respect, the opinions of preschool teachers who provide disaster education to preschool children about disaster education also gain importance. This study aims to seek an answer to the question, "What are the opinions of preschool teachers about disaster education given in preschool period?".

METHOD

Research Model

This qualitative study aims to gather the opinions of preschool teachers about disaster education given in the preschool period. Qualitative research is a method of gathering data through techniques such

as interviews and document analysis to examine and comprehend events and perspectives in a comprehensive manner within a natural setting (Yıldırım & Şimşek, 2011). Phenomenology design was used in the study. Phenomenological studies focus on the shared meanings that individuals create when they experience a phenomenon of which they are aware but do not have a deep and detailed understanding (Creswell, 2015; Yıldırım & Şimşek, 2011). These studies aim to provide a detailed description of the experiences related to a specific phenomenon (Creswell, 2015; Patton, 2014). The phenomenon analyzed in this research is disaster education and the opinions and experiences of preschool teachers about it.

Study Group

The study group of the research consisted of 76 preschool teachers. Criterion and maximum variation sampling methods, both of which belong to purposeful sampling methods, were utilized to establish the study group. The criterion sampling method was selected to ensure that the sample includes individuals with the qualifications identified in connection with the problem situation (Büyüköztürk et al., 2009). The maximum variation sampling method was preferred to achieve high-level diversity in the sample (Yıldırım & Şimşek, 2011). The main criterion for selecting the teachers was to have knowledge about disaster education. Maximum diversity was determined based on gender, age, education status, professional seniority, the region worked, the province worked, the settlement worked, the type of institution, the type of preschool education institution, and the way to obtain information on disaster education. The number of participants in phenomenological research can generally be between 5 and 25 people (Patton, 2014). However, contrary to this general judgment, there are studies in which the number of participants ranges from one person (Miles & Huberman, 2015) to 325 people (Neuman, 2014). Since the maximum diversity sampling method was used to determine the study group in the research, it was tried to reach a sufficient number of participants from every region in the country. The demographic characteristics of the teachers are presented in Table 1.

Table 1

Demographic Information on Teachers

Demographic Information		n	f	%
Gender	Female	76	49	64,47
	Male		27	35,53
Age	25-35	76	24	31,58
	36-45		32	42,10
	46-55		20	26,32
Education Status	Bachelor's degree	76	48	63,16
	Master's degree		20	26,31
	PhD		8	10,53
Professional Seniority	1-5 years	76	10	13,16
	6-10 years		14	18,42
	11-15 years		22	28,95
	16-20 years		16	21,05
	21 years and over		14	18,42
The Region Worked	Marmara Region	76	16	21,05
	Central Anatolia Region		14	18,42

	Mediterranean Region		11	14,47
	Aegean Region		10	13,16
	Black Sea Region		10	13,16
	Eastern Anatolia Region		8	10,53
	Southeastern Anatolia Region		7	9,21
The Province Worked	Konya	76	7	9,21
	Ankara		4	5,26
	Eskişehir		3	3,96
	Samsun		5	6,58
	Trabzon		5	6,58
	İstanbul		9	11,84
	Bursa		4	5,26
	Çanakkale		3	3,96
	İzmir		6	7,89
	Aydın		4	5,26
	Antalya		7	9,21
	Mersin		4	5,26
	Erzurum		4	5,26
	Malatya		4	5,26
	Şanlıurfa		5	6,58
	Adıyaman		2	2,63
The Settlement Worked	Provincial center	76	34	44,74
	District center		31	40,79
	Village		11	14,47
Type of Institution	Public School	76	45	59,21
	Private School		31	40,79
Type of Preschool Education Institution	Independent preschool	76	40	52,63
	Preschool class within a primary school		36	47,37
The Way to Obtain Information on Disaster Education	Acquired knowledge in education life	76	23	30,26
	Received in-service training		22	28,95
	Attended a seminar		18	23,68
	Made research on the subject		13	17,11

Table 1 reveals that most of the preschool teachers are female teachers (49 - 64.47%) between the ages of 36 and 45 (32 - 42.10%) with a bachelor's degree (48 - 63.16%) and professional experience of 11-15 years (22 - 28.95%). These teachers work in Marmara Region (16 - 21.05%) and specifically in İstanbul (9 - 11.84%), primarily in the provincial center (34 - 44.74%), in public schools (42 - 59.21%), and independent preschools (40 - 52.63%).

Data Collection Tools

The data collection tool used in the study consisted of a "Personal Information Form" comprising questions directed towards preschool teachers and a semi-structured "Interview Form" made up of open-ended questions suitable for qualitative research. Personal Information Form consists of questions examining personal information such as gender, age, and education level of preschool

teachers. The interview form consisted of questions about the necessity of disaster education for preschool children, the basic concepts that should be taught about disasters, the gains aimed to be achieved with disaster education, the natural disasters that are most and least included in disaster education, which methods and techniques are used in disaster education, the issues to be considered about disaster education, the benefits of disaster education for preschool children and what can be done for effective disaster education in the preschool period. In semi-structured interviews, the questions are flexible. They are pre-planned but can be rearranged during the interview. Semi-structured interviews are neither as rigid as fully structured interviews nor as flexible as unstructured interviews (Büyüköztürk, 2009; Ekiz, 2009; Karasar, 2012; Merriam, 2009). In the research, a literature review was first conducted. Then, 12 questions were prepared to be included in the interview form. Two field experts were consulted to evaluate and ensure the validity of the purpose, meaning, and scope of the interview form. An interview form consisting of 8 semi-structured questions was then created. In order to check whether the interview questions were clear and comprehensible, a preliminary application of the interview questions was made with three preschool teachers who had knowledge about disaster education and did not participate in the study; then the interview form was finalized.

Data Collection

Before collecting the data, the researcher explained the research purpose to the teachers and emphasized the importance of answering the interview questions sincerely to achieve the research goal. Participation in the research was based on the principle of volunteerism. Separate and online interviews were conducted with each of the 76 volunteer teachers between May 15, 2023 and August 15, 2023. Interviews were recorded to prevent data loss. Before the interviews, participants were notified that all the sessions would be recorded. Participants were assured that they could listen to those recordings at the end of the interviews to enhance their comfort level. Furthermore, the participants were allowed to delete the recordings partially or entirely based on their wishes. The participant interviews lasted roughly 40 minutes.

Data Analysis

The data obtained from the interview form was analyzed using the descriptive analysis technique, a qualitative data analysis method. In the descriptive analysis technique, the data obtained are summarized and interpreted according to predetermined themes (Yıldırım & Şimşek, 2011). In this research, the research questions serve as the themes. The gathered data were arranged and analyzed according to these questions. The preschool teachers (T1, T2, T3...) who participated in the research were assigned a code number to protect their anonymity during the analysis. Their names were not directly mentioned. Findings were presented using frequency and percentage values. Direct quotations were included to fully capture the teachers' opinions and ensure a clear and complete reflection of the findings.

Validity and Reliability of the Study

Internal validity was ensured through a clear and detailed presentation of how the findings, results, and interpretations were derived. External validity was achieved by providing detailed explanations of the research model, study group, data collection tool, and all data collection and analysis processes. To enhance internal reliability, the teachers' responses to interview questions were analyzed independently by the researcher and an expert academic in the field. Codes identifying "consensus" and "disagreement" were established, and appropriate adjustments were made. The coder reliability

analysis formula (Reliability = Agreement / [Agreement + Disagreement]×100) developed by Miles and Huberman (2015) was used to calculate the reliability of the coding. The total reliability was found to be 92% as a result of the calculations. A reliability analysis result exceeding 70% is deemed trustworthy for the research (Miles & Huberman, 2015). In order to ensure external validity, detailed and clear explanations were provided to allow for testing the research results with other studies, avoiding assumptions and biases.

Ethical Principles

Ethics committee permission for this study was obtained from Necmettin Erbakan University Social and Humanities Scientific Research Ethics Committee decisions with the decision dated 12.05.2023 and numbered 2023/209.

FINDINGS

The findings obtained from the analysis of the interview forms used to determine the opinions of preschool teachers in the study group regarding disaster education in the preschool period are presented in this section.

Necessity of Disaster Education

After analyzing the data collected from the interviews, teachers' opinions on the necessity of disaster education were grouped under three subcategories.

Table 2

Necessity of Disaster Education

Necessity of Education	n	f	%
Necessary		69	90,79
Not necessary	76	4	5,26
Undecided		3	3,95

As seen in Table 2, while most preschool teachers found disaster education necessary in preschool, some teachers stated that this education was not necessary or they were undecided about this issue because it might cause anxiety in children.

Examples of preschool teachers' responses to the necessity of disaster education:

T12: "I find disaster education necessary for children to gain awareness from an early age."

T27: "I think disaster education is necessary for preschool children; thanks to this education, children's survival skills improve."

Examples of preschool teachers' responses that disaster education is not necessary:

T33: "I do not think disaster education is necessary because it causes anxiety in children."

T38: "Whenever I give information about disasters to children, I observe that they get scared. In this respect, I think that disaster education is too early for the preschool period."

Examples of the responses of preschool teachers who were undecided about disaster education:

T7: "Preschool children can be briefly informed about disasters, but I am not sure whether disaster education is necessary or not."

T49: "I do not have a clear idea whether disaster education is necessary or unnecessary."

Basic Concepts to Be Taught about Disasters

After analyzing the data collected from the interviews, teachers' opinions on the basic concepts that should be taught about disasters were grouped under four subcategories.

Table 3

Basic Concepts to Be Taught about Disasters

Basic Concepts	n	f	%
Danger		29	38,16
Precaution	76	23	30,26
Risk		15	19,74
Damage		9	11,84

As seen in Table 3, preschool teachers listed the basic concepts that should be taught to preschool children about disasters as "danger", "precaution", "risk," and "damage".

Examples of the responses of preschool teachers who stated that the basic concept that should be taught about disasters is "danger":

T5: "I talk about the dangers that will arise as a result of disasters."

T66: "I tell my students about the dangers they may encounter."

Examples of the responses of preschool teachers who stated that the basic concept that should be taught about disasters is "precaution":

T29: "We talk about the precautions that can be taken before disasters."

T53: "I give information to my students about what to do before experiencing disasters."

Examples of the responses of preschool teachers who stated that the basic concept that should be taught about disasters is "risk":

T3: "Talking about risk situations should be a priority."

T19: "I think it is important for children to know in which situations they are at risk when faced with disasters."

Examples of the responses of preschool teachers who stated that the basic concept that should be taught about disasters is "damage":

T41: "I talk about the damages that people will face as a result of disasters."

T72: "It is necessary to explain the damages to be encountered."

Outcomes Aimed to Be Achieved through Disaster Education

After analyzing the data collected from the interviews, teachers' opinions on the outcomes aimed to be achieved through disaster education were grouped under six subcategories.

Table 4

Outcomes Aimed to Be Achieved through Disaster Education

Aimed Outcomes	n	f	%
Knowing the types of natural disasters		31	40,79
Knowing the causes of natural disasters		13	17,11
Understanding the importance of taking precautions before natural disasters		10	13,16
Knowing the methods of protection during natural disasters	76	9	11,84
Understanding the importance of cooperation after natural disasters		7	9,21
Knowing the numbers to call in case of emergencies		6	7,89

As can be seen in Table 4, preschool teachers stated the outcomes aimed to be achieved through disaster education as "knowing the types of natural disasters", "knowing the causes of natural disasters", "understanding the importance of taking precautions before natural disasters", "knowing the methods of protection during natural disasters", "understanding the importance of cooperation after natural disasters" and "knowing the numbers to call in case of emergencies."

Examples of preschool teachers' responses to "knowing the types of natural disasters" regarding the outcomes aimed to be achieved through disaster education:

T10: "I think that children should primarily know the disasters we may encounter."

T62: "They should know what natural disasters are."

Examples of preschool teachers' responses to "knowing the causes of natural disasters" regarding the outcomes aimed to be achieved through disaster education:

T18: "Children should learn why disasters occur."

T37: "I think that knowing the causes of natural disasters is very effective in preventing disasters."

Examples of preschool teachers' responses on "understanding the importance of taking precautions before natural disasters" regarding the outcomes aimed to be achieved through disaster education:

T44: "The effect of taking precautions before a disaster can be discussed."

T51: "The vital importance of taking precautions should be emphasized."

Examples of preschool teachers' responses on "knowing the methods of protection during natural disasters" regarding the outcomes aimed to be achieved through disaster education:

T55: "Children should definitely learn what to do during a disaster."

T75: "We should teach children how to avoid disasters."

Examples of preschool teachers' responses on "understanding the importance of cooperation after natural disasters" regarding the outcomes aimed to be achieved through disaster education:

T2: "What to do after a disaster should definitely be discussed."

T24: "Helping each other after a disaster is the most practical way to heal the wounds."

Examples of preschool teachers' responses to "knowing the numbers to call in case of emergencies" regarding the outcomes aimed to be achieved through disaster education:

T4: "Teaching the emergency number is very important."

T16: "Children should learn whom to call in case of emergency."

Disasters Most and Least Mentioned in Disaster Education

After analyzing the data collected from the interviews, teachers' opinions on the disasters most frequently included in disaster education were grouped under four subcategories, and teachers' opinions on the disasters least included in disaster education were grouped under three subcategories.

Table 5

Disasters Most Frequently and Least Included in Disaster Education

Most Frequently Included Disasters	n	f	%
Earthquake		53	69,74
Flood	76	20	26,31
Fire		2	2,63
Landslide		1	1,32
The Least Included Disasters	n	f	%
Avalanche		33	43,42
Tsunami	76	28	36,84
Volcano		15	19,74

As seen in Table 5, preschool teachers stated that the disasters most frequently included in disaster education were "earthquake", "flood", "fire" and "landslide", while the least included disasters were "avalanche", "tsunami" and "volcano."

An example of preschool teachers' responses to "earthquake", one of the disasters most frequently included in disaster education:

T11: "I focus on earthquakes the most sometimes we even do drills in the classroom."

An example of preschool teachers' responses to "flood", one of the disasters most frequently included in disaster education:

T23: "I mostly focus on flood and earthquake disasters while doing activities."

An example of preschool teachers' responses to "fire", one of the disasters most frequently included in disaster education:

T30: "As a teacher, I strive to raise awareness about fires, especially forest fires."

An example of preschool teachers' responses to "landslide", one of the disasters most frequently included in disaster education:

T46: "We should definitely inform children about earthquake and landslide disasters."

An example of preschool teachers' responses to "avalanche", one of the least common disasters in disaster education:

T39: "I do not remember ever mentioning avalanche as a natural disaster."

An example of preschool teachers' responses to "tsunami", one of the least common disasters in disaster education:

T58: "Since tsunami is not a disaster encountered in our country, I never include it in the activities."

An example of preschool teachers' responses to "volcano", one of the least common disasters in disaster education:

T69: "I never told the children about volcanoes as disasters."

Methods and Techniques Used in Disaster Education

After analyzing the data collected from the interviews, teachers' opinions on the methods and techniques used in disaster education were grouped under four subcategories.

Table 6

Methods and Techniques Used in Disaster Education

Methods and Techniques	n	f	%
Game		36	47,37
Drama	76	21	27,63
Technology-supported applications		14	18,42
Puppet		5	6,58

As seen in Table 6, preschool teachers stated the methods and techniques they used in disaster education as "game", "drama", "technology-supported applications" and "puppet."

Examples of preschool teachers' "game" responses about the methods and techniques used in disaster education:

T6: "In the games, children learn what they should do in case of a disaster without being afraid."

T25: "We can give children all kinds of information about disasters through games."

Examples of preschool teachers' "drama" responses about the methods and techniques used in disaster education:

T9: "We make drama enactments about disasters in the classroom; this way, children understand what I tell more clearly."

T64: "I use drama because it concretizes everything, so children comprehend what I teach better."

Examples of preschool teachers' "technology-supported applications" responses about the methods and techniques used in disaster education:

T1: "I usually explain disasters with informative animations."

T28: "I usually use educational videos on such subjects that I do not know exactly how to explain."

Examples of preschool teachers' "puppet" responses about the methods and techniques used in disaster education:

T31: "Since puppets are interesting for preschool children, I use them when talking about disasters."

T74: "Puppets are very important. For example, puppets explain what we need to do before and after an earthquake in our class."

Issues To Be Considered in Disaster Education

After analyzing the data collected from the interviews, teachers' opinions on the issues to be considered in disaster education were grouped under three subcategories.

Table 7

Issues To Be Considered in Disaster Education

Issues To Be Considered	n	f	%
Be age-appropriate		51	67,11
Focus on practical skills	76	14	18,42
Be based on cooperation		11	14,47

As seen in Table 7, preschool teachers stated that the issues to be considered in disaster education should "be age-appropriate", "focus on practical skills" and "be based on cooperation."

Examples of preschool teachers' responses to "it should be age-appropriate" regarding the issues to be considered in disaster education:

T13: "Certainly, training should be appropriate for children's ages."

T21: "Information about disasters should be appropriate for children's age and developmental characteristics."

Examples of preschool teachers' responses to "it should focus on practical skills" regarding the issues to be considered in disaster education:

T8: "Information on what to do before and after disasters should be practical and suitable for children's skills."

T35: "Disaster education should be aimed at developing children's skills."

Examples of preschool teachers' responses to "it should be based on cooperation" regarding the issues to be considered in disaster education:

T52: "The information given in the training should be based on children's collaborative practices."

T67: "Children should be enabled to act together."

Benefits of Disaster Education

After analyzing the data collected from the interviews, teachers' opinions on the benefits of disaster education for preschool children were grouped under six subcategories.

Table 8

Benefits of Disaster Education

Benefits	n	f	%
Being prepared for emergencies		21	27,63
Gaining life skills		19	25,00
Raising awareness	76	16	21,05
Problem solving		12	15,79
Developing resilience		5	6,58
Helping others		3	3,95

As seen in Table 8, preschool teachers stated the benefits of disaster education for preschool children as "being prepared for emergencies", "gaining life skills", "raising awareness", "problem-solving", "developing resilience" and "helping others."

Examples of preschool teachers' responses to "being prepared for emergencies" about the benefits of disaster education for preschool children:

T26: "Children learn how to behave in emergencies."

T40: "Disaster education teaches children how to act in an emergency."

Examples of preschool teachers' responses to "gaining life skills" about the benefits of disaster education for preschool children:

T14: "Disaster education makes it possible to survive in difficult situations."

T57: "With education, for example, a child who suffers a disaster such as an earthquake or flood learns what to do to survive."

Examples of preschool teachers' responses to "raising awareness" about the benefits of disaster education for preschool children:

T61: "With this education, children become more conscious about people exposed to disasters."

T68: "Children's level of consciousness increases."

Examples of preschool teachers' responses to "problem-solving" about the benefits of disaster education for preschool children:

T15: "They gain experience on how to solve a problem when they encounter a situation."

T59: "They have knowledge about how to cope with a disaster."

Examples of preschool teachers' responses to "developing resilience" about the benefits of disaster education for preschool children:

T17: "Their ability to struggle with problems increases."

T48: "They become stronger against the problems that arise after the disaster."

Examples of preschool teachers' responses to "helping others" about the benefits of disaster education for preschool children:

T70: "With disaster education, children become more willing to help people who are damaged after disasters."

T76: "Children become more sensitive about people who need help after a disaster."

Requirements for Effective Disaster Education

After analyzing the data collected from the interviews, teachers' opinions on the requirements for effective disaster education were grouped under five subcategories.

Table 9

Requirements for Effective Disaster Education

Requirements	n	f	%
Should provide the necessary knowledge and skills in disaster preparedness and response		34	44,74
Content should be age-appropriate	76	18	23,68
Should be practice-based		13	17,11
Should support community participation		9	11,84
Should be inclusive		2	2,63

As seen in Table 9, preschool teachers stated the requirements for effective disaster education as "should provide the necessary knowledge and skills on disaster preparedness and response", "content should be age-appropriate", "should be practice-based", "should support community participation" and "should be inclusive".

Examples of preschool teachers' responses on the requirements for effective disaster education on "it should provide the necessary knowledge and skills on disaster preparedness and response":

T20: "Children should be informed in detail about being prepared for disasters."

T32: "Children should be told what to do after a disaster."

Examples of preschool teachers' responses on the requirements for effective disaster education on "content should be age-appropriate":

T43: "Disaster education should definitely be appropriate for the age of children."

T60: "The methods used in disaster education should be appropriate to the age and developmental level of children."

Examples of preschool teachers' responses on the requirements for effective disaster education on "it should be practice-based":

T71: "Disaster education should be for children to gain experience in the form of drama practices."

T73: "Training should be done through practicing, not by transferring information."

Examples of preschool teachers' responses on the requirements for effective disaster education on "it should support community participation":

T22: "Emergency services should also be supported to provide information during training."

T45: "Disaster interventions of different institutions can be mentioned."

Examples of preschool teachers' responses on the requirements for effective disaster education on "it should be inclusive":

T54: "It should address the needs of both students with normal development and students with special needs."

T56: "Disaster education should support all children."

RESULTS, DISCUSSIONS AND SUGGESTIONS

This study presents a description of the responses given to research questions regarding the perceptions of preschool teachers on disaster education provided in the preschool period. The responses are discussed in light of the relevant literature.

Children depend on adults for protection against emergencies and disasters as they are vulnerable regarding their physical, emotional, and cognitive abilities (Bosschaart et al., 2016; Tuladhar et al., 2015). Disaster education aims to improve children's knowledge, skills, and motivation to reduce their vulnerability to disasters (Torani et al., 2019). Because educating vulnerable people leads to actions that affect the whole society (Rohrmann, 2008). In recent years, disaster education programs for children are considered an innovative approach to disaster risk reduction (Torani et al., 2019). In the study, most preschool teachers think disaster education is necessary in the preschool period. Some preschool teachers stated that disaster education is not necessary because it may cause anxiety in children or they are undecided about this issue. Studies reveal that it is very important to provide disaster education and develop disaster awareness during the preschool period (Bulut, 2020; Komac et al., 2013; Musacchio et al., 2016) and that disaster education programs provided from an early age improve children's knowledge and awareness on disasters (Fetihi & Gülay, 2011; Sapsağlam, 2019). It is possible to reduce the destructive damages caused by disasters to individuals and society thanks to the awareness gained by children through disaster education (Clerveaux et al., 2010; Değirmenci et al., 2019). In addition, education programs related to disasters such as earthquakes help preschool children exhibit higher levels of self-confidence

and less anxiety in case of encountering these disasters (Parsizadeh & Ghafory-Ashtiany, 2010; Ronan et al., 2001). Teachers' opinions on the necessity of disaster education in the preschool period are consistent with the literature.

In the study, preschool teachers stated the basic concepts that should be taught to preschool children about disasters as "danger", "precaution", "risk", and "damage". In Anadolu University Disaster and Emergency Education Program (2017), the basic concepts related to disasters are stated as hazard, risk, risks arising from structural elements, risks arising from non-structural elements, emergency, disaster, and vulnerability. Disaster education provides information, especially about hazards and risks (Shaw et al., 2004), and can increase risk perception in children (Faber et al., 2014; Johnson, 2014). Teachers' opinions on the basic concepts that they should teach children about disasters support the literature.

Preschool teachers stated that the outcomes aimed to be achieved through disaster education are "knowing the types of natural disasters", "knowing the causes of natural disasters", "understanding the importance of taking precautions before natural disasters", "knowing the methods of protection during natural disasters", "understanding the importance of cooperation after natural disasters" and "knowing the numbers to call in emergencies." Research emphasizes the importance of training preschool children on what to do before, during, and after disasters and the necessity of knowing the phone numbers where they can ask for help in emergencies (Bulut, 2020). Through these pieces of training, children gain knowledge and skills to prevent the causes, effects, and damages of disasters (Mangione et al., 2013) and become aware of the risks before being exposed to a disaster (Muttarak & Pothisiri, 2013). Children who receive disaster education can exhibit appropriate behaviors by helping their friends during and after a disaster (Izadkhah, 2004). Teachers' opinions on the outcomes aimed to be achieved through disaster education in the preschool period are consistent with the literature. However, nearly half of the teachers' expectations that children should know the types of disasters rather than disaster prevention or protection methods as the target outcome reveals that they need support in disaster education.

Preschool teachers stated that the natural disasters most frequently included in their disaster education were "earthquake", "flood", "fire" and "landslide", while the natural disasters least frequently included were "avalanche", "tsunami" and "volcano." It is thought that the disasters that teachers prefer the most or the least in their training are related to the occurrence of disasters in Turkey. In a study conducted with classroom teachers, teachers categorized disasters as natural disasters and man-made disasters. They listed natural disasters as earthquake, avalanche, flood, tsunami, landslide, hurricane, cyclone, erosion, drought, volcanic eruptions, and storm (Avcı, 2022). The fact that the disasters that preschool teachers include in their disaster education are only natural disasters and that they do not include man-made disasters shows that the participants' disaster knowledge is limited in this respect.

Preschool teachers stated the methods and techniques they used in disaster education as "game", "drama", "technology-supported applications" and "puppet." The best teaching

methods for preschool children may be the use of fun activities such as games and songs (Izadkhah & Hosseini, 2005). Studies reveal that teachers prefer drama, educational games, and shows in training to raise disaster awareness in the preschool period (Bulut, 2020). In addition, digital technological educational tools contribute positively to children's learning performance (Ayaz et al., 2023) by allowing children to gain experience through more activities in the classroom environment (Uslu & Özgün, 2023). Disaster education can be given with the help of videos, storybooks, computer games, dramas, puppets, music, poems (Petal & Izadkhah, 2008), and drills in the form of games (Daniel et al., 2016). The methods and techniques preschool teachers use in disaster education are consistent with the literature. In this respect, it is thought that preschool teachers are adequate in terms of the different methods and techniques they use in disaster education.

Preschool teachers stated that disaster education should "be age-appropriate", "focus on practical skills" and "be based on cooperation." Studies reveal that the knowledge acquired through disaster education that starts in the preschool period is more permanent (Sarı, 2016). Transferring these acquired knowledge and skills into practice is an effective method for disaster education (Siriwardena et al., 2013). The trainings given during this period must be appropriate for the age and developmental characteristics of children (Kandır et al., 2010). Effective participation of all stakeholders in the society in disaster education in cooperation increases the capacity to combat disasters (Chou et al., 2015). In addition, people who participate in these trainings share what they have learned with the people around them and raise awareness of more people about disasters (Yamori, 2009). It can be said that the issues to be considered in disaster education expressed by the teachers facilitate learning for preschool children. The issues teachers pay attention to in disaster education practices in preschool support the literature.

Preschool teachers stated the benefits of disaster education for preschool children as "being prepared for emergencies", "gaining life skills", "raising awareness", "problem-solving", "developing resilience," and "helping others". Disaster education increases children's awareness about the disasters they may encounter and raises their awareness about how they should behave in the event of a disaster (Değirmenci, 2019; Mızrak, 2018; Shiwaku et al., 2007). These trainings make it easier to help others affected by disasters, ensuring that people have sufficient knowledge and skills to respond to disasters with the right behaviors (Auf der Heide, 2006; Bartolucci & Magni, 2016). Disaster education is also important to increase children's resilience levels (Sawada, 2007). Teachers' opinions on the benefits of disaster education in the preschool period are consistent with the literature. From this point of view, it can be said that preschool teachers' level of knowledge about the benefits of disaster education is sufficient.

Preschool teachers stated the requirements for effective disaster education as "it should provide children with the necessary knowledge and skills on disaster preparedness and response", "the content should be age-appropriate", "it should be practice-based", "it should

support community participation" and "it should be inclusive". Transferring knowledge and skills to children about disasters and risk reduction in schools is very important in terms of protecting children from possible disasters and taking measures against these disasters (Musacchio et al., 2016; Sawada, 2007). Disaster education should consist of theoretical and practical practices based on children's learning by doing and active participation (Codreanu et al., 2014; Kadıoğlu, 2006; Yılmaz, 2014). Children, who represent one of the most vulnerable groups in taking action to prevent disasters and participating in decision-making processes, can play an active role in their families and communities (Tanner, 2010). Teachers' opinions on effective disaster education in preschool period support the literature and it can be said that teachers have sufficient knowledge about effective disaster education.

According to the results of the study, the majority of preschool teachers think that disaster education is necessary for the preschool period, and the basic concepts that should be taught to children about disasters are "danger", "precaution", "risk" and "damage". The majority of preschool teachers emphasized that they aimed for children to know the types of natural disasters through disaster education. Most preschool teachers stated that "earthquake" was the most common disaster mentioned in disaster education and "avalanche" was the least common disaster. The majority of the teachers stated that they frequently included "game" activities in disaster education and that the training should be appropriate for the age of the children. The majority of preschool teachers stated the benefits of disaster education for children as "being prepared for emergencies", "gaining life skills" and "raising awareness". Most preschool teachers argued that effective disaster education should provide children with "the necessary knowledge and skills to prepare for and respond to disasters".

The following suggestions can be made in line with the results obtained;

• Preschool teachers who participated in the study stated that they obtained information about disaster education in different ways, such as attending seminars and receiving training. Therefore, in-service training can be given to preschool teachers who have not received any training on disasters and do not have sufficient knowledge.

• It is thought that the fact that preschool teachers who have knowledge about disaster education do not include human-induced disasters in their disaster education and only include natural disasters constitutes a limitation in terms of the education given to children. For this reason, it can be suggested that the content of the training programs given to teachers should be enriched in terms of both natural disasters and human-induced disasters.

• The majority of preschool teachers who had knowledge about disaster education expressed the gains aimed to be achieved through disaster education as "knowing the types of natural disasters" instead of "taking precautions before disasters or knowing the methods of protection." From this point of view, it can be aimed to improve the perspectives of teachers who have knowledge about disaster education through different in-service trainings.

- Pre-service preschool teachers can be informed about disasters through elective courses during their undergraduate education.

- Parents can be given seminars on disasters in preschool education institutions, and family participation activities can be organized to raise awareness of their children.

- Based on experts' recommendations, an independent disaster education program for disaster awareness for the preschool period can be prepared and implemented in all preschool education institutions.

- Based on the recommendations of experts in the field, topics related to disaster education can be included in the preschool education program.

- Disaster-related institutions and organizations can organize interesting programs for children, parents, and educators who do not have sufficient knowledge about disasters to increase disaster awareness.

- More visual and written educational materials can be prepared, and media support can be provided to inform and raise awareness of children, parents, and educators who do not have sufficient knowledge about disasters.

- The study included the opinions of teachers with knowledge of disaster education. Other studies may utilize the opinions of teachers without such knowledge.

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Availability of Data and Materials

Not applicable.